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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

**TECHNICAL REPORT
ON THE
COLOMBIAN HIGHWAY PROJECT**

March 30, 1951

Loan Department

TECHNICAL REPORT - COLOMBIAN HIGHWAY PROJECT

Scope of this Report

1. This report discusses the technical aspects of the Colombian highway project which the Bank has been requested to assist in financing. It is based on:

- (a) the Report of the General Survey Mission headed by Dr. Currie;
- (b) information submitted by the Minister of Public Works;
- (c) the Road Transport Report submitted by the Economic Development Committee to the National Government;
- (d) discussions of the Burland Mission with various Colombian Government officials and transport experts, including Mr. Frederick W. Gill, Transport Advisor to the Economic Development Committee, and representatives of the U.S. Bureau of Public Roads stationed in Colombia; and
- (e) discussions with two American contracting firms engaged in road construction in Colombia.

2. In this report the exchange rate used is 1.95 Colombian pesos equals 1 U.S. dollar.

Loan Request

3. The Government of Colombia, through its Minister of Public Works, submitted a request for a loan of \$16.5 million, or the equivalent in other currencies, for (a) the purchase abroad of construction equipment and of certain construction materials, and (b) payment for the services of engineers and contractors for a highway rehabilitation project. This project was estimated to cost a total of approximately 90 million pesos (\$45.1 million) over a period of three years and was designed to provide Colombia with 3,061 Km of reconditioned all-weather trunk highways. The Government of Colombia would be the borrower and the loan would be for 10 years with amortization payments beginning approximately 3 years after the effective date.

Importance of Highways in Colombia

4. Highways carry a greater volume of traffic than any other form of transport in Colombia. The table below shows the amounts of traffic handled by each means of transport in Colombia and the relative position occupied by highways.

Table I

Estimated Total Freight Volume in 1947 ^{1/}

	<u>Total Freight Ton-Kilometers (millions)</u>	<u>Percent of Total</u>
Railways	584.0	32.5
Highways	642.5	35.8
Inland waterways*	511.5	28.5
Airways**	<u>56.5</u>	<u>3.2</u>
Total	1,794.5	100.0

* Includes 51.3 million ton-kilometers for coastwise traffic.

** Adjusted to reflect differences in air and surface kilometrage for the purpose of comparability.

5. The reasons for the great importance of highways in Colombia according to the General Survey Mission were: "First, the highway system, even in its present state, reaches many hundreds of communities that are not accessible by other means. Second, it is cheaper and easier to construct highways than railroads through the typical Colombian terrain because investments in highways are reasonably flexible and can be adjusted to lower volumes of traffic. They are thus more suitable for reaching undeveloped markets and sources of supply. Third, highway transportation has been able to give faster service than the railroads, especially on short hauls which account for a major share of Colombian transport volume." At present, major traffic flows in Colombia generally use a combination of at least two of the three means of surface transport as no single type of transport provides a dependable through service between the coastal area and the more important interior cities (See Map 1). The capacity of the railroads is limited because of narrow gauges, steep grades, and sharp curves imposed by the rugged terrain of the country. Although the Magdalena River is a major and essential artery of commerce, it provides service to only limited areas and the service varies with the seasonal flows.

Existing Highway Network

6. At present there are about 20,300 kilometers (12,586 miles) of roads in Colombia, 12,000 Km of which are national highways and 8,300 Km departmental roads. Approximately 800 Km or 4% of the total are surfaced with

^{1/} From Report of General Survey Mission (Currie Report).

concrete or bituminous macadam. The remainder of the national highways and the most important departmental roads are surfaced with so-called "water bound macadam", usually local crushed rock with a filling of fine material consolidated by weather and traffic. Some of the more important highways have a width of 9 meters (29.5 feet) with a surfacing 6 meters wide. Most of the roads, however, are through mountainous country where the widths average about 6 or 7 meters, the curves are sharp and the grades are often excessively steep. Most of the highways have been built in the last 25 years, often with inadequate tools and limited financial resources. The over-all highway achievement, however, has been impressive in view of the great difficulties of construction and maintenance. The foundation for a good road system has been laid, although there are some gaps in the network and, because of lack of adequate maintenance, many kilometers of the existing roads are in need of extensive repairs or rehabilitation. Some sections should be reconstructed to improve grades or alignment and many bridges are inadequate for the present day traffic and must be replaced. Excessive rains in the past two years have speeded the deterioration of the roads which were inadequately maintained and, as a result, existing transportation by highways, already seriously handicapped, may reach a critical state unless prompt action is taken to improve the main traffic routes.

Conclusions of the General Survey Mission on Highways

7. Colombia's highway system was thoroughly studied by the General Survey Mission (Currie Mission). Its principal conclusions as to operational improvements were:

"The present unsatisfactory standards of highway maintenance are less the result of inadequate appropriations than of uneconomic administration of the funds available. The average National Government allowance of 1,000 pesos per kilometer per year for maintenance and paving, which was approximately provided in the 1950 budget, should be sufficient if properly used, especially since it is supplemented by substantial departmental expenditures."

"Greater use of mechanical road equipment is recommended. The equipment now in use should be concentrated in fewer larger pools to permit better supervision and maintenance and more flexible use. Budget allocations for purchase of highway machinery and parts should be larger than in past years; the 1950 figure is more adequate, however, and we recommend that this level be maintained for some years to come."

"Unsatisfactory highway conditions have contributed greatly to the excessively high cost of truck operations. Maintenance and accident costs are heavy and the life of equipment is short; a large part of every truck fleet is always laid up. As a result of these hazards, light equipment and low speeds are generally used and reduce the efficiency of operations. The wide diversity of truck types in use and the foreign exchange

restrictions of the past few years have made it difficult to maintain adequate inventories of spare parts and have increased maintenance costs and delays. We believe it should be possible, by improving the quality of the major highways and using more uniform fleets of higher capacity trucks, to reduce truck operating costs by at least 50 percent."

The Committee for Economic Development

8. Following the publication of the report of the General Survey Mission, the Government of Colombia appointed a non-partisan Economic Development Committee of outstanding Colombian citizens to review the Mission's recommendations. At the same time, it engaged a group of technicians to assist the Committee in formulating programs of development and to study ways and means of improving the administrative systems of the nation. Mr. Frederick W. Gill, an American Transportation Consultant, was retained for the Committee as the advisor on highways. Because of the urgency of highway improvements, the Committee early in December 1950 submitted an emergency highway program.

Reorganization of the Highway Department

9. The Mission for Public Administration which grew out of and followed the General Survey Mission, studied the administrative organization of the Ministry of Public Works and recommended a reorganization of the Highway Department so that it could efficiently administer a comprehensive highway construction program and carry a better maintenance in the future. The recommendations were accepted by the Minister and the reorganization was completed early in 1951. In addition a number of young Colombian Engineers will be sent to the United States for training under the U.S. Bureau of Public Roads.

Programs Considered

10. The Minister of Public Works personally presented for consideration of the Bank a document outlining and discussing in some detail several highway programs, all with the same objective, namely, providing Colombia with a system of dependable trunk highways. Included in the document were the following programs:

Table II

<u>Program of</u>	<u>Kilometers of New Construction</u>	<u>Kilometers of Improvement</u>	<u>Total Km</u>	<u>Estimated Cost Millions Pesos</u>
Currie Mission	593	0	593	36.6*
Economic Development Committee (1st step)	155	2,906	3,061	90.1
Ministry of Public Works	736	4,110	4,846	165.2

* 42.6 if general pool of construction equipment is added.

11. The General Survey Mission's program was a general plan for the future, giving priority, as an initial step toward a continuous highway system, to the construction of a number of relatively short new sections of road to close gaps in existing trunkline highways. At the time the Survey Mission made its study of the Colombian highway system, about two years ago, the existing roads had not deteriorated to the critical state in which they are now; it was then reasonable to expect that improved maintenance could bring the roads back to a satisfactory condition. Continued lack of adequate maintenance and unusual rains, however, caused an increasingly rapid deterioration with the result that now reconstruction of most of the highways will be required. While the other programs include reconstruction of existing highways in addition to new construction, they cover the essential portions of the same routes selected by the Currie Mission as the main trunkline highways of the country.

12. The Economic Development Committee in setting forth its program concluded: "The country needs to make its main trunk roads practicable at any season as soon as possible; this endeavor requires the setting up of an intensive program of maintenance, reconstruction and building of new roads."

13. Its program^{1/} is designed to be completed in 5 years and is divided into two steps (see Map 2). The first step, set forth in Table II, is in the nature of an emergency program to be completed in 3 years and is directed chiefly toward the restoration of deteriorated trunk roads, and toward the construction of a few connecting links where necessary to provide a continuous system of highways. The first step envisages the improvement of 3,061 Km of highways and will cost about 90.1 million pesos. The second step, to be completed in a further period of two years, would include 2,200 Km of highways and is estimated to cost 59 million pesos. The Committee's total program, therefore, includes 5,261 Km of highways and would cost about 149.1 million pesos. Only the first step was presented for consideration by the Bank at the present time.

14. The program of the Ministry of Public Works contains almost 5 times more new construction than the first step of the Committee's program and includes some new construction not included in the General Survey Mission's program. In addition, the Government's program includes 1,204 Km more reconstruction and repair work than the Committee's first step, but it is scheduled to be completed in 4 years as compared with a 3-year schedule for the Committee's first step. The essential difference between the Minister's program and the Committee's total long-range program, however, is that the Committee proposes to undertake the work in two steps over a 5 year period and the Minister proposes to undertake almost as much work in 3 to 4 years.

^{1/} A copy of the Committee's full report, which was included in the document submitted by the Minister of Public Works, is available in the files.

The Minister's program would cost 16 million pesos more than the Committee's 5 year program, because of the much greater mileage of new construction, but it would provide some 415 Km less in all weather highways than the Committee's program.

15. After some study, the Bank concluded that the first step of the Committee's program was the most desirable for consideration at present, especially in view of the fact that:

- (a) There was serious doubt as to Colombia's ability to construct the larger program of the Ministry of Public Works within the 4 years estimated for its completion, considering the organizational problems involved and the fact that even for the smaller project of the Economic Development Committee it will be necessary to train labor, technical and administrative personnel and, in addition, bring in key personnel from abroad.
- (b) Some of the roads included in the Minister's program should be deferred until the more urgent trunk roads included in the basic highway system are completed.
- (c) The larger program favored by the Ministry of Public Works would commit a disproportionate amount of Colombian resources before the total requirements of the over-all development program being formulated by the Committee were known.

16. After some discussion, the Minister of Public Works adopted the Committee's program and submitted the first step of this program as the project which Colombia desired the Bank to assist in financing.

Description of the Project

17. The project envisages 155 kilometers (96 miles) of new construction and 2,906 kilometers (1,703 miles) of reconstruction on trunk highways over a three year period. Work will be undertaken on portions of two main north and south trunk highways described as the Eastern and Western Trunklines and on certain portions of trunk highways running east and west described as the Transverse Trunklines. Taken together, the highways form a continuous network serving the more important business and agricultural sections of Colombia. A summary of the cost and the extent of new construction and other work on each of the trunk highways is given below; for a more detailed breakdown see Annex Table 1.

Table III
Summary of the Project

<u>Trunk Roads</u>	<u>New Construction Km</u>	<u>Reconstruction Km</u>	<u>Total Km</u>	<u>Average Cost (Rounded) Per Km Pesos</u>	<u>Total Estimated Cost (Millions Pesos)</u>
Eastern	0	1,051	1,051	27,300	28.7
Western	155	1,282	1,437	30,000	43.0
Transverse	<u>0</u>	<u>573</u>	<u>573</u>	<u>32,100</u>	<u>18.4</u>
Total	155	2,906	3,061	29,400	90.1

18. As some of the estimates for various sections of the highways were, of necessity, made without field surveys, it was considered prudent to provide for a special contingency allowance of 15% of the presently estimated total cost to be used as and if required on any section of the highway to assure the completion of the project and the maintenance of the roads during construction.

Specifications

19. Subject to minor modifications on the basis of field surveys, roads included in the project described above will, in general, have a minimum width of 7 meters; capacity of the bridges and culverts will be 20 tons, and the minimum width of the new bridges will be 6.1 meters. All roads except an estimated 15% to be paved will have a gravel or crushed rock surface and the surface will be approximately 15 cm thick, minimum. When necessary, thickness of the rock or gravel surfacing will be increased to meet the demands of traffic. Paving of about 15% of the highways will be undertaken only after the sections to be hard surfaced have been opened to traffic for some time and traffic counts have been made. For new sections of road to be constructed, the maximum grades will generally be 7%; 1/ in exceptional cases the maximum grade may be 8% for short distances.

1/ 7% grade is a rise of 7 ft. in 100 ft. horizontal distance.

20. These specifications compare reasonably well with those of the Inter-American highway. For a detailed comparison see Annex Table 2.

Currency Requirements

21. It is estimated that 57.1 million pesos of the total cost of the project, plus the 13.5 million peso contingency allowance, would be in local currency and that about 33 million pesos (\$16.5 million) would be required in foreign exchange (probably all in U.S. Dollars) for the importation of construction machinery, trucks, machine tools, paving materials, steel, lubricants and for payment for the services of engineers and contractors. For a breakdown of the list of goods anticipated to be purchased with foreign exchange see Annex Table 3.

22. The amount of local currency and foreign exchange estimated to be required is shown in the table below.

Table IV

Phased Requirements of Funds

All figures expressed in millions of pesos
for years ending

	<u>Mid-1952</u>	<u>Mid-1953</u>	<u>Mid-1954</u>	<u>TOTAL</u>
Local Currency including 15% for contingencies	23.5 /	23.5 /	23.5 /	70.6
Foreign Exchange	<u>22.4</u>	<u>5.4</u>	<u>5.2</u>	<u>33.0</u>
Total	45.9	28.9	28.7	103.6
(Foreign Exchange in \$)	11.2	2.7	2.6	16.5

23. The local currency set forth above will be provided for in the annual budget appropriation for the Ministry of Public Works. The special allowance for contingencies amounting to 4.5 million pesos annually, as well as the other peso funds (19.0 million) included in the annual budgets for the project, if not completely expended during any one budgetary year will be carried over to the next budgetary year and will be used only for carrying out the project.

24. The Government of Colombia does not intend to undertake any major highway projects other than the project described in this report, except normal maintenance and the continuance of work on four contracts now in effect which the Minister of Public Works feels it would be most inconvenient to cancel. Three of these contracts will involve the expenditure of approximately 2.7 million pesos annually for 3 years and the fourth will require the expenditure of about 5 to 6 million pesos in the next 18 months. The

maximum local currency requirements of the main project, 23.5 million pesos annually, plus the expenditures for the four contracts mentioned above will require a peak expenditure on new construction and reconstruction of less than 30.0 million pesos in 1952. This is well under the 38.6 million pesos budgeted for highway construction and reconstruction in 1951. In addition, the 1951 highway budget includes 21 million pesos for maintenance. The demands of the project for local currency should, therefore, not overtax the highway budget, assuming that the future budgets will be at least equal to the 1951 budget.

Plan of Construction

25. It is proposed that the construction of the project will be undertaken by awarding contracts on a cost-plus-fixed-fee basis to a few prime contractors. All contracts will be submitted by the Colombian Government to the Bank in advance and are to be, in form and substance, satisfactory to the Bank. The contractors' fees will amount to approximately 7.5% of the total minimum estimated costs of the project and 50% to 60% of the fees will be payable in dollars (see Table 3 Annex). The names of the contractors with whom negotiations are being now carried on are shown in Annex Table 4. The exact mileages which will be contracted for with each such contractor will depend, of course, on a number of considerations, including the terms offered by such contractors, and can only be finally determined after negotiations have been completed. Except in those contracts where paving is specifically prescribed, the contracts will provide that each contractor is to construct an adequate stabilized sub-base, surfaced with crushed rock or gravel which will be suitable for paving at a later date, if and as required.

26. The roads will be provided with adequate ditches and culverts for drainage. Each contractor will open for traffic, from time to time, as rapidly as possible, sections of the road covered by his contract and will keep open for traffic, as far as practical, those sections on which he is working where no alternate routing is possible. Each contractor will maintain in condition for normal traffic purposes, the roads repaired, reconstructed, or constructed by him, during the period of his contract.

27. Contractors will be required, at the outset, to carry on engineering studies and prepare the detailed plans and specifications for work on the sections of the road covered by their contracts. Such plans and specifications will be satisfactory to both the Government and the contractors and acceptable to the Bank. Such contracts will provide that the Government will furnish to the contractor the equipment needed for his work. Insofar as possible it will be furnished by having the contractor purchase the equipment and reimbursing him for amounts paid by him or providing him with funds to make payments. While the Government will be the actual owner, the equipment, materials and supplies so purchased will be delivered to and remain under exclusive control of each of the contractors till such time as his contract has been completed, except in cases of landslide or other similar emergency, in which cases equipment may be taken off the project

and used temporarily to restore other roads to operating conditions. Each contractor will be responsible for the maintenance of the equipment and for turning this equipment over to the Government in good condition at the completion of the contract.

28. The contractors will establish equipment repair depots for the maintenance of the machinery used in carrying out their respective contracts. These depots will be located at appropriate sites capable of serving efficiently particular areas of highway. Each depot will be capable of keeping in sound operating condition the amount and type of equipment required by the contractor for his maintenance of the highways during the period of his contract. Each depot will provide equipment storage facilities and lubrication facilities. Each contractor will be required, during the period of his contract, to train Colombian personnel to operate the repair depots, to operate and maintain the road equipment and to learn the techniques of road maintenance. After completion of the contracts, the repair depots will be turned over to the Government.

29. At present, the Government has concluded certain contracts which cover sections of the proposed project with:

- (a) The Raymond Concrete Pile Company, Inc. and Finston, Inc. for the upkeep, maintenance and improvement of the Simon Bolivar highway located between the port of Buenaventura and the point on that road known as "El Saladito", located approximately 12 kilometers north and west of Cali. This contract is estimated to cost approximately 5,375,000 pesos.
- (b) The Utah Construction Company, Inc. for the construction of highways between Armenia and Ibague, Calarca and Murillo, Armenia and Pereira, Armenia and La Espanola, Armenia and Aeropuerto, and Pereira-Cartago. This contract is estimated to cost approximately 6,850,000 pesos.

30. As rapidly as possible, additional contracts will be awarded for the remaining sections of the route included in the project. It is expected that the entire program will be under contract not later than August 1, 1951.

Maintenance After Construction

31. After each section of the road has been completed and accepted by the Government, adequate provision will be made for its proper maintenance and all useful construction and maintenance equipment in the hands of the contractor at the time of completion of the contract will be turned over to the Government for this purpose. It is intended that repair depots established by the contractors will be continued in operation by the Government. Adequate amounts of funds have been included in the annual budgets of the National Government in the past two years and if similar amounts are included in the future, the project roads and equipment should be properly maintained after completion of the project, particularly in view of the re-

organization of the highway department which provided for a special maintenance section.

Plans for Permanent Paving

32. Paving during the 3 year rehabilitation project will cover only an estimated 15% of the trunkline highways that will be reconditioned. It is the intention of the Government in subsequent years to proceed with further paving where necessary as rapidly as funds and materials permit.

Discussion

33. While the Economic Development Committee's program which was adopted by the Government is sound from the point of view of giving top priority to rehabilitation and construction of the highways which will be of the greatest economic benefit to the nation in the shortest period of time, it must be recognized as an emergency project which had to be formulated without adequate field surveys and detailed plans and specifications. The estimates of cost are, therefore, not based on exact information, and it is anticipated that there will be variations from the figures contained in this report, but it is thought that the special contingency fund will cover these variations.

34. The highway department reorganization which has been put into effect provides a functional organization which, if faithfully followed, will give the Minister of Public Works an establishment for the efficient administration of the highway project and its subsequent maintenance. The critical state of the existing roads because of faulty construction and lack of adequate maintenance will undoubtedly be remedied by the carrying out of the project before the Bank, if it should be favorably considered, and the highway officials of Colombia have unquestionably been sufficiently impressed by the faulty and inadequate maintenance methods used in the past to adopt an improved system of highway maintenance. The new construction equipment and stations for its maintenance to be established under the project plus personnel which will be trained provides a good technical base on which to build an efficient organization for future maintenance.

35. While the desire to have a larger percentage of the roads hard surfaced at the outset is understandable, it is wise to delay the paving of most of the trunkline network until the traffic flows resulting from the new continuous system develop.

36. The plan of construction devised meets realistically the conditions that exist in Colombia today and, in the opinion of the Engineering Staff, is from the technical standpoint a sound procedure. It proposes to place the responsibility of getting the job done on a relatively few experienced and reliable prime contractors who may or may not sub-contract parts of the work. These contractors will supply, in addition to technical skill, skill in organization which will be a valuable contribution to the project.

37. The critical period in the development of the project, however, is likely to be during the next 3 or 4 months when negotiations with the various contractors will take place and, in effect, the type of roads to be built will be decided. With only general specifications as a guide, the Bank cannot be sure of the quality of the roads which may result. It is, therefore, considered important that the Bank send an experienced engineer to Colombia to advise the Bank, after becoming familiar with local conditions, on the technical soundness and suitability of the contracts submitted to the Bank for review.

Conclusions and Recommendations

38. The project presented by the Colombian Government is satisfactory from a technical point of view and is suitable for financing by the Bank.

39. The amount of \$16.5 million is an appropriate estimate of the foreign exchange cost of the project.

40. In the event that a loan be favorably considered, it is recommended that an experienced engineer be sent to Colombia at an early date to advise the Bank on the contracts which will be submitted to it for review.

A. D. Spottswood
Engineer

March 20, 1951

ANNEX

Table 1

THE THREE-YEAR COLOMBIAN HIGHWAY PROJECT
Mid 1951 - Mid 1954

	Total Distance KM	Est. KMs included in project	Est. Cost Per Km (Pesos)	Total Cost (1,000's Pesos)
1. WESTERN TRUNKLINE AND BRANCHES				
*Cali-Palmira	25	25	50,000	1,250
Palmira-Murillo	95	95	10,000	950
Murillo-Cartago	71	71	15,000	1,065
Cartago-Medellin	280	280	15,000	4,200
Medellin-Puerto Valdivia	202	143	30,000	4,290
Pto. Valdivia-Taraza	55	55	40,000	2,200
*Taraza-Planeta Rica	130	130	60,000	7,800
Planeta Rica-Cartagena	322	230	40,000	9,200
Cartagena-Barranquilla	139	120	20,000	2,400
Cauya-Manizales	66	66	30,000	1,980
Cerritos-Manizales	79	79	25,000	1,975
Manizales-Honda	143	143	40,000	5,720
2. EASTERN TRUNKLINE AND BRANCHES				
Espinal-Girardot	20	10	30,000	300
Girardot-Fusagasuga	80	80	40,000	3,200
Bogota-Tunja	162	162	3,000	486
Tunja-Barbosa	75	75	40,000	3,000
Barbosa-Bucaramanga	238	193	30,000	5,790
Bucaramanga-Pamplona	132	132	45,000	5,940
Pamplona-Cucuta	74	74	25,000	1,850
Cucuta-Gamarra	325	325	25,000	8,125
3. TRANSVERSE TRUNKLINES				
Espinal-Ibague	62	50	30,000	1,500
Ibague-Murillo	192	192	40,000	7,680
Cali-Buenaventura	142	130	41,346	5,375
Bogota-Honda	166	166	20,000	3,320
Honda-La Dorada	35	35	15,000	525
TOTALS	3,310	3,061		Ps. \$ 90,121

* New Construction

ANNEX

Table 2

COMPARISON OF SPECIFICATIONS OF COLOMBIAN PROJECT
WITH THOSE OF INTER AMERICAN HIGHWAY

<u>Item</u>	<u>Inter American Highway</u>	<u>Colombian Highway Project</u>
Maximum Grade	7%	7 to 8%
Width between shoulders	8.5 meters	7 meters
Depth of hydraulic macadam	15 centimeters	15 centimeters
Bridges, double lane	15 tons	20 tons

ANNEX

Table 3

	Year Ending			Total
	<u>Mid-1952</u>	<u>Mid-1953</u>	<u>Mid-1954</u>	
EQUIPMENT	\$6,939,000	-	-	\$6,939,000
Draglines, Trucks, Tractors, Graders, Rollers, Rock Crushers, Machine Tools, Generators, etc.				
SPARE PARTS	1,387,000	-	-	1,387,000
MATERIALS	1,386,000	924,000	462,000	2,772,000
Bridge Structures, Rein- forcing Steel, Lubricants, Paving materials, Miscel- laneous Supplies				
GENERAL & ADMINISTRATION	901,000	1,201,000	1,500,000	3,602,000
Administrative expenses and salaries of foreign per- sonnel.				
CONTRACTORS' FEES	<u>600,000</u>	<u>600,000</u>	<u>600,000</u>	<u>1,800,000</u>
TOTALS	<u>\$11,213,000</u>	<u>\$2,725,000</u>	<u>\$2,562,000</u>	<u>\$16,500,000</u>

The above list is an estimate based on the best information available at the present time. As contracts are awarded each contractor will submit a list of the equipment and materials he will require from abroad. From these lists a more detailed list of goods can be compiled.

Because the contractors will be required to undertake a larger amount of survey work and other engineering work and a training program not usually included in this type of contract, the amount for salaries of foreign personnel and administrative expense, \$3.6 million, is higher than it might be otherwise.

The amount of contractors' fees payable in dollars is about 4% of the total; the remainder of those fees, 3.5% of the total, is payable in pesos.

ANNEX

Table 4

LIST OF LARGE FOREIGN GENERAL CONTRACTORS OP-
ERATING IN COLOMBIA AS SUBMITTED BY
THE MINISTER OF PUBLIC WORKS

Winston brothers Company
Calle 15 N^o 8-94
Bogota, Colombia

Raymond Concrete Pile Company
Calle 15 N^o 8-94
Bogota, Colombia

Utah Construction Company
Carrera 9^a N^o 16-20
Bogota, Colombia

Morrison and Knudsen Company
Calle 12 N^o 8-11
Bogota, Colombia

Christiani & Nielsen
Carrera 9^a N^o 16-20
Bogota, Colombia

United States Steel Export Company
Calle 13 #7-90, Of. 529/532
Bogota, Colombia

Frank Engineering Company

