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**TECHNICAL REPORT  
ON THE  
RHODESIA RAILWAYS DEVELOPMENT PROGRAM**

by

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**Technical Operations**



# TECHNICAL REPORT ON RHODESIA RAILWAYS

## DEVELOPMENT PROGRAM

### SUMMARY

To provide capacity for anticipated large increases in traffic, the Rhodesia Railways has adopted a development program for the triennium 1953-55, estimated to cost approximately £ 28 million. Other financing will be available for all but about £ 9 million of the cost, and the Bank has been requested to consider a loan to cover part of this deficiency.

The Rhodesia Railways is a statutory corporation controlled jointly by Southern Rhodesia, Northern Rhodesia and the Bechuanaland Protectorate. A body called the Higher Authority determines the policies of the Railways, which are carried out by the Rhodesia Railways Board. The governments of the three owning territories are entitled to receive dividends from the Railways where net revenues permit and are ultimately responsible for any deficits.

The system of the Rhodesia Railways comprises 2500 route miles of single-track, 3'6" gauge railway line. From Bulawayo, Southern Rhodesia, as a center, the main line extends northward 800 miles to the Belgian Congo border, eastward 463 miles to the Mozambique border, and southward 580 miles to Vryburg in the Union of South Africa. The Bulawayo-Vryburg line is operated for the Rhodesia Railways by the South African Railways. The system connects to various seaports through other railways, as follows: through the Beira Railway to Beira, Mozambique, the principal port for the Rhodesias; through the South African Railways to ports in the Union and also to Lourenco Marques in Mozambique; and through the Belgian Congo Railways and the Benguela Railway to the port of Lobito in Angola.

Freight traffic on the Rhodesia Railways has increased 70% since 1947, and estimates of future traffic indicate that this rapid growth will continue for several years at least. The existing equipment and facilities of the Railways are not adequate for handling all freight now offered, without considering future increases. Traffic estimates for the line to Beira indicate that its capacity will be reached or exceeded by about 1955. There is therefore urgent need for expanding the capacity of the present system and for providing additional capacity for traffic to and from the sea, and the development program of the Rhodesia Railways is designed to meet that need.

In respect of the present system, the program includes (a) large purchases of locomotives and rolling stock; (b) enlarged and better equipped repair shops; (c) comprehensive measures for expanding main-line capacities by reducing grades and curvature, enlarging and remodelling yards and sidings, installing new signalling equipment, improving water supplies, etc.; and (d) the construction of housing for both European and African staffs.

To meet the need for more capacity to and from the sea the program provides for a new connection, called the Southeast Connection, from Bannockburn on the Shabani Branch to Lourenco Marques. It will require the construction of approximately 400 miles of new line, half in Southern Rhodesia and half in Mozambique. The Portuguese Government will do the

construction work in Mozambique and has been granted a credit for the purpose by the Export-Import Bank. The 204 mile section to be built by the Rhodesia Railways presents no difficult construction problems, and the completed line will have favorable operating characteristics.

The estimated cost of the entire program was originally £ 30.5 million, but deferments of less urgent projects will reduce the estimate to about £ 28.4 million. Increases in labor and material costs could conceivably raise the total cost substantially, perhaps to around £ 31 million. The estimated cost of goods to be purchased outside of the Rhodesias, mainly in the United Kingdom, will be around £ 18.5 - 19.0 million.

The program as a whole is considered to be sound, well-balanced and realistic. It could not be materially reduced without endangering the accomplishment of its purposes. Its completion by the end of 1955 is considered reasonably possible. Many of the improvements included in the program, such as the Southeast Connection, will serve the needs of traffic for many years. Other parts of the program, such as the item for new locomotives and rolling stock, are designed only to meet predicted demands to 1955, and the housing projects will probably serve for an even shorter time. Hence further capital expenditures will probably be necessary in the future, but the present program is complete in itself.

Assured financing for the program consists of a balance of £ 0.7 million from the preceding year, and loans as follows: ECA £ 5 million, Railways Pension Funds £ 3.5 million, and Southern Rhodesia £ 5 million in 1953 and £ 5 million in 1954, making a total of £ 19.2 million. The estimated shortfall of roughly £ 9 million is to be made up from other sources, including the Bank. Another £ 4 million will be supplied by one or both of the Rhodesias or from the Railways' resources, thus reducing the shortfall to about £ 5 million. Any excess cost of the program over the present estimates will be supplied either by the Railways or by one or both of the Rhodesias.

The Rhodesia Railways normally sets up a 1% sinking fund for all loans. For loan repayments in excess of those provided by the sinking funds it intends to create a Special Reserve Account, to be built up by appropriations from net revenue. Southern and Northern Rhodesia have agreed to waive their right to receive subventions from net revenue and will introduce legislation to legalize that action and the establishment of the Special Reserve Account. The waiver of subventions, plus added revenues resulting from a recent rate increase, should enable the Railways to pay all debt charges, for a number of years at least, without recourse to the owning Governments. If more revenues are needed later, it would appear that further increases can be made in the rates, many of which are low in comparison with similar rates elsewhere.

The management and the technical staff of the Railways appear to be very competent. There has been difficulty during recent years in maintaining both the European staff and the African staff at full strength, but the management is satisfied that enough employees of all categories can be obtained to carry out the development program and to staff the

expanded facilities that the program will provide.

Recommended Basis for a Loan

The Rhodesia Railways development program is worthy of financial assistance by the Bank to the extent of approximately £ 5 million. Before any loan is made the Bank should satisfy itself (a) that arrangements have been made for providing the remainder of the funds required for the program; and (b) that procedures will be made effective for coordinating the construction work on the Southeast Connection on both sides of the Mozambique-Southern Rhodesia border.

## TECHNICAL REPORT ON RHODESIA RAILWAYS

### DEVELOPMENT PROGRAM

#### SCOPE OF THE REPORT

1. This report covers the technical features of the development program of the Rhodesia Railways for the triennium 1952/53 to 1954/55, which has the purpose of enabling the Railways to meet the estimated demands of traffic during that period. The development program originally contemplated the expenditure of £ 30.5 million, including a carry-over to the following fiscal year, but the Railways' management has since agreed that by the deferment of certain less urgent items the total amount can be reduced to approximately £ 28 million, of which £ 19 million will be provided from various firm sources, leaving a gap of £ 9 million. It is in respect of this gap that the Bank has been requested to consider a loan.

#### THE RHODESIA RAILWAYS

2. Description The Rhodesia Railways is a statutory corporation established by the Rhodesia Railways Act, 1949, of Southern Rhodesia and concurrent legislation of Northern Rhodesia and Bechuanaland Protectorate. It owns and, with the exception mentioned below, operates the system of railways serving the three territories. The system comprises 2,500 route miles of single-track railway. The gauge of the track, like that of many of the railways in Africa, is 3 feet 6 inches.

3. From Bulawayo in Southern Rhodesia as a center, the main line extends north 800 miles to the Belgian Congo border beyond N'dola in the Copper Belt of Northern Rhodesia, north and east 463 miles to the Mozambique border beyond Umtali, Southern Rhodesia, and south 580 miles to Vryburg in the Union of South Africa. The Bulawayo-Vryburg line is operated on behalf of the Rhodesia Railways by the South African Railways. Various branch lines in Southern and Northern Rhodesia add 657 miles to the total mileage of the system. For convenience the Bulawayo-Vryburg line is usually referred to as the line "south of Bulawayo", and the rest of the system as the lines "north of Bulawayo".

4. The main line generally follows the principal watersheds across high-veldt country, at altitudes varying between 3,000 and 5,500 feet, except where it descends to Wankie and the Zambezi valley areas. Some sections of the line traverse very rough country and consequently have comparatively steep gradients and heavy curvature; this is particularly true on the Salisbury-Umtali section, where the maximum grade is 2.0% but the curvature makes the ruling grade a virtual 2.5%. Other sections generally traverse less difficult country and are constructed to varying but better standards.

5. The three territories served by the Rhodesia Railways system are land-locked, and depend for their access to the sea upon connecting railways, as follows:

(a) The main line east of Bulawayo connects at the Mozambique border with the Beira Railway, owned and operated by the Portuguese Government, which leads to the port of Beira. The Beira route is the shortest route from the Rhodesias to the sea and handles the bulk of their imports and exports.

(b) The main line south of Bulawayo connects at Mafeking and Vryburg with the system of the South African Railways, by which access is obtained to the ports of the Union of South Africa and to Lourenco Marques.

(c) The main line through Northern Rhodesia connects at the Belgian Congo border with the Belgian Congo Railways, by which the port of Lobito, in Angola, can be reached via the Benguela Railway.

6. Historical The main and branch lines which now comprise the Rhodesia Railways system were constructed in stages from 1893 to 1932, by various companies formed under the aegis of the British South Africa Company to assist in the development of Northern and Southern Rhodesia. By 1937 all of these companies had been merged into the Rhodesia Railways, Limited, except the Shabani Railway Company, Limited, owner of the Branch line from Somabula to Shabani, which line was, however, operated by Rhodesia Railways, Limited.

7. In 1947 the Legislature of Southern Rhodesia authorized the raising of a loan not exceeding £ 32 million, of which £ 30 million was to be used for the purchase of the shares of Rhodesia Railways, Limited, the redemption of its debentures, and additional capital for the Railways system. As the result of this legislation the Railways passed under the ownership and control of the Government of Southern Rhodesia in 1947, without change in corporate form. In 1949, legislation passed by Southern Rhodesia, and similar legislation issued by Northern Rhodesia and the Bechuanaland Protectorate, created a new statutory body known as Rhodesia Railways, which took over the undertakings then owned and operated by the Rhodesia Railways, Limited, on November 1, 1949.

8. The Shabani Railway Company, Ltd., remained in private ownership until 1951, when it was purchased by the Rhodesia Railways.

#### LEGAL STRUCTURE OF RHODESIA RAILWAYS

9. As established by the legislation mentioned in paragraph 7 above, the Rhodesia Railways consist of (a) an authority known as the Rhodesia Railways Higher Authority, and (b) a board of management known as the Rhodesia Railways Board. In addition, the legislation provides for a General Manager of Rhodesia Railways.

10. General duties and power of the Railways The Rhodesia Railways is a body corporate, capable of suing and being sued, and generally of performing all such acts as a body corporate may by law perform. It is the duty of the Railways to provide an efficient and adequate system of public transport of goods and passengers by rail within the three territories, and for that purpose to take such steps as it may consider necessary for extending and improving rail transport facilities. It is required to

administer its undertakings on business principles and with due regard to the needs of the public and the development of agriculture, commerce, industry and mining by means of cheap and efficient transport.

11. The Higher Authority consists of four members: the Prime Minister of Southern Rhodesia; the Governor of Northern Rhodesia; the High Commissioner for Basutoland, the Bechuanaland Protectorate and Swaziland; and such other Minister of the Crown in Southern Rhodesia as the Governor may appoint (currently the Minister of Mines and Transport). The functions of the Higher Authority are to determine the policy of the Railways, to appoint the members of the Board and the General Manager, to give the Board general directions on matters of policy and specific directions on all matters which legally require the Authority's prior approval, and to decide any questions at issue between the Board and the General Manager. Examples of matters which require the prior approval of the Authority are: important questions of railway policy; radical alterations of the rates and fares structure; the raising of new capital; the construction of any new railway; capital expenditures on any one work involving £ 50,000 or more; and any other matter that the Authority may direct from time to time to be reserved for its approval.

12. The Board consists of not more than six nor less than five members, selected because of their wide experience and proved capacity in general administration, agriculture, commerce, industry, mining, transport or financial affairs, or in the administration or organization of workers. The function of the Board is to conduct and manage the business of the Railways in accordance with the policy determined by the Higher Authority, subject to the prior approval of the Authority on certain matters mentioned in the preceding paragraph. The Board is authorized, with the approval of the Authority, to borrow money for capital purposes, including the execution of permanent works, the provision of working capital, the repayment of loans, and the purchase of shares or securities of any body corporate engaged in activities such as the Railways are authorized to carry on.

13. The General Manager, who is required to be a person of wide experience in railway administration, is appointed by the Authority after consultation with the Board. As chief executive officer of the Railways, it is his function generally to direct the regulation, maintenance and operation of the Railways' undertakings, subject to the prior approval of the Board on certain matters.

#### FINANCIAL STRUCTURE OF RHODESIA RAILWAYS

14. Legal requirements The legislation creating the Rhodesia Railways established a number of requirements affecting the financial structure, the most important of which are summarized briefly as follows:

(a) Repayment of original indebtedness The cost to Southern Rhodesia of acquiring the shares and debentures of Rhodesia Railways, Ltd., and providing further capital for the company, was established as a debt of £ 30 million due by the Railways to the Government of Southern Rhodesia, with interest payable semi-annually and an annual sinking fund payment of 1%. The amount of this loan, together with all due and unpaid interest,

sinking fund and other charges, was made a first charge on all the property and assets of the Railways.

(b) Reserve funds The legislation provided for setting up the nucleus of an improvement or betterment fund, and directed the establishment of a rates and wages stabilization account, which is to be replenished by action of the Board approved by the Authority whenever it falls below £ 2.5 million, but is never to exceed £ 4 million.

(c) Borrowing The Board is authorized to borrow money for capital purposes with the approval of the Authority, and the General Manager, with the approval of the Board, can borrow money temporarily for the ordinary course of business.

(d) Allocation of revenue receipts The revenue receipts in any financial year are to be applied to meeting all expenses properly chargeable against revenue, which include sums required for: (1) paying all working expenses; (2) making contributions to pension funds; (3) making provision for maintenance, renewals and depreciation, and appropriations to the rates and wages stabilization account and to the improvement or betterment account; and (4) paying interest, sinking fund and other loan charges. From the balance, if any, of revenue receipts, there shall be paid to the Governments of the three territories a sum not exceeding £ 600,000, or such lesser sum as may be available, divided so that each Government will receive the same proportion as the net operating revenues earned in its territory bears to the total net operating revenue. A special proviso prescribes that the amount payable annually to the Bechuanaland Protectorate for the first five years shall be at least £ 75,000, or such lesser sum as the balance of the revenue receipts will permit.

(e) Meeting of deficits If the revenue receipts in any year are not sufficient to pay the expenses properly chargeable against revenue, the deficiency shall be met from the rates and wages stabilization account. If that account will not cover the whole deficiency, the three Governments shall make good the remainder, Southern Rhodesia paying 75%, Northern Rhodesia 20% and the Bechuanaland Protectorate 5% -- these proportions being subject to review at the end of successive 5-year periods.

(f) Disposition of surplus Any surplus that may exist in any year, after meeting the charges outlined in sub-paragraph (d) above, shall be used first to reimburse the Governments for any payments previously made by them to meet deficits, and any balance shall be allocated to the improvement or betterment account and to the rates and wages stabilization account in such proportions as the Authority may approve.

(g) Variations in rates Whenever it appears that existing rates will produce more or less revenue than is necessary to pay expenses chargeable to revenue and to provide a balance for paying the whole, or such portion of the whole as the Authority may specify, of the subvention to the Governments mentioned in subparagraph (d) above, appropriate changes are to be made in the rates.

15. Present Financial Position of Railways

(a) The following summarized balance sheet shows the financial position of Rhodesia Railways on March 31, 1952:

TABLE 1

<u>Assets</u>	<u>£1000s</u>	<u>Liabilities</u>	<u>£1000s</u>
<u>Fixed Assets</u>		<u>Capital and Reserves</u>	
Capital expenditure	41,029	Loan from S.R.Govt.	30,000
Net cost of share equity in Rhodesia Rlwys Ltd.	2,784	Loan from N.R.Govt.	7,730
Shares of Victoria Falls Hotel Ltd. and Shabani Rlwy Co. Ltd.	272	Loans from Pension Scheme	1,806
	-----	Capital Reserve	2,460
	44,085	Miscellaneous reserves	143
		Improvement or better- ment account	237
<u>Investments on account of rates and wages stabil- ization account</u>	2,423	Rates and wages stabil- ization account	2,573
			-----
			44,949
<u>Current Assets</u>		<u>Current Liabilities</u>	
Investments	1,728	Accounts payable	1,783
Stores and miscell- aneous equipment	4,678	Provision for workmen's compensation	188
Work in progress, etc.	144	Provision for sinking fund	168
Accounts Receivable	2,053		-----
Cash	808		2,139
	-----		
	9,411	<u>Depreciation and Renewal Accounts</u>	
		Permanent way and works, engines and rolling stock	8,707
		Road motor services	106
		Miscellaneous	18
			-----
			8,831
<u>TOTALS</u>	<u>55,919</u>		<u>55,919</u>

(b) As the balance sheet indicates, the financial structure of the Railways is sound. The capitalization is not excessive. The shareholders' equity amounts to about £5.4 million. Most of the indebtedness is owed to Southern and Northern Rhodesia, the two principal owners of the

Railways. Current assets are 4.4 times the current liabilities. There are depreciation reserves of £ 8.8 million against physical assets costing about £ 41 million. The working capital of £ 7.3 million is considered adequate.

16. Recent growth of freight traffic The very rapid development of the two Rhodesias since the end of World War II has been accompanied by a correspondingly rapid growth of the freight traffic on the Rhodesia Railways system, as the following table shows:

TABLE 2

Freight Traffic on Rhodesia Railways

Year *	Total Tonnage 1000s	Net Ton-Miles
		Nor. of Bulawayo only 1000s
1952	7,296	2,793,344
1951	6,689	2,591,770
1950	5,755	2,265,021
1949	5,097	2,000,254
1947	4,288	1,681,910
1946	4,157	1,655,147
1945	4,353	1,794,447
1941	3,810	1,629,476

17. The composition of the freight at various times is shown by the following table:

TABLE 3

Percentage of Freight Tonnage Commodity

	<u>1952</u>	<u>1947</u>	<u>1941</u>
General goods	47.8	43.7	37.5
Coal and coke	32.0	34.7	32.3
Chrome ore	4.2	4.0	9.6
Copper	5.7	6.3	9.0
Asbestos	1.1	1.4	1.3
Lead, Zinc, Vanadium	.5	.9	.4
Other minerals	8.7	9.0	9.9
	100	100	100

\* Note - Because of a change in the fiscal year, statistics for the full year 1948 are not available.

18. The following table is a summarized traffic analysis showing, as percentages of the total traffic, the movements of coal, minerals and general goods over different parts of the system in 1951:

TABLE 4

Analysis of 1951 Traffic

General goods over Beira Rlwy, mainly imports for Rhodesias	12.0%	
Export minerals from Rhodesias and Congo over Beira Rlwy	<u>11.9%</u>	23.9%
Coal from Wankie to points on Beira, Rhodesia and Congo Rways.		32.5%
General goods moving locally north of Bulawayo	20.0%	
Local mineral traffic north of Bulawayo	<u>7.0%</u>	27.0%
General goods between S.A.Rlwys and Bulawayo or beyond		12.3%
Other traffic		<u>4.3%</u>
		100.0%

19. It will be seen from the foregoing tables that the annual tonnage of freight carried has nearly doubled since 1941, and that the increase since 1947 has been 70%. Reflecting the general prosperity of the Rhodesias, the proportion of general goods has steadily grown until in 1952 they constituted nearly half of the total freight. However, the most important single job of the Railways is the hauling of Wankie coal and coke, which have consistently formed about one-third of the total tonnage; they are distributed along the total length of the lines "north of Bulawayo", roughly one-third moving north of Wankie and the remainder south and east. The predominance of the Beira route in the movement of imports and exports is made clear by the table in the preceding paragraph.

FUTURE FREIGHT TRAFFIC

20. Estimates of future traffic demands are made annually by the Railways, with the assistance of the Governments of Southern and Northern Rhodesia. These estimates are prepared in detail insofar as coal, copper, chrome and other minerals, cement, fertilizer, and other bulk commodities are concerned; but estimates of general goods traffic are based primarily on conclusions as to general trends. The Railways do not consider it practicable to make detailed traffic estimates beyond a three year period, but they do make general estimates for a further period for use as a guide in preparing long-range development programs. The detailed estimates for the calendar years 1953/55 are now in process of being made, so the estimates presently available are those made in 1951. As a general rule the estimates made in the past have turned out to be reasonably accurate.

21. The following tables show the tonnages of principal commodities actually carried in recent years and the 1951 estimates of future tonnages, and the estimated net and gross ton-miles of freight in the near future for which provision must be made.

TABLE 5

Tonnages of Principal Commodities

<u>Calendar Years</u>	<u>Coal &amp; Coke million tons</u>	<u>General Goods million tons</u>	<u>Copper thousand tons</u>	<u>Chrome thousand tons</u>	<u>Asbestos thousand tons</u>
<u>Actual:</u>					
1950	2.153	2.610	366.2	322.6	71.0
1951	2.351	2.759	418.1	333.6	78.3
1952	2.416	2.714	377.5	335.4	75.8
<u>Planned for:</u>					
1953	3.793	No global estimate made. Additional	488.4	480.0	119.5
1954	4.190	traffic is expressed in net ton-miles over each train-working section in "loaded" direction	483.4	480.0	120.0
<u>Estimated required in:</u>					
			All minerals from N.R. and Congo		
1955	4.472	No estimates	529.6	720.0	129.0
1956			568.0	720.0	129.0
1961	5.500	made	607.0	No estimates made	

TABLE 6

Total Movements (in Ton-Miles)  
(Excluding Bulawayo-Vryburg Section)

<u>Calendar Year</u>	<u>Net Ton-Miles</u>	<u>Gross Ton-Miles: main line in "loaded" direction excluding passenger vehicles.</u>
1946	1,700 million	Performance calendar year 1951: 3,165 million
1951	2,815 million	Demand " " 1953: 4,720 million
		Demand " " 1954: 5,000 million
Increase 65.6%		

Note: Planning has been done with view to meeting these demands, which in 1954 represent an increase of 58% over 1951 performance.

22. The estimates of the tonnages of coal and coke, copper, chrome, and asbestos to be transported during the next three years were based on the plans of the various mining companies for increasing their production. These estimates were assembled and checked by the appropriate Government departments of Southern and Northern Rhodesia, and, except for asbestos, were checked by the mission with the principal producers. They can be accepted as firm provided adequate railway capacity is supplied to meet the needs of the mines. For general goods an increase of 12% per year in imports was assumed after consultation with the territorial Governments, and based on this figure estimates were made of tonnages in the "loaded" direction on each section of the Railways. The resulting estimates are considered to be dependable, but they may prove to be on the low side.

23. The following table shows the actual number of trains each way per day on certain sections of the main line in 1946 and 1951, and the estimated number that will be required in 1953 and 1956 to carry the predicted traffic, except that the numbers shown for the Salisbury-Umtali line in 1953 and 1956 represent the optimum capacity of the line in those years rather than the amount of traffic desiring to use it.

Table 7

Number of Trains Each Way per Day

	A c t u a l		Estimated	
	June 1946	August 1951	1953	1956
Wankie-Livingstone	5.7	9.7	10	13.5
Wankie-Bulawayo	5.7	9.1	12	14.1
Bulawayo-Que Que	7.0	11.4	15	18.3
Que Que-Salisbury	5.7	10.7	14	16.1
Salisbury-Umtali	5.3	11	12	12.7

PRESENT FACILITIES AND CAPACITY

24. (a) General. Capital expenditures on the Railways immediately after the end of World War II were very small, both because there was doubt about the post-war demand for copper and chrome and because the prospect of nationalization discouraged the raising of new capital by the then owners of the Railways. In the period 1947-1952, however, capital expenditures amounted to nearly £ 17.5 million, of which about a half was for locomotives and rolling stock, a quarter for operating buildings and housing, 10% for improvements to track and operating facilities, and the remainder for miscellaneous purposes. On the lines north of Bulawayo (i.e. omitting the Bulawayo-Vryburg line operated by the South African Railways) the number of locomotives increased 28% during the period and the number of freight cars 52%, while the tons of freight increased 70% and the ton-miles of freight increased in the same proportion. It is evident that the increased traffic could have been handled only by the efficient and intensive use of equipment, particularly the locomotives.

The following table gives figures illustrating the utilization of Rhodesia Railways equipment in 1951, and comparable average figures for

all Class I Railways in the United States for the latest periods available:

Table 8

Utilization of Equipment

	<u>Rhodesia Railways</u> 1951	<u>U.S. Railways</u> 1950
Miles per day per engine in use	145	—
Miles per day per engine on line	122	119.4
wagon miles per wagon day	61.9	46.5
Average load of loaded wagon	27.7	31.4*
Net ton-miles per wagon day	1,134	972
Percentage of locomotives un- serviceable	9.8	9.9*
Percentage of wagons unserviceable	3.4	6.2
Average length of haul	415	417

(b) Permanent way and operating facilities. Standards of track maintenance are reasonably satisfactory. Re-railing of the main line from Salisbury to Ndola with 80-pound rail, authorized some fifteen years ago, was delayed by the war and has progressed only to the general vicinity of Kafue. All other parts of the system have 60-pound rail. Recent exceptionally dry years have shown the inadequacy of the water supplies in a number of areas; many improvements have been made but much remains to be done to meet the needs of increasing traffic. Bridges and culverts are generally adequate, although the major bridge over the Kafue River in Northern Rhodesia will have to be raised for safety against floods. Construction of a new marshalling yard at Bulawayo, with new connections to the Vryburg, Victoria Falls and Salisbury lines, is well under way, but many other yards are inadequate for present traffic.

(c) Locomotives and rolling stock. The following table shows the equipment in service in June 1952:

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\* 1949 figures.

Table 9

<u>Type of vehicle</u>	<u>Number</u>	
Locomotives:		
Straights	171	
Garratts	<u>115</u>	<u>286</u>
Passenger coaches:		<u>473</u>
Goods wagons:		
Open	4,930	
Covered	1,242	
Tank	291	
Guard's vans	180	
Service	<u>145</u>	<u>6,788</u>

All of the existing locomotives are of the coal-burning, steam type. The number of both locomotives and wagons on hand is insufficient to handle the present traffic, and delays in the delivery of additional equipment on order are adding to the operating difficulties.

(d) Repair facilities. The main workshops are at Bulawayo and Umtali, with engine sheds for minor repairs at Ndola, Broken Hill, Livingstone, Wankie, Bulawayo, Gwelo, Salisbury and Umtali. With additions recently completed the main workshops are just adequate for present needs and have made a creditable record in the maintenance of the Railways' equipment. For the year ended 31 March 1952 the average percentages of locomotives and wagons out of service was as follows:

	<u>Locomotives</u>	<u>Wagons</u>
In shops	5.61%	0.59%
Awaiting shops	1.52	0.93
Under repair at sheds or depots	<u>2.90</u>	<u>1.40</u>
	10.03%	2.92%

The workshops appear to be well-equipped and well-managed, and satisfactory procedures are in effect for the regular inspection of equipment and the scheduling of repairs. The capacity of the workshops is fully taken up by existing equipment and must be expanded to handle the maintenance of new equipment on order.

Many of the engine sheds are congested and obsolete. A new engine shed is under construction at Bulawayo and some others have been improved, but as a whole the sheds cannot be considered adequate even for the present equipment.

(e) Capacity. Although the Railways have made good use of the available resources in their efforts to keep up with the constantly increasing demands of traffic, the fact remains that for some time they have been unable to move all the freight that is offered or that would

be offered if the capacity were adequate. This deficiency is particularly marked in the case of the important bulk commodities, coal, chrome ore and copper, which together make up more than 40% of the total traffic.

Wankie coal, which is the life blood of the Rhodesian economy, has for several years been in short supply at many consuming centers. It has not always been entirely clear in the past whether the shortages were the result of inadequate production or of inadequate transportation, but in recent months the collieries have produced more coal than the Railways could transport. There is every reason to believe that the production will continue to increase at a rapid rate unless it is purposely held back because of the continuing inability of the Railways to transport a larger quantity.

The production of chrome ore in Southern Rhodesia in recent years has consistently been greater than the Railways' capacity for moving it to seaports for shipment overseas, and as a result, stockpiles of ore aggregating over half a million tons have been built up at various railway stations awaiting transportation. These piles are being added to daily.

#### NEED FOR INCREASING CAPACITY OF PRESENT LINES

25. The estimates of future traffic in paragraphs 17 to 19, together with the information in paragraph 23, show clearly the need for increasing the capacity of the present lines as soon as possible.

#### NEED FOR A NEW CONNECTION TO THE SEA

26. A comprehensive study of all traffic facilities, made during the annual traffic review in 1951, led to the conclusions: (a) that the optimum capacity of the line connecting the Rhodesias to the port of Beira will be reached or exceeded about 1955 as a result of increasing export and import traffic, and (b) that the project for constructing a new Southeast connection to the port of Lourenco Marques is the most desirable of the alternative projects suggested for obtaining the necessary additional capacity promptly. Accordingly this project was adopted as an important part of the development program. Another study of the problem by the Knappen Tippetts Abbett Engineering Company, consulting engineers retained jointly by the governments of Southern Rhodesia and Portugal, confirmed the Railways' conclusions. The concurrence of the Portuguese Government in the conclusions is evidenced by assurances from the Prime Minister of Southern Rhodesia by the President of the Council of Portugal that the Government of Portugal will build the Mozambique section of the Southeast Connection, and will carry out the construction in collaboration with the Rhodesia Railways so as to permit of its completion within three years. The reasons for the conclusions are summarized in Appendix I.

THE RHODESIA RAILWAYS DEVELOPMENT PROGRAM

27. The development program of the Rhodesia Railways to meet the needs of traffic as outlined in the preceding part of this report includes measures to increase the capacity of existing lines, and also the construction of the new Southeast Connection from Bannockburn to the Mozambique border. The entire program adopted in 1951 contemplated the expenditure of £ 52.3 million during the eight fiscal years 1951-52 to 1958-59, and included the construction of the so-called Sinoia-Kafue cut-off, beginning in 1954-55, at an estimated total cost of £ 8 million. However, this report is concerned only with that part of the program which applied to the triennium 1952-53 to 1954-55, excluding any expenditure on the Sinoia-Kafue project which has been postponed. The approved capital program for the triennium contemplated the expenditure of £ 30.502 million for the general purposes shown in the following breakdown:

Table 10

Development Program  
(1952-53 - 1954-55)

<u>Item</u>	<u>Capital Expenditure</u> £
Traffic and operating facilities	2,882,000
Housing, European	3,435,000
Housing, African	1,338,000
Permanent way and bridges	984,000
Buildings for workshop, etc.	532,000
Plant, machinery and equipment	1,036,000
Deviations, regrading, etc.	1,420,000
Water supplies	638,000
Locomotives and rolling stock	11,995,000
Southeast Connection	5,395,000
Miscellaneous	847,000
	<hr/>
Total	£ 30,502,000

Since this program was adopted the management of the Railways has agreed that by deferring some of the less urgent projects the total of the program can be reduced to approximately £ 28,362,000.

RENEWALS AND BETTERMENT EXPENDITURES

28. The development program just outlined does not include proposed expenditures during the same triennium of £ 4,171,000 for renewals and £ 1,924,000 for betterments, as charges against the Depreciation and Renewals Account over the Improvement or Betterment Account, respectively. Expenditures under the first heading are for renewals of permanent way, bridges, engines and rolling stock, and other assets. The Railways' practice is to charge to the Improvement or Betterment Account expenditures for new assets or alterations or additions to existing assets, which, although desirable, are not revenue-producing or strictly essential for the normal working of the Railways, including such items as hospitals

and clinics, recreation halls, grade crossings, fencing Railway property, etc.

DISCUSSION OF PROGRAM

29. The purposes of a great part of the items comprising the development program are apparent from their titles. General information concerning all items will be found in Appendix II, but a few of the more important ones are discussed briefly below.

30. Traffic and Operating Facilities, £ 2,882,000

This item includes such projects as the construction of new marshalling yards and remodelling of existing yards, the eastward extension of the centralized train control system now in use between Bulawayo and Somabula, the construction of new engine sheds and goods depots, the improvement of telephone and telegraph communications for train operating, and the construction of new stations to reduce the length of block sections for train operating. These and other similar measures included in Item 1 will make possible a greater train density on the most congested main-line sections, reduce delays to freight traffic, and promote the more effective use of rolling stock.

31. Housing, European, £ 3,435,000

In common with most other large enterprises in the Rhodesias, the Railways have been forced by the general shortage of housing to build quarters for many of the European staff. In Southern Rhodesia the policy is to house employees who are subject to transfer and to being called out at any hour, but to house only exceptionally those who are rarely subject to transfer and who have fixed hours of work. In Northern Rhodesia, because of the almost complete lack of other housing, most of the staff have to be housed.

32. Housing, African, £ 1,338,000

It is an obligation of the Railways to house their African employees throughout the system.

33. Permanent Way and Bridges, £ 984,000

This item covers the part of the cost of renewing old rails and bridges that is chargeable to capital, e.g. the additional cost of heavier rails or stronger bridges.

34. Buildings for Workshops, etc. £ 532,000

Plant, Machinery and Equipment, £ 1,036,000

The greater part of both these items covers the building and equipping of new workshops and additions, for the repair of the growing number of locomotives, coaches and wagons.

35. Deviations, Regrading, etc., £ 1,420,000

The largest project under this item is for relocating the 50-mile main-line between Wankie and Dett; the relocation will shorten the line 4-1/2 miles, reduce curvature, and cut down the ruling grade from 1.64% to 0.83%, thus greatly increasing the capacity of the section. Other similar but smaller projects are included in the item.

36. Locomotives, Rolling Stock, etc., £ 11,995,000

This item contemplates the purchase of the following locomotives and rolling stock:

Table 11

Locomotive and Rolling Stock Program

<u>Units</u>	<u>Number in Program</u>	<u>Number on Order 1 April 1952</u>
Locomotives:		
Garratts	73	73
Straights	28	28
Diesel-electrics	23	23
Coaches (all types)	171	98
Wagons:		
Goods, bogie	2,150	1,661
Goods, 4-wheel	650	650
Refrigerator	35	35
Tank	105	105
Guard's vans	60	60

Most of the straight locomotives on order and 10 of the Garratts had been delivered or were en route on 1 April 1952. The remainder of the Garratts and all of the diesel-electrics are scheduled for delivery by about the end of 1954. All of the wagons on order are scheduled for delivery before the end of 1953.

The Railways are about to lease six additional diesel-electrics for immediate delivery, with an option to purchase at the end of the 5-year lease period.

37. Southeast Connection, £ 4,395,000

(a) General description of project. The new connection will run from Bannockburn on the Shabani branch, over some 400 miles of new line, to Guija in Mozambique, which is connected with the port of Lourenco Marques by 132 miles of existing lines of the Mozambique Railways. Some improvement of both the Shabani branch and the Guija branch will be necessary, and the Rhodesia Railways main line will eventually have to be doubled-tracked between Bulawayo and Somabula. The connection will have ruling grades not exceeding 1.25%, except on the existing 33-mile

main-line section out of Lourenco Marques, which has a ruling grade of 1.5%. Portugal will carry out all work for the connection in Mozambique.

(b) The new line in Southern Rhodesia. The length of the new line to be constructed in Southern Rhodesia is approximately 204 miles. The construction work presents no unusual difficulties. The first 88 miles out of Bannockburn will be in rough terrain; rather heavy grading will be required and the line will have numerous curves and a 1.25% ruling grade. The remaining section will be in flat country, where easy curvature and a ruling grade of only 0.88% can be obtained with very little grading. Only one good-sized bridge will be needed. It is the intention to use eighty-pound rail with steel sleepers on the new line. If 60-pound rail should be used instead of 80-pound rail, the estimated cost of the project would be reduced by perhaps as much as £ 1 million.

(c) Methods of construction. Most of the grading will be done by the Railway's forces, using construction equipment ordered under Item 6 (b) of the development program. Track-laying and steel-bridge erection will also be done by the Railways. All concrete work and a small part of the grading will be done by contract.

(d) Time of completion. The Railway's construction schedule, calling for completion by 1 April 1955, is somewhat optimistic. It should be possible, however, to complete the work by the end of 1955.

(e) Cost of the Project. The present cost estimate, £ 5,395,000, contains an allowance of only 5% for engineering and contingencies, which is considered inadequate for a project of this kind. If the more reasonable allowance of 20% were adopted, the estimate would be increased to about £ 6,000,000.

#### APPRAISAL OF THE PROGRAM

#### 38. Appraisal of measures for improving existing system.

The program for improving the existing facilities and equipment of the Railways appears to have been carefully prepared by competent personnel, and in general is considered to be sound, well-balanced, and realistic. The very numerous projects making up the program could not be examined in detail by the Mission, but it is believed that the agreed postponement of work estimated at £ 2,000,000 or more will leave a program containing few if any projects that are not essential. The reduced program may well prove to be a minimum program for its purpose, which is to meet the predicted needs of traffic to 1955, based on traffic estimates made in 1951. If the future traffic should exceed the estimates some additional measures will have to be taken. If, on the other hand, the growth of traffic should be less than was estimated, which now seems unlikely, the result might be to put the Railways temporarily a step ahead of the demand, instead of a step behind as they have been for several years; and in such a case there is little doubt that any excess capacity would be absorbed in a relatively short time.

In respect of housing the program does not attempt to meet the full needs anticipated in 1955, but instead is designed only for the needs

through 1953. The importance of providing adequate housing is recognized, but any increase in the amounts earmarked for that purpose would require reducing other equally important items and thus unbalancing the program. Moreover, the present amount is probably about as much as can be expended efficiently, in view of the general shortage of both skilled and common labor in the territories.

Although further capital expenditure will undoubtedly be necessary to care for future traffic increases, the present program is complete in itself, in that no important item of the program will require further material expenditure to make it fully useful. Because many projects to be completed under the present program will provide facilities, such as new yards, major deviations, water supplies, etc., that will be adequate for a greatly increased traffic, expenditures in future years under many headings - not including housing and locomotives and rolling stock - may well be proportionately less than those shown in the present program.

39. Appraisal of Project for Southeast Connection.

The need for additional railway capacity in the near future to handle the growing export and import trades of the Rhodesias, and the desirability of providing the additional capacity by establishing a new connection to the sea at Lourenco Marques rather than by improving the existing line to Beira, are both unquestioned. Some of the reasons advanced for favoring the Bannockburn-Guija-Lourenco Marques route over the alternative route via West Nicholson and Beit Bridge might be subject to argument, but the weight of the practical evidence amply supports the selection of the former route.

The Rhodesia Railways originally planned to use 60-pound rail for the new construction in Southern Rhodesia, contrary to the advice of the consulting engineers and other experts, but the plans have recently been changed to provide for 80-pound rail instead. This change will make possible the use when desirable of the Railways' most powerful locomotives and heaviest rolling stock on the line and will reduce maintenance costs, and is considered desirable in spite of the additional cost involved.

The construction forces of the Rhodesia Railways appear to have the ability and experience to carry out the greater part of the new construction, and the construction equipment ordered for this project (and other future projects) has been well chosen for the work to be done. Qualified contractors are available to do the concrete work and such part of the grading as may be assigned to them.

The new line in Southern Rhodesia will be valueless for its main purpose until the corresponding line in Mozambique is completed, and vice versa. It is important, therefore, that positive methods of coordinating the work of the Rhodesia Railways with that of the Mozambique Railways be put into effect, with a view to insuring the simultaneous completion of the lines on the two sides of the border.

ESTIMATED COST OF PROGRAM

40. The estimated cost of the original three-year program, including a carry-over to the following fiscal year for final payments, was £ 30,502 million. However, as has been stated above, the Railways have agreed that less-essential projects can be deferred to the extent of some £ 2 million, thus reducing the estimated cost of the program to £ 28,362 million.

The estimated cost of imported goods under the original £ 30.5 million program was £ 19 million, as shown in the following table.

Table 12

Estimated imported goods and local expenditures  
in £ 1000's

<u>Item</u>	<u>Imported</u>	<u>Local</u>	<u>Total</u>
Traffic and operating facilities	550	2,332	2,882
Passenger amenities	-	11	11
Housing, European	500	2,935	3,435
Housing, African	-	1,338	1,338
Permanent way and bridges	600	384	984
Workshop buildings	250	282	532
Plant, machinery and equipment	1,000	36	1,036
Administrative buildings and general requirements	60	258	318
Staff amenities	-	11	11
Road services	320	33	353
Deviations, regrading, etc.	140	1,280	1,420
Land	-	140	140
Water supplies	200	438	638
Unforeseen, etc.	-	14	14
Locomotives and rolling stock	11,995	-	11,995
Southeast Connection	<u>3,390</u>	<u>2,005</u>	<u>5,395</u>
Totals	19,005	11,497	30,502

The program involves such a variety of goods that it is not possible at this time to list all of the imported goods by categories. However, the table below gives estimates of the purchases of some of the principal types of equipment and material under the original program. The bulk of these purchases will be made in the United Kingdom.

Table 13

Imported Goods

<u>Type</u>	<u>Estimated Cost</u> <u>(in £1000's)</u>
Locomotives and rolling stock	11,995
Motor vehicles	320
Machine tools for workshops	400
Construction equipment	447
Coal-handling equipment	78
Water-supply equipment	290
Building materials and supplies	810
Steel rails, sleepers and bridges	3,700
Miscellaneous	<u>965</u>
Total	19,005

41. The deferment of projects to reduce the estimated cost of the program to £ 27.36 million will make some reduction in the amount of imported goods but the total effect will be relatively small, because no reduction can be made in the purchases of locomotives and rolling stock, materials required for the Southeast Connection, or construction equipment, and large reductions cannot be safely made in the purchases of machine tools, water-supply equipment, and some miscellaneous items such as signalling equipment, etc. As a rough estimate, it is probable that the importations in the reduced program will amount to some £ 18.5 million, with expenditures by years approximately as follows: 1952-53, £ 9,475,000; 1953-54, £ 4,115,000; and 1954-55, £ 4,910,000.

ADEQUACY OF COST ESTIMATES

42. As has been pointed out earlier, the estimated cost of the Southeast Connection if the allowance for engineering and contingencies were increased from 5% to 20%, would become approximately £ 6 million. The estimates for the remainder of the program are based on somewhat better information of the quantities of work involved and also on contract prices for locomotives and rolling stock, steel rails, etc., already ordered, and probably do not require such a large allowance for contingencies. However, most of the purchase contracts provide for escalation and additional costs resulting from increases in the prices of labor and materials are to be expected; hence it would appear possible that the estimates might be exceeded by as much as £ 2.0 million. If these increases should actually occur, the total cost of the development program might be about £ 31 million instead of £ 28.36 million.

FINANCING DESIRED

43. For the execution of the development program at estimated cost of £ 28.36 million, the Rhodesia Railways is assured that it can count on the following sources of funds: (a) an E.C.A. loan of £ 5 million made available in 1951 but not yet drawn down; (b) further loans from the Railway

Pension Funds amounting to £ 3.5 million; and (c) two loans of £ 5 million each from Southern Rhodesia, which has been promised access to the London Market in 1953 and 1954 for larger loans including these amounts. The aggregate of these loans, £ 18.5 million, added to an estimated balance from previous financing of some £ .7 million, gives a total assured financing of about £ 19.2 million and leaves a shortfall of approximately £ 9 million for which other financing must be found. The attached Table 14 shows by periods the estimated expenditures under the program, the finance available, and the cumulative shortfall. It is in respect of this shortfall that the Bank has been approached for a loan.

14. If the total cost of the program should rise to the neighborhood of £ 31 million, which has been mentioned as a possibility in paragraph 13 above, the shortfall would be over £ 11 million instead of £ 9 million. However, the magnitude of any increases that actually occur cannot be predicted, and they may be less than has been suggested. It will be noted that the sources of assured financing for the program do not include any funds from the Railway's net revenue account. That account will have to make contributions to the Improvement or Betterment Account and to the Rates and Wages Stabilization Fund and also provide for the repayment of loans in excess of the 1% Sinking Fund, but in view of the additional net revenue that will result from the recently increased rates and the waiving of subventions by the Rhodesias (both of which subjects are discussed below), there is good reason to believe that the Railways will also be able to provide funds to meet cost increases that occur. If this should not prove possible, further borrowing may be resorted to later, but the need for such borrowing is considered unlikely.

#### POLICY ON LOAN REPAYMENT

15. The legislation creating the Rhodesia Railways prescribes that the payment of interest, sinking-fund and other loan charges shall be a charge against operating revenues. In respect of the original long-term loan made by Southern Rhodesia to the Railways, the legislation requires that a 1% annual sinking-fund payment shall be made and the same sinking-fund payment has since been made applicable to all loans, whether long or short term, as the basic requirement. In the case of loans repayable within a fixed period, such as the E.C.A. loan and any loan made by the Bank, repayments in excess of the sinking-fund provision will be met from a Special Reserve Account to be built up by transfers from the Railways net revenue account. The existing law requires that up to £ 600,000 of any balance remaining in the net revenue account each year shall be paid to the three Governments as subventions; but the Higher Authority has recognized that it would be unreasonable to expect the Railways to pay subventions as well as heavy repayment charges, and the Governments of Southern and Northern Rhodesia have agreed to suspend their right to subventions and to amend the law accordingly. Payments to Bechuanaland will continue as now required by law or in accordance with a new agreement to be reached between the three Governments.

#### FINANCIAL RESULTS OF OPERATIONS

16. The Rhodesia Railways has been a profitable undertaking for many years, but because of rising costs and stationary freight rates since the

Table 14

Development Program  
Estimated Expenditures  
And Sources of Funds  
(in £ 1000's)

	<u>1952-53</u>		<u>1953-54</u>		<u>1954-55</u>		<u>1955-56</u>	<u>Totals</u>	
							carryover		
<u>Expenditure</u>									
As in original program	13,789		7,727		7,597		1,389	30,502	
Est. deferments	653		490		533		324	2,000	
Est. annual expenditures	13,136		7,237		7,064		1,065	28,502	
	6 mos to 30 Sep. 52	6 mos to 31 Mar. 53	6 mos to 30 Sep. 53	6 mos to 31 Mar. 54	6 mos to 30 Sep. 54	6 mos to 31 Mar. 55	Less credit for earth moving equipment bought for S.E. Connection	140	140
Est. Semi-Annual expenditures	6,568	6,568	3,619	3,618	3,532	3,532	925	28,362	
<u>Finance available</u>									
Balance at beginning of period		713						713	
E.C.A. loan		5,000						5,000	
Pension fund loan	250	250	250	250	250	250	500	2,000	
S.Rhodesia loan			5,000		5,000			10,000	
Additional pension fund loan						1,500		1,500	
Total assured finance	5,963	250	5,250	250	5,250	1,750	500	19,213	
Surplus for period			1,631		1,718				
Shortfall " "	605	6,318		3,368		1,782	425		
Net cumulative shortfall	605	6,923	5,292	8,660	6,942	8,724	9,149	9,149	

War, operating ratios have been increasing with a consequent decrease in the proportion of net revenue. However, a new freight tariff, which went into effect on July 1, 1952, raised the rates about 12-1/2% on the average and will result in substantially higher net revenues. Table 15 summarizes the actual operating revenue and net revenue accounts for the fiscal years 1949 to 1952, and the estimated figures for 1953 to 1955; and Table 16 shows the estimated cash position during the period 1953 to 1956.

#### RATE STRUCTURE

47. The Rhodesia Railways until the middle of the present year was one of the few common carriers in the world which still maintained its pre-war freight rates, but on 1 July 1952 a complete revision of the rate structure became effective. This revision was undertaken for two reasons: to provide additional revenue to meet increased working costs and loan charges, and to remove certain anomalies from the structure.

48. In order to produce more revenue, increases were made in the charges for local traffic, which did not adequately cover terminal costs of handling, etc. More important, however, were the increases made in the rates for a number of low-rated commodities such as raw sugar, maize, fertilizers, chrome, ore and coal, which were formerly at a sub-economic level. The large increases in this bulk traffic and the still larger increases predicted for the future made it necessary, as far as was reasonably possible, to raise the rates to the payability stage. The new rates for coal are still below the variable costs of operation, but coal is always hauled to points where some return loads are available.

49. The average increase in freight rates of about 12-1/2%, together with increases in passenger rates and certain other charges, will add materially to the revenues. The table in paragraph 46 indicates that the estimated net revenues during the next few years will be more than sufficient to pay all charges, including the repayment of existing loans. However, as the funded debt is increased to finance the present development program and additional projects that may be necessary in the future to cater for further traffic growth, the interest, sinking-fund and repayment requirements will rise steeply, and if there should also be a continued rise in the cost of labor and materials, the revenues will soon cease to be adequate, and a further increase in rate will be necessary. Further increases may also become desirable to provide funds for financing future development projects, either wholly or in part. The average ton-mile charges for coal, minerals and general goods under the new rates will still be less than 1 U.S. cent, which may be compared with 1949 average ton-mile charges of 1.33 U.S. cents in the United States, 1.7 U.S. cents in South Africa, 1.36 U.S. cents on the Indian Railways, 2.93 U.S. cents in Great Britain, etc. It would appear, therefore, that if further rate increases should become necessary and desirable in order to provide additional income, they could be made without imposing undue hardships on the users of the Railways.

#### SPECIAL AGREEMENTS

50. Special agreements which affect the rates or workings of the

Table 15

Operating and Net Revenues  
(in £ 1000's)

	<u>Actual</u>				<u>Estimated</u>		
	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
Operating Receipts	8,924	10,265	12,308	13,545	17,019	20,288	21,394
Expenditures	6,956	8,701	10,154	11,963	14,073	15,955	16,796
Net Operating Revenues (Operating ratio)	1,998 (73%)	1,564 (79%)	2,154 (76%)	1,582 (81%)	2,946 (83%)	4,333 (79%)	4,598 (79%)
Add interest earnings, etc.	291	244	105	169	145	150	150
Gross Income	2,289	1,808	2,259	1,751	3,091	4,483	4,748
Deduct:							
Interest, sinking fund, etc.	1,071	1,074	1,102	1,437	1,776	2,446	2,764
Taxes	237	335	7	8			
Other deductions	97	363	74	219		150	150
Deductions from Gross Income	1,405	1,772	1,783	1,664	1,776	2,596	2,914
Balance before ap- propriations to special accounts	884	36	476	87	1,315	1,887	1,834
Appropriations to:							
Betterment Account				87	500	450	450
Rates & Wages Account	300				250	250	250
Reserve Account	584	40					
Balancing figure		-4	4				
Subvention			472				
Total Appropriations, etc.	884	36	476	87	750	700	700
Surplus available to meet obligation to Bechuana- land and for approp. to Special Reserve Account and Rates and Wages Stab. Account as Higher Auth- ority may approve	-	-	-	-	565	1,187	1,134
Estimated repayment of loans in excess of 1% sinking fund, not including repayment of any loan which Bank may grant.					285	327	377

Table 16

Rhodesia Railways

Estimated Cash Position  
(in £1,000)

	<u>1952/53</u>		<u>1953/54</u>		<u>1954/55</u>		<u>1955/56</u>
	<u>I</u>	<u>II</u>	<u>I</u>	<u>II</u>	<u>I</u>	<u>II</u>	<u>I and II</u>
Receipts <sup>1/</sup>							
Cash available at beginning of period	713	395	77	1,708	340	58	276
Net Oper. revenues <sup>2/</sup>	-	565	-	1,037	-	984	900
E.C.A. loan	5,000	-	-	-	-	-	-
Pension fund loans	250	250	250	250	250	1,750	500
Southern Rhodesia loan	-	-	5,000	-	5,000	-	-
Temporary loan from Northern Rhodesia	1,000	1,000	-	-	(Cr.) 2,000	-	-
Proposed new financing from N or S. Rhodesia <sup>3/</sup>	-	2,000	-	-	-	2,000	-
IBRD loan	-	-	3,000	2,000	-	-	-
Short-term temporary financing	-	3,000	(Cr.) 3,000	-	-	-	-
Credit for earth-moving equipment bought with ECA loan	-	-	-	-	-	-	140
<b>Total receipts</b>	<b>6,963</b>	<b>7,210</b>	<b>5,327</b>	<b>4,995</b>	<b>3,590</b>	<b>4,792</b>	<b>1,816</b>
Expenditures							
Development program <sup>4/</sup>	6,568	6,568	3,619	3,618	3,532	3,532	1,065
Transferred to Special Reserve Account for loan amortization	-	565	-	1,037	-	984	900
<b>Total expenditures</b>	<b>6,568</b>	<b>7,133</b>	<b>3,619</b>	<b>4,655</b>	<b>3,532</b>	<b>4,516</b>	<b>1,965</b>
Balance at end of period	395	77	1,708	340	58	276	(Dr) 149

1/ Timing shown for new financing from N. or S. Rhodesia, IBRD loan and temporary financing is illustrative only.

2/ After payment of estimated maximum subventions to Bechuanaland of £ 141,000 in 1953 and £ 150,000 each in 1954 and 1955.

3/ The additional financing shown on this line has not yet been arranged by N. or S. Rhodesia.

4/ Neglecting possible overruns from increased labor and material costs.

Rhodesia Railways have been made from time to time in the past. The principal agreements still effective are summarized below.

(a) By the Beira Convention of 1950, Portugal agreed to improve the capacity of the port of Beira, while the United Kingdom agreed to prevent discrimination against Beira and to maintain the existing rate preferences in favor of Beira over ports in the Union of South Africa.

(b) By an agreement made in 1936, the Union of South Africa agreed not to exercise before 1970 its right to purchase some 350 miles of railway line from Vryburg northward, while Southern Rhodesia and the Railways agreed not to increase the existing rate preferences in favor of Beira over Union ports.

(c) An agreement between the Railways and the principal copper mines in the Copper Belt of Northern Rhodesia provides that the mines will ship all their export copper and their imports via Beira, will take all their coal requirements from Wankie, and will not use hydro-electric power for any purpose, and in return will be granted special freight rates on their copper, imports and coal. The agreement will expire in 1956, but in the meantime the mines have agreed to pay a substantial sliding-scale surcharge on the special freight rate on copper, based on the market price of copper.

(d) A somewhat similar agreement exists with the principal copper-mining company in the Belgian Congo, which has also agreed to pay a sliding-scale surcharge on copper shipments.

#### EFFECT ON RAILWAYS OF FUTURE HYDRO-ELECTRIC PROJECTS

51. The copper mines of Northern Rhodesia are about to conclude a contract to import approximately 50,000 kw of hydro-electric power from the Belgian Congo during a five-year period beginning in 1957, with an option to extend the period for another five years. Two large hydro-electric projects in the Rhodesias are under study: the Kariba Gorge Project on the Zambezi River between Southern and Northern Rhodesia, with an initial capacity of 385,000 kw, and an estimated final capacity of 1,000,000 kw, and the Kafue Gorge project on the Kafue River in Northern Rhodesia, with an estimated capacity of perhaps 185,000 kw, or more, and the possibility of future expansion by the provision of upstream storage. It has been estimated that Kariba project could be completed in about eight years from the beginning of construction and the Kafue project in a somewhat shorter time. In view of the growing power demand in the Rhodesias and the favorable features of both of these projects, the completion of one or the other of the projects within the next ten or fifteen years, and the eventual substitution of hydro-electric power for thermal power, must be regarded as definite possibilities. The Railways will be called upon to transport increasingly large quantities of coal for thermal generation in the meantime, and will apparently be left with a surplus of locomotives and rolling stock when hydro-electric power becomes available. However, the Wankie collieries believe that the growing use of coal for other purposes, together with the exportation of surplus coal, will soon restore the balance between demand and production; and the Railways are satisfied that any surplus of equipment that may

develop will be absorbed by the traffic demands of increased business activities resulting from the availability of relatively cheap hydro-electric power. In any event, it does not appear that future hydro-electric projects will be a serious continuing threat to the prosperity of the Rhodesia Railways.

#### MANAGEMENT

52. The management of the Railways appears to be excellent. The Chairman and only full-time member of the Board, while not a railway expert, is an engineer with wide experience in the management and supervision of large undertakings, principally in India. The General Manager has had long experience as a railway administrator in important positions, also principally in India, and appears to possess both high technical qualifications and managerial ability. So far as could be determined from personal contacts and observation, the technical staff of the Railways are generally very competent.

53. The one obviously weak spot in the organization is the lack of a deputy to the General Manager, to relieve him of part of his heavy burden of work and to take over the management during his absence or incapacity for any reason. The Higher Authority and the Board appear to be aware of this weakness, and the mission was informed that measures for correcting it are under consideration.

#### OPERATING STAFFS.

54. The maintenance of an adequate European staff has been difficult, because recruiting has been handicapped by the lack of suitable housing for employees, and because the many opportunities for other employment in the Rhodesias has led many men to shift to more remunerative or more congenial work, sometimes in violation of their contracts of employment. However, the recruiting agency in the United Kingdom has extended its efforts to Holland (for operating personnel) and Italy (for track foremen, etc.), and has recently been reasonably successful in filling its quotas. There are also indications that the force in Central Africa is becoming more stable as the housing situation improves.

55. An adequate African staff has also been difficult to maintain, particularly for heavy manual work in urban areas. Continuous efforts are being made to overcome shortages by improving housing, rations, etc., by improving productivity through time and motion studies, and by installing labor-saving machinery, such as coaling plants for locomotives.

56. Although the Railways do not underestimate the seriousness of the problem, they believe that they will be able to obtain and hold enough personnel to cater for predicted future traffic. Relations between the management and both European and African staffs appear to be generally satisfactory.

#### CONCLUSIONS

57. Because of the anticipated growth of railway traffic during the next few years, it is necessary to increase the capacity of the present

Rhodesia Railways system, and to provide a new connection to the sea, as speedily as possible. The development program of the Railways for the triennium 1952-53 - 1954-55, including the construction of the new South-east Connection, is considered to be a sound, well-balanced and economical program which will reasonably meet the now foreseen needs. By the deferment of some less-urgent projects the total estimated costs of the program will be reduced to approximately £ 28.36 million, but no further material reduction could be made in the program without endangering the accomplishment of its purposes. The projects comprising the program will be fully useful upon their completion, without further expenditures. The completion of some parts of the program will extend beyond the triennium, but there is no apparent reason why the whole program cannot be finished before the end of the following fiscal year, 1955-56.

58. Financing already assured will be available for all but about £ 9 million of the total cost of the program. Another £ 4 million will be supplied by one or both of the Rhodesias or from the Railways' resources, thus reducing the shortfall to about £ 5 million. Any excess cost of the program over the present estimates will be supplied either by the Railways or by one or both of the Rhodesias.

59. During the next several years the Railways can undoubtedly service existing and projected loans from their own revenues, provided legislation is enacted promptly to suspend the payment of subventions to Southern and Northern Rhodesia. If rising debt charges and operating costs should make additional revenues necessary, it is believed that they can be obtained by some further increases of freight rates without causing undue hardships to shippers.

#### RECOMMENDED BASIS FOR A LOAN

60. The Rhodesia Railways development program for the triennium 1952-53 - 1954-55 is worthy of financial assistance by the Bank to the extent of about £.5 million. Since the estimated cost of imported goods to be delivered during the year 1952-53 is nearly twice this figure, the entire amount of a loan from the Bank could be expended during the early part of the program. Before a loan is made the Bank should satisfy itself: (a) that arrangements have been made for providing the remainder of the funds required to complete the program, including funds required to meet any over-run of the present cost estimates; and (b) that satisfactory procedures will be put into effect for coordinating the construction work to be done on the Southeast Connection by the Rhodesia Railways in Southern Rhodesia and by the Mozambique Railways in Mozambique.

J.C. Mehaffey

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