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BOLIVIA

LA PAZ-SAN BORJA HIGHWAY

(BO0022)

PROJECT REPORT

OCTOBER 1975

B O L I V I A

LA PAZ-SAN BORJA HIGHWAY

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 La Paz-San Borja

BOLIVIA

La Paz-San Borja Highway

Project Report

I. INTRODUCTION

A. The Application

- 1.01 The Government of Bolivia, through the Ministry of Finance, submitted to the Bank an application for a loan 1/ on April 18, 1975 to assist in financing a project for the construction of the La Paz-Puerto Salinas highway, with a branch to San Borja, 2/ to link the capital city with the Beni region. Specifically, the application submitted would require the Bank's participation in financing: (i) the first phase of said highway consisting in the La Paz-Cotapata section; and (ii) construction of bridges over the Yolosa and Yara Rivers, as well as bridges between the Alto Beni River, Puerto Salinas and San Borja.

B. Priority

- 1.02 The priority that the Government of Bolivia grants the La Paz-Puerto Salinas project, verified in the abovementioned application, was brought out at the time the IDB programming mission visited Bolivia in 1974 and in January 1975. In fact, the Bolivian authorities informed the missions that among the chief objectives of Bolivian Government policy was the execution of this project on a priority basis so as to give impetus to the first stage in the agricultural development of the project service areas and integrate into the national economy vast areas of land encompassed by the Beni and Pando Departments. This is now materializing with the startup of construction of the earthworks on the sections of this highway between the Alto Beni River, Puerto Salinas and San Borja; the work is being done by the government with its own resources and elements (see Chapter IV of this report).
- 1.03 The project is consistent with the basic objectives set for Bolivia's development as resolved at the last meeting of the Permanent Executive Committee of the Inter-American Economic and Social Council (CEPCIES)

1/ Since 1970 the Bank has made five loans to the Government of Bolivia and one technical cooperation grant for studies and highway construction (see Chapter VII).

2/ The technical-feasibility studies and the final engineering design studies, which support this application, were prepared with resources of Loan 17/CD-B0 granted on November 17, 1971 (see Chapter VII).

for Bolivia, (September 1975) which referred to "reducing inequalities in income distribution and the marked differences of wealth in the various parts of the country to allow the just and equitable distribution of the national wealth". Furthermore, at this meeting the need was pointed out for eliminating the present deficiencies in the transportation system, for accomplishing and improving links with the diverse areas of Bolivia as well as with the ports on the Pacific Ocean that serve Bolivia's foreign trade.

C. Mission

- 1.04 During June 1975 a negotiation and analysis mission visited Bolivia to examine the application and discuss with the local authorities the chief aspects of the project and of the prospective IDB loan for financing the project. Together with the Bolivian authorities a careful examination was made of the project's definition, 1/ its total cost and, on a preliminary basis, the terms and conditions of the prospective loan. The findings of the analysis of the project are given herein.

1/ See Chapter III to this report.

II. FRAME OF REFERENCE

A. The National Transportation System

2.01 The Bolivian National Transportation System includes the following means for moving passengers and cargo: (i) land transportation comprising the highways and railways; (ii) air transportation; and (iii) transportation on inland waterways and lakes. Of course, Bolivia lacks its own oceangoing transportation, since it must use ports in neighboring countries (Peru and Chile, mainly) and foreign vessels for carrying national imports and exports. The national means of transportation are fairly complementary to one another and, generally speaking, the transportation system has developed slowly in Bolivia owing to the broken character of its topography and the high costs of constructing the basic infrastructure facilities - these reasons have led to the isolation of vast regions and to an unequal distribution of population, now concentrated along the Andean region and scattered throughout the eastern part of the country.

I. Land Transportation

2.02 The national highway system in December 1974 measured 37,313 kilometers overall, of which 3.1% (1,163 kilometers) were paved, 17.5% (6,530 kilometers) were gravel-surfaced and the rest, that is, 79.4% (29,620 kilometers) were unimproved earth roads.

2.03 Highways in Bolivia are divided into three categories: (i) Fundamental Highway Network, consisting of highways directly linking the main economic centers and Bolivia itself with its neighbors. This fundamental highway system measured a total of 5,019 kilometers, of which 1,098 kilometers were asphalt-paved; 3,353 kilometers were gravel-surfaced, and 568 kilometers were unimproved earth surface. The Complementary Highway Network links the main producing areas with the economic centers of consumption and is constituted by 3,647 kilometers of roads, of which only 23 kilometers are asphalt-surfaced and the rest are surfaced with gravel and earth. The Local Roads Network links the small production centers and distant places with the Complementary Network and measures 28,647 kilometers overall, of which 42 kilometers are asphalt-surfaced and the rest earth-surfaced. Highway density in Bolivia, in relation to total area, is 17 meters of highway per square kilometer of area. ^{1/} This fact in itself would illustrate the insufficiency of the infrastructure of this means of transportation for achieving harmonious development of the diverse regions of the country.

^{1/} For purposes of illustration similar ratios for other countries at diverse stages of economic development are given: Japan: 2,720; the United States: 632; Brazil: 110; Peru: 35; Paraguay: 16 (expressed in meters of highway per square kilometer of national area).

- 2.04 The main highways constituting the Fundamental Network are: (i) the Pan American Highway, which crosses Bolivia's national territory from north to south along the highland plain, from the border with Peru (Desaguadero) to the border with Argentina (La Quiaca). This highway is paved (asphalt) only from La Paz to Oruro, and for the most part it is an earth-surfaced unpaved highway; and (ii) the highway to the east, which starts at a point along the Pan American Highway near Oruro and extends to Santa Cruz, passing through Cochabamba. The section of this highway between Cochabamba and Santa Cruz is paved with asphalt. Using the resources of Loan 399/SF-BO this highway is being improved and the Quillacollo-Confital sections on the Cochabamba-Oruro road, will be paved with asphalt. The proposed La Paz-San Borja highway would form part of the Fundamental Network linking the northeastern part of the country with the national highway system.
- 2.05 In the last decade the Government of Bolivia gave considerable support for the development of its highway system, undertaking construction of new highways and improving existing ones. The Bank has made a decidedly effective contribution since 1970 to the financing of studies and to the construction of highways throughout Bolivia in support of the national effort. ^{1/} In the past, this activity was carried out by the AID.
- 2.06 The improvement and opening up of new highways as well as the development of Bolivia's economy in the last few years has increased passenger and cargo traffic along national routes an average of 6% per annum during 1970-1973, and in 1973 the following traffic volumes were recorded:

<u>Network</u>	<u>Length</u>	Passenger/kilometers	Ton/kilometers
		<u>per annum</u>	<u>per annum</u>
		(In thousands)	(In thousands)
Fundamental	5,019	1,397,431	521,081
Complementary	3,647	99,955	36,031
Local	<u>28,647</u>	<u>92,014</u>	<u>23,149</u>
Total	37,313	1,589,400	580,261

- 2.07 Bolivia's railway system measures a total of 3,524 kilometers. This system is divided into two principal systems which are not now connected by rail and operate independently of one another. The first constitutes the eastern system which links La Paz and the mineral-producing centers of the Andean plain with the Chilean ports of Arica and Antofagasta. To

^{1/} The Bank has made 5 loans and provided one technical cooperation grant to the Republic of Bolivia in the aggregate amount of US\$61,850,000 equivalent; evaluations of these operations are given in Chapter VII to this report.

the north this system extends to Lake Titicaca, and at the lake port of Guaqui it joins the south Peruvian railway system through a system of ferries along the lake to the Port of Matarani in Peru. The most important cargo on this system consists of minerals, merchandise imports and merchandise exports.

- 2.08 The second railway system, in the eastern part of Bolivia, joins the city of Santa Cruz with Yacuiba whence it joins the Argentine railway system at Pocitos. A railway also starts at Santa Cruz bearing to the border with Brazil (Corumbá) where it joins the railway to Santos on the Atlantic Ocean. This railway is now being extended northward of Santa Cruz in the direction of San Pablo on the San Pablo River. The junction between both systems is effected by highway. The main cargo carried along this railway is general merchandise comprising domestic trade as well as external trade with Argentina. The traffic along the railway to Corumbá has increased in the last few years owing to the increase in trade with Brazil.
- 2.09 The World Bank in 1974 granted a loan to the Government of Bolivia in the amount of US\$5,000,000 equivalent to provide for the improvement and equipment of its railway systems. The expansion mentioned in the preceding paragraph is being carried out with the Bolivian Government's own resources and with a loan from the Argentine Government.

2. Riverine and Lake Transportation

- 2.10 The riverine transportation system is made up of an extensive network of inland waterways located in the eastern and northern part of Bolivia, measuring about 1,600 kilometers. The system is now constituted by five main waterways:
- a) The Ichilo and Mamoré Rivers, which are navigable from Puerto Villaroel to Trinidad and Guayanamerín in the north. There exists at present a highway connection between Cochabamba and Puerto Villaroel, and studies are being made for extending this highway to Santa Cruz along the flatlands of this department.
 - b) The Guaporé and Iténez Rivers, which are navigable from Piso Firme to Guayana-merín on the Madera River.
 - c) The Tahuamanu and Orthon Rivers, which are navigable from Cobija to Riberalta in the Pando Department.
 - d) The Madre de Dios River, which is navigable from Puerto Heat (along the border with Peru) to Riberalta.
 - e) The Beni River, which is navigable from Puerto Salinas to Riberalta. From the locality of Guayanamerín, on the Madera River, to Riberalta, on the Lower Beni River, merchandise is now being carried over a

highway and from this last-named port by waterway (in boats) to the Alto Beni River, whereupon it is transported by highway to La Paz. This is a difficult journey and takes too much time (more than a week).

- 2.11 Lake-going transportation is exclusive to Lake Titicaca, which is the highest navigable lake in the world (4,000 meters above sea level) and plays a very important role in trade between Bolivia and Peru.

3. Air Transportation

- 2.12 The air transportation system covers most of the national territory and, in some cases, is the only means of communication with the remote parts of the country. The system consists of a network of 161 landing fields of which 34 provide regular service to aircraft and the rest operate on an irregular basis, depending on the volume of cargo accumulated and weather conditions. The majority of these fields are located in the eastern part of the country and only the airports at La Paz, Cochabamba, Santa Cruz and Trinidad have paved runways and airport installations, whereas the others have only grass or earth runways. The airport in the city of Sucre is now being paved at the initiative of the Departmental Committee for Development of the Region.
- 2.13 Domestic air passenger travel has grown an average of 6% a year over the last five years, and about 96% of this passenger travel is catered for by the Lloyd Aéreo Boliviano (LAB) airline company, which is a government enterprise. LAB also carries 20% of Bolivia's air cargo while the remaining 80% is carried by private companies on a nonscheduled basis.
- 2.14 The insufficiency of the national transportation system to provide for the country's needs has had an adverse effect on its development. The area of the highland plain (Altiplano), owing to the fact that it has had a railway system that was designed to carry minerals, was linked with the populated centers in the region. On the other hand, the eastern part of the country was historically separated - even politically - from the rest of the national territory by the technical difficulties and high cost of constructing communications links. Later on, with the advent of air transportation, this isolation was partly remedied, though limited by the high cost. Construction of the first paved highway between Cochabamba and Santa Cruz opened up a permanent access road into a potentially wealthy area in natural resources, the development whereof exceeded all estimates that were made at the time of its construction. The Santa Cruz region is now one of the most important areas of Bolivia, and the highway has made it possible to diversify agriculture and livestock production as well as to exploit hydrocarbon resources. The area of the proposed project in the Beni is also a region whose natural resources potential is quite important,

especially for cattle raising because of its abundant natural pastures. This type of operation is now being developed though there are as yet unexploited possibilities for increasing tenfold present output. Forestry operations have not yet been started on the intensive scale, though the region has substantial natural forest areas.

B. The Project Area

- 2.15 The project surface area comprises about 100,000 square kilometers along a front of 600 kilometers, approximately, and a width of as much as 300 kilometers. ^{1/} The proposed highway would serve two well differentiated areas as regards topography, climate and production:
- i) The Yungas region, which comprises the narrow east-west valleys of the eastern cordillera, covered with semitropical forests, where farming, forestry and mining activities are carried out; and
 - ii) The Beni flatland area, which is covered with forest and natural pasture suitable for cattle raising;
- 2.16 The Yungas region is at present sparsely populated and along the existing road, towns and small agricultural settlements have sprung up in which subsistence agricultural products are raised as well as some livestock (chiefly sheep and llamas). In the more important settlements and in the towns bananas, cocoa, coffee, sugarcane, corn, fruit and vegetables are grown and are sold in the market at La Paz. In the last few years work has started on commercial exploitation of forestry resources; there are now 60 sawmills installed in the region and the treated lumber is carried to La Paz for use in construction work. There are also mineral deposits in this region and most activity takes place in the gold deposits located to the north of Caranavi, at Tipuani and Teoponte. At the place named Sararfa, to the northeast of Caranavi, a sugarmill project is now being installed with a capacity of processing 4,000 tons of sugarcane a day. In the Bellavista and Mapiri areas several sugarcane growing projects are being carried out and sugarcane pro-
- 2.17 In the Upper Beni area, between Santa Ana y Sapecho, there are some 30,000 hectares of farmable lands. Program for colonization of those lands have been under way since 1959 with financial assistance from AID and the Bank. In addition, the government is carrying out a program under which approximately 2,000 families from the Altiplano are to be resettled in the same region. Lastly, the Bank is studying a request for technical cooperation in preparing a project for agricultural development in the area of influence of the highway to the Beni area. All these colonization programs now in progress, as well as those to be carried in the near future, will benefit directly from the improvement of the road to La Paz, which would provide an adequate all-weather route for the transportation of produce and for social and political linkage with the rest of the country, bringing the area firmly into the national economy.

^{1/} See map on page 11.

- 2.18 The most important economic activity in the Beni area at present is the raising of beef cattle for domestic consumption and for export (chiefly to Peru and Chile). The beef cattle population is estimated to exceed one million heads of livestock, located in the Beni region to be served by the proposed highway. Likewise, the ample forest resources in the region have barely been exploited. Transportation of output from the Beni region is done almost exclusively by air, though with the construction of the proposed highway the cargo would be carried by truck to the consumption centers.
- 2.19 In the Beni Department, the area between San Borja, San Ignacio and Trinidad is the greatest producer of beef cattle; it contains the most important cattle-raising ranches in Bolivia, - most important by reasons of quality and abundance of natural pasture. However, most of this area is at present unexplored, and therefore, has considerable available potential for further developing this kind of cattle-raising. The World Bank has in the last five years financed three agricultural and technical assistance programs, the beneficiaries whereof were the cattlemen in the Beni Department. These programs have contributed to the development of livestock activities in the region.
- 2.20 Construction of the proposed road to San Borja would provide a natural outlet for cattle production from this region and thus supplement the area's highway system, since the government is now building a highway from San Borja to San Ignacio, and this last-named location is linked with Trinidad by an earth-surfaced road which would thus increase traffic volume and enable more intensive utilization of the proposed road.
- C. The Project's Relationship to the National Development Plan
- 2.21 Linking the Beni Department by highway with the rest of the national territory has been a constant concern of the various Bolivian Governments during the last 15 years. The first Development Plan (1966) ever formulated in Bolivia even then stated as a goal the construction of the highway to the Beni region. In 1962 work started on the first serious studies of this road and were included in the National Work Plan for 1966. In the comprehensive transportation study done in 1969 the road linking Beni and Pando was given first order of priority. The selection of the route was done on the basis of a feasibility study carried out in 1965, which was later on amended (1969) to the definitive bearing selected by means of a highway engineering study financed through loan 17/CD-BO.
- 2.22 The 1970-75 National Highway Plan, now in force as updated, sets forth that the La Paz-Beni project has a high priority, and the present government has set as its aim to tie in and integrate the Beni Department with the rest of the national economy in the shortest possible period of time, for which purpose it has been providing decided financial support in the national budget (see Chapter V herein).

III. THE PROJECT

A. Objective

- 3.01 The principal objective of this project is to collaborate in the execution of the first phase (La Paz-San Borja) of the Beni Highway, which is part of the national program to connect and integrate the Department of Beni with the national highway system. The purposes of this are: (i) to promote the economic and social development of the Department of Beni; (ii) to give the department's products access to the major markets of the country; (iii) to incorporate the population of that region into the economic, educational and social activities of the rest of the country; and (iv) to relocate in the department some of the excess population of the Altiplano by means of land settlement programs.

B. The La Paz-San Borja Highway

- 3.02 The La Paz-San Borja Highway has three sections: (i) La Paz-Cotapata; (ii) Cotapata-Alto Beni River; and (iii) Alto Beni River-San Borja (see map, page 11). The highway would be built in two stages, depending on the country's financial possibilities.
- 3.03 The first stage of the highway involves the following:
1. Reconstruction of the initial stretch of the highway from La Paz to the Cotapata area, a section 43.2 kilometers long. It would be financed from the resources of the prospective Bank loan and the counterpart funding from SENAC. These investment funds would become part of the project, as it would be defined in the loan contract.
 2. Construction of a motor trail ^{1/} for gear-round traffic, between the Alto Beni River and San Borja. This section, approximately 142 kilometers long, is the third section of the highway. The financing of this work would be the exclusive responsibility of SENAC and the Army Engineering Service (SIE) which would use their own resources apart from the counterpart funding for the project. This investment would not be part of the project even though the loan contract could include provisions obligating the Republic of Bolivia to complete this section within the disbursement period of the loan (see Recommendations).

^{1/} A motor trail is a one-lane temporary road with an unpaved (asphalted) wearing course. The surface is of earth and graded materials; and has a temporary drainage system. Its bearing fits the conditions of the terrain in order to allow the minimum acceptable amount of earth-moving. The road has a horizontal crest with pronounced grades.

3. Construction of three large bridges over the Yara and Yolosa Rivers (both located in the second section of the highway) and over the Alto Beni River, and 16 smaller bridges as well, all in the third section, except the Piquendo Bridge to be located at the end of the second section. These investments would be part of the project, as defined in the loan contract.

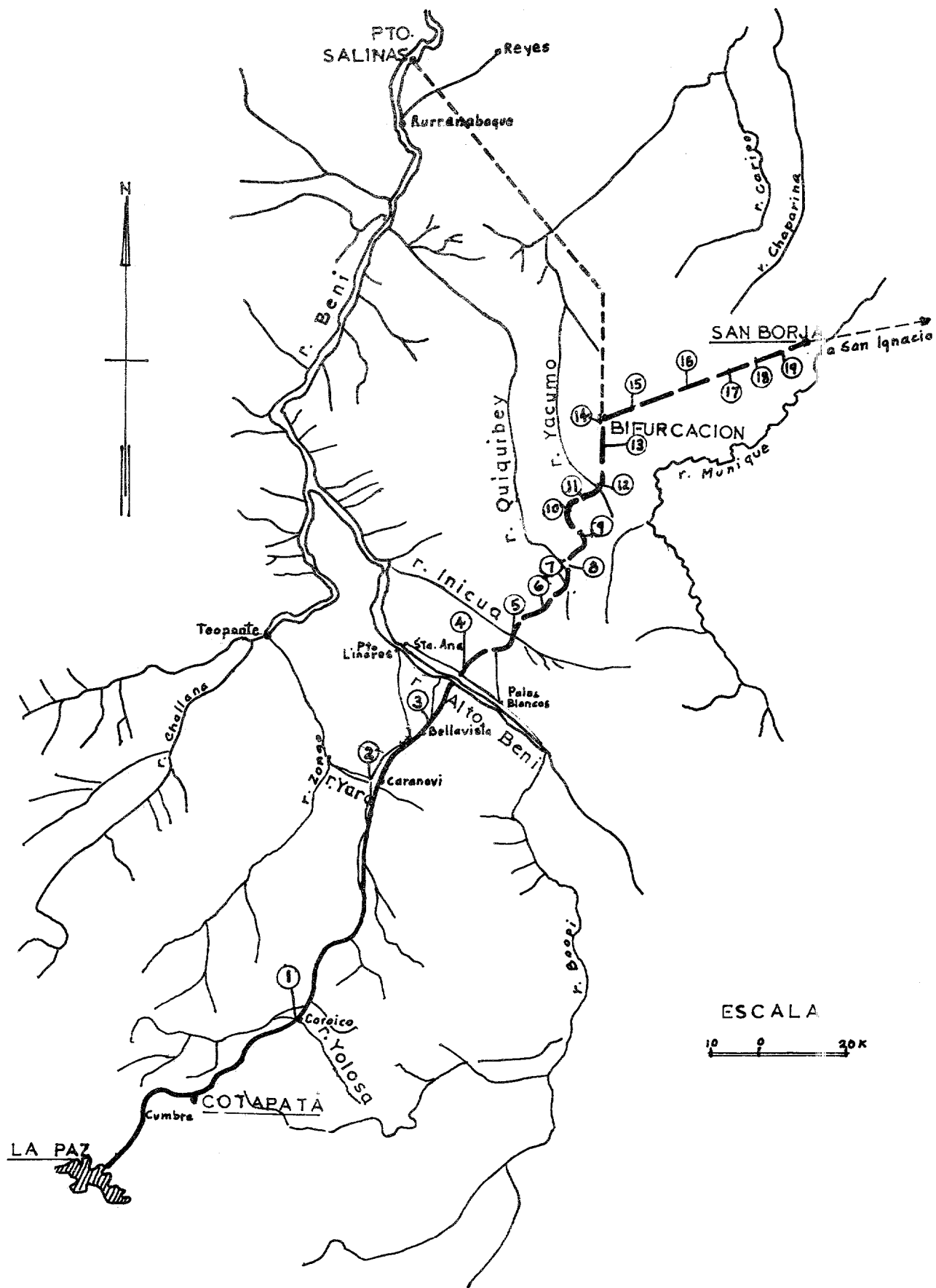
3.04 The second state of the highway would involve the following:

1. Reconstruction of the second section of the Cotapata-Alto Beni River Highway. Execution of this work would be done at some as yet undetermined time in the future, depending on the country's financial availabilities. However, the last 13 kilometers of this section, between Bellavista and Alto Beni, are now being built by SENAC under force account, following the bearing line and characteristics of the final engineering design. This part of the road will give access to the construction sites for the bridges over the Piquendo and Alto Beni Rivers included in the first stage (see paragraph 3.08).
2. Improvement of the motor trail between the Alto Beni River and San Borja site, built during the first stage of the project in accordance with the final engineering designs. This improvement would be made at some time in the future, depending on traffic demands and the financial availabilities of SENAC.

C. Description of the Proposed Project

- 3.05 As explained, the project for which financing is requested from the Bank and which constitutes the object of this operation consists in the execution of the following works in the first stage construction of the highway: (i) reconstruction and paving of the La Paz-Cotapata section, 43.2 kilometers; (ii) construction of the Yolosa and Yara bridges located along the Cotapata-Alto Beni River section, 75 meters and 200 meters long, respectively; (iii) construction of a larger bridge over the Alto Beni River, 570 meters long; and (iv) construction of 16 smaller bridges between the approaches to the Alto Beni River and the San Borja locality, with a combined length of 874 meters. 1/
- 3.06 The La Paz-Cotapata section, the first part of the highway, would be a two-lane road, with an asphalted wearing course, and conforming to Category I specifications; it would have the widest possible vertical and horizontal curves allowed by the topography and grades suitable for a mountain road. Both the small and large bridges would be built of prestressed concrete and all would be along the final line of the

1/ These bridges are listed in Appendix 1 of this report. Their locations are shown on the map on next page.



CARRETERA LA PAZ - SAN BORJA

La Paz-San Borja Highway, as determined in the final study made by the consultants (see Chapter IV of the report). 1/

- 3.07 The motor trail between Alto Beni and San Borja, which would be built by SENAC and SIC, as an addition apart from the proposed project, would also be built along the bearing line given in the final engineering study. It would depart from this bearing only in those places where the topography would raise the construction costs greatly (such as, large volume earth-moving). Building the road this way will make most of the road suitable for later expansion and improvement to meet the final highway specifications. The roadway would be four meters wide. As of the end of June, 1975, 44 kilometers of this trail had been built, from Alto Beni to the La Cascada River, and it is now in service. The critical section of this trail is along the peaks of the last spurs of the eastern mountain chain, in the area of the Yacumo River. From this point to San Borja, the road would be on level ground and there the pace of construction could be stepped up. Another 43 kilometers would have to be built before this point is reached. SENAC estimates that it will accomplish this during 1976. The total cost of completing this section is estimated at the equivalent of US\$5,500,000.
- 3.08 The Bellavista section, a supplementary work to the proposed project and under the responsibility of SENAC, which will have its own financing not included in the project, as mentioned in paragraph 3.04, consists of the construction of 13 kilometers of highway between Bellavista and the left bank of the Alto Beni River.

This section would connect with the existing highway from La Paz and lead to the construction sites of the Piquendo and Alto Beni bridges located 6 kilometers apart. Its total cost is estimated at the equivalent of US\$2,300,000 and construction should be finished by late 1977. However, in 1976 SENAC would open useable temporary roads to those sites before awarding the contracts for these works to the contractor selected (see Recommendations).

D. Total Cost and Financing of the Project

1. Total cost

- 3.09 The total cost of the project to be financed with the Bank loan is estimated at the equivalent of US\$56 million, allocable as follows:

1/ The advisability and timing of the construction of these bridges in the first phase are analyzed in Chapter VI of this report.

(In equivalent of US\$ thousands)

	Costs in Foreign Currency			Costs in local currency	Total
	Direct	Indirect	Subtotal		
<u>ing and Administration</u>	<u>1,050</u>	<u>-</u>	<u>1,050</u>	<u>3,000</u>	<u>4,050</u>
vision	1,050	-	1,050	2,450	3,500
istration	-	-	-	550	550
<u>ts (Construction)</u>	<u>7,250</u>	<u>13,000</u>	<u>20,250</u>	<u>14,050</u>	<u>34,300</u>
az-Cotapata	2,520	11,080	13,600	10,900	24,500
sa and Yara bridges	550	200	750	500	1,250
Beni river bridges	2,060	880	2,940	1,460	4,400
ges to San Borja	2,120	840	2,960	1,140	4,100
ts of Way	-	-	-	50	50
<u>Charges</u>	<u>1,800</u>	<u>-</u>	<u>1,800</u>	<u>350</u>	<u>2,150</u>
rest during execution	850	-	850	350	1,200
t commission	500	-	500	-	500
nspection fee	450	-	450	-	450
<u>ed</u>	<u>3,400</u>	<u>5,800</u>	<u>9,200</u>	<u>6,300</u>	<u>15,500</u>
escalation	2,200	3,800	6,000	4,100	10,100
ngencies	<u>1,200</u>	<u>2,000</u>	<u>3,200</u>	<u>2,200</u>	<u>5,400</u>
TOTAL	<u>13,500</u>	<u>18,800</u>	<u>32,300</u>	<u>23,700</u>	<u>56,000</u>
Percentage	24.1	33.6	57.7	42.3	100.0

- 3.10 The costs included under the engineering and administration item are for (i) consulting services for supervision of works execution; and (ii) wages and expenses of SENAC personnel working directly on project execution.
- 3.11 The construction costs were determined by the consultants who made the project studies on the basis of the final engineering plans and the volume and quantities of work. These are as follows for the La Paz-Cotapata section:

<u>Item</u>	<u>Quantity</u>	<u>Unit price US\$</u>
Excavation, basic works (m ³)	5,670,000	3.35
Graded materials (m ³)	780,000	0.64
Structural excavation (m ³)	15,000	9.20 <u>1/</u>
Removal of earthslides and rubble (m ³) (estimate)	400,000	1.00
Granular sub-base (m ³)	12,000	7.00
Granular base course (m ³)	73,000	13.00
Double treatment (m ²)	286,000	1.25
Type A concrete (m ³)	900	170.00 <u>1/</u>
Prestressed concrete (m ³)	430	460.00 <u>1/</u>
Reinforcing rods (Kg)	137,090	1.45 <u>1/</u>
Concrete drainpipe (ml)	3,422	145.00 <u>1/</u>
Corrugated pipe - 36" (ml)	267	86.00 <u>1/</u>
Rolled pipe (ml)	289	525.00 <u>1/</u>

- 3.12 The unit prices are based on July, 1975 construction costs in Bolivia. The average construction cost per kilometer for the La Paz-Cotapata section is the equivalent of US\$567,000, a reasonable figure considering that this section crosses the mountain range at the highest point of the highway (4,600 meters above sea level) where terrain conditions (rock) are difficult, resulting in higher construction costs.
- 3.13 The average costs of the smaller bridges would be US\$4,600 and of the larger bridges, US\$7,700, per linear meter. These costs are reasonable and in line with current costs for such structures.
- 3.14 The unspecified item includes 12% per year for cost escalation of building materials and supervision, and 15% of the total of these items for contingencies. The annual estimate of the percentage of cost escalation is considered adequate, judging by price trends in Bolivia in 1974 and the Bank's analysis of general escalation of construction materials prices in Latin America. As regards the contingencies percentage (15% of direct costs and supervision), this includes probable increases in the quantity of labor above the amount specified in the final engineering plans and the work supervision

1/ Typical price for several types.

expenditures. This percentage is appropriate considering that the designs for the works to be executed are now available (see Chapter IV).

- 3.15 The direct costs in foreign currencies correspond to the cost of imported materials, freight and overhead, and the fees of international contractors. The indirect costs in foreign currency correspond primarily to depreciation of the foreign-bought heavy equipment. The national currency component includes the salaries of national technicians assigned to administration of the project, wages for national workers, locally bought materials, overhead and fees of contractors.
- 3.16 The direct construction costs in foreign currency and local currency for this project were estimated on the basis of an analysis of unit prices and on the assumption that approximately 80% of the work would be executed by international contractors. ^{1/} A cost analysis was made for each element of construction. Each was divided into labor, materials, equipment and so forth, and the individual amounts in foreign and local currencies were identified. The results of this analysis expressed in percentages are given below:

(Percentage of Construction Costs)

<u>Principal categories</u>	<u>Direct</u>	<u>Indi- rect</u>	<u>Total</u>	<u>Costs in local currency</u>	<u>Total</u>
1. Labor	1.7	-	1.7	7.6	9.3
2. Equipment	-	23.5	23.5	-	23.5
3. Spare parts	-	10.8	10.8	-	10.8
4. Fuel and lubricants	-	-	-	8.2	8.2
5. Materials ^{2/}	15.3	-	15.3	5.8	21.1
6. Overhead and fees	4.2	3.6	7.8	19.3	27.1
Partial total	<u>21.2</u>	<u>37.9</u>	<u>59.1</u>	<u>40.9</u>	<u>100.0</u>

2. Financing plan

- 3.17 The estimated financing plan for this project is as follows:

^{1/} Bolivia has few construction companies large enough and experienced enough to undertake a project of the scale proposed here. Furthermore, considering the volume of construction there now, much of their capacity is being taken up in other projects. Consequently, it is assumed that these companies would work with international contractors in the execution of this project.

^{2/} Includes primarily steel, cement and asphalt for the construction of the roads and bridges, as well as explosives for rock excavation.

(In equivalent of US\$ thousands)

	IDB Loan			SENAC			Total
	Costs in foreign currency	Costs in local currency	Sub- total	Costs in foreign currency	Costs in local currency	Sub- total	
<u>Engineering and Administration</u>	<u>1,050</u>	<u>2,450</u>	<u>3,500</u>	<u>-</u>	<u>550</u>	<u>550</u>	<u>4,050</u>
Supervision	1,050	2,450	3,500	-	-	-	3,500
Administration	-	-	-	-	550	550	550
<u>Project Costs (Construction)</u>	<u>20,250</u>	<u>7,550</u>	<u>27,800</u>	<u>-</u>	<u>6,500</u>	<u>6,500</u>	<u>34,300</u>
La Paz-Cotapata	13,600	6,400	20,000	-	4,500	4,500	24,500
Yolosa and Yara bridges	750	250	1,000	-	250	250	1,250
Alto Beni river bridge	2,940	610	3,550	-	850	850	4,400
Bridges to San Borja	2,960	290	3,250	-	850	850	4,100
. Rights of way	-	-	-	-	50	50	50
<u>Financing Expenses</u>	<u>1,300</u>	<u>-</u>	<u>1,300</u>	<u>500</u>	<u>350</u>	<u>850</u>	<u>2,150</u>
Interest during execution	850	-	850	-	350	350	1,200
Credit commission	-	-	-	500	-	500	500
IDB inspection fee	450	-	450	-	-	-	450
<u>Specified</u>	<u>9,200</u>	<u>3,200</u>	<u>12,400</u>	<u>-</u>	<u>3,100</u>	<u>3,100</u>	<u>15,500</u>
Cost escalation	6,000	2,100	8,100	-	2,000	2,000	10,100
Contingencies	3,200	1,100	4,300	-	1,100	1,100	5,400
TOTAL	<u>31,800</u>	<u>13,200</u>	<u>45,000</u>	<u>500</u>	<u>10,500</u>	<u>11,000</u>	<u>56,000</u>
Percentage	56.8	23.6	80.4	0.9	18.7	19.6	100.0

- 3.18 The sources and uses of the currencies for financing the project would be as follows:

(In equivalent of US\$ thousands)

	<u>Origin of funds</u>		<u>Expenditures to be incurred</u>		<u>Totals</u>	<u>%</u>
	<u>Foreign currency</u>	<u>Local currency</u>	<u>Foreign currency</u>	<u>Local currency</u>		
IDB	35,000	10,000	31,800 ^{1/}	13,200 ^{2/}	45,000	80.4
SENAC	500	10,500	500	10,500	11,000	19.6
Totals	<u>35,500</u>	<u>20,500</u>	<u>32,300</u>	<u>23,700</u>	<u>56,000</u>	<u>100.0</u>
Percentages	63.4	36.6	57.7	42.3	100.0	

3. Use of the loan resources

- 3.19 The loan resources, totaling the equivalent of US\$45 million (US\$35 million in foreign currency and the equivalent of US\$10 million in Bolivian pesos), would be used to finance all the foreign currency expenditures of the project, both direct and indirect, except the credit commission, the total of these expenditures being US\$35.5 million. The balance of the loan, in the equivalent of US\$13.2 million (the equivalent of US\$10 million of which would be disbursed in Bolivian pesos) would be used to cover part of the project expenditures in local currency for supervision (equivalent to US\$2,450,000), construction (equivalent to US\$7,550,000) and unspecified items (equivalent to US\$3,200,000).
- 3.20 The counterpart funding for the financing of this project would be equivalent to US\$11 million. This money would be used to cover the balance of the expenditures in local currency for administration (equivalent to US\$550,000), construction (equivalent to US\$6,500,000), interest in local currency (equivalent to US\$350,000) and unspecified item (equivalent to US\$3,100,000). It would also be used to finance the credit commission, in foreign currency, estimated at US\$500,000.
- 3.21 In addition to this counterpart funding, but not part of it nor included in the total cost of the project to be financed with the resources of the loan, the Bolivian Government would invest the equivalent of US\$7,800,000 ^{3/} over the next five years in construction by force account of a motor trail between Alto Beni and San Borja, and the Bella-vista access road to the new bridges over the Alto Beni and Piquen Rivers (see Chapter IV of this report).

^{1/} Includes the equivalent of US\$18,800,000 for indirect costs in foreign currency.

^{2/} US\$3,200,000 would be taken from the foreign currency of the loan to finance local expenditures of the project.

^{3/} If this amount were included in the total cost, the project would reach the equivalent of US\$63,800,000 and the counterpart funding would amount to 29.6% of this amount.

4. Terms and conditions of the loan

- 3.22 It is recommended that the prospective Bank loan should be granted chargeable to the resources of the Fund for Special Operations under the softest terms allowed by that fund, considering that: (i) Bolivia is one of the relatively least developed countries of Latin America and has a small market; it has consequently always deserved special treatment by the Bank; (ii) the project service area is a low income region in Bolivia and it would be settled primarily by the excess rural population of the Altiplano; and (iii) the project, a highway, is one of slow maturation, since it will take several years before the road is useable to maximum capacity. In addition, in the particular case of the La Paz-San Borja Highway, it would incorporate a region of incipient development but with great potential in natural resources into the national economy, thereby requiring supplementary investment for complete development.
- 3.23 Consequently, it is recommended that the loan should be granted on the following terms and conditions:
- a) Amortization: 40 years
 - b) Grace period: 10 years
 - c) Disbursement period: 5 years
 - d) Interest: during the grace period: 1% per annum
for the remainder: 2% per annum
 - e) Credit commission: 0.5% per annum.
- 3.24 Considering the economic situation of Bolivia, whose inflation rate was high in 1974 and which expects a moderate deficit in its balance of payments for 1975 and 1976 (see financial indicators - Appendix 4 of the report), it is also recommended that part of the resources of the loan (US\$3,200,000) be used to finance local expenditures of the project. This amount would represent only 7.3% of the loan and 9.1% of its foreign currency amount.

IV. EXECUTION OF THE PROJECT

A. Execution

- 4.01 As defined in Chapter III of the report, the proposed project would be carried out by the SENAC through its Construction and Bridges Departments.
- 4.02 Construction of the La Paz-Cotapata highway section offers no special technical difficulties aside from the natural difficulties of construction along the mountain range and at an altitude above sea level such as affects equipment performance (construction work will be done from 3,700 meters to 4,600 meters at the highest point). The technical characteristics of the highway are given in Appendix 2 to the Project Report. Similarly, construction of the bridges offers no special problems as regards their erection, since simple, prestressed concrete structures are involved, especially in the smaller bridges and the bridges over the Yolosa and Yara Rivers. Construction of the bridge over the Alto Beni River, since it is longer and the river is subject to severe flooding, will pose the greatest technical problems.
- 4.03 The chief problem in the construction of the bridges may turn out to be the preparation of the access roads to the bridge construction sites. In the case of the Yara and Yolosa bridges there are now usable approaches to the definitive construction sites. Approaches for the other bridges will be constructed together with the complementary work to the proposed project and are described in Chapter III.
- 4.04 In effect: (i) the Bellavista-Alto Beni section, which would afford access to the Piquendo and Alto Beni bridges, is projected for completion by the end of 1977. However, the provisional approaches to both bridges could be emplaced in the course of 1976 to enable the works to be started; and (ii) the motor trail that would complete the road to San Borja would afford access to the 15 smaller bridges located to the east of the Alto Beni River. This trail would be completed in 3 years, approximately, ^{1/} and by the end of 1977 SENAC would have built accesses to all bridge construction sites. Therefore, three years of the disbursement period of the respective loan would remain (assuming that the contract is signed in January 1976) for inviting bids for the last smaller bridges and for carrying out the associated construction work. This term regarded as reasonable considering the present advance of construction of the trail (44 kilometers completed) and the volume of heavy equipment now being

^{1/} Within the estimated five-year term for project execution.
(see Recommendations).

used by the SENAC and the SIE along the area of construction 1/ which at the end of June 1975 had progressed to the La Cascada River, four kilometers from the Quiquibey River. However, before awarding bids for bridge construction east of the Upper Beni River SENAC must demonstrate to the Bank that it has built the section of the trail between the Upper Beni and D'Artagnan rivers and that the schedule for completion of the trail as far as San Borja is such as to assure completion of the entire trail with the period for the last disbursement from the loan (see Recommendations).

B. Project Studies and Designs

- 4.05 The technico-economic feasibility studies of the project were revised and approved by the Bank in May 1975. The final engineering designs were completed in August 1975. These studies were financed partly with resources of Loan 16/CD-BO. 2/ The construction plans and technical specification were submitted to the Bank also in August 1975. The final plans of all bridges to be constructed are being revised by the SENAC and will be submitted to the Bank in the course of 1975.
- 4.06 Furthermore, the SENAC has delivered to the Bank the following documents which are now undergoing review: (i) documentation concerning prequalification of contractors' firms (bases, terms of reference, regulations, etc.); (ii) bid schedules and base for bidding on construction work, to be delivered to the construction contracting firms that eventually qualify to present proposals; (iii) draft construction contract; (iv) terms of reference for selecting consultants to be charged with construction work supervision, and (v) draft contract for supervisory services. 3/
- 4.07 Once all this project documentation is revised and approved by the Bank (see Recommendations) the SENAC would be able to start executing the project - immediately upon the signing of the loan contract - by instituting proceedings for prequalification of construction contractors and selecting consultants for supervision. In order to expedite initiation of the project, the SENAC intends to start the prequalification proceedings of contractors and selection of consultants before the contract is signed, with the prior authorization of the Bank. (See paragraph 4.13.)

C. Line Schedule of Investments and Period of Execution

- 4.08 The project execution period is estimated at 5 years, of which the first 6 or 8 months would be taken up by the process of inviting bids and contracting the construction firm (contractor). The

1/ Appendix 3 to the Project Report gives a list of the equipment being used as of June 1975 in the construction of the motor trail.

2/ See Chapter VII herein for the evaluation of this loan.

3/ The regulations to be used for inviting for bids would be the same ones used in previous loans (see paragraph 4.09).

estimated term allowed is regarded as a reasonable and realistic one, chiefly because it will make it possible to finish the La Paz-Cotapata section (earth movement is estimated at 6.5 million cubic meters) and to construct the 19 bridges the project comprises. Given the volume of work to be done, bearing in mind that the engineering designs are completed and given the status of preparation of the necessary documents for inviting construction bids and contracting works supervision the following time schedule for disbursements has been estimated:

(Equivalents in thousands of US\$)

	<u>1st. year</u>		<u>2nd. year</u>		<u>3rd. year</u>		<u>4th. year</u>		<u>5th. year</u>		
	<u>IDB</u>	<u>SENAC</u>	<u>IDB</u>	<u>SENAC</u>	<u>IDB</u>	<u>SENAC</u>	<u>IDB</u>	<u>SENAC</u>	<u>IDB</u>	<u>SENAC</u>	T
ering and administration	500	50	750	125	750	125	750	125	750	125	4
costs	3,250	1,350	9,050	3,000	8,400	1,800	4,800	650	1,950	50	34
ing charges	110	180	220	160	350	100	460	40	510	20	2
ified	<u>1,440</u>	<u>570</u>	<u>4,080</u>	<u>1,365</u>	<u>3,800</u>	<u>825</u>	<u>2,190</u>	<u>315</u>	<u>890</u>	<u>25</u>	<u>15</u>
tal	<u>5,300</u>	<u>2,150</u>	<u>14,100</u>	<u>4,650</u>	<u>13,300</u>	<u>2,850</u>	<u>8,200</u>	<u>1,130</u>	<u>4,100</u>	<u>220</u>	<u>56</u>
percentage	9.5	3.8	25.2	8.3	23.7	5.1	14.6	2.0	7.3	0.5	10

D. Procurement and Contracting of Goods and Services

- 4.09 The work forming part of the project to be financed through the loan would be carried out by means of international public invitations for bids since all procurements and contracts would amount to more than the equivalent of US\$25,000. The regulations to be used for inviting bids would be the same as those used in previous loans, 1/ as they meet the requirements of Bolivia's laws now in effect as well as the terms and conditions acceptable to the Bank in keeping with its policies and with the purposes of the loan (see draft resolution).
- 4.10 For purposes of inviting bids and awarding construction contracts, the SENAC proposes to divide these into the following groups and amounts which are regarded as acceptable and are consistent with the time schedule of project execution:

<u>Invitation for Bids</u> <u>2/</u>	Amount in thousands of <u>US\$</u>	<u>Date</u>
1. La Paz-Cotapata Highway	24,500	June 1976
2. Yolosa and Yara Bridges	1,250	June 1976
3. Piquendo and Alto Beni Bridges	4,800	June 1976
4. Bridges named: Inicua, San Andrés, La Cascada, Quiquibey, Monitos A and Monitos B, Mitre C, Yacumo, Coripo, and D'Artagnan	2,980	September 1977
5. Bridges named: Caripo, Chaparina Grande, Chaparina Chico, Tebaida, Bibaje <u>3/</u>	800	December 1977

- 4.11 It is estimated that the unit volume of construction work of the first four invitations for bids shown in the preceding table would be so attractive to international construction contractors as to encourage their submission of bids; but, the fifth invitation for bids, owing to its small amount and to the location of the bridges, would perhaps more likely be within the scope of local contractors.

1/ The draft regulations are attached as Appendix 8 to this report.

2/ Invitations for bids would be grouped, as far as possible, into packages so as to enable participation of construction firms in the whole of the work to be done or in part of it, that is, in given works.

3/ All located in the last-named sector, from the fork leading to San Borja.

E. Work Supervision and Control

- 4.12 Supervision and quality control of the various components making up the construction work will be done by a firm of engineering consultants engaged especially by the SENAC for the purpose. This contracting shall be approved previously by the Bank and it will be a requirement that this be done before the first disbursement of the prospective loan. (See draft resolution).
- 4.13 It is appropriate to point out that during execution of the previous highway loans the SENAC gained valuable experience in works supervision and control as well as in dealing with the complex process of inviting bids for work. In the case of the present project, the Ministry of Transportation and Communications, of which the SENAC is a dependent unit, has consulted the Bank, by letter of August 13, 1975, as to the possibility of engaging the engineering consulting firms that were in charge of preparing the project studies for Loan 17/CD-BO to do the works supervision in this case. 1/ The consultation is now under consideration. It was drawn up on the following grounds: (i) the SENAC is satisfied with the services rendered by the firms proposed during execution of the studies financed through the abovementioned loan and, based on experience obtained in the construction of highways and the information gained about the project area, the capacity of these firms to supervise the accomplishment of the works under this project is regarded as adequate; (ii) to continue to make use of the services of the same firms would perhaps bring about a reduction in the cost of supervision; and (iii) by avoiding a contest among consulting firms for this kind of services an important time saving would be achieved, and therefore, an earlier start on the invitations for bids, as well as a reduction of the cost of construction by shortening the period of time open to price escalation.

F. Right of way

- 4.14 The bearing line of almost all of the proposed highway runs through government-owned land and, therefore, no problems concerning rights of way are anticipated such as might delay timely execution of the work. The total estimated project cost includes an item of US\$50,000 equivalent, chargeable to the local contribution to the project, for purchasing land located along the right of way near the city of La Paz. This amount is regarded as adequate and sufficient to the purpose. However, the SENAC shall give evidence to the Bank that it has acquired the right of way before inviting bids for any of the work called for by the project. (See Recommendations.)

1/ The firms: De Leuw Cather Canada Ltda., associated with Prudencio Claros Asociados.

G. Highway Maintenance

- 4.15 The SENAC is in charge of maintaining all highways in Bolivia, a task it accomplishes through its Maintenance and Improvement Department. The technical staff assigned this task has sound professional training; the kind of highway maintenance carried out by the SENAC is satisfactory within the limits of its annual budget allocation. 1/ The most important limitation as regards road maintenance in Bolivia is the availability of equipment. The government, awake to the problem entered into an agreement in 1954 with the Government of Brazil to acquire equipment, both heavy and light, in the amount of as much as US\$12 million equivalent. This equipment is now being received by the SENAC in order to expand its highway maintenance and conservation activities. Likewise, its budgetary allocation for maintenance has been increased by more than US\$1.5 million.
- 4.16 The costs of maintaining the La Paz-Cotapata section are estimated at the equivalent of US\$1,200 per kilometer per year. Maintenance of the bridges would amount to the equivalent of US\$10 per meter per year.

It is felt that the SENAC will be capable of carrying out adequate maintenance of the highway once it is finished, in keeping with the normal requirements imposed by the Bank (see Appendix III - Annex B to the loan contract).

H. Project Inspection and Supervision

- 4.17 Project inspection and supervision by the Bank would be carried out by the Office of the Bank's Representative in Bolivia.

1/ Chapter V herein gives the number of kilometers and type of maintenance carried out by the SENAC.

V. THE BORROWER AND THE EXECUTING AGENCY

A. The Borrower and Executing Agency

- 5.01 The Republic of Bolivia would be the borrower. The project would be executed by the SENAC, a government organization created on February 21, 1964 (by Executive Decree 06684) and reorganized the following year (by Decree Law 0790) as a decentralized agency of the Ministry of Transportation, Communications and Civil Aviation, having technical and administrative autonomy. In accordance with these decrees the SENAC is the unit of the Ministry charged with responsibility for studies, construction, supervision and maintenance of the national highway system. The institutional aspects of the SENAC were analyzed during examination of the applications for the loans granted previously. ^{1/} Therefore, there follows only a short account of the main features of the institution.

B. Organization of the Executing Agency

- 5.02 The organization of the SENAC consists of a General Management, comprising the administrative department and five technical departments. The heads of the latter departments constitute the Technical Council of the SENAC, which advises the Director in the performance of his functions. The Director is appointed by the President of the Republic of Bolivia. These technical departments have the following main functions:
1. Department of Planning and Programming: It is responsible for carrying out studies, maintaining statistical records, and doing the necessary investigations for periodic preparation of the investment plans of the SENAC.
 2. Department of Studies and Construction: It is responsible for preparation of highway projects, design specifications, supervision and construction. Owing to the small size of its technical staff that carries out diverse works construction duties, this department does only a limited number of studies and supervises some projects directly. However, it does use the services of specialized firms in preparing most studies and in supervising larger-scale works. The department would be charged with the chief responsibility in the execution of a proposed project.
 3. Department of Maintenance and Improvement: It is responsible for the preparation and implementation of annual plans for maintenance

^{1/} See Documents PR-541, PR-553 and PR-623 of November 1, 1972, December 4, 1972 and May 7, 1974, respectively.

and improvement of the national highways. This department oversees the maintenance districts which perform this work throughout the national territory. SENAC maintains about 15,191 kms of roads. About half of these roads (7,576 kms) receive routine maintenance and the remaining 7,615 kms are maintained periodically as required to keep them serviceable. The 12,928 kms of local roads in the Bolivian highway system are maintained by the beneficiary population who do this work as compensation for being exempted from the payment of the highway use tax.

4. Department of Bridges and Structures: This department is responsible for the preparation of engineering studies of bridges and other highway structures as well as the supervision of their construction. In the project proposed herein the department would advise the Construction Department as regards the bridges included in the project.
5. Equipment Department: This department is responsible for the procurement and maintenance of equipment and materials used by the SENAC in the construction and maintenance of highways.

C. Personnel and Functions

- 5.03 The SENAC has a staff of about 2,905 employees; this includes engineers, technicians, clerks and manual laborers. SENAC has a work force with technical expertise and enough experience to administer the proposed project. This experience was gained in the execution of the previous loans (see Chapter VII to this report) and of major highway works during the last few years. The Central Office in La Paz has 305 employees, of whom 58 are professional staff, mainly civil engineers and mechanical engineers specialized in design, construction and maintenance of highways, and the rest are aides, technicians and administrative staff.
- 5.04 There are about 2,600 employees assigned to the districts, that is, about 90% of the total staff of the SENAC. The District Engineers supervise the preparation of engineering studies and the construction of the smaller projects executed within the districts.

D. General Financial Administration

- 5.05 The Administrative Department of SENAC is in charge of all the administrative and accounting functions. These functions are performed through the departments of accounting and general services.
- 5.06 The accounting division is in charge of budgetary accounting, the cost accounting system and budgetary controls. Accounting is done on the basis of a system of accounts in use since SENAC started its operations. The accounting records are kept in acceptable fashion and facilitate the examination of the SENAC's financial condition. The cost accounting

system in use apportions the expenses to each of the operating units of the SENAC, according to the expenses incurred, allocating the former by use such as, highway maintenance, repairs and construction work. This system provides the SENAC with information on costs per kilometer of maintenance and construction of each road and of the construction works themselves.

- 5.07 As is characteristic to organizations of this kind, budgetary control is limited to matching budget items with expenditures. There is no adequate control over the use of budgeted amounts and the budgeting system is not directly tied in with SENAC's accounting system, even though reasonably accurate figures may be obtained for analytical purposes.
- 5.08 The Division of General Services is charged with procurement, storage and distribution of supplies and materials. This division uses adequate procedures for inventory control of storage, stocks being tagged within this Division as well as at each one of the warehouses, periodical physical counts being made and tallied with the records.

E. Internal Auditing

- 5.09 In accordance with the provisions of loan contract 342/SF-B0, the SENAC undertook to implement a plan for reorganizing its auditing office which was previously a part of the Administrative Department and lacked sufficient authority to function as the internal auditing unit of SENAC. As a result, an auditing activity was created in keeping with guidelines approved by the Bank. This unit reports directly to the Director General of SENAC and the performance of its duties is regarded as adequate so far.

F. External Auditing

- 5.10 The Office of the Controller General of the Republic exercises prior control over the expenditures of the SENAC in order to ensure compliance with the rules governing the procurement of materials and supplies. However, this supervision does not mean that there is effective control over the expenses authorized in the annual budget of the SENAC. Therefore, as has been required in previous loans executed by SENAC, it is recommended that the financial statements of the project should be audited by a firm of independent auditors acceptable to the IDB and submitted within 120 days of the close of each fiscal year, starting with the year ending December 31, 1976. (See Recommendations)

G. Capacity of the Executing Agency

- 5.11 It is felt that the SENAC has the managerial and administrative capacity as well as the financial and technical capacity suitable for effectively executing the project and managing the prospective loan since

it has the trained technical staff to perform such duties and, in addition, it has experience in the administration of loans granted by international organizations. Furthermore, the hiring of consulting engineers to advise the SENAC in works supervision and control would ensure their technical quality.

H. Historical Financial Analysis

1. Resources of the Executing Agency

- 5.12 The SENAC obtains funds from three main sources: (i) National Government budgetary appropriations; (ii) participation in taxes collected by other institutions; (iii) direct taxes earmarked solely for the SENAC. The following table summarizes the SENAC's revenues in the last three years:

(In thousands of US\$ equivalent) 1/

<u>Revenue</u>	<u>1972</u>		<u>1973</u>		<u>1974</u>	
	<u>Amount</u>	<u>% of Total</u>	<u>Amount</u>	<u>% of Total</u>	<u>Amount</u>	<u>% of Total</u>
<u>Allocations</u>						
National Treasury	4,689	54.5	3,734	28.3	11,507	54.4
AID-DCCP <u>2/</u>	1,451	16.8	2,548	19.3	1,219	5.7
AID-Direct <u>3/</u>	118	1.4	588	4.5	-	-
Other Allocations	341	4.0	70	0.6	-	-
Total Allocations	6,599	76.7	6,940	52.7	12,726	60.1
<u>Participation in Taxes</u>						
Taxes on Gasoline	757	8.8	-	-	-	-
Taxes on Farm Commodities	171	2.0	108	0.8	101	0.5
Total Tax Participation	928	10.8	108	0.8	101	0.5
<u>Direct Taxes</u>						
Tolls	361	4.2	256	1.9	312	1.5
Highway Service	113	1.3	88	0.7	113	0.5
Total Direct Taxes	474	5.5	344	2.6	425	2.0
Loan Disbursement	605	7.0	5,784	43.9	7,910	37.4
Total Revenue	8,606	100.0	13,176	100.0	21,162	100.0

5.13 It follows from the previous table that:

- (a) The total revenues of the SENAC have increased annually from 60.6% in 1974 owing to an increase of US\$7.8 million in National Treasury appropriations. The increase exceeded the reductions in other revenues.

1/ Rate of exchange used throughout B\$20 = US\$1.
2/ Department of Project Coordination and Control. See next paragraph.
3/ Budgetary support. See next paragraph.

- (b) The SENAC continues to receive support from the USAID 1/ by means of allotments for emergency programs and budgetary support. In October 1971, owing to the insufficiency of resources in the National Treasury, the first Emergency Plan was adopted and the DCCP appropriated funds in the amount of US\$1.9 million equivalent for the special road maintenance and improvement program, which was completed in 1972. The USAID granted Bolivia in September 1972 a second emergency loan, the SENAC having been allocated an amount equivalent to US\$3,670,000 of which US\$2.5 million were used in 1973 for maintenance and construction programs and US\$1.2 million were used in 1974 for the same purpose. The two loans were granted to the Government of Bolivia and are not financial obligations of the SENAC.
- (c) The direct allotments which the USAID had granted up to 1973 for budgetary spending of SENAC in amounts ranging from US\$117,000 in 1970 to US\$558,000 in 1973 were terminated in 1974.
- (d) The tax on gasoline was removed in 1973. This tax was an important source of revenue to the SENAC and in order to offset its removal the government made a larger direct budgetary appropriation in 1974.
- (e) Revenues from the Tax on Agricultural Products fell off slightly 1/ during the period examined, this being offset also by an increase in national budgetary appropriations. By means of Executive Decree No. 11,090, dated September 19, 1973, the percentage of participation of SENAC in this tax has increased so as to compensate for the loss of revenue (obtained in previous years) from the tax on gasoline. However, the decree entered into force only in the third quarter of 1974, for which reason its effect has not yet been felt.

2. Expenditure of the executing agency

5.14 The composition of the SENAC's expenditure in the last three years is summarized below:

1/ The funds received from AID are administered by the Department of Project Coordination and Control, a unit of the Ministry of Finance charged with the administration of AID funds granted to the Bolivian Government for emergency and budgetary support programs. These funds are transferred to the national budget and thereupon to the executing agencies, earmarked exclusively for the specific projects.

2/ SENAC receives a part of the revenues from taxes on agricultural products paid to the Revenue Services of La Paz and Cochabamba. Since 1971, all income for SENAC from revenues to La Paz has been delivered to the Central Bank for reimbursement of a loan in the amount of US\$450,000 equivalent granted by that body to SENAC for construction of the Choquechaca-La Asunta Road. This debt is still outstanding in the amount of US\$388,000 equivalent.

(In thousands of US\$ equivalent)

	1972		1973		1974	
	<u>Amount</u>	<u>% of Total</u>	<u>Amount</u>	<u>% of Total</u>	<u>Amount</u>	<u>% of Total</u>
Administration and Engineering	1,650	20.8	1,619	12.5	2,859	13.8
Highway Maintenance	4,716	59.7	3,755	28.9	4,538	21.9
Construction of Roads and Bridges	1,409	17.9	2,489	19.1	11,900	57.5
Maintenance of Construction Equipment	-	-	5,000	38.4	-	-
Transfers and Other <u>1/</u>	129	1.6	135	1.1	1,408	6.8
TOTAL	7,904	100.0	12,998	100.0	20,705	100.0

- 5.15 The preceding table illustrates the impact recorded in 1973 and especially in 1974, of the increase in disbursements for SENAC and the substantial increase in national allotments for 1974. In fact, in 1973 the SENAC increased investment outlays for highway and bridge construction by 76.7%, raising them fourfold in 1974.
- 5.16 As regards bridge and road maintenance, in 1974 this item increased by US\$783,000 over the previous year, having nearly regained the level of US\$4.7 million achieved in 1972. In March 1973, the SENAC obtained a loan from the Government of Brazil in the amount of US\$5 million for the procurement of maintenance equipment, which was used during that year. It is estimated that for 1975 another loan will be disbursed in full in the amount of US\$12 million, obtained from CACEX (Bank of Brazil) for the procurement of highway construction and maintenance equipment. A loan is being negotiated with Japan in the amount of US\$12 million for the procurement of equipment, which will begin to be put to use in 1977.
- 5.17 The increase of US\$1.2 million in engineering and administrative expenses in 1974 may be explained by the salary adjustments and increases in staff necessary to cater for the increase in activities owing to the execution of projects in that year.
- 5.18 It is appropriate to point out that the SENAC has received, in addition to the two credits from Brazil, the following loans, the service whereon is provided from its own resources and government allotments:

1/ Includes service on the Central Bank loan.

(In US\$ thousands equivalent)

<u>Amount</u>	<u>Lender</u>	<u>Date</u>	<u>Conditions</u>	<u>Purpose</u>
US\$90,000	Ministry of Finance	2/11/70	Grace Period 2-1/2 yrs. Interest at 6% 40 years Amortization	Updating Design for La Paz-El Alto Expressway
450,000	Central Bank	1/15/71	No Grace Period Interest at 6% 18 years Amortization	Construction of Choquechaca-La Asunta Road
750,000	Andean Development Corporation	11/12/73	Grace Period 2-1/2 yrs. Interest at 5% 16 years Amortization	Patacamayo-Tamba Quemado Highway Study

- 5.19 The analysis of revenue and expenditure of SENAC in the last few years supports the conclusion that the financial results of the institution during the three-year period 1972-1974 were satisfactory, an earned surplus of US\$1.3 million having been produced as shown in the following table:

(In thousands of US\$ equivalent)

	<u>1972</u>	<u>1973</u>	<u>1974</u>
Revenue	8,606	13,176	21,162
Expenditure	<u>7,904</u>	<u>12,998</u>	<u>20,705</u>
Surplus - Annual	702	178	457
- Accrued	702	880	1,337

- 5.20 This annual surplus is retained by the SENAC and may be used in successive fiscal periods. This represents a significant improvement over the years 1970 and 1971 - in which deficits amounting to US\$103,000 and US\$618,000, respectively, were posted - not only because the trend of the last three years was reversed but also because it was accompanied by a substantial increase in the annual application of funds of the SENAC.

VI. JUSTIFICATION AND VIABILITY OF THE PROJECT

A. Technical Viability

- 6.01 Judging by the technical analysis of the executing agency and of the proposed project, it is concluded that the operation is justified and viable, both technically and operationally, in view of the following:
- (a) The executing agency has the qualifications needed to execute the project. These qualifications include a satisfactory organization and the professional, technical and administrative personnel with the specialized knowledge required and with experience in the execution of other road projects and earlier loans from international lending agencies.
 - (b) The final engineering studies, designs and plans, as well as the bid documents and draft contracts for the works and their supervision are already prepared and are being reviewed by the Bank. Thus, the executing agency has all the background information it needs to start the execution of a large scale project such as the one proposed. This will result in a considerable savings of time during the initial stage of the project.
 - (c) The contracting of a specialized consulting firm in the construction of highways for the supervision of the works would guarantee their quality.
 - (d) The construction costs have been estimated from the final plans and specifications for the highway. The unit costs were based on prices prevailing in Bolivia during this second half of 1975. Furthermore, reasonable amounts have been included for contingencies during the construction period and for escalation of construction costs, both internal and external.
 - (e) No special technical problems are foreseen during construction. The technical standards and specifications that will be followed in the execution of the works are normal civil engineering practices and are suited to the type of road that will be built.
 - (f) The estimated investment timetable for the project is technically viable and shows the timing of the contributions needed for satisfactory execution of the project.
 - (g) The estimated execution period, five years, is realistic and consistent with actual building conditions in the country and the volume of works to be executed.

B. Financial Viability

- 6.02 Appendix 5 of this report includes projections of SENAC income and expenditures for the period of project execution as well as the bases on which these were prepared.
- 6.03 These projections show that during the period of execution of the project SENAC:
- (a) Would have total funding in the equivalent of US\$224.2 million of which US\$131.6 million (58.7%) would come from government contributions and US\$88.8 million (39.6%) from disbursements of loans from the IDB, CAF and local public agencies;
 - (b) Would use during this period a total of US\$223 million, of which US\$157 million (70.4%) would go to investments in highway construction and US\$39.3 million (17.6%) to highway maintenance;
 - (c) Would need US\$21.7 million for the counterpart funding of the IDB loans (not including the contribution to the proposed project), to which would have to be added US\$46.5 million for completion of its 1976-1980 construction program as mentioned in paragraph (a) above;
 - (d) Would substantially increase the amount of external resources included in the financing of road projects rising from US\$11.9 million in 1974 to US\$42.6 million in 1977. This is believed viable considering the increase in national resources between 1974 (US\$12.7 million) and 1975 (US\$19.0 million), a policy which the government plans to continue at least during the period of project execution.
- 6.04 The net capital flow for the five-year period in question leaves a total cumulative surplus in the equivalent of US\$1.2 million. However, during the first three years, there would be yearly deficits that would rise to a total equivalent to US\$6.8 million ^{1/} by the end of 1978. The actual deficit however, would be US\$4.8 million, considering the existing surplus as of the close of the fiscal year ending December 1974 (US\$1.4 million - see paragraph 5.19 of this report) and the expected surplus in 1975 (US\$0.6 million). Together these total approximately US\$2.0 million, an amount which would not revert to the national treasury and could be used in later years. Furthermore, if necessary, SENAC could adjust its spending on other programs to balance its budget.

^{1/} The projected income does not include government budgetary appropriations for the counterpart funding of the project. Only the foreseen increases in income as part of the normal resources of SENAC have been computed (see Appendix 5).

every year. One exception to this is the investment funds for the Alto Beni-San Borja section and the Bellavista section which would be the equivalent of US\$7.8 million over a five-year period. The following table gives the annual amounts that may be reduced:

(In thousands of US\$ equivalent)					
	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>Total</u>
Expected deficit	2,130	4,190	480	-	6,800
Initial balance 1974-75	<u>2,000</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>2,000</u>
Deficit	<u>130</u>	<u>4,190</u>	<u>480</u>	<u>-</u>	<u>4,800</u>
Program, other investments	7,300	8,500	9,300	10,200	35,300
Less estimated investment San Borja motor trail and Bellavista section	<u>2,500</u>	<u>2,800</u>	<u>1,500</u>	<u>1,000</u>	<u>7,800</u>
Annual adjustable balance	<u>4,800</u>	<u>5,700</u>	<u>7,800</u>	<u>9,200</u>	<u>27,500</u>

The loan contract would stipulate that the borrower is obliged to present proof to the Bank every year that SENAC has sufficient resources to provide the counterpart funding to the project.

- 6.05 To measure the impact of the counterpart funding to the proposed project on the current financial capacity of SENAC, the following table presents year-by-year comparisons of that amount with national treasury appropriations and the other works programmed by SENAC:

(In thousands of US\$ equivalent)						
	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>Total</u>
Contributions, national treasury	21,500	23,700	26,100	28,700	31,600	131,600
Other programmed works	7,300	8,500	9,300	10,200	11,200	46,500
Counterpart funding for project	2,150	4,650	2,850	1,130	220	11,000
<u>Local contribution as % of:</u>						
Treasury contributions	10%	20%	11%	4%	1%	8%
Other programmed works	29%	55%	31%	11%	2%	24%

As can be seen in this table, the counterpart funding for the project is always lower than the funding of other programmed works of SENAC. In 1977, when the single largest annual amount of counterpart funding is required, other programmed works still data 55% of the total. The average for other works over the period is 24% which indicates it is possible to reduce those programs if necessary to meet the commitments undertaken in the proposed project. In addition, the counterpart funding required (US\$11 million) is 8% of the total of all national treasury contributions (US\$131.6 million) during the period. The maximum yearly contribution - US\$4,650,000 in 1977 - represents only 20% of national treasury appropriations in that year, but it is the single largest item.

- 6.06 Judging by the statements in the preceding paragraphs, it is concluded that SENAC would have the financial capacity to undertake the project and make the local contributions on time for the following reasons:
- (a) The government would authorize additional budgetary allocations for the project's counterpart funding;
 - (b) If necessary, SENAC could adjust its investment program for works using its own financing;
 - (c) The counterpart funding represents a reasonably low percentage of the annual budgetary appropriation of government resources and the government has planned sizable annual increases in the SENAC budget; and
 - (d) SENAC is authorized to carry over any surpluses from previous fiscal years and use them to reduce the deficit of later fiscal years.
- 6.07 A study was also made of the fiscal situation to determine whether the government will be able to make transfers to SENAC for the project's counterpart funding as well as the contributions to other road projects being executed with the funds of Bank loans. 1/ That analysis indicates that Bolivian finances have recovered considerably from the rather unfavorable position of earlier years. The over-all deficit of the central government, which averaged 32% of current revenue from 1970 to 1973, fell to 3% in 1974 due to the upsurge in current revenue and the slower growth of current expenses. This is the case even though the situation in 1975 and the outlook for 1976 are less encouraging than they were in 1974 because of drop in the prices of exported minerals. It is estimated that government transfers to SENAC, and consequently the required counterpart funding, will be viable because these transfers are less than 7% of the total amount of current revenue during the period of execution of the project.

1/ See Appendix 4 of this report.

- 6.08 The Bank analysis and negotiation mission (June 1975) discussed this with government authorities and the latter agreed to allocate additional budgetary items to SENAC to cover the counterpart funding requirements of the project. However, to enable the road projects financed by Bank loans (which are the most important, highest-priority projects being carried out by SENAC) to develop properly and steadily, it is recommended that the loan contract include a provision through which the government agrees to give special priority to the appropriation of fiscal resources for those works and for the road projects directly connected with them such as, for example, the Alto Beni-San Borja road and the Bellavista section (see proposed resolution).

C. Economic Viability

- 6.09 The consultants' study of the improvement project for the existing highway from La Paz to San Borja and Puerto Salinas indicates that the project is economically viable.
- 6.10 The present road between La Paz and the Alto Beni River is a narrow dirt road 194 kilometers long. It has steep inclines and virtually blind curves which make it difficult and dangerous to use. The road conditions limit its average capacity to only 350 vehicles per day, with a maximum capacity of 550 vehicles per day. The section with the heaviest traffic, La Paz-Cotapata, now carries some 430 vehicles per day. The transport costs are high not only due to the condition of the road but also because it is a winding road that climbs from La Paz (at 3,750 meters above sea level) to the peak (4,600 meters above the sea level) and descends to the Alto Beni River (490 meters above sea level).
- 6.11 The high estimated cost of rebuilding this road and extending it to Puerto Salinas (more than US\$147 million) would not be within the financial reach of SENAC as it is nor of the government in general, if it were undertaken in a single phase. Completion of the entire highway would take place at a second stage (see Chapter II) which it was estimated could start within five years of conclusion of the first stage, to be financed with the proposed project. ^{1/} However, construction of an all-weather road as far as San Borja would make it possible to open up an extensive and important area in Beni Department for development and thereby satisfy the principal objective of the project: providing Beni Department with reliable links with the rest of the country. During the visit of the Bank analysis and negotiation mission, those highway sections were selected whose improvement and construction were most

^{1/} Within this period other road projects financed by the Bank were completed, including the La Paz-El Alto highway (Loan 342/SF-B0) and the eight highway sections (Loan 351/SF-B0). This would enable the government to allocate resources for the second stage of the Beni highway.

urgently needed and whose economic returns were highest 1/ and would materialize most rapidly, while still preserving the principal objective of the project, which is linkage with the department of Beni. The project was defined as described in Chapter III of this report. The section between the fork in the highway and Puerto Salinas, as well as the 14 bridges in between, have been left for a second construction phase (see map, page 11). The economic justification of each of the sections and parts of the project are summarized below:

(a) La Paz-Cotapata Section:

- 6.12 The major economic benefits of this section of the highway are savings to the present users of the road as well as future users. In addition, when this section is rebuilt and cost of transport lowered, especially for shipments of farm produce, supplies of these products to the capital city will be improved, with attendant benefits to its inhabitants; in the opposite direction, manufacturers and social services can be sent from La Paz to the interior of Bolivia.
- 6.13 The transport cost on the existing road is US\$0.42 per kilometer for a 4.5 ton vehicle. Estimates indicate that this cost will drop to US\$0.24 per kilometer for the same vehicle once the road is rebuilt and opened. The only alternative transport route for the products produced in Beni, which must pass through the La Paz-Cotapata section, is air transport 2/ which costs US\$0.72 per kilometer for the same amount of freight carried by a 4.5 ton truck. In the event that the Cotapata section remains in service in its present condition and vehicle traffic reaches a level of 1,000 vehicles per day (within 10 years), the cost of highway transport would rise substantially, ultimately to a level comparable to the cost of air transport.
- 6.14 The present average daily traffic on the Cotapata section is 430 vehicles per day. It is estimated that this will increase by an annual average of 8.5%, reaching 610 vehicles per day in 1978 and 3,200 vehicles per day in 1998. The traffic figures, both current and projected, for these years would be as follows:

1975	430 vehicles per day
1978	607 vehicles per day
1985	1,211 vehicles per day
1990	1,750 vehicles per day
1995	2,539 vehicles per day
1998	3,188 vehicles per day

1/ Of the four highway sections analyzed, La Paz-Cotapata showed the highest economic return (18.8%). Moreover, Cotapata is at the junction of the roads running from Yungas Sur and Yungas Norte to La Paz, so that Cotapata-La Paz is the section most heavily travelled.

2/ Intermediate spots along the highway to Beni have no alternative transport.

- 6.15 Savings to users have been estimated at US\$18 per vehicle per year (4.5 ton truck) in addition to a savings of time on the new highway through elimination of congestion. With these assumptions the internal rate of return to the La Paz-Cotapata section would be 18.8%, a figure considered satisfactory. The sensitivity analysis taken for this highway section shows that with a cost increase of 25%, the rate of return would decline to 16.0% and with a decrease in benefits of 25%, the return would be 15.3%, again figures considered satisfactory.

(b) Yolosa and Yara Bridges

- 6.16 The old bridge over the Yolosa River was destroyed by a flood in 1974. Vehicles now cross the river over a temporary ford, but during the rainy months it is sometimes impossible to cross the river. The present bridge is an old metal structure with a wooden roadbed that was built as a temporary crossing in 1960. In addition, it is poorly placed and is constantly threatened by the current of the river, especially the center support. Both bridges are in the Cotapata-Alto Beni section.
- 6.17 The construction of the new bridges to replace the ford on one hand and the precarious bridge on the other is of major importance in order to keep traffic moving, especially considering that at this time 154 vehicles use ford and temporary bridge each day. Of this number, 80% are heavy trucks carrying farm products from jungle areas and the Beni area. To this number would have to be added the traffic generated by the construction of the highway to San Borja. The growth rate of the traffic over the section where both bridges are being built (kilometer 83 and kilometer 139 from La Paz, respectively) has reached 20.1% in recent years due to the settlement taking place in recent years along the road in the Yungas area.
- 6.18 In making the economic calculations, a rate of 20% per annum was used as the growth rate of traffic during the first five years and 10% following that. This rate was adjusted to the growth of gasoline consumption in the Department of La Paz and of the number of vehicles. In addition, a study was made of the only possible alternative of using paved fords for five years (since the rivers move fast and are not very deep, thereby ruling out ferries) and then building the bridges in the fifth year. The vehicle operating costs and losses because of temporary inability of using the ford under this alternative show that the best solution is immediate construction of the bridges. The internal rate of return calculated for both bridges is greater than 50%. The present value of savings from the bridges, compared with their construction costs, gives a benefit-cost ratio of 4.0, using a discount factor of 12%.

Alto Beni and Piquendo Bridges 1/

- 6.19 Construction of these bridges would be accompanied by final construction of a 13-kilometer stretch of highway between Bellavista and the Alto Beni River (see Chapter IV of the report) to provide access to the site of the bridge that will cross the Alto Beni. This section, and its connection through the two bridges, shortens the distance over the present road by 21 kilometers.
- 6.20 The Alto Beni River is now crossed by motorized ferries, capable of transporting one 4-ton truck per trip (safely) at three trips per hour. This system now moves an average of 30 vehicles per day.
- 6.21 The historical rate of annual growth of traffic to the west of the Alto Beni River (toward La Paz) is 25.7%, including a high percentage of heavy trucks (heavier than 4.5 tons). To the east of the river (toward San Borja), the historical growth rate has been only 15%. In this direction primarily small trucks are used because of the danger involved in crossing the river. It is estimated that the amount of traffic induced by the bridge over the river would be 180% over the amount now using the fording system. 2/
- 6.22 Furthermore, the construction of the road to San Borja and the land settlement and livestock development program would allow regional production to grow at a rate of 20% during the first five years and then 10% per annum after the growth has stabilized. The crossing of the river would constitute a bottleneck holding back development of the area.
- 6.23 The analysis of vehicle operating costs over the existing road, added to the cost of ferry passage, shows that using ferries is not a practical alternative to construction of the bridges. In effect, the costs and savings obtained with a bridge for the current amount of traffic (without considering the amount of traffic taken from air transport or generated by the San Borja highway) show an internal rate of economic return of 13%. In other words, construction of the bridge is justified without considering the benefits of lengthening the road. The same analysis, considering the amount of traffic taken from airlines or generated by the bridge and the San Borja road, shows a rate of economic return of 15.4%.

1/ The Piquendo River is near the Alto Beni River (6 kilometers to the west) and is considered within the accesses to that river.

2/ Reflects the increased number of crossings if we take the number of vehicles that reach the river banks but do not cross the river because of the limited capacity of the ferries, the high cost and the risk involved.

(d) Alto Beni-San Borja section and smaller bridges

- 6.24 The financial limitations of the Bolivian Government restrict it at this time to building a vehicular road from Alto Beni to San Borja (see paragraph 6.09). Its estimated cost is the equivalent of US\$7.8 million ^{1/} to which would be added the costs of maintenance and improvements until the road is finally built, plus the value of the smaller bridges, all of which would total the equivalent of US\$15.2 million (37.5% of the final cost).
- 6.25 This road section is usable only if there are adequate means of crossing the rivers along its route. An analysis was made of the following four alternative solutions for crossing these rivers:

Alternative A: Construction of permanent prestressed concrete bridges located in the sites selected for the final road path.

Alternative B: Construction, in the same final sites, of the permanent supports of the bridges (the infrastructure) and the laying of temporary bailey latticed panels, with a wood deck and then, after five years of use, the construction of the final prestressed concrete superstructure.

Alternative C: Construction of temporary wooden bridges (infrastructure and superstructure) with 15-meter sections, at the narrowest places on the rivers and as close as possible to the final path of the road. At the end of five years of use, permanent bridges of prestressed concrete would be built at the final sites.

Alternative D: Construction of paved fords instead of the bridges and, after five years of use, construction of the prestressed concrete bridges. The paved fords would be built in the best possible sites, generally far from the final path of the road. Temporary accesses would be built to these fords which would be built of stonework using cement mortar and cyclopean concrete.

- 6.26 The analysis of the cost and updated values of the costs for the different alternatives is given below:

^{1/} The total final cost of this section is estimated at close to the equivalent of US\$40 million.

Years	Costs of Alternatives			
	A	B	C	D
0	4,800	3,500	1,700	345
1		350	850	172.50
2		350	850	172.50
3		350	850	172.50
4		350	850	172.50
5		350	850	172.50
6 <u>1/</u>		1,610	4,800	4,800
P.V. 12%	5,408 <u>2/</u>	5,577	7,196	3,399

6.27 It can be concluded from the table that the construction and maintenance costs (present value) of Alternatives B and C are higher than those of A and D. In addition, the operating costs of Alternatives B and C would also be slightly higher than those of Alternative A. Consequently, Alternatives B and C would not compete with A.

6.28 As for the other two alternatives (A and D), Alternative A would be passable the year round and have a minimum operating cost. On the other hand, with Alternative D, traffic would be interrupted during the rainy season (4 months of the year) during which time the paved fords could not be used and thus the road could only be used eight months a year. It is estimated that under these circumstances, the amount of traffic generated (compared with normal traffic) would certainly be less than the amount under normal conditions of the highway with bridges. The operating costs of Alternative D would be high, since the time and distance would be greater because of the detours to the fords.

6.29 Comparative analysis of Alternatives A and D shows that the greater cost of construction of the bridges as opposed to the fords would give

1/ Represents the cost of construction of the prestressed concrete bridges, except in Alternative A in which the bridges would be built in year 0.

2/ Includes a difference of six years of useful life of the final bridges since these would be built in the sixth year of Alternatives B, C and D.

a substantial increase in benefits through savings to the users of the road. And a comparison of Alternatives A and D in terms of flow of funds and benefits produced, shows that the internal rate of economic return for the smaller bridges of the Alto Beni-San Borja section is 24.2%, a high rate. 1/

- 6.30 The analysis of optimum timing for construction of the smaller bridges shows that the present value (at a discount rate of 12%) of the costs and benefits of those bridges is highest for final construction of the bridges (Alternative A) simultaneously with construction of the road. If construction of the bridges is delayed just one year, the present value drops by US\$335,000 (see Appendix 7 of this report).

1/ The computation of the rate of return to these small bridges is given in Appendix 6 of this report.

VII. EVALUATION OF PREVIOUS LOANS

- 7.01 The Bank has made 5 loans to Bolivia and provided one technical cooperation grant for highway construction works and studies, now being carried out by the SENAC, for a total of US\$61,850,000 equivalent. One of the loans has been disbursed in full (274/SF-BO) and the other four, as well as the technical cooperation grant, are now in various stages of execution. An evaluation of these loans is given below:

A. Loan 274/SF-BO - Oruro-Quillacollo Highway Study

- 7.02 The loan contract was entered into on October 31, 1970, in the amount of US\$530,000 equivalent, the purpose whereof was to assist in financing the technical-economic feasibility studies and final engineering design studies for the Oruro-Quillacollo Highway. The loan was disbursed in full within the period set forth in the contract and the executing agency performed the clauses of the contract in a manner satisfactory to the Bank. The studies as well were finished within the periods of time specified in the contract for services and were reviewed and approved by the SENAC and the Bank. These studies served as the basis for the application for a loan for the construction of the Quillacollo-Confital section, financed partly through loan 399/SF-BO, work on which is now in progress.

B. Loan 17/CD-BO - La Paz-Beni Highway Study

- 7.03 The loan contract was entered into on November 17, 1971 in the amount of US\$1,700,000 equivalent. The purpose of the loan was to assist in financing the technical-economic feasibility and primary engineering design studies for the La Paz-Puerto Salinas Highway and of the San Borja, Reyes and Rurrenabaque branch roads, which support the present application for a loan for the construction of the first section thereof, La Paz-Cotapata, and the bridges to San Borja.
- 7.04 As of August 31, 1975 an amount equivalent to US\$1,664,819.38 (97.9% of the total) had been disbursed, the undisbursed amount of US\$52,180.62 representing withholding of the performance guarantee on the part of the consultants; this would be the last disbursement on the loan once the final report of the consultants is approved. During execution of the loan two extensions were granted to the deadline for disbursement (totaling 12 months) and this term is due to expire on November 17, 1975. The reasons for these extensions were the additions made in preparing the studies, since those corresponding to the economic feasibility of the project were questioned by the Bank and the consultant introduced the suggested amendments, which were definitively approved by the SENAC and the Bank in May 1975.

- 7.05 Work advance on the final engineering studies of the project stands at 97% approximately, and only some detail maps for certain minor bridges are pending. The part of the studies corresponding to the La Paz-Cotapata section was completed and sent to the Bank for review, as well as the documents for inviting bids for this section and for the bridges. Given the advance of these studies it is estimated that these will be completed before the date scheduled for the last disbursement of the loan. The other contractual clauses were performed by the SENAC to the satisfaction of the Bank.

C. Loan 342/SF-BO - La Paz-El Alto Expressway Construction

- 7.06 This loan was made by the Bank, chargeable to the Fund for Special Operations, in the amount of US\$13,700,000 equivalent. The loan contract was entered into on December 27, 1972 and its purpose was to assist in financing the construction of an expressway between La Paz and El Alto. The borrower is the Republic of Bolivia and the executing agency is SENAC.
- 7.07 After a six-month extension to allow for performing the conditions precedent to the first disbursement the loan was declared eligible on August 15, 1973. As of August 31, 1975 an amount equivalent to US\$6,744,000 of the loan had been disbursed, that is, 49.2% of the total loan amount. The term allowed for making the last disbursement expires on December 27, 1976.
- 7.08 Accomplishment of the project was held up from the outset owing to the problems of procuring the right of way for construction. In fact, most of the bearing line of the expressway lay on the slope leading up to El Alto, and at the time there were squatter dwellings and other precarious housing along it, containing an estimated population of 4,300 persons. Achievement of a partial solution to this problem took nearly two years, since expropriation of the lands was a slow process and it became necessary to undertake simultaneously a program of housing construction (950 units) to relocate the settlers in the city of El Alto, and within the city limits of La Paz. As of August 31, 1975, 95% of the right of way had been procured; only the land upon which the interchange at El Alto will be located has yet to be procured.
- 7.09 Work construction was awarded in the first quarter of 1974, actual construction having started on sections for which the right of way had been secured. This meant a limitation on the opening up of work fronts.
- 7.10 Unexpected problems arose during the construction process which were caused by slipping of the hillside at Km. 7 and 8 of the highway. As a result, there were severe land slides which made it necessary to realign the original bearing by as much as fifty meters. This change in alignment necessitated additional materials movement of about 300,000 cubic meters. Work was intensified during 1975 as the imported machinery

(especially for earth compacting) and materials have been received, and the project is now at the stage of earth movement, construction of drains and culverts, which are the most significant items. Construction advance on the expressway stands at about 38%. It is less than originally scheduled for the reasons given in the preceding paragraphs. The works contractor submitted to the SENAC in June 1975 and the SENAC approved a new time schedule for construction of the project. Completion of the work is scheduled for December 1976, which is within the present period for total disbursement of the loan. The new time period set is considered reasonable, since the principal problems of the project have been overcome and the contractor has the machinery and the equipment necessary to sustain the rate of construction even though it may yet be necessary to grant a prudent extension to the term for the last disbursement of the loan.

- 7.11 As of the date of this report (September 1975) the contract clauses were being performed by the SENAC to the satisfaction of the Bank, except for the clause regarding the first disbursement of the loan, as indicated previously. The greater project costs associated with the delays and construction problems were assumed by the SENAC and the Bolivian Government has allocated the necessary budget items for timely provision of the local contribution to the project. Work supervision, contracted with a consulting firm, has been performed adequately ever since the expressway has been under construction. Project management, of which SENAC is in charge, is being done satisfactorily.

D. Loan 351/SF-BO - Construction of 8 highway sections

- 7.12 The loan was granted by the Bank to the Republic of Bolivia, chargeable to the Fund for Special Operations, for an amount equivalent to US\$10 million. The loan contract was entered into on January 18, 1973, its purpose being to assist in financing the construction and improvement of 8 sections of major highways of the National Highway System. The executing agency for the project is SENAC. The sections constituting the project are listed below:

- | | |
|------------------------------|------------------------------------|
| 1. El Alto-Viacha (19 kms) | 5. Vinto-Machacamarca (28 kms) |
| 2. Río Seco-Huarina (57 kms) | 6. Santa Cruz-Guabirá (54 kms) |
| 3. Huarina-Tiquina (42 kms) | 7. Cochabamba-Quillacollo (12 kms) |
| 4. Oruro-Vinto (9 kms) | 8. Tolata-Cliza (7 kms) |

- 7.13 In order to provide for the performance of the conditions precedent to the first disbursement as set forth in the contract, SENAC was granted a six-month extension and the loan was declared eligible for disbursement on September 14, 1973. As of August 31, 1975 an amount equivalent to US\$5,309,689.37 had been disbursed, that is, 53.1% of the total amount of the loan. The term allowed for the last disbursement expires on January 18, 1977.

- 7.14 To provide for execution of the project it was necessary to make 7 different invitations for bids for as many sections, since the El Alto-Viacha section was constructed by the SENAC under force account in keeping with the provisions of the loan contract. This process was necessarily delayed owing to the volume of documents that had to be prepared and, moreover, by the limited number of Bolivian tenders. ^{1/} In some cases, such as the Cochabamba-Quillacollo and Tolata-Cliza sections, it was necessary to make a second invitation for bids since the first one was declared void. Most of the awards for construction work (5 sections) were made during the first quarter of 1974, the last of them, Huarina-Tiquina, one year later, because the original bearing was flooded by the overflow from Lake Titicaca in 1974. A survey had to be done of the new section on higher ground which made it necessary to change the specifications for inviting bids. Hence, a three-month extension to the term specified in the contract for starting construction work was granted.
- 7.15 As indicated in the previous paragraph, the El Alto-Viacha highway section was constructed by SENAC under force account, the works having been completed and the highway inaugurated in November 1974; this is the only one entirely completed. The other sections are now at various stages of construction and are behind schedule according to the original project schedule and the work contract terms, owing especially to the limited operating capacity of the Bolivian contractors charged with constructing these sections. An extreme example is the contractor charged with constructing the Cochabamba-Quillacollo and Tolata-Cliza sections, whose contract was rescinded by the SENAC for failure to meet the deadlines for work advance and execution. The SENAC has applied to the Bank to be allowed to carry out the work on the two sections by force account - the application is now being examined - in order to complete these within the term set for the last disbursement of the loan. The total project work advance was estimated at 27% approximately, in July 1975.
- 7.16 The total cost of the project has increased by US\$3,367,000 equivalent owing to the increase in the cost of imported equipment and materials and government-decreed salary and wage increases for Bolivian labor. Most costs were assumed by the SENAC and the government is appropriating the necessary funds in its budget to allow for timely provision of the local contribution of the project.
- 7.17 The contract clauses were performed by the SENAC to the satisfaction of the Bank except the two clauses mentioned above which require additional time for performance. In spite of the difficulties mentioned SENAC has administered the loan and done the work supervision in adequate fashion.

E. Loan 399/SF-BO - Quillacollo-Confital Highway

- 7.18 The loan was made to the Republic of Bolivia, chargeable to the Fund for Special Operations, in the amount of US\$35,000,000 equivalent. The

^{1/} Owing to the small amount of each one of the work-measures to be carried out in the program, foreign construction companies had no special interest in participating.

loan contract was entered into on August 30, 1974 and was meant to assist in financing the construction of the Quillacollo-Confital Highway, which was the first stage in the improvement of the Oruro-Cochabamba Highway.

- 7.19 In the light of the delay in selecting the consulting firm to supervise the project construction work and in negotiating the services contract, a five-month extension was granted for performance of the conditions precedent to the first disbursement of the loan. The loan was declared eligible on July 30, 1975. As of August 31, 1975 an amount equivalent to US\$480,000, representing 1.4% of the total amount of the loan, had been disbursed. The term allowed for the last disbursement of the loan expires on August 24, 1979.
- 7.20 The project is now in the phase of prequalification of the construction firms who would participate in the international invitation for bids on the construction work. The invitation for bids was made by SENAC on August 1, 1975 and the term allowed the contractors for submitting documents was 60 days. ^{1/} The regulations and documents concerning prequalification of contractors were reviewed and approved by the Bank. The prequalified firms will be invited later on to submit tenders for the construction work. It is estimated that the construction work can be started in the first quarter of 1976.

F. Technical Cooperation ATC/TF(SP)1317-BO - Chimoré-Yapacaní Highway Study

- 7.21 This technical cooperation was granted by the Bank to the Republic of Bolivia, chargeable to the resources of the Social Progress Trust Fund in the amount of US\$920,000 equivalent. The respective contract was entered into on August 30, 1974 and its purpose was to assist in financing the technical-economic feasibility and final engineering design studies of the Chimoré River-Yapacaní River Highway.
- 7.22 The services contract was entered into April 20, 1975 with the consulting firm selected for the study, and in May 1975 preliminary work on the study was started. The terms of reference, documents for inviting bids and the contract were reviewed and approved previously by the Bank. All studies are expected to be completed in 18 months, and the consultants are now preparing the technical-economic feasibility studies. Once these are approved by the SENAC and the Bank, work would start on the final engineering studies. The expiration date for the last disbursement of this credit is November 30, 1976.
- 7.23 All contractual conditions have been performed to the Bank's satisfaction by SENAC. As of August 31, 1975 the amount of US\$233,600 equivalent had been disbursed, representing 25.4% of the total amount of the technical cooperation grant.

^{1/} At the end of September 1975, 4 proposals from contracting firms had been received.

APENDICE 1

PUENTES
CARRETERA LA PAZ-SAN BORJA

<u>Relación de los Puentes incluidos en el Proyecto</u>	<u>Ubicación Kilómetro</u>	<u>Longitud Metros</u>	<u>Costo (US\$000)</u>
LA PAZ	0		
1. Río Yolosa	83	75	420
2. Río Yara	139	200	830
3. Río Piquendo	188	100	400
4. Río Beni	194	570	4.400
5. Río Inicua	219	65	370
6. Río San Andrés	228	65	350
7. Río La Cascada	238	50	270
8. Río Quinquibey	242	50	280
9. Río Monitos "A"	246	60	260
10. Río "B"	250	50	280
11. Río Mitre "C"	253	60	390
12. Río Yacumo	281	60	200
13. Río Caripo I	288	56	210
14. Río D'Artagnan	292	48	190
15. Río Caripo II	300	48	180
16. Río Chaparina Grande	314	42	160
17. Río Tebaida	321	36	150
18. Río Chaparina Chico	223	42	150
19. Río Bibaje	326	42	160
SAN BORJA	336		
T o t a l		1.719	9.750

APENDICE 2

CRITERIOS DE DISEÑO

LA PAZ-SAN BORJA

<u>C l a s i f i c a c i ó n</u>		<u>Montaña</u> <u>La Paz-Punto</u> <u>Bifurcación</u>	<u>Llano</u> <u>Punto LL-Punto</u> <u>Bifurcación</u>
Velocidad Directriz	KPH	50	100
Radio Mínimo de Curvatura Horizontal	Mts.	80	350
Distancia Mínima de Visibilidad de Parada	Mts.	60	150
Distancia Mínima de Visibilidad de Paso	Mts.	300	650
Ancho Pavimento	Mts.	7	7
Ancho Berma	Mts.	1	1
Gradiente Máxima	(%)	7	3
Peralte Máximo	(%)	10	10
Bombeo Base	(%)	3	3
Bombeo Superficie	(%)	2	2
R. mínimo curvas verticales cóncavas		10	10
R. mínimo curvas verticales convexas		8	8
Cargas Pavimento	Lbs.	18.000/eje	
Diseño de Puentes = HS 20 (AASHO)		(8.200 K/eje)	
Derecho de Vía = 50 mts.			
Capacidad de Diseño (Nivel D) (7% Gradiente) = 1.600 V.P.D.			
Capacidad Posible = 2.200 V.P.D.			
Capacidad de Diseño (Nivel D) (5%) = 2.100 V.P.D.			
Capacidad Posible (Nivel E) (5%) = 2.900 V.P.D.			

APENDICE 3

SERVICIO NACIONAL DE CAMINOS

RELACION DE EQUIPO DISPONIBLE PARA PROYECTO
DE CONSTRUCCION RIO ALTO BENI-SAN BORJA

GRUPO PALOS BLANCOS

<u>E q u i p o</u>	<u>Cantidad</u> <u>Disponible</u>	<u>Fecha</u> <u>Disponible</u>
Tractores D-6 con escarificador	6	5/4/75
Tractores D-6 S.E.	6	5/4/75
Tractores D-4	2	5/4/75
Pala Cat. 966	2	5/4/75
Motoniveladora	3	5/4/75
Volquetes	10	5/4/75
Camionetas	3	5/4/75
Compresoras	3	5/4/75
Equipo Radio	1	5/4/75
Generador Luz	2	5/4/75

APENDICE 4

SITUACION FISCAL Y CAPACIDAD DE APOORTE LOCAL

A partir de 1973 la situación financiera del Gobierno Central ha mejorado significativamente, pasando de un estado de serio desbalance en 1972 hasta un punto de casi equilibrio en 1974. En el cuadro que sigue se puede observar cómo el déficit global descendió del 39 al 3% de los ingresos corrientes.

Resumen de las Operaciones del Gobierno Central
(millones de b\$)

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975 a/</u>	<u>1971 b/</u>
Impuestos internos	565	769	1.088	1.462	
Impuestos aduaneros	418	517	947	1.180	
Regalías mineras	43	190	903	597	
Regalías petroleras	69	234	883	796	
Impuesto a venta de divisas	37	100	178	225	
Impuesto a las exportaciones	139	452	801	624	
Impuesto al azúcar	-	-	138	376	
1. Ingresos corrientes	1.330	2.470	5.070	5.457	6.581
2. Gastos corrientes	1.448	2.236	4.054	5.081	5.694
3. Ahorro en cuenta corriente	(118)	234	1.016	376	887
4. Gastos de capital	393	586	1.169	1.478	1.891
Transferencias al resto del sector público	(30)	(67)	(368)	(563)	(798)
5. Déficit global	511	353	153	904	1.004
6. Porcentaje (5/1)	38	14	3	17	15

a/ Presupuesto.

b/ Proyección a precios de 1975.

Fuente: Ministerio de Planeamiento y Coordinación.

APENDICE 4

Esta evolución favorable se debió fundamentalmente al dinamismo de los ingresos corrientes que prácticamente se cuadruplicaron entre 1972 y 1974. Los principales factores de esta expansión fueron el alza en los precios de los hidrocarburos y minerales, y la introducción del impuesto adicional sobre las exportaciones como parte de las disposiciones tributarias contenidas en el programa de estabilización de 1972. Es así que las regalías petroleras y mineras sumadas al nuevo impuesto recién mencionado, se elevaron de b\$ 251 a b\$ 2,587 millones, pasando a consistir el 51% de los ingresos corrientes totales. Por otra parte, el crecimiento menos dinámico de los gastos corrientes permitió la obtención de ahorros en cuenta corriente, los que en 1974 llegaron a financiar el 87% de los gastos de capital del Gobierno Central. Con relación a estos gastos, cabe precisar la creciente importancia de las transferencias al resto del sector público, parte de las cuales se asigna al SENAC, cuya ponderación en el total se ha elevado de 8 a 31% .

Las perspectivas fiscales para 1975-76, no son tan favorables como en 1974, debido al deterioro en las condiciones de mercado para los principales productos de exportación de Bolivia, particularmente en lo que se refiere al sector minero. Sin embargo, las nuevas medidas tributarias que afectan la renta de personas y empresas y que entrarán en vigencia en el presupuesto de 1976, así como las mayores recaudaciones por concepto de derechos de importaciones, debe aminorar el impacto negativo de la tendencia de las exportaciones. En cualquier caso se anticipa un aumento significativo del déficit fiscal que promediaría el 16% de los ingresos corrientes en ambos años. Este es un nivel similar al de 1973, y ciertamente manejable. Debe precisarse al respecto, que ese déficit está calculado tomando en cuenta un crecimiento de más de 60% en los gastos de capital y de más de 100% en las transferencias al resto del sector público durante el bienio; tasas éstas que pueden considerarse más bien optimistas.

En este contexto, las transferencias del Gobierno Central al SENAC, así como el aporte local requerido para el proyecto, parecen viables. En el cuadro que sigue, se puede observar que las primeras no excederían el 6,6% de los ingresos corrientes del Gobierno Central durante el período de ejecución del proyecto. Esto en comparación con 7% en 1975 y en el supuesto de que los ingresos corrientes aumenten a una tasa anual de 10%, lo cual es indudablemente conservador. En cuanto al aporte local, su peso fiscal es muy reducido, oscilando entre 1,3 y menos de 0,1% .

APENDICE 4

(millones de US\$ dólares)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
1. Ingresos corrientes del Gobierno Central	329,1	362,0	398,2	438,0	481,8
2. Transferencias Presupues- tarias al SENAC	21,5	23,7	26,1	28,7	31,6
3. Porcentaje (2/1)	6,5	6,5	6,6	6,6	6,6
4. Aporte Local	2,1	4,7	2,9	1,1	0,2
5. Porcentaje (4/1)	0,6	1,3	0,7	0,3	- <u>a/</u>

a/ Menor del 0,1%.

APENDICE 4

Indicadores Financieros Seleccionados

(millones de US\$ dólares)

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u> ^{a/}	<u>1976</u> ^{b/}
1. Exportaciones de mercade - rías (CIF)	174	338	643	528	627
2. Exportaciones de Hidrocar - buros .	42	67	193	143	178
3. Superávit o déficit (-) de balanza de pagos .	19	-14	112	-34	-10
4. Nivel de reservas interna- cionales netas (a fin de año)	47	33	145	111	101
5. Liquidez monetaria	134	177	255	300	360
6. Tasa de inflación (porcentaje)	7	32	63	12	13

a/ Estimado .

b/ Proyección .

Fuente: Ministerio de Planeamiento y Coordinación y División de
Estudios de Países (BID) .

APENDICE 5

PROYECTO CARRETERA LA PAZ-SAN BORJA

Servicio Nacional de Caminos

Bases para Proyecciones Financieras

1. Se refleja como aporte del Tesoro Nacional en 1975 aproximadamente entre el 80% y el 90% del total de los fondos presupuestados por el Gobierno con destino al SENAC. Se asume un aumento del 13% en 1976 y de un 10% en los años sucesivos, de acuerdo con incrementos proyectados en el parque de vehículos.
2. No se incluyen partidas presupuestarias para el aporte local al proyecto propuesto, adicionales a los recursos normales del SENAC, a fin de determinar sus disponibilidades de fondos de acuerdo con el nivel de los recursos con que ha contado y los aumentos previstos en éstos durante el período de ejecución del proyecto.
3. No se recibirán fondos de AID directamente o a través de la DCCP a partir de 1975.
4. Se asume que los ingresos derivados de las recaudaciones del Impuesto sobre Productos Agropecuarios crecerían en US\$10.000 anuales.
5. Con respecto a los impuestos directos, se ha estimado que el peaje aumentará a razón de US\$50.000 anuales y que el impuesto de servicio vial producirá anualmente el equivalente de US\$120.000.
6. Los desembolsos de los préstamos se han proyectado de acuerdo con el desarrollo que se estima habrán de tener las obras correspondientes, incurriendo las del proyecto propuesto.
7. En cuanto a los egresos, los gastos de administración e ingeniería así como los de mantenimiento y mejora de caminos se han proyectado de acuerdo con los técnicos del SENAC y se consideran razonables.
8. El desarrollo de los proyectos que aparece en el rubro de construcción de caminos y puentes también fue preparado por técnicos del SENAC y representa el ritmo que se espera habrá de tener la ejecución de los proyectos correspondientes.

APENDICE 5

9. El servicio de la deuda corresponde a los créditos cuyo servicio realiza el SENAC con y sin la cooperación financiera del Gobierno Central. Estos son: US\$90.000 del Ministerio de Finanzas para la actualización del diseño de la autopista La Paz-El Alto; US\$450.000 del Banco Central para la construcción del Camino Choquechaca-La Asunta; US\$5.000.000 del Gobierno del Brasil para la adquisición de equipo de mantenimiento; US\$750.000 de la CAF para el estudio de la Carretera Patacamaya-Tambo Quemado; y US\$12.000.000 del Gobierno del Brasil para la compra de equipo para la construcción y ulterior mantenimiento y mejora de carreteras. El préstamo que se proyecta negociar con el Gobierno del Japón por US\$12.000.000 no se incluye por encontrarse en una etapa muy incipiente de negociación.
10. Con el fin de presentar una posición conservadora se ha asumido que el rubro Transferencias y Otros aumentará en US\$50.000 a partir de los US\$200.000 estimados para 1976.

APENDICE 5

(Miles de US\$)

Ingresos	1974 1/ (Real)	1975 2/ (Estimado)	1976	1977	1978	1979	1980	Total 3/
<u>Aportaciones</u>								
Tesoro Nacional	11.507	19.000	21.500	23.700	26.100	28.700	31.600	181.600
AID - DCCP	1.219	-	-	-	-	-	-	-
AID - Directas	-	-	-	-	-	-	-	-
Total Aportaciones	12.726	19.000	21.500	23.700	26.100	28.700	31.600	181.600
<u>Participación en Impuestos</u>								
Impuesto sobre Productos Agropecuarios	101	120	130	140	150	160	170	750
<u>Impuestos Directos</u>								
Peaje	312	350	400	450	500	550	600	2.500
Servicio Vial	113	120	120	120	120	120	120	600
Total Impuestos Directos	425	470	520	570	620	670	720	3.100
<u>Préstamos</u>								
BID - 17/CD Preinversión	930	310	-	-	-	-	-	-
342/SF Autopista La Paz - El Alto	4.987	3.000	3.000	2.576	-	-	-	5.576
351/SF Prog. Infraestruc. Caminos	1.756	3.500	3.000	1.624	-	-	-	4.624
399/SF Carret. Oruro-Quillacollo-I	-	1.900	10.000	8.000	8.000	7.100	-	13.100
1317/TF Preinversión	-	450	470	-	-	-	-	470
Proyecto Propuesto	-	-	5.300	14.100	13.300	8.200	4.100	5.000
CAF - Patacamaya - Tambo Quemado	237	513	-	-	-	-	-	-
Total Préstamos	7.910	9.673	21.770	26.300	21.300	15.300	4.100	88.770
Total Ingresos	21.162	29.263	43.920	50.710	48.170	44.830	36.590	284.220
<u>Egresos</u>								
Administración e Ingeniería	2.859	1.900	2.000	2.200	2.500	2.700	3.000	2.400
Mantenimiento y Mejora de Caminos	4.538	5.840	6.400	7.100	7.800	8.600	9.400	69.300
<u>Construcción de Caminos y Puentes</u>								
Autopista La Paz - El Alto	5.751	3.750	3.750	3.300	-	-	-	7.050
Programa de Infraestruc. de Caminos	2.104	5.800	3.750	2.100	-	-	-	5.850
Carretera Oruro - Quillacollo - I	-	2.400	12.400	9.900	9.900	8.900	-	41.100
Proyecto Propuesto	-	-	7.450	18.750	16.150	9.330	4.320	56.000
Preinversión	980	1.400	500	-	-	-	-	500
Otros Programados 4/	3.065	5.750	7.300	8.500	9.300	10.200	11.200	46.500
Total Constr. Caminos y Puentes	11.900	19.100	35.150	42.550	35.350	28.430	15.520	157.000
Servicio de la Deuda	1.300	1.700	2.300	2.800	2.700	2.600	2.400	12.800
Transferencias y Otros	108	100	200	250	300	350	400	1.500
Total Egresos	20.705	28.640	46.050	54.900	48.650	42.680	30.720	223.000
Superávit (Déficit) - Anual	457	623	(2.130)	(4.190)	(480)	2.150	5.870	1.220
- Acumulado	457	1.080	(2.130)	(6.320)	(6.800)	(4.650)	1.220	

- 1/ Cifras reales que se muestran a título ilustrativo y no se suman en el total.
2/ Cifras estimadas que se muestran a título ilustrativo y no se suman en el total.
3/ Sumatoria de los años que comprenden el período de ejecución del proyecto: 1976-1980.
4/ Programas de otras construcciones y mejoras.

APENDICE 6

CALCULO DE LA TASA DE RETORNO DE LOS PUENTES MAS ALLA
DE BELLA VISTA

FLUJOS NETOS (US\$ MILES)

<u>Alternativa A</u>	<u>Alternativa D</u>	<u>Diferencia</u>		<u>12%</u>
-7.025	-6.093	-931		-931
-7.025	-6.093	-931	1	-832
-7.025	-6.093	-931	2	-742
1.477	856	620	3	441
2.176	1.325	851	4	540
2.400	1.475	925	5	524
2.621	1.623	998	6	505
2.763	188	2.575	7	1.164
2.922	365	2.561	8	1.034
3.102	3.102	-		
3.257	3.257	-		
3.816	3.816	-		
3.991	3.991	-		
4.180	4.180	-		
4.436	4.436	-		
4.646	4.646	-		
4.920	4.920	-		
5.156	5.156	-		
5.427	5.427	-		
5.713	5.713	-		
6.067	6.067	-		
6.352	6.352	-		
6.718	6.718	-		

T.I.R.: 24,2%

V.P.N.: 1705.7 (a 12%)
2152.4 (a 10%)

APENDICE 7

PUENTES
ANALISIS DE OPORTUNIDAD EN EL TIEMPO

0 Delay

<u>C o s t o s</u>		<u>B e n e f i c i o s</u>		<u>Net</u>
<u>Puentes</u>	<u>Badenes</u>	<u>Puentes</u>	<u>Badenes</u>	
(-)	(+)	(+)	(-)	
0 898.3				-898.3
1 898.3	-			-898.3
2 898.3	193.7			-699.6
3 0	96.9	1.560.4	1.045.5	611.8
4 0	96.9	2.264.9	1.517.5	844.3
5 0	96.9	2.491.5	1.669.3	919.1

1 yr. Delay

<u>C o s t o s</u>		<u>B e n e f i c i o s</u>		<u>Net</u>
<u>Puentes</u>	<u>Badenes</u>	<u>Puentes</u>	<u>Badenes</u>	
(-)	(+)	(+)	(-)	
0 -				-
1 898.3				-898.3
2 898.3 + 193.7	193.7			-898.3
3 898.3 + 96.9	1.045.5	1.045.5	1.045.5	-898.3
4 0	96.9	2.264.9	1.517.5	844.3
5 0	96.9	2.491.5	1.669.3	919.1

Dif.

<u>0 Delay</u>	<u>1 yr. Delay</u>	<u>Dif.</u>	<u>Dif. V.P. (12%)</u>
0 -898.3	-	898.3	-898.3
1 -898.3	-898.3	0	0
2 -699.6	-898.3	198.7	158.4
3 611.8	-898.3	1.510.1	1.074.9
4 844.3	844.3	0	0
5 919.1	919.1	0	0
			335.0

REGIMEN DE LICITACIONES PARA LA CONTRATACION DE OBRAS
Y ADQUISICION DE BIENES PARA EL PROYECTO DE LA CARRETERA
LA PAZ - SAN BORJA

CAPITULO I

DISPOSICIONES GENERALES

- ART. 1 - Este Régimen establece las normas y procedimientos a los que se sujetarán las licitaciones y adjudicaciones de contratos de obra y adquisición de bienes, con financiamiento del Préstamo No.
- ART. 2 - La Autoridad Competente para efectuar las licitaciones y adjudicaciones de contratos de construcción y de adquisición de bienes será el Servicio Nacional de Caminos (SENAC) del Ministerio de Transportes y Comunicaciones.
- ART. 3 - Toda suscripción de contratos para la ejecución de obras o adquisición de materiales y/o equipo con financiamiento de este Préstamo, se efectuará necesariamente mediante licitación pública internacional cuando el valor de la licitación exceda del equivalente de US\$ 25.000.

CAPITULO II

PRECALIFICACION

- ART. 4 - Solamente las empresas precalificadas podrán intervenir en las licitaciones correspondientes a obras a realizarse dentro del Proyecto, salvo que el Banco y el SENAC acuerden lo contrario en cada caso específico.
- ART. 5 - Para efectuar la precalificación a que se refiere el Artículo 1 anterior, se publicarán avisos por lo menos en dos diarios de mayor circulación en el país durante tres días consecutivos. Simultáneamente, en los casos en que la obra se financie total o parcialmente con divisas del Préstamo, se enviará a la embajada o consulado de cada país miembro del Banco, copia de la invitación para precalificarse. Dichos avisos deberán contener información completa relacionada con la licitación respectiva. Los avisos deberán ser previamente aprobados por el Banco.
- ART. 6 - La precalificación se efectuará en base de los "Documentos de Precalificación" que en cada caso serán elaborados por el SENAC y sometidos previamente a la aprobación del Banco. La documentación solicitada para precalificar a las firmas constructoras deberá proporcionar al SENAC como mínimo la siguiente información:

- (a) Antecedentes legales sobre la constitución de la empresa.
- (b) Antecedentes sobre su capacidad financiera.
- (c) Capacidad técnica y de equipo de construcción para las empresas constructoras.
- (d) Experiencia en la construcción de obras similares.
- (e) Nombre de la entidad bancaria o de seguros que, en caso de contratación emitirá la Póliza o Boleta de Garantía de cumplimiento de contrato.

ART. 7 - El plazo para presentar los "Documentos de Precalificación" no será inferior a 30 días calendarios contados a partir de la fecha de la última publicación.

ART. 8 - La Junta de Licitaciones del SENAC procederá a la apertura de los sobres que contengan los "Documentos de Precalificación" presentados dentro del plazo establecido y encargará su análisis a una Comisión Técnica designada para el efecto la que preparará un Informe con las recomendaciones del caso.

ART. 9 - Sometido el Informe de la Comisión Técnica a consideración de la Junta de Licitaciones, y una vez aprobado, el ya citado Informe será enviado al Banco para que este organismo haga conocer su conformidad u observaciones si las tuviera. Una vez que el Banco haya indicado su conformidad, las firmas calificadas deberán ser notificadas si son elegibles para presentar ofertas en las licitaciones correspondientes.

CAPITULO III

DE LAS LICITACIONES PARA OBRAS

ART. 10 - Solamente podrán participar las firmas constructoras oportunamente precalificadas para la licitación respectiva, salvo acuerdo en contrario entre el Banco y el SENAC.

ART. 11 - Las bases y el pliego de especificaciones de la convocatoria serán aprobados por el SENAC y subsiguientemente por el Banco, antes de ser enviados a cada una de las firmas elegibles.

ART. 12 - Las condiciones y especificaciones serán redactadas en términos claros, haciendo conocer en forma detallada las bases, objeto, fecha de presentación de propuestas, cotización de precios, forma de pago, garantía de seriedad de la propuesta y de buena ejecución del contrato, multas, responsabilidades y toda otra información que se considere conveniente.

- ART. 13 - La convocatoria de cada licitación se efectuará mediante notificación enviada a cada una de las firmas elegibles. Dicha notificación deberá indicar la fecha para la presentación de las ofertas, que no podrá ser menos de 30 días, contados del envío de la notificación, así como la hora y lugar de la apertura de las ofertas. Tanto las bases y condiciones de la licitación, así como la notificación respectiva, deberán ser aprobadas por el Banco antes de su envío.
- ART. 14 - En caso de presentarse menos de 2 proponentes, a la primera convocatoria, se efectuará una segunda convocatoria, en igual forma que la primera. Si a esta segunda convocatoria igualmente se presentaren menos de 2 propuestas, se la declarará desierta, y con la previa aprobación del Banco se hará invitación directa a no menos de 3 firmas elegibles a presentar propuestas, incluídas las firmas que concurrieren a las anteriores convocatorias. En este último caso se abrirán las propuestas presentadas, cualquiera sea su número.

CAPITULO IV

LICITACIONES PARA LA ADQUISICION DE EQUIPO, MATERIALES Y OTROS BIENES

- ART. 15 - El SENAC deberá seguir los procedimientos establecidos en este Reglamento para la adquisición de equipo, materiales y otros bienes, excepto los previstos en el Capítulo II relacionados con Precalificación. En este caso, la notificación a que se refiere el Artículo 13 con los antecedentes correspondientes deberán ser enviados a las Embajadas y Consulados de todos los países miembros del Banco para que los hagan conocer a las posibles firmas interesadas en dicha adquisición. Avisos de la licitación deberán ser publicados en la prensa local tres veces en días consecutivos, por lo menos con 30 días de anticipación a la fecha fijada para la presentación de ofertas. Dichas notificaciones y avisos deberán ser previamente aprobados por el Banco.

CAPITULO V

DE LA FORMA DE PRESENTACION Y RECEPCION DE LAS PROPUESTAS PARA EJECUCION DE OBRAS Y ADQUISICION DE EQUIPO Y OTROS BIENES

- ART. 16 - Las propuestas deberán ser presentadas en sobre cerrado, y estar firmadas y selladas por sus representantes legales de acuerdo a las condiciones establecidas en las bases y especificaciones.
- ART. 17 - La presentación de una oferta implica el sometimiento del proponente a todas las disposiciones legales y a las normas contenidas en las bases y especificaciones de la licitación, sin necesidad de declaración expresa.

ART. 18 - Las propuestas no deberán llevar raspaduras o enmiendas, pudiendo ser rechazadas por la Junta de Licitaciones, en el momento de su apertura, aquellas que a su criterio contravengan esta disposición.

ART. 19 - Toda propuesta deberá estar acompañada de:

- (a) Papel sellado y timbres de ley sobre el monto total de la propuesta. Los proponentes del exterior que no pudieran adquirir estos valores fiscales, podrán remitir su importe mediante cheque a la orden del Tesoro de la Nación, cobrable en la ciudad de La Paz. Las bases de la licitación deberán indicar el monto requerido.
- (b) Una garantía de seriedad de la propuesta por el monto señalado por ley y con un plazo mínimo de validez de 120 días contados desde la fecha de recepción de las propuestas.
- (c) Certificado de inscripción en las Cámaras Nacionales de Comercio, de Industria o en la Cámara Boliviana de Construcción, según corresponda.
- (d) Certificados de solvencia tributaria extendidos por las oficinas de la Renta y la Alcaldía Municipal.
- (e) Certificado de la Contraloría General de la República de no tener cargos pendientes de parte del Estado.

Los proponentes del exterior se sujetarán a lo dispuesto en el Artículo 41 de este Reglamento y quedarán inicialmente exentos del cumplimiento de los incisos (c), (d) y (e) del presente artículo.

ART. 20 - En el sobre de cada propuesta se hará constar la fecha y hora en que fue recibida, además de cualquier novedad o circunstancia de la cual se desee dejar constancia.

ART. 21 - Vencido el plazo para la presentación de propuestas, en el día y hora indicados en la convocatoria, el funcionario del SENAC encargado de su recepción procederá a cerrar el Libro de Registro, levantando el Acta correspondiente que será firmado por el Asesor Legal del SENAC y dos miembros de la Junta de Licitaciones.

CAPITULO VI

DE LA COMPOSICION DE LA JUNTA DE LICITACIONES DEL COMITE

ART. 22 - La Junta de Licitaciones del SENAC, tanto para el caso de ejecución de obras como para adquisición de bienes y equipo, estará conformada de acuerdo con las disposiciones legales en vigencia.

- ART. 23 - Ningún miembro podrá delegar poderes a otro, ni ser representado por persona ajena a la Junta, sin la expresa aprobación del Presidente.
- ART. 24 - Las decisiones de la Junta serán tomadas por mayoría absoluta de votos, en sesiones a las que asista un quórum compuesto por lo menos de la mitad de sus miembros lo que deberá certificarse mediante las Actas correspondientes levantadas por el Secretario de la Junta en cada reunión.
- ART. 25 - La Junta de Licitaciones del SENAC podrá requerir la presencia de cualquier funcionario del SENAC u otra persona ajena a ella, cuando lo considere necesario para fines de asesoramiento e información.
- ART. 26 - Los proponentes o sus representantes podrán asistir al acto de apertura de propuestas en la reunión que a ese efecto tenga la Junta de Licitaciones.
- ART. 27 - Las reuniones de la Junta serán efectuadas a convocatoria de la Presidencia cada vez que así lo requiera el SENAC. Las citaciones, salvo casos de urgencia y fuerza mayor, se harán por escrito con 24 horas de anticipación, adjuntándose el Orden del Día y la documentación que sea pertinente.

CAPITULO VII

DE LA APERTURA, CALIFICACION Y ADJUDICACION DE PROPUESTAS

- ART. 28 - La apertura de propuestas se efectuará en la primera reunión siguiente al plazo establecido en la convocatoria. Abiertas las propuestas se verificará el cumplimiento de los requisitos legales del caso y se aceptarán o rechazarán de acuerdo al análisis de la documentación presentada. En esta oportunidad cada miembro de la Junta examinará todas y cada una de las ofertas recibidas.
- ART. 29 - Abiertas las propuestas, éstas no podrán ser modificadas de manera alguna por los interesados.
- ART. 30 - La Junta designará una Comisión Calificadora a efecto de proceder a la calificación de las propuestas aceptadas. Dicha Comisión Calificadora, de la que formará parte un representante técnico de la Contraloría General de la República, podrá solicitar el asesoramiento técnico de cualquier Departamento del SENAC y presentará su informe y recomendaciones en el plazo que se fije para el efecto.
- ART. 31 - En el caso de ejecución de obras, habiéndose ya procedido a una precalificación de las empresas participantes, el Contrato será adjudicado a la oferta más baja que cumpla con las especificaciones y otras condiciones de la licitación. Tratándose de adquisiciones, la Comisión tomará en cuenta no sólo el precio sino también otros factores que sean del caso, como eficiencia y calidad, los plazos de entrega, repuestos y servicios.

- ART. 32 - La Comisión Calificadora, una vez elaborado el cuadro comparativo correspondiente y formado su criterio, redactará su informe incluyendo sus recomendaciones y lo elevará a consideración de la Junta.
- ART. 33 - En conocimiento del informe y recomendaciones de la Comisión Calificadora, la Junta enviará al Banco su opinión sobre el mismo y una vez que el Banco se haya pronunciado favorablemente, la Junta procederá a tomar una decisión final.
- ART. 34 - Después de que se haya obtenido el pronunciamiento del Banco y si hay razones fundadas, la Junta de Licitaciones podrá declarar desierta cualquier licitación o adjudicar sólo parcialmente una propuesta, siempre que ello no implique un fraccionamiento de la obra de que se trate.
- ART. 35 - Resuelta una adjudicación, ya sea para ejecución de obras o adquisición de equipo u otros bienes, se preparará el correspondiente contrato, que en el caso de adquisición podrá tener la forma de orden de compra, y se lo enviará al Banco para que se pronuncie al respecto, dentro de un plazo razonable.
- ART. 36 - Obtenido el pronunciamiento favorable del Banco en cuanto al contrato u orden de compra, el SENAC tramitará la aprobación del instrumento legal correspondiente autorizando la suscripción del contrato o de la orden de compra según sea el caso.
- ART. 37 - Contándose con el instrumento legal a que se hace referencia en el Artículo 38 de este Reglamento, se notificará al o a los proponentes favorecidos para que se apersonen a suscribir el respectivo contrato u orden de compra. A los ofertantes no favorecidos se les devolverá la garantía de seriedad de sus propuestas y otros documentos que no constituyan la propuesta en sí.
- ART. 38 - Si a tiempo de suscribirse el contrato o extenderse la orden de compra, surgiera la necesidad de efectuar modificaciones admitidas dentro de la convocatoria, las bases, condiciones y/o especificaciones, tales modificaciones deberán ser igualmente sometidas a consideración del Banco, de acuerdo con lo señalado en el Artículo 35.
- ART. 39 - Una vez formalizado el contrato o la orden de compra, se enviarán dos ejemplares a la Representación del Banco en Bolivia.
- ART. 40 - La empresa adjudicataria de una licitación antes de suscribir el contrato o aceptar la orden de compra, deberá presentar las garantías de cumplimiento establecidas en los correspondientes Documentos de Licitación.
- ART. 41 - La firma extranjera favorecida con una adjudicación, que tenga que suscribir un contrato, deberá establecer domicilio legal en Bolivia

y designar un Representante Legal para el cumplimiento de las obligaciones emergentes de dicho contrato y, además, cumplir con los requerimientos establecidos en el literal (e) del Artículo 19.

- ART. 42 - Formarán parte del contrato u orden de compra emergentes de una adjudicación, la convocatoria, todos los Documentos de Licitación, la propuesta, las actas de la Junta relativas al asunto, las garantías ofrecidas y cualquier otro documento inherente a la licitación.