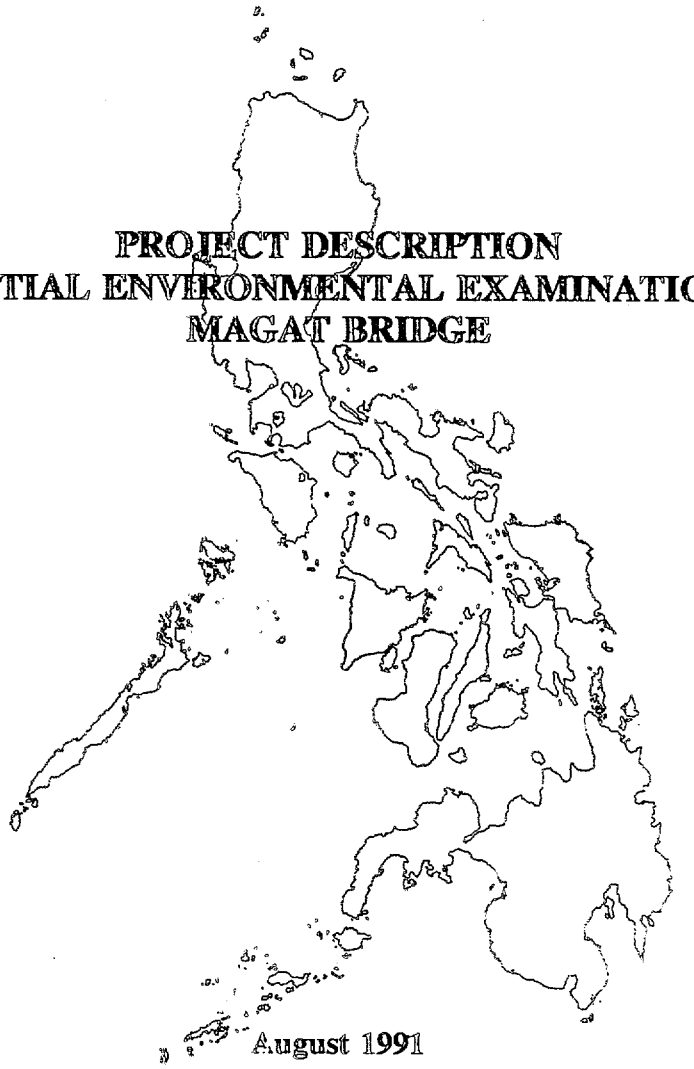
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

RURAL INFRASTRUCTURE FUND PROJECT

(AID PROJECT NO. 492-0420)



PROJECT DESCRIPTION
INITIAL ENVIRONMENTAL EXAMINATION
MAGAT BRIDGE

August 1991

LOUIS BERGER INTERNATIONAL, INC.
100 Halsted Street, East Orange, NJ, 07019, U.S.A.

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

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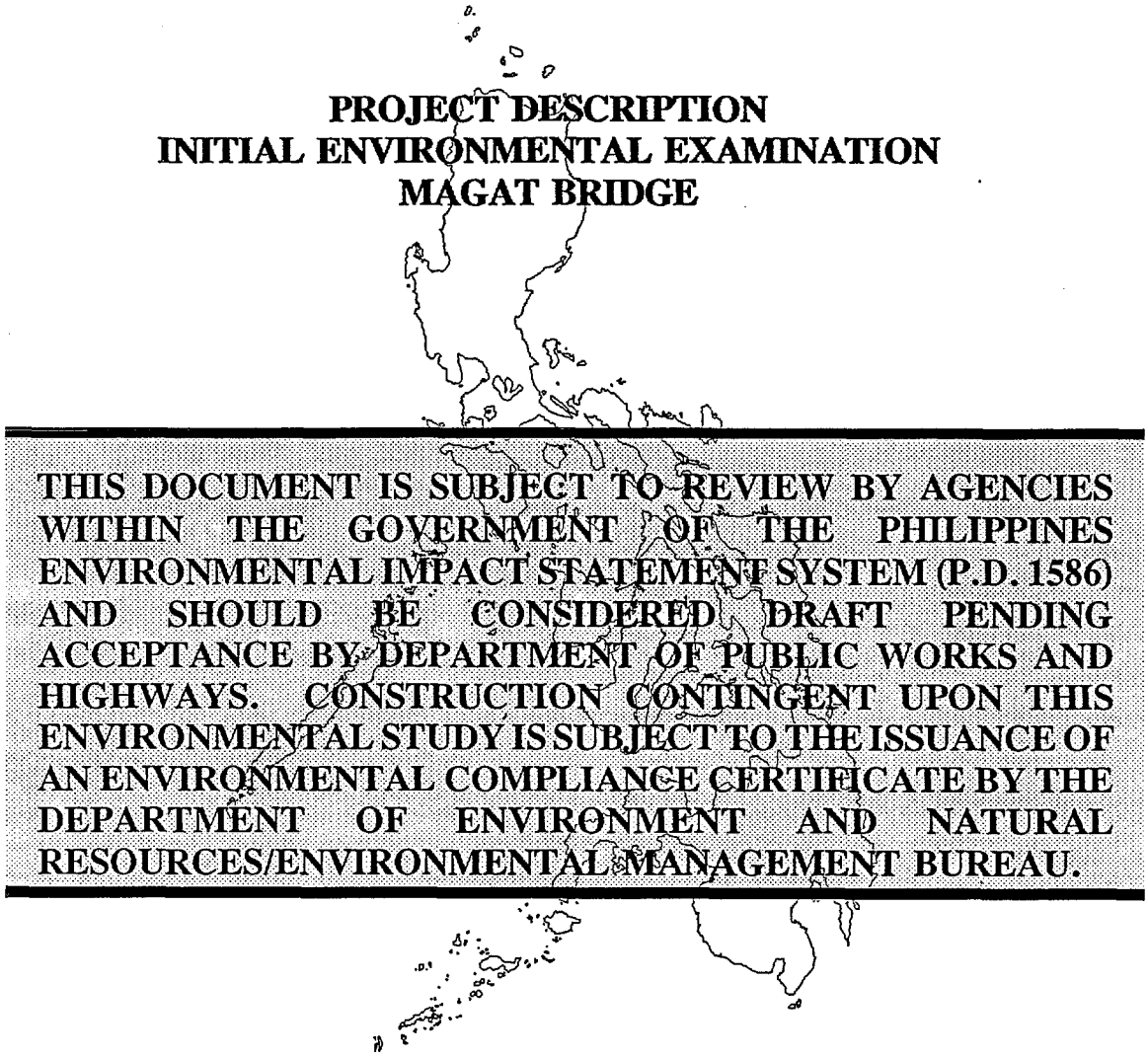

THIS DOCUMENT IS SUBJECT TO REVIEW BY AGENCIES WITHIN THE GOVERNMENT OF THE PHILIPPINES ENVIRONMENTAL IMPACT STATEMENT SYSTEM (P.D. 1586) AND SHOULD BE CONSIDERED DRAFT PENDING ACCEPTANCE BY DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS. CONSTRUCTION CONTINGENT UPON THIS ENVIRONMENTAL STUDY IS SUBJECT TO THE ISSUANCE OF AN ENVIRONMENTAL COMPLIANCE CERTIFICATE BY THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES/ENVIRONMENTAL MANAGEMENT BUREAU.

August 1991

LOUIS BERGER INTERNATIONAL, INC.

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PROJECT DESCRIPTION
Initial Environmental Examination

MAGAT BRIDGE

1. PROPONENT

Department of Public Works and Highways
Rural Infrastructure Fund Project
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2. TYPE AND PURPOSE OF PROJECT

2.1 Background

The design and construction of the Magat Bridge was originally a component of the Santiago-Tuguegarao Road Project funded by the International Bank of Reconstruction and Development (IBRD, World Bank). This project covered approximately 125 kilometers of road improvement (Figure 1), divided into five separate contract packages.

The Magat Bridge was a part of Contract Package II which includes the road section from Cabatuan to Aurora (Figure 2). In order to accelerate the completion of the Magat Bridge, the implementation of the bidding and construction was shifted to the Rural Infrastructure Fund (RIF) Project funded by United States Agency for International Development (USAID). The balance of Contract Package II, involving the adjacent seven kilometers of road improvement and the smaller Malacopa Bridge, is reportedly scheduled for IBRD funding in 1992.

2.2 Project Description

As designed, the Magat Bridge will be 926 m long, containing 13 spans - 2 exterior spans of 50 m each and 11 interior spans of 75 m each (Figures 3-6). The superstructure will be comprised of pre-stressed concrete box girders (2 cell) approximately 2.5 m deep (4 m deep at haunches), with alternate spans having drop-in girders. The roadway deck is 7.32 m wide, with 0.42 m wide sidewalks.

The substructure will incorporate reinforced concrete piers and abutments supported by either driven steel H-piles or cast-in-place bored piles.

The proposed bridge project will include rubble-concrete revetments on each river bank (one 550 m length and one 242 m length) and also the two sections of approach road on each side of the bridge, one 250 m long and one 200 m long.

2.3 Purpose of the Project

The existing IBRD Project Road, from Santiago to Tuguegarao, serves as the primary route to the agricultural communities of the western Cagayan Valley (Figure 7). Utilization of this important transportation route is limited by the existing Magat River crossing between the municipalities of Cabatuan and Aurora, which consists of a low, "Irish-bridge" or over-flow type structure covering part of the river's width (Plates 1-3). At present, vehicles must often ford the unbridged 450-500 m wide river section. During periods of high water the river is reportedly impassible and north-south traffic is diverted through the municipality of Roxas and the Pan-Philippine Highway; an added distance from Aurora to Cabatuan of nearly eighty kilometers (Figure 7). The current Road Influence Area (RIA) affects a population of over 600,000.

3. LOCATION OF THE PROJECT

The proposed site of the Magat Bridge straddles, approximately mid-river, the political boundaries of Barangay Del Pilar of the Municipality of Cabatuan, and Barangay Saranay of the Municipality of Aurora (Figure 8). Both municipalities are located in the Province of Isabela, Region II, in Northern Luzon (Figure 1). The coordinates of the project site are approximately 121° 39' 00" east and 16° 58' 00" north. A reproduction of the latest available cadastral survey (1:20,000 scale, dated 1927), is provided for the project site in Figure 9.

4. DESCRIPTION OF ENVIRONMENTAL SETTING

4.1 Nearby Surface Water Bodies

The proposed Magat Bridge is a multi-span structure which will cross the Magat River between two municipalities of Isabela province; Cabatuan on the south and Aurora on the north.

Magat River flows across the Cagayan Valley in a northeasterly direction until it meets the Cagayan River 65 km downstream. The hydroelectric and irrigation potential of the Magat River has been tapped with the construction of a series of multi-purpose dams, including the Maris Dam and the Magat Dam, 18 and 23 km upstream of the proposed bridge site, respectively (Figure 10).

In the vicinity of the proposed project are two major tributaries of the Magat River, namely the Tao-Tao River and the Malacopa Creek. The surrounding Cagayan Valley is laced with additional tributaries of the Cagayan River (Figure 10) as well as the distribution network of irrigation canals of the National Irrigation Administration (NIA).

Magat River was classified by the Environmental Management Bureau (EMB) in 1983 as a Class "C" river and continuous monitoring by the DENR regional office supports this classification. Class "C" waters are described as suitable for fishery, recreational and industrial uses. (DENR Administrative Order No. 34, Series of 1990).

The water of the Magat River is silty and brown in appearance and color as it carries eroded soil from upland slopes and stream banks.

In addition to wide-spread irrigation use of the Magat River provided by upstream multi-purpose dams, local use of the river is primarily for a limited, subsistence fishery of freshwater fish (tilapia) and shrimps. Observed catch methods include hand lines, traps and nets. Due to the silty nature of the Magat River water, local communities utilize abundant groundwater and pumps to provide domestic and drinking water needs.

4.2 Important Ecological Systems

In the vicinity of the proposed project site, the Cagayan Valley can be described as an expansive flood plain, with the dominant land cover primarily agricultural (Figure 11). Remnant, uncultivated riverine environments exist along scattered sections of surveyed water courses. Wetland areas which are too deep for rice cultivation may be seasonally present during the rainy season. Based on a literature review, the project vicinity does not include any undegraded or primary forest (initially identified on land cover maps); wetland areas (identified by the Asian Wetland Bureau); prime fisheries area; and areas under or proposed for protection as national parks or reserves.

In addition to the multi-purpose dams near Oscaris, Ramon, the water course and natural habitats of the Magat River have been altered by dry season farming practices and extensive river training structures, including a 15 km length of levees near San Mateo.

4.3 Land Uses

Agriculture is the predominant existing land use within the project vicinity (Figure 11; Plate 1). Based on the socio-economic profile available for the municipality of Cabatuan (1990), agricultural use occupies 6,266 ha or 78% of the total municipal land area, with the balance of the land use areas described as open grasslands, roads and irrigation canals. Rice and corn are the traditional crops planted.

Similar land use is assumed for the adjoining municipality of Aurora, for which a current socio-economic profile was not obtained due to the flooded condition of the existing Magat River crossing at the time of the environmental field survey (August, 1991).

The Magat River bed, including an area near the proposed project site, has been utilized in the past as a traditional borrow source of aggregates and gravel. Use of river source borrow sites is anticipated to continue, as identified on the source materials map (Figure 7).

4.4 Existing Environmental or Population Problems

Flooding is the most prominent environmental problem besetting the two municipalities and adjacent areas as they form part of the Isabela flood plain. (Figure 12). This flood plain is shaped by the confluence of the Magat and Cagayan rivers. A number of factors contribute to flooding in the area including low elevation, poor drainage, high rainfall intensity, deforestation in the highland zones and overflowing of the Magat and Cagayan Rivers during periods of high water flow.

Prior to 1982, the year the Magat River Multi-Purpose Dam was completed, Cabatuan and Aurora were subject to seasonal floodwaters during the river's high stage discharge. For example, in 1971, flood depths of six meters were measured within the Magat Basin. With the construction and operation of the dam, it was observed and confirmed by local officials and residents that no major flooding has occurred in the area.

Is this due partly to lack of watershed mgmt.

Drought was also a recent environmental problem which occurred from the first months of 1991 to the usually wet months of May, June and July. The severity of the drought caused the alteration of the normal cropping seasons for rice and other crops. From three cropping cycles per year, it is likely that there will be only one cropping cycle for rice in 1991. The drought also depleted the water stored at the Magat Dam reservoir which will only be replenished with the anticipated onset of rains in August.

Environmental problems related to the local prevalence of agriculture include the potential of surface and groundwater contamination by commonly used pesticides and fertilizers. Dust pollution, generated from milling and trucking operations, may be common following harvest. In Cabatuan alone, there are twelve rice and corn mills with a reported daily milling capacity of 1,500 metric tons. During a previous feasibility study (DPWH, 1988), nearly 60%, or 1000 MT of surveyed daily freight travelling the Santiago-Tuguegarao Project Road consisted of rice and corn products.

As identified in previous studies involving the Magat Bridge and through site visits and interviews, a primary population problem remains the poor condition and serviceability of the existing transportation infrastructure serving the western Cagayan Valley.

4.5 Socio-Economic Indicators

4.5.1 Population

Based on the 1990 National Statistical Coordination Board survey of population, the municipality of Aurora has a total population of 24,903 distributed among a total of 4,794 households or families. The proposed bridge would be located partially within the barangay of Saranay which has a population of 346 comprising about 1.4 percent of the municipal population (Table 1). There is a total of 67 households in this barangay.

The municipality of Cabatuan has a slightly higher population than Aurora with a total population of 26,380 divided among 5,118 households. The project would be located partially within the barangay of Del Pilar which has a population of 1,246. This accounts for 4.7 percent of the total municipal population. A reported 257 households reside within this barangay.

From 1975 to 1987, the municipalities of Aurora and Cabatuan registered almost identical annual population growth rates of 2.48 percent and 2.47 percent respectively. These rates are lower than the annual provincial growth rate of 3.08 percent, which may indicate out migration from these rural areas.

Municipality and Barangay	Total Population	Household Population	Number of Household	Ave. Number of Members per Household
Aurora	24,903	24,856	4,794	5.2
Saranay	346	346	67	5.2
Cabatuan	26,380	26,272	5,118	5.1
Del Pilar	1,246	1,246	257	4.8

Source: 1990 Census of Population and Housing
National Statistics Office

4.5.2 Income

The 1988 National Statistics Office survey on family income indicated an annual average family income of ₱ 36,145 for the province of Isabela. The province has a total of 37 municipalities. Income figures per household were not available for local barangay and municipality level comparisons.

As previously described, agriculture is the main source of income in the two municipalities of Aurora and Cabanatuan. In addition, they have a combined total of 83 agro-industrial establishments which include rice/corn mills, warehouses, grain driers and food factories. The two municipalities rank among the top ten municipalities of Isabela with regards to the number of agro-industrial establishments.

4.6 Environmentally Critical Projects and Areas

Presidential Proclamation No. 2146 (1983) describes specific projects and areas which are considered to be environmentally critical from the perspective of potential impact. Based on a review of this proclamation in relation to the described siting and scale of the Magat Bridge, the proposed project appears to fall within four categories of concern:

- major roads and bridges which could affect the hydrology of traversed areas;
- major roads and bridges which could substantially increase or impede traffic flow;
- areas frequently visited and/or hard-hit by natural calamities; and
- areas classified as prime agricultural lands.

The management and mitigation of these four recognized categories of concern is included in Section 7, Environmental Management Measures.

5. PROJECT SCALE AND CYCLE

5.1 Project Area

Based on the project description (Section 2.2, including Figures 3-6) and review of the submitted construction method statement (D.M. Consunji, Inc.), the estimated project area is 7.2 ha as summarized in Table 2. Of this estimated project area, approximately 55% or 4.0 ha, is described as temporary use, construction areas (service roads, work camp, borrow site) while 3.4 ha encompasses the permanent project displacement area, including the bridge surface area, river revetments and approach roads. The general location of these areas are indicated on Figures 2 and 3. Several local river sources for required aggregate materials are identified in Figure 7. Actual location of the project borrow site(s) will be determined by material specifications and existing government regulations and policies, including the Mines Administrative Order No. MRD 27, Series of 1980, of the Department of Environment and Natural Resources, which governs the issuance of extraction permits (Appendix 1).

5.2 Projected lifespan and cost of construction

Construction of the Magat Bridge is anticipated to span a 24 month period, with an estimated project cost of ₱ 237 million. A construction schedule and a corresponding equipment schedule is provided in Tables 3 and 4.

5.3 Construction Method

5.3.1 River Diversion

To enable construction equipment to work in the dry, the river will be temporarily diverted during a pre-determined stage of construction . River diversion would be accomplished by excavating a channel where water may pass and at the same time filling the portion of the river where construction work has to be done. Channel excavation and filling work would be done with the use of bulldozers.

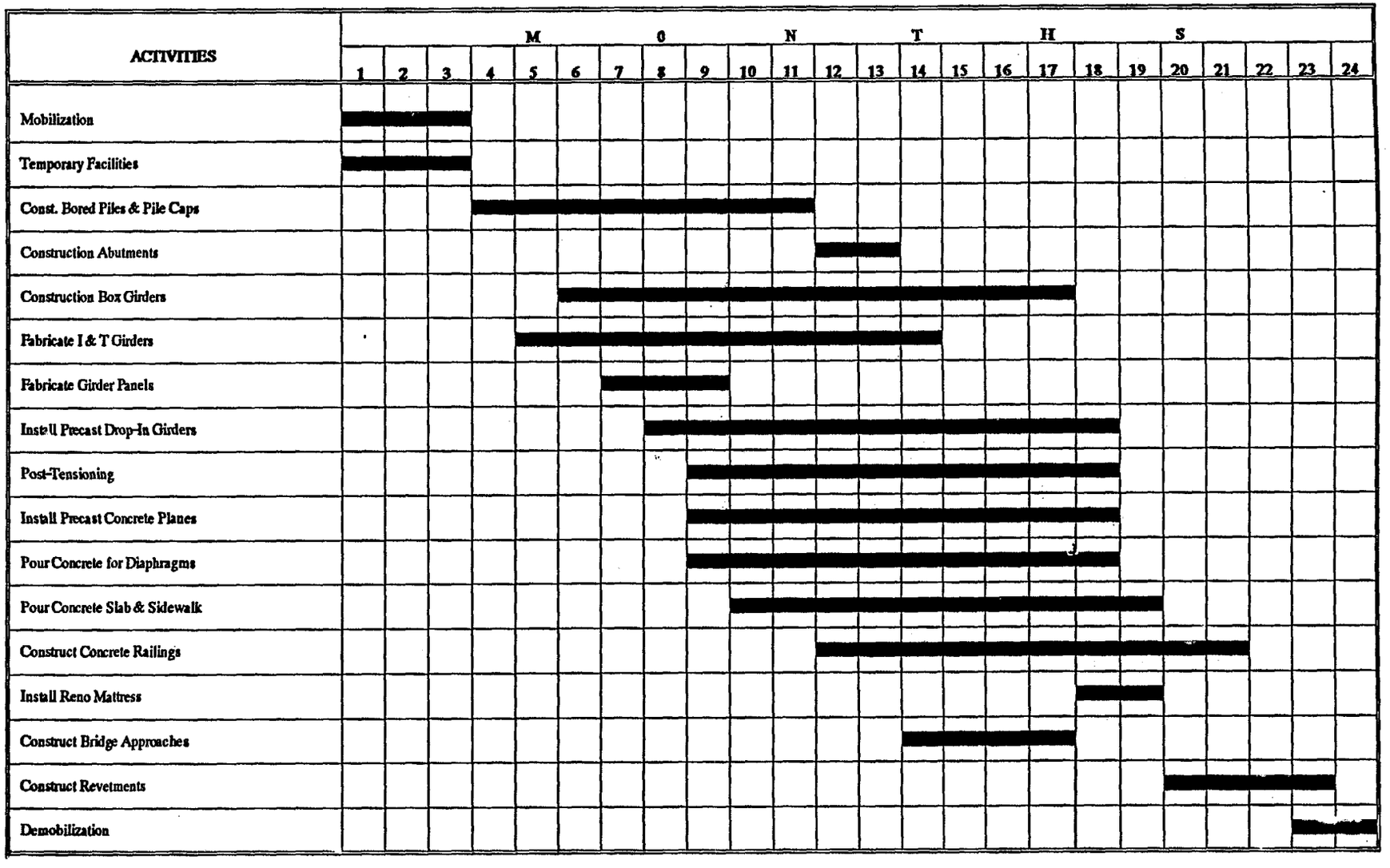
5.3.2 Temporary Access Roads

Temporary access roads for construction equipment will be constructed to allow maneuverability of the various construction equipment. The access road would run parallel to the length of the proposed bridge so that all pier locations can be reached.

Table 2
ESTIMATED PROJECT AREA, MAGAT BRIDGE

	AREA in hectares
Construction, Temporary Use	
Work Camp, Batching Plant, Pre-casting Yard	1.0
Access and Service Roads	1.0
Borrow Site, Quarry	2.0
Operation, Permanent Use	
Bridge Structure, Surface Area	0.7
Land Area, 12 Bored Pile Piers	0.02
River Revetments	1.5
Approach Roads	1.0
Estimated Total Project Area, Temporary and Permanent Use	7.2

Table 3
CONSTRUCTION SCHEDULE, MAGAT BRIDGE



Note: Schedule applies to construction with bored pile foundations

Source: Main Project Bid, D.M. Consunji, Inc., 1981

Table 4
EQUIPMENT SCHEDULE, MAGAT BRIDGE

DESCRIPTION	No. of Units	M				0					N			T			H			S				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BORED PILING EQUIPMENT																									
Crawler Crane, 100T	1					1						1													
Crawler Crane, 40T	1					1						1													
Bored Piling Equipment	Lot					1						1													
Bentonite Plant	1					1						1													
Bentonite Pumps	4					1						1													
EARTHWORK EQUIPMENT																									
Backhoe, 1 CY capacity	1	1																				1			
Crawler tractor, D6	1	1																				1			
Payloader	1	1																						1	
Road Roller, Vibratory 10T	1	1		1															1				1		
Road Grader, 120G	1	1																							1
Dump Truck, 12.0 cm	3	3		3	1														1	3			3	2	1
CONCRETING EQUIPMENT																									
Batching Plant, Elba 30	2				2															2	1	1			
Pumpcrete	1				1																1	1			
Transit Mixer	3				3															3	2	2			
Concrete Vibrator	4				4																	4			
Concrete Mixer, 1 bagger	3	1	2										2	3										3	
Concrete Mixer, 2 bagger	1													1										1	
MATERIAL HANDLING EQUIPMENT																									
Rough Terrain Crane, 22T	1	1																							1
Trailer, Low Bed	1	1																							1
Cargo Truck	1	1																							1
Crawler Crane, 150T	1	1																							1
OTHER EQUIPMENT																									
Bar Cutter, 36 mm dia. cap	1		1																				1		
Bar Bender, 36 mm dia. cap	1		1																				1		
Generator Set, 210KVA	2	1	1	2																				2	1
Container Van	2	2																							2
Service Pick-up	2	2																							2
Air Compressor, 150 CFM	1	1																							1
Welding Machine	3	1	2	3																	3	2	2	1	1

Note: Equipment schedule applies to construction with bored pile foundations

Source: Main Project Bid, D.M. Consunji, Inc., 1991

5.3.3 Bored Piling

Excavation would be undertaken with the use of a rotary drilling machine mounted on a 100 ton capacity crawler crane. The excavated trench or hole would be filled with bentonite clay suspension to keep the sides of the excavation stable. Prior to concreting, the bentonite suspension would be recycled or desanded until such time that its density and other physical properties are acceptable. Rebar cages will be prefabricated on site and transported to the pile location by crane. Placing of concrete will be done with the use of tremie pipes or through the tremie method.

5.3.4 Driving of Steel H-Piles

If used, steel H-Piles would be driven with the use of either Delmag D-36 or Kobe K-45 diesel hammers. To ensure safety and accuracy of driving, fixed leads shall be installed on 60 to 100 ton capacity crawler cranes to support the pile hammer.

5.3.5 Structural Excavation

Excavation for pile caps, abutments and other structures will be done with the use of backhoes. Excavated materials would be loaded on dump trucks and hauled off site if found unsuitable for embankments or backfill.

5.4 Construction Materials

A summary of the estimated quantities of construction material is included as Table 5. In addition to the listed line items of locally-sourced borrow and crushed aggregate material, approximately 6,820 cu.m. of sand and 8,840 cu.m. of gravel are required as components of the listed quantities of concrete.

Table 5
ESTIMATED CONSTRUCTION QUANTITIES, MAGAT BRIDGE USING CAST-IN-PLACE BORED PILINGS

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
	EARTHWORKS		
100(1)	Clearing and Grubbing	17,294.00	Sq. M.
100(3)	Individual Removal of Trees or Stumps	20.00	Ea.
102(1)	Unsuitable Roadway Excavation	2,882.00	CU. M.
104(1).1	Embankment from Roadway Excavation	3,314.00	CU. M.
104(1).2	Embankment from Borrow	66,920.00	CU. M.
104(2)	Selected Borrow Topping	951.00	CU. M.
	SUBBASE AND BASE COURSE		
200	Crushed Aggregate Subbase Course	1,672.00	CU. M.
202	Crushed Aggregate Base Course	461.00	CU. M.
	SURFACE COURSES		
311(1)	Portland Cement Concrete Pavement (230 mm)	844.00	CU. M.
405(10)	Lean Concrete (Bridge Approaches)	6.50	CU. M.
	BRIDGE CONSTRUCTION		
	SUBSTRUCTURE		
	CAST-IN-PLACE BORED PILING		
400(16)	Concrete Piles Cast in Drilled Holes		
400(16).1	Bored Holes	895.00	L.M.
400(16).2	Permanent Steel Casing Left-in-Place (10 m long average per hole)	28.00	Ea.
404(1)	Reinforcing Steel, Grade 40	81,500.00	Kg.
404(2)	Reinforcing Steel, Grade 60	571,380.00	Kg.
405(4).1	Structural Concrete Class "P" (Tremie Pour)	2,267.00	cu.m.
405(4).2	Structural Concrete Class "P" (Above Normal Water Level)	620.00	cu.m.
405(6)	Structural Concrete Class "D", 400 psi	478.00	cu.m.
509(1)	Reno Mattress	1,400.00	cu.m.
	SUPERTRUCTURE		
401	Railings	1,852.00	L.m.
403(8)	Furnish, Fabricate & Erect Bridge Bearing	54.00	Ea.
404(1)	Reinforcing Steel, Grade 40	789,000.00	Kg.
404(3)	Pre-stressing Reinforcing Steel	255,920.00	Kg.
405(1).1	Structural Concrete, Class "A"	409.00	cu.m.
405(1).2	Structural Concrete, Class "A", Precast	101.00	cu.m.
405(4)	Structural Concrete, Class "P"	4,732.00	cu.m.
405(6)	Structural Concrete, Class "D"	750.00	cu.m.
405(8)	Expansion Joint Device (Waboflex)	103.00	L.m.
406(1).1	Prestressed Structural Concrete I-Girder, Type VI (Modified Interior)	12.00	Ea.
406(1).2	Prestressed Structural Concrete I-Girder, Type VI, (Modified Exterior)	12.00	Ea.
	DRAINAGE & SLOPE PROTECTION STRUCTURES		
405(2)	Structural Concrete Class "B"	51.00	cu.m.
405(7)	Rubble Concrete Class "B"	2,633.00	cu.m.
504(5)	Grouted Rip-rap Class "A"	5.00	cu.m.
510(3)	Loose Boulder Fill	3,750.00	cu.m.

5.5 Construction Manpower

Construction manpower will include direct (field) and indirect (office) labor requirements. During the timeframe of the project, the direct labor requirement will range from an estimated 45 to a maximum 281 persons while indirect labor will range from 60 to 304 persons. Locally recruited manpower is anticipated to satisfy the direct labor requirements of the project.

6. SOURCES OF ENVIRONMENTAL IMPACT

Four major categories of environmental concern are described in Section 4.6 for defined critical projects and area. Sources of environmental impact related to these specific concerns are anticipated to be present during construction and operational phases of the project cycle.

6.1 Construction of the Project

Identified sources of environmental impact during construction of the project include:

- site disruption of temporary use construction areas, including service roads, work camp, borrow sites and river diversion courses;
- construction-generated traffic, fugitive dust and noise;
- river-borne silt derived from pile borings, river diversion activities, river bed, borrow sites and service roads;
- effluents, emissions and wastes associated with the projected manpower, equipment and material requirements, and site abandonment;
- flood water obstructions due to construction and diversion structures.

6.2 Operation of the Bridge

Potential sources of environmental impact associated with the operation of the Magat Bridge may include:

- Increase in traffic flow utilizing the Santiago-Tuguegarao Project Road
- Site displacement of permanent use approach roads, bridge structures and revetments
- flood water obstruction of completed bridge structure

7. ENVIRONMENTAL MANAGEMENT MEASURES

As an initial step in the process of impact management and mitigation, this project description outlines, in Sections 4.6, 6.1 and 6.2, identified areas of concern and sources of environment impact. Existing and proposed environmental management measures will be incorporated into the construction contract agreement for this project.

7.1 Major Roads and Bridges Which Could Affect the Hydrology of Traversed Area

As designed, the Magat Bridge will accommodate anticipated 100-year flood levels based on existing and projected river flow data. For example, the wide (75 m width) and high spans of the proposed structure will offer the minimum backwater pressure compared to alternative (two shorter bridges) and existing structures (over-flow type "Irish Bridge" and ford, Plate 2). Since 1982, flow of the Magat River has been controlled by the Magat and Maris Dams.

The deep footings of the proposed cast-in-place bored piles are designed to handle both aggradation and degradation of the river bed at the bridge site. River bank revetments are included to maintain the integrity of the bridge abutments and approach road embankments.

The alignment of the proposed Magat Bridge will closely parallel the existing "Irish Bridge" and ford crossing. As an amendment to the construction contract, the removal of the close spanned "Irish Bridge" structure and recently graded ford would be required upon completion of project construction to eliminate potential waterflow obstructions. During a recent environmental field survey (August, 1991), the pilings of the existing "Irish-Bridge" were noted to restrict water flow by impediment of water borne debris, notably water hyacinth plants.

7.2 Major Roads and Bridges Which Could Substantially Increase or Impede Traffic Flow

A 1991 Traffic Survey (DPWH) recorded a daily average of 1190 vehicles (not including motorcycles and tricycles) along the project road section from San Manuel to Cabanatuan, which includes the Magat River crossing. A previous feasibility study (DPWH, 1988) estimated diverted traffic on completion of the Santiago-Tuguegarao Road Project of approximately 500 vehicles per day. As designed, the Bridge and associated road project can accommodate substantially higher levels of traffic flow, while relieving the current congestion of the distressed Pan-Philippine Highway.

7.3 Areas Frequently Visited and/or Hard Hit By Natural Calamities

In addition to site hydrology, the proposed bridge design incorporates seismic loadings per the latest edition of the National Building Code, Volume II (Bridges) which are very similar to American Association of State Highway and Transportation Officials (AASHTO) Standards and were submitted and approved by the Bureau of Designs (BOD).

7.4 Areas Classified as Prime Agricultural Lands

The Cagayan Valley is noted as a prime agricultural area. The proposed project area includes both a riverbed, which is seasonally utilized for marginal farming and approach road areas above the existing river banks which include year round farm land primarily planted to corn.

In addition to an estimated 1.7 ha of permanently displaced seasonal riverbed and year round riverbank farm land, approximately 2.0 ha of these areas will be required temporarily for construction activities (Table 2). The compensation for rental or purchase of these land areas will be a component of the project costs, per DPWH Standard Procedures. Consultations should be held with affected landholders and local officials to determine adequate compensation rates, which could include primary consideration for local manpower employment during the projects' construction cycle.

7.5 Site Disruption of Temporary Use Construction Areas,

Rehabilitation of affected temporary use areas will be incorporated as an amendment to the construction contract. Rehabilitation will include regrading of affected areas to original topographic configurations and deep plowing of discontinued service roads and work camp areas within farm land areas.

7.6 Construction-Generated Traffic, Fugitive Dust and Noise

Substantial loads of heavy equipment and off-site materials are required for project construction (Tables 4 and 5). Preliminary surveys will be conducted to ascertain the load and traffic bearing capacity of connector road linkages to the project site to avoid project-related excesses. Construction access roads and work camp surface areas should be gravel to reduce incidental dust generation. With respect to noise, there are not permanent residences currently in the immediate vicinity of the project area.

7.7 River Borne Silt Derived From Pile Borings, River Diversion Activities, River Bed Borrow Sites and Service Roads

Environment field surveys indicate that the Magat River is presently silt-laden from upstream sources. Construction activities will be scheduled to coordinate with low water flows associated with dry seasons to minimize additional silt inputs.

7.8 Effluent, Emissions and Wastes Associated with the Projected Manpower, Equipment and Material Requirements, and Site Abandonment

Construction-related impacts to land and aquatic resources could occur as a result of improper disposal of solid and liquid wastes and accidental spills of environmentally harmful materials such as construction contract, it will be mandatory for the contractor to implement a waste management program for the duration of construction activity that ensures safe and appropriate handling.

7.9 Flood Water Obstructions Due to Construction and Diversion Structures

As described in Section 7.7, constructional activities will be scheduled during low water, dry season periods.

7.10 Increase in Traffic Flow Utilizing the Santiago-Tuguegarao Project Road

Refer to Section 7.2

7.11 Site Displacement of Permanent Use Approach Roads, Bridge Structures and Revetments

Refer to Section 7.4

7.12 Flood Water Obstruction of Completed Bridge Structure

Refer to Section 7.1

8. STATUS OF THE PROJECT

Feasibility and Detailed Design Studies for the Magat Bridge have been completed and reviewed. The proposed project has been released for bid to identify the prime contractor. Ground breaking rites for the project were recently held at the site, officiated by President Corazon C. Aquino. The final release of USAID project funding is pending the Environmental Management Bureau (EMB) review of this Project Description and issuance of the Environmental Compliance Certificate (ECC). IBRD funding of the balance of Contract Package II is reportedly scheduled for 1992.

9. SIGNATURES OF PROJECT PROPONENT AND PROJECT DESCRIPTION PREPARER

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Rural Infrastructure Fund Project

Reviewed and endorsed by:
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Florante Soriquez
Project Director
Rural Infrastructure Fund Project

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Cabatuan, Isabela

Municipal Government
Dr. Benedicto A. Acousta, Mayor
Mr. Fred L. Subillaga, Municipal Planning and Development Coordinator

Cauayan, Isabela

Department of Public Works and Highways, District 2
Engr. Ernesto D. Bulatao, Assistant District Engineer
Engr. Moises Mansano, Materials Engineer

National Irrigation Administration
Engr. Jose Rosero, Magat Multi-Purpose Dam Project

Ilagan, Isabela

Provincial Government
Mr. Nicolas P. Baggao, Provincial Administrator
Mr. Nestor O. Santiago, Senior Project Analysis (PPDO)
Mr. Elias Seraspi, Provincial Environment and Natural Resources Officer (PENRO)
Major Castro, 5th Infantry Division, Philippine Army

Tuguegarao, Cagayan

Department of Environment and Natural Resources (DENR) Region 2
Engr. Leonardo Paat, Regional Executive Director, Region 2
Mrs. Resty Antolin, Senior Ecosystem Management Specialist
Mr. Julius V. Calina, Division Chief, Bureau of Land Management
Engr. Jaime Briones, Coordinator, Land Evaluation, Forest Management Bureau
Mr. Edwin Ganu, Division Chief, Mines and Geosciences Bureau

Housing and Land Use Regulatory Board (HLURB)
Mr. Gerry Cacliong, Head Technical Division
Region 2

Mr. Roger Salvatierra
Head, Compliance Monitoring Section
Region 2

Manila

Environmental Management Bureau, DENR
Mr. Sixto E. Tolentino, Jr., Head, Environmental Impact Assessment Group

Philipp's Technical Consultants Inc.
Mr. Epifanio C. Lustre, President and General Manager

REFERENCES:

1. Technical Report on Magat Bridge. Michael A. Stevens, Louis Berger International, Inc.. 1990.

2. Design Report. Fifth IBRD Highway Project. Santiago-Tuguegarao Road. Philipp's Technical Consultants. 1990

3. Fourth UNDP Road Feasibility Study. Draft Report on the Feasibility of Upgrading the Santiago-Tuguegarao Road, North Luzon. DPWH - Grenardet S.A. 1988.

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5. Local Government Report. Province of Isabela. Provincial Planning and Development Office, 1990.

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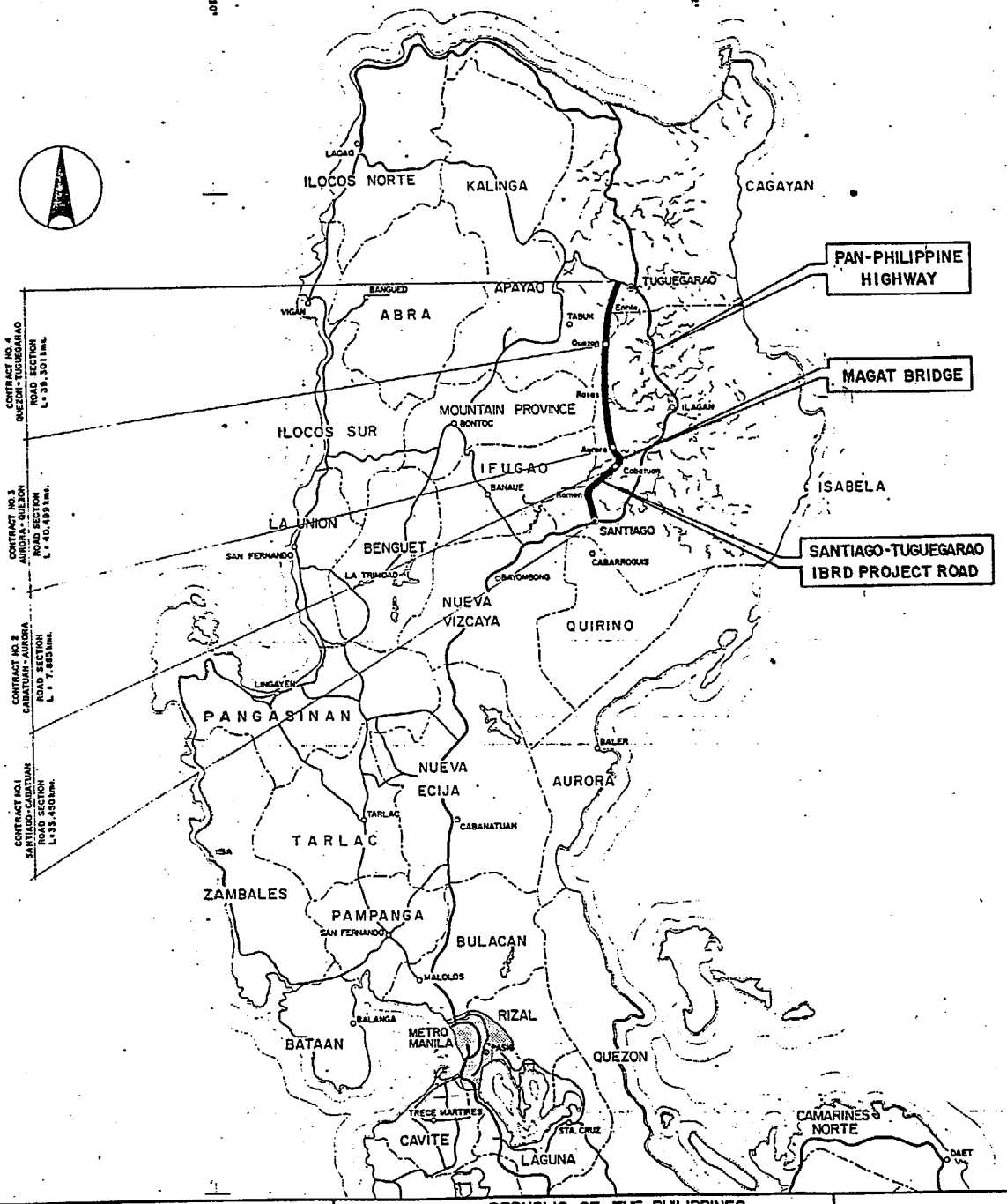
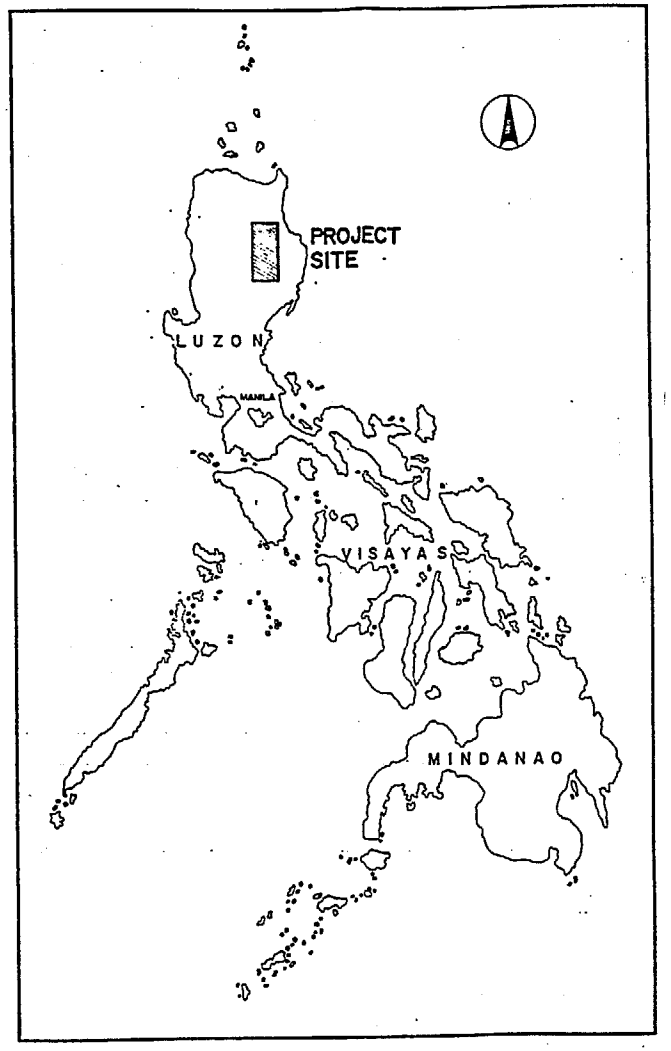
11. Philippine Statistical Yearbook. National Statistical Coordination Board. 1990

12. Family Income and Expenditures Survey. National Statistics Office, Volume II, Final Report. 1988

LIST OF FIGURES

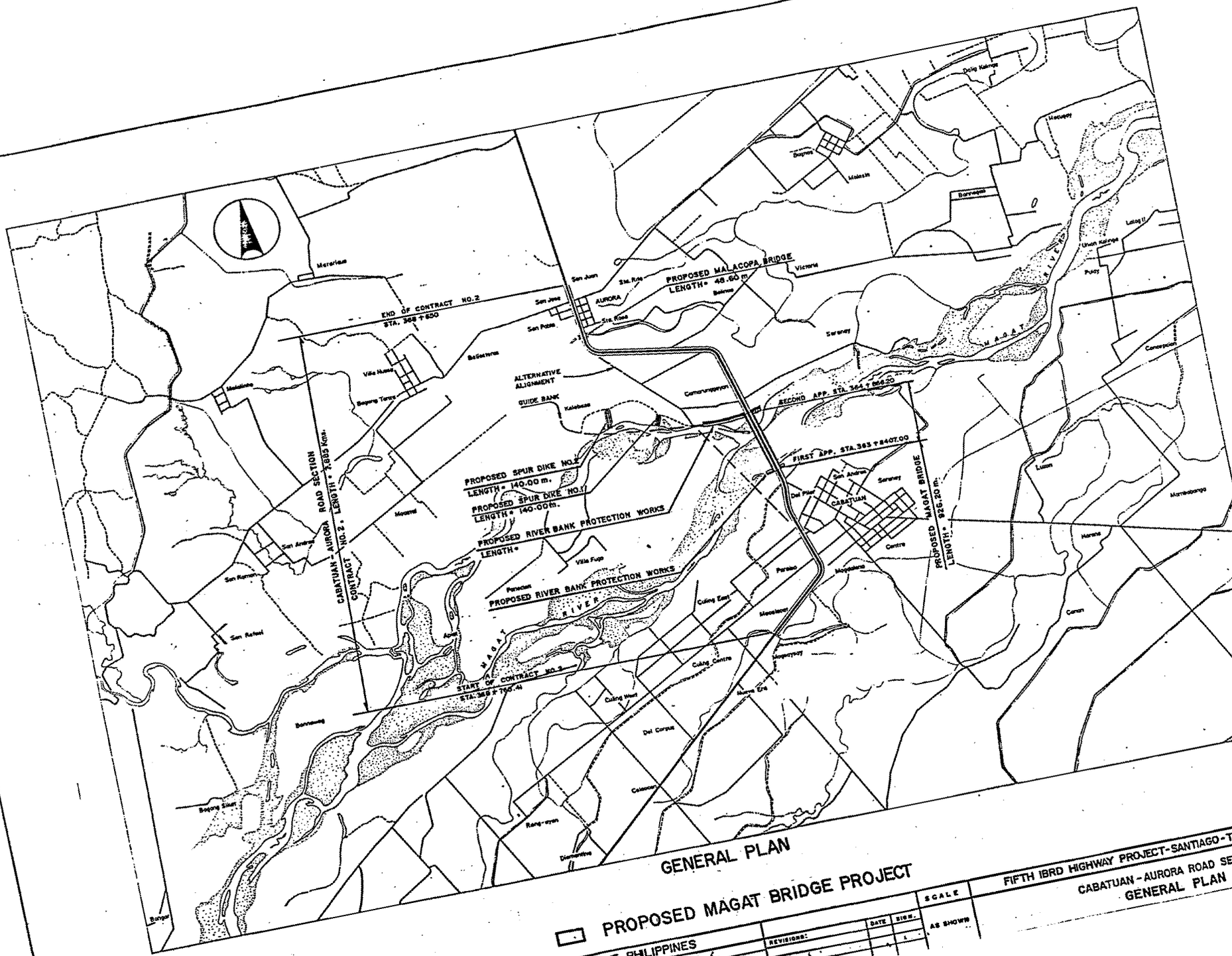




MAP OF THE PHILIPPINES

FIGURE 1

CONSULTANT	REPUBLIC OF THE PHILIPPINES			SCALE	FIFTH IBRD HIGHWAY PROJECT-SANTIAGO-TUGUEGARAO ROAD	DRAWING NO.
philipp's technical consultants inc.	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	REVIEWED: SEVERINO B. BRESTANIS, CHIEF, HIGHWAY DIVISION	RECOMMENDED: FRANCISCO R. PASCUAL, DIRECTOR, BOB	REVISIONS: / DATE / SIGN.	AS SHOWN	LOCATION MAP AND MAP OF THE PHILIPPINES	A-2



GENERAL PLAN

FIGURE 2

PROPOSED MAGAT BRIDGE PROJECT

REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REVIEWED: SECRETARY'S REPRESENTATIVE

RECOMMENDED: FRANCISCO R. BASCUIL, DIRECTOR, BOD

REVISIONS: | DATE | SIGN.

SCALE: AS SHOWN

FIFTH IBRD HIGHWAY PROJECT-SANTIAGO-TUGUEGARAO ROAD
CABATUAN - AURORA ROAD SECTION
GENERAL PLAN

DRAWING NO. A-3

CONSULTANT

philipp's technical consultants inc.

	DATE:	SIGNATURE:
DESIGNED	9-6-89	
CHIEF ENGINEER	9-6-89	
PROJ. MANAGER	9-6-89	

G E N E R A L N O T E S:

A. REFERENCE CODES

1. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, THIRTEENTH EDITION, 1983, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORT OFFICIALS (A A S H T O)
2. STANDARD SPECIFICATIONS FOR PUBLIC WORKS AND HIGHWAY, 1988. BY D P W H.
3. MANUAL OF STEEL CONSTRUCTION EIGHTH EDITION BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (A I S C)

B. HYDROLOGIC / HYDRAULIC DATA

1. DESIGN FLOW : Q_{50} = 14,474 m³ / Sec.
2. DESIGN VELOCITY: V = 4.01 m / Sec.

C. DESIGN LOADS

1. DEAD LOAD
   a. CONCRETE - 23.6 KN / m³
   b. WEARING COURSE- 1.06 kPa
2. LIVE LOAD
   TRUCK LOADING -AASHTO MS-18 OR EQUIVALENT
3. SEISMIC LOAD
   IN ACCORDANCE WITH J.P. HOLLINGS REPORTS OR 10% (DL + 1/2 LL) WHICHEVER IS GREATER.

D. DESIGN STRESSES

1. CONCRETE
   UNLESS OTHERWISE NOTED, MINIMUM CYLINDER COMPRESSIVE STRENGTH AT 28- DAY AGE (fc') AS FOLLOWS:
   a. FOR ALL REINFORCED CONCRETE EXCEPT PILE CAP AND FOOTINGS fc'=27.6 MPa
   b. FOR REINFORCED CONCRETE PILE CAP AND FOOTINGS - fc' = 20.7 MPa
   c. FOR PRESTRESSED CONCRETE AND BORED PILES fc' = 34.5 MPa
2. REINFORCING STEEL
   UNLESS NOTED OTHERWISE, REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 40 WITH A MINIMUM YIELD STRENGTH, fy = 276 MPa.
3. PRESTRESSING STEEL
   PRESTRESSING STEEL SHALL CONFORM TO ASTM A416 AASHTO M203 WITH A MINIMUM ULTIMATE STRENGTH OF 1860 MPa
4. STRUCTURAL STEEL
   STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 OR AASHTO M183 WITH A MINIMUM YIELD STRENGTH, fy = 248 MPa.

E. FOUNDATION PILES FOR ALTERNATIVE NO. 1

1. PILES SHALL CONFORM TO AISC DESIGNATION HP 14 X 117 WITH A WEIGHT OF 1.71 KN / M.
2. PILES SHALL BE DRIVEN TO A DEPTH THAT WILL PRODUCE THE REQUIRED MINIMUM BEARING CAPACITY OF 150 TONS BUT MUST MAINTAIN A MINIMUM PILE LENGTH OF 27.00m FROM TIP TO TOP PLATE.
3. PILES SHALL BE PROVIDED WITH METAL SHOE FOR HARD DRIVING.
4. TEST PILES WITH SAME PROPERTIES AND CAPACITY AS THE REGULAR PILES SHALL BE DRIVEN AT THE INDICATED LOCATIONS AND SHALL FORM PART OF THE PILE FOUNDATION.

F. DIMENSIONS:

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE. ALL ELEVATIONS ARE IN METERS AND STATIONINGS ARE IN KILOMETERS AND METERS UNLESS OTHERWISE SHOWN.

ALL BAR SPACINGS REFER TO DISTANCE BETWEEN CENTERS OF BARS. THE MINIMUM CONCRETE COVER MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF OUTERMOST BAR SHALL BE 50 mm UNLESS OTHERWISE NOTED. CLEARANCE BETWEEN REINFORCING BARS IN GIRDERS SHALL NOT BE LESS THAN 50 mm.

G. BORING DATA :

SEE DRAWING NO. L-2a

H. ALL STATIONINGS AND ELEVATIONS SHALL BE VERIFIED BEFORE CONSTRUCTION.

I. BASIS FOR COMPUTING ALLOWABLE PILE BEARING CAPACITY:

$$Pall = \left(\frac{21.24\,\phi_h E_h}{S + 2.54}\right)\left(\frac{Wr + 0.16\,Wp}{Wr + Wp}\right)$$

WHERE:

- Pall = ALLOWABLE PILE BEARING CAPACITY (TON)
- ϕ_h = HAMMER EFFICIENCY
- E_h = HAMMER ENERGY RATING (KN-m)
- Wr = WEIGHT OF RAM (kN)
- Wp = WEIGHT OF PILE AND OTHER DRIVEN WEIGHTS (kN)
- S = AVERAGE PENETRATION PER BLOW FOR THE LAST 150mm OF DRIVING (mm)

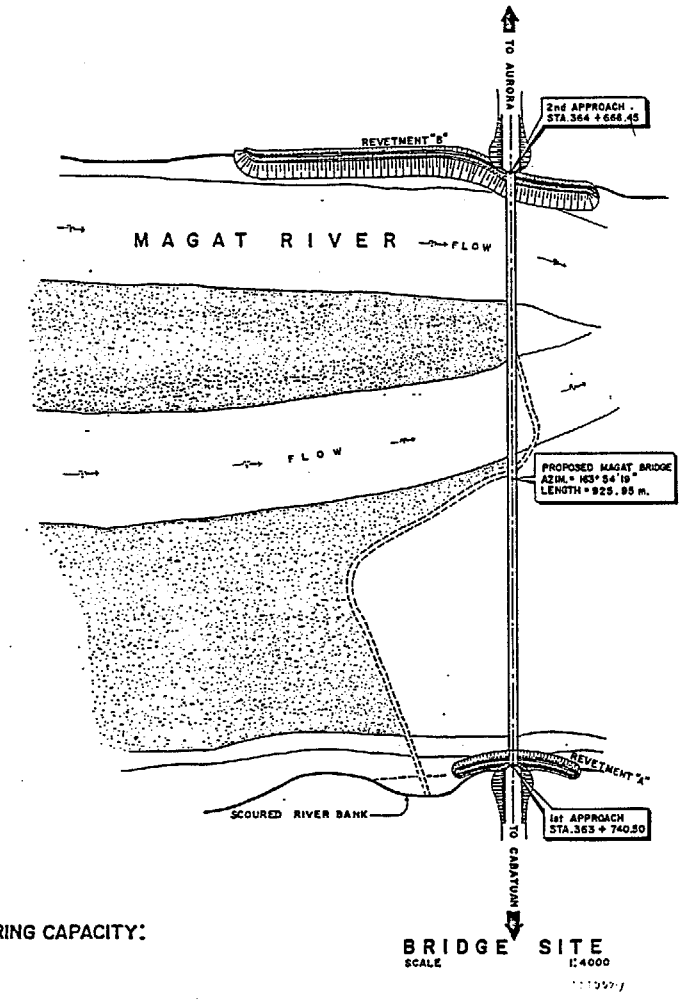
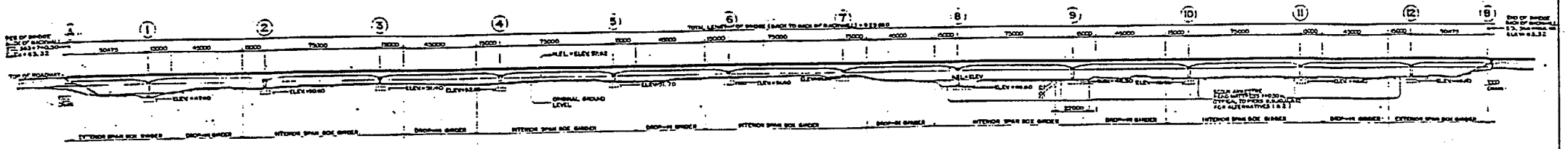


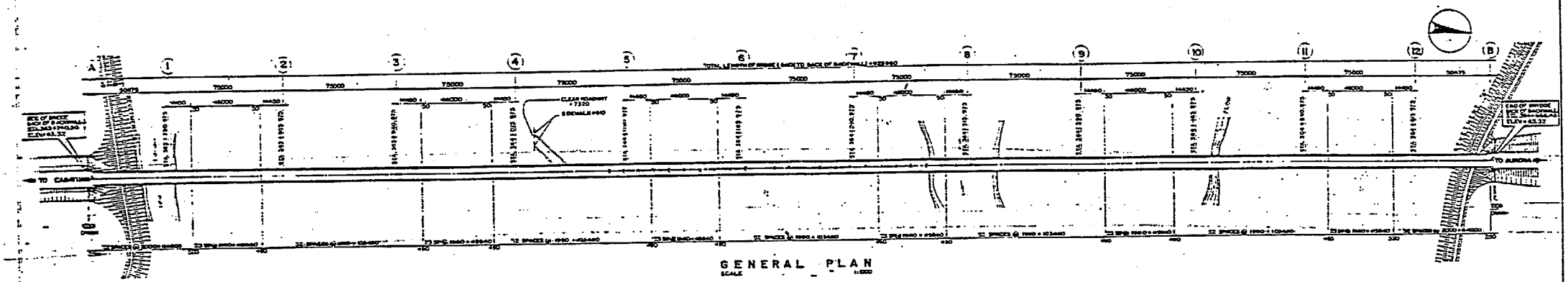
FIGURE 3.

NOTE:
THESE REVIEW & APPROVAL DO NOT RELIEVE PHILIPPS TECHNICAL CONSULTANTS INC. OF RESPONSIBILITY AND ACCOUNTABILITY FOR THE STABILITY AND SAFETY OF THE STRUCTURES AS DESIGNER & CONSULTANT.

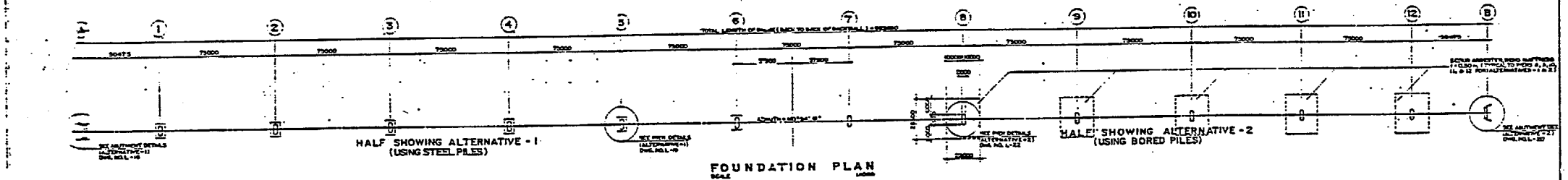
CONSULTANT		REPUBLIC OF THE PHILIPPINES			SCALE	FIFTH IBRD HIGHWAY PROJECT-SANTIAGO-TUGUEGARAO ROAD	DRAWING NO.
philipp's technical consultants inc.	DESIGNED 9-6-89	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	REVIEWED: CARLOS V. RODRIGUEZ, CHIEF, BRIDGE DIVISION	RECOMMENDED: FRANCISCO N. PASCUAL, DIRECTOR, BOD	REVISIONS: DATE SHEET	AS SHOWN	CABATUAN-AURORA ROAD SECTION MAGAT BRIDGE LOCATION PLAN AND GEN NOTES	L-1
	CHIEF ENGINEER 9-6-89							
	PROJ. MANAGER 9-6-89							



GENERAL ELEVATION
SCALE 1:1000



GENERAL PLAN
SCALE 1:1000



FOUNDATION PLAN
SCALE

CONSULTANT	REPUBLIC OF THE PHILIPPINES	SCALE	FIFTH IBRD HIGHWAY PROJECT-SANTIAGO-TUGUEGARAO ROAD	
philcoa technical consultants inc.	REVIEWED: CARLOS V. QUIRIMIT; RECOMMENDED: FRANCISCO B. PARCHAL	AS SHOWN	CABATUAN-AURORA ROAD SECTION MAGAT BRIDGE GENERAL PLAN, GENERAL ELEVATION, FOUNDATION PLAN	L-2

FIGURE 4

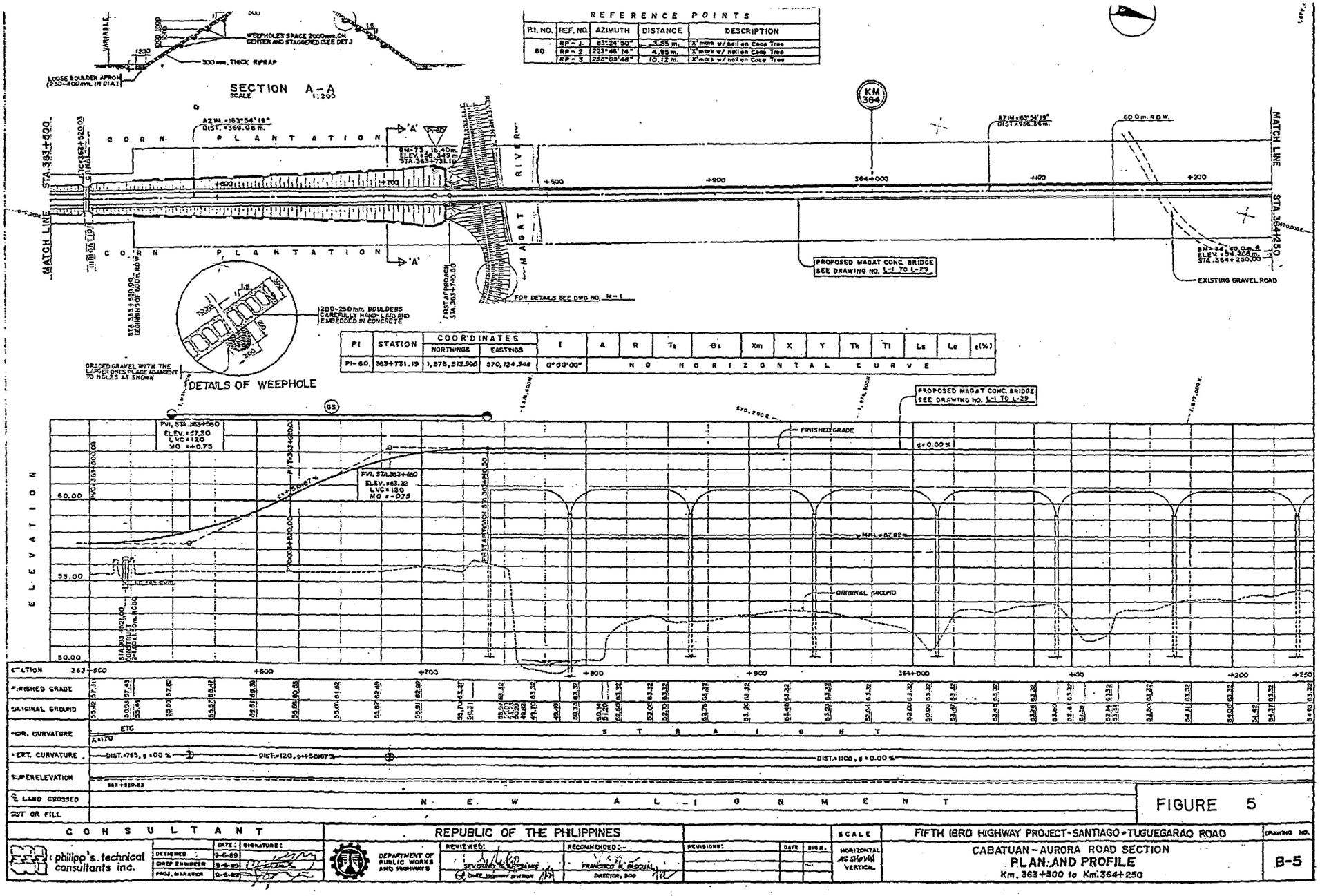


FIGURE 5

CONSULTANT

philipp's technical consultants inc.

	DATE	SIGNATURE
DESIGNED	9-6-89	
CHIEF ENGINEER	9-6-89	
PROJ. MANAGER	9-6-89	

REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REVIEWED: SEVERINO S. SUTCLIFFE, DIREC. HIGHWAY DIVISION

RECOMMENDED: FRANCISCO R. PASCUAL, DIRECTOR, BOD

REVISIONS: | DATE | SIGN.

SCALE: HORIZONTAL AS SHOWN, VERTICAL

FIFTH IBRD HIGHWAY PROJECT - SANTIAGO - TUGUEGARAO ROAD

CABATUAN - AURORA ROAD SECTION

PLAN AND PROFILE

Km. 363+500 to Km. 364+250

DRAWING NO. B-5

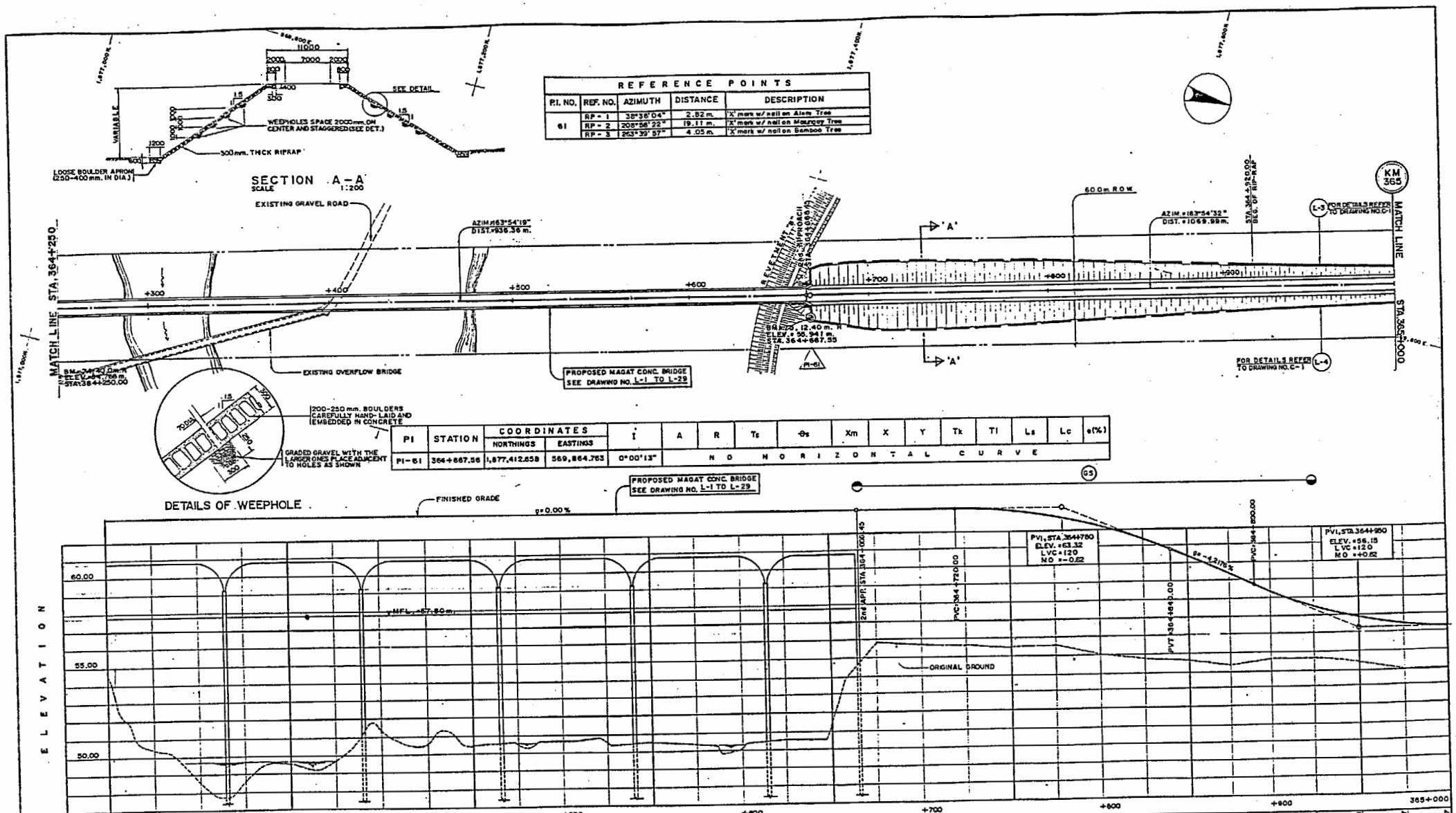


FIGURE 6

CONSULTANT

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF

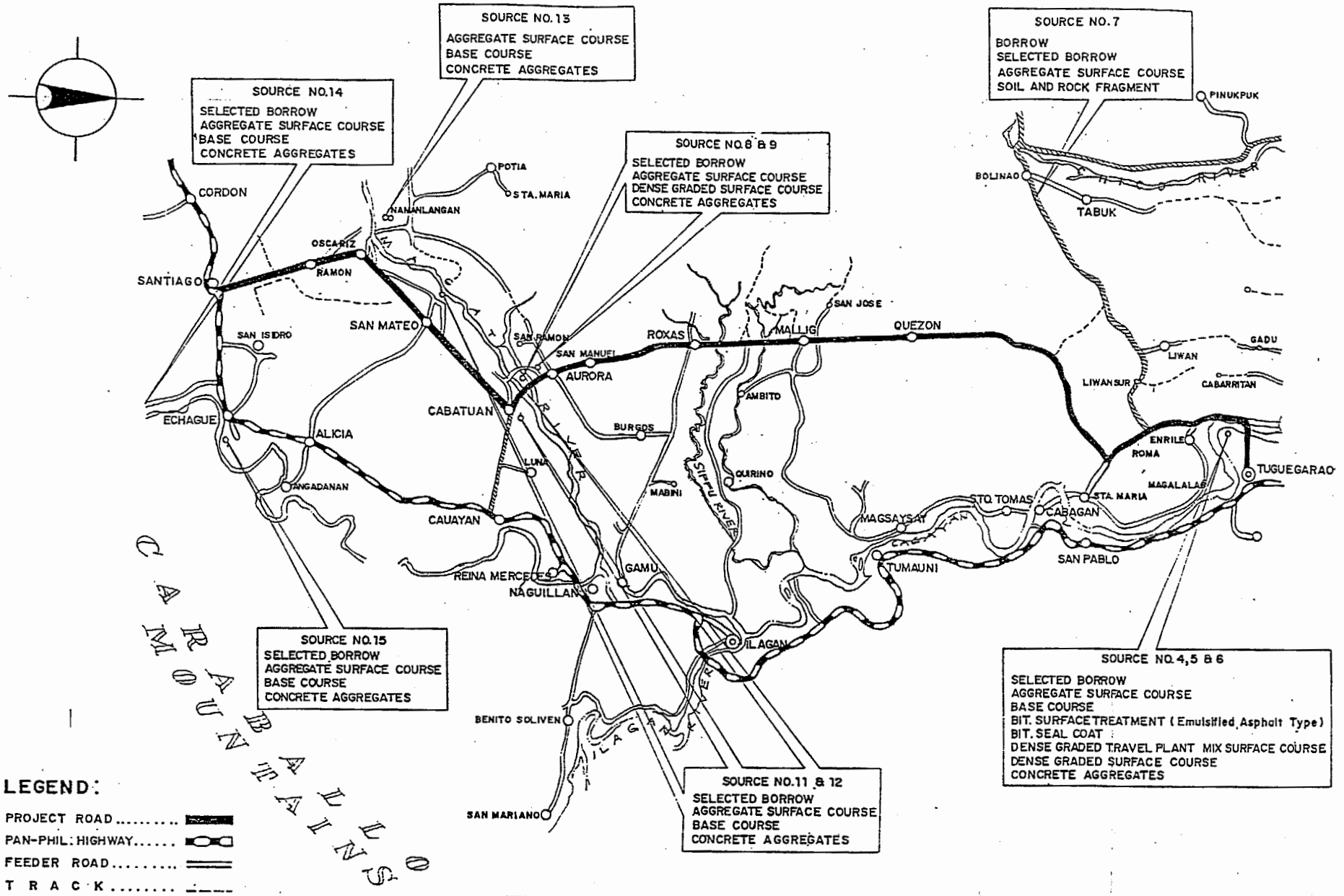
REVIEWED: RECOMMENDED:

REVISIONS: DATE SIGN.

SCALE HORIZONTAL AS SHOWN

FIFTH IBRD HIGHWAY PROJECT-SANTIAGO-TUGUEGARAO ROAD
CABATUAN-AURORA ROAD SECTION
PLAN AND PROFILE

DRAWING NO. B-6

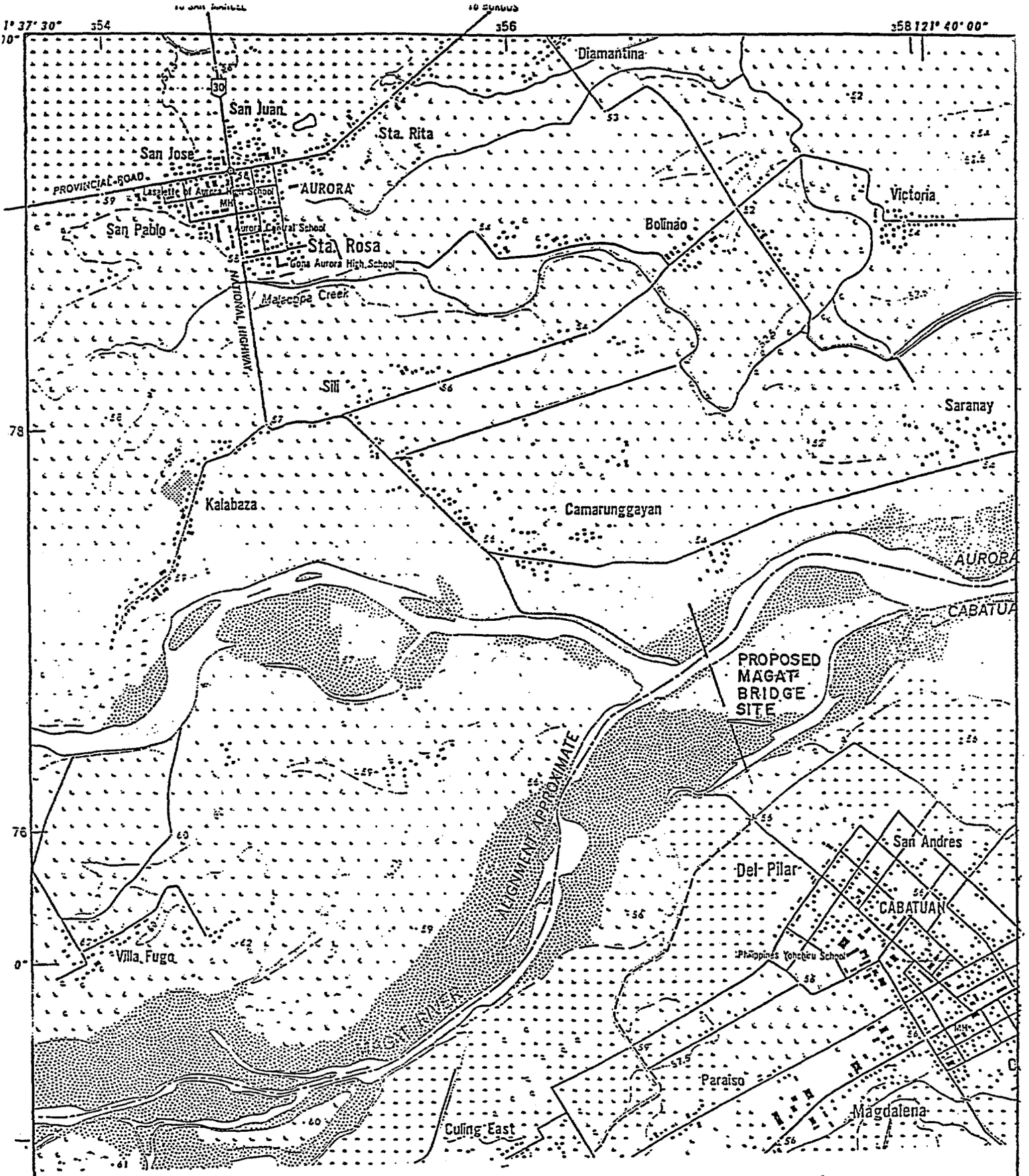


SOURCE: FINAL REPORT, PHASE I FEASIBILITY STUDIES FOR SANTIAGO - TUGUEGARAO AND SOLANA - PIAT ROAD VOLUME 2, JANUARY, 1976 DEPARTMENT OF PUBLIC WORKS AND HIGHWAY.

RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420

MATERIAL SOURCE MAP, MAGAT BRIDGE

FIGURE 7



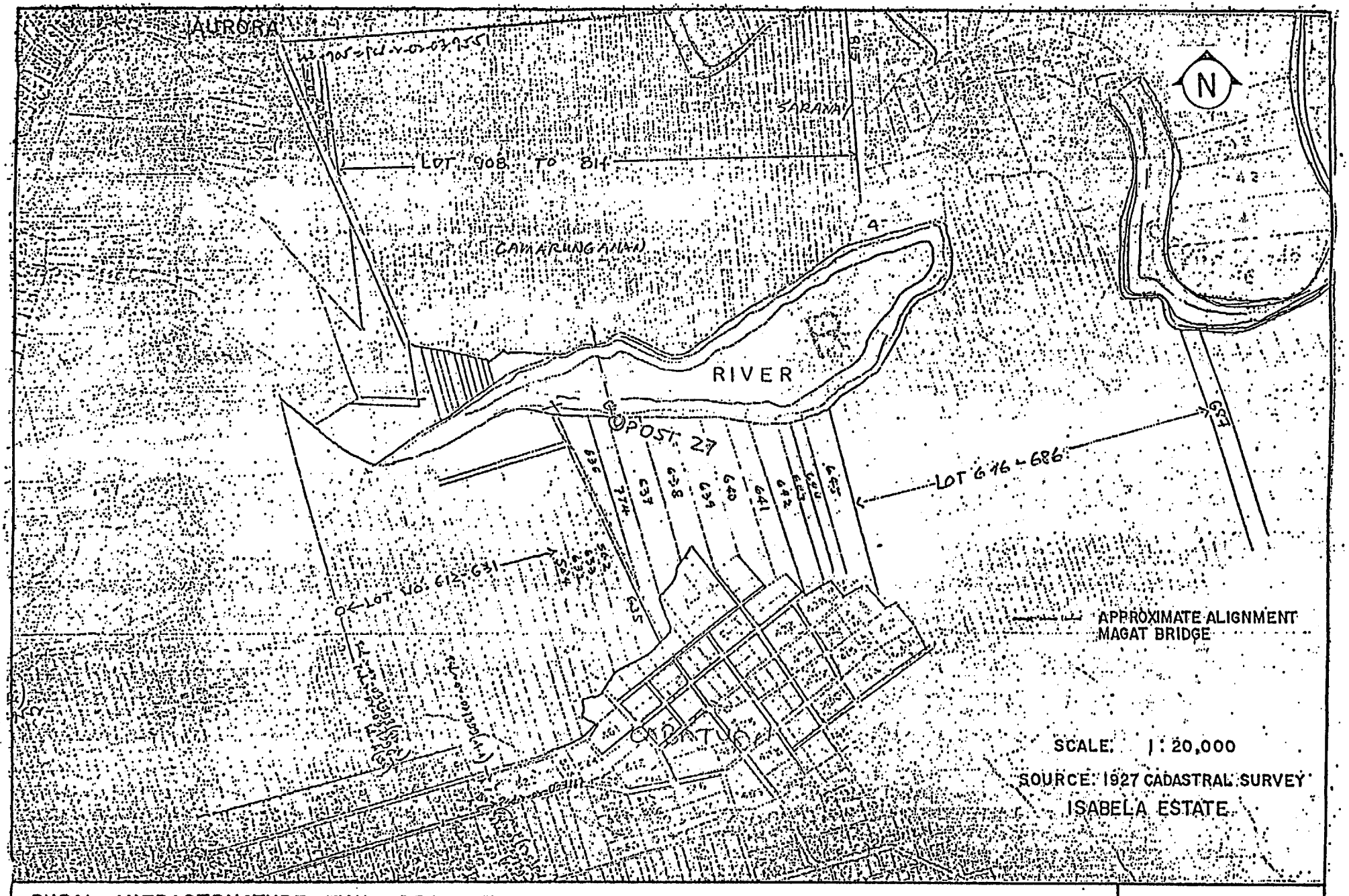
SCALE: 1:25,000

SOURCE: NAMRIA CHART 3334 - IV - A , 1983

RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492 - 0420

TOPOGRAPHIC MAP - MAGAT BRIDGE SITE

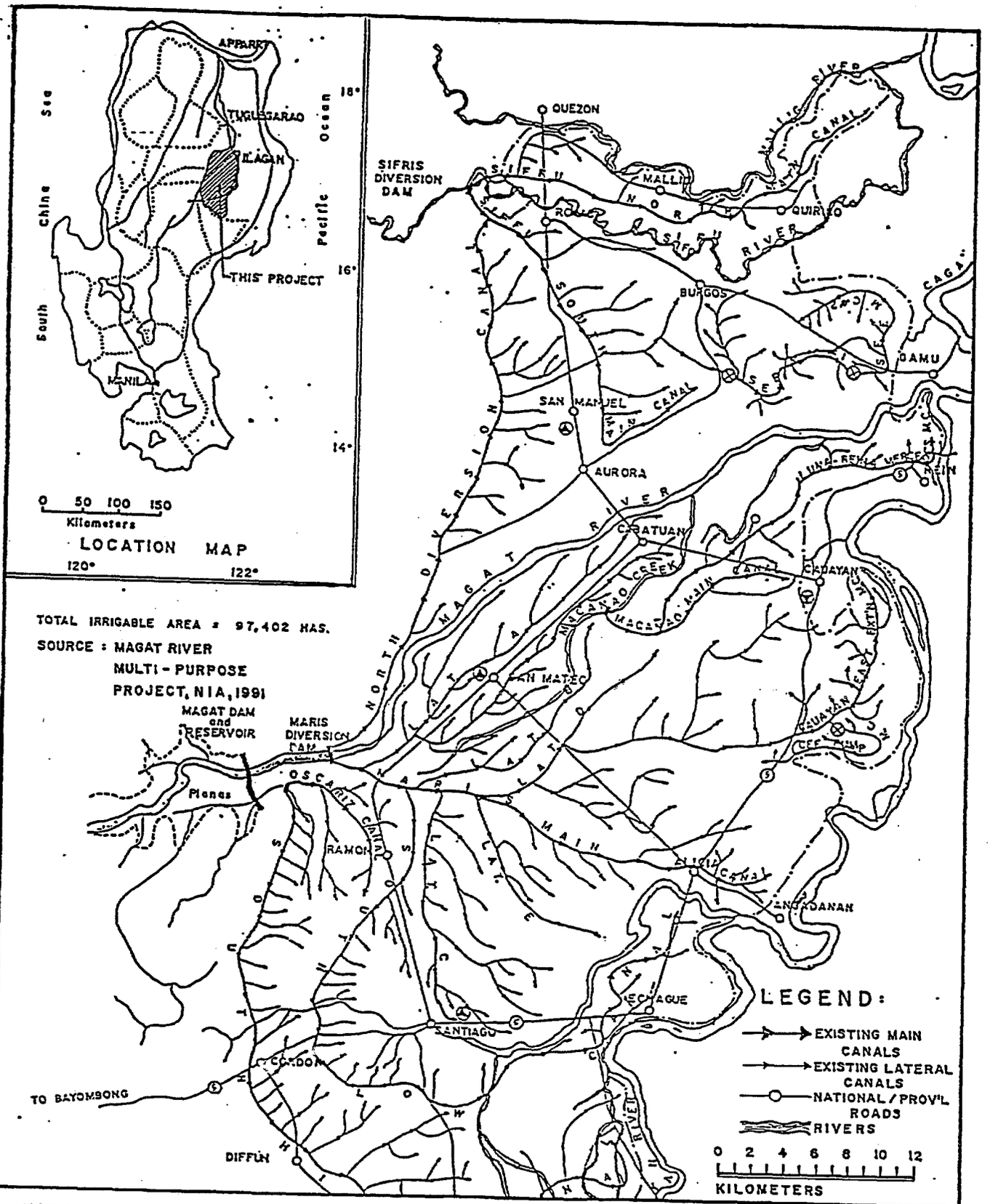
FIGURE 8



RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT No. 492-0420

CADASTRAL SURVEY PLAN - MAGAT BRIDGE SITE

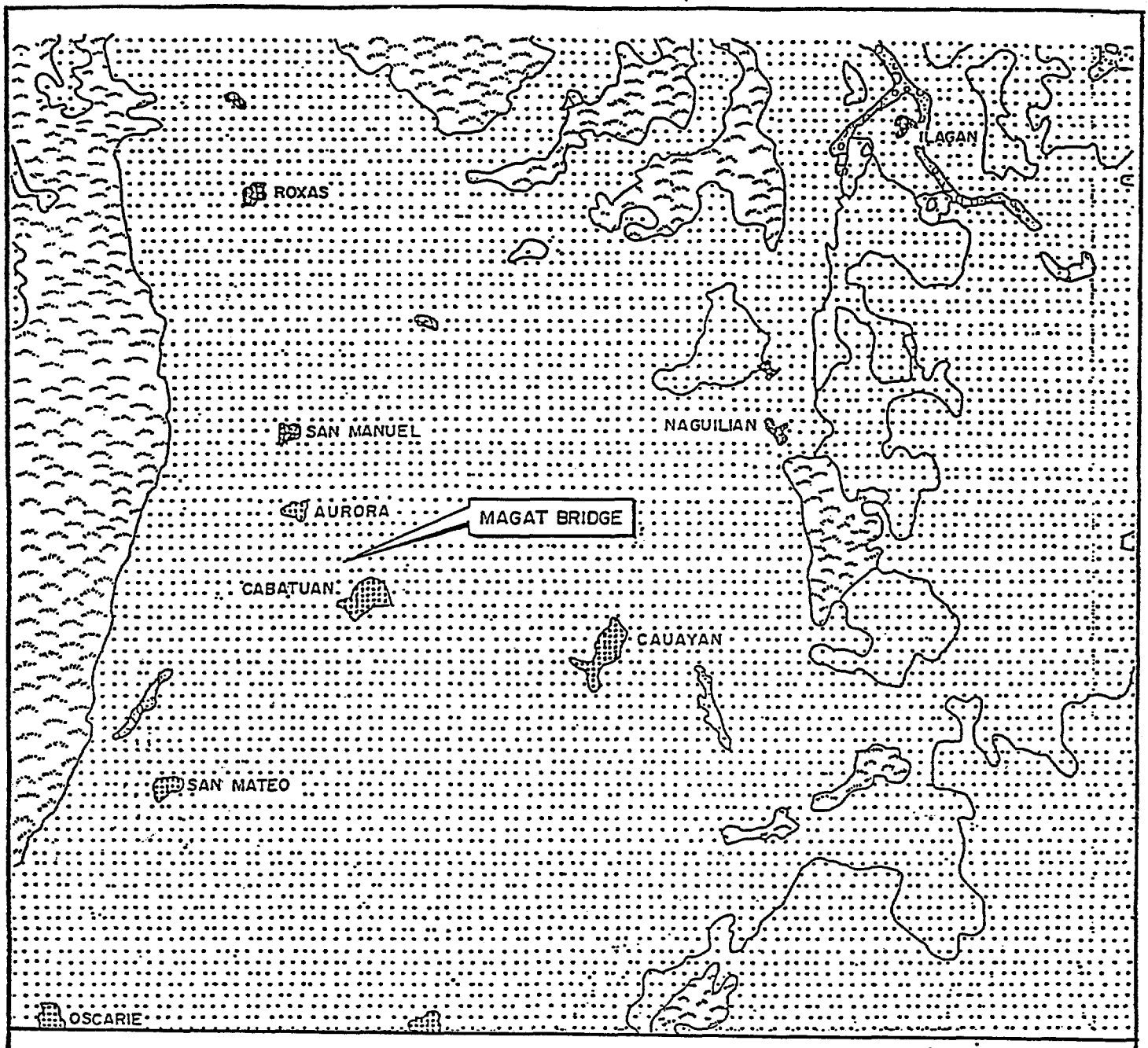
FIGURE 9



RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT NO.492-0420

PROJECT SERVICE AREA
MAGAT RIVER MULTI-PURPOSE PROJECT

FIGURE 10



LEGEND

- DIPTEROCARP FOREST, CLOSED CANOPY
- DIPTEROCARP FOREST, OPEN CANOPY
- CULTIVATED AREA MIXED W/ BRUSH & GRASS
- GRASSLAND, GRASS COVERING
- RIVERBEDS
- BUILT UP AREA
- CROP LANDS MIXED WITH COCONUT PLANTATIONS.
- CROP LAND MIXED WITH OTHER PLANTATIONS.

5 0 5 10 KMS.
SCALE 1 : 250,000

N

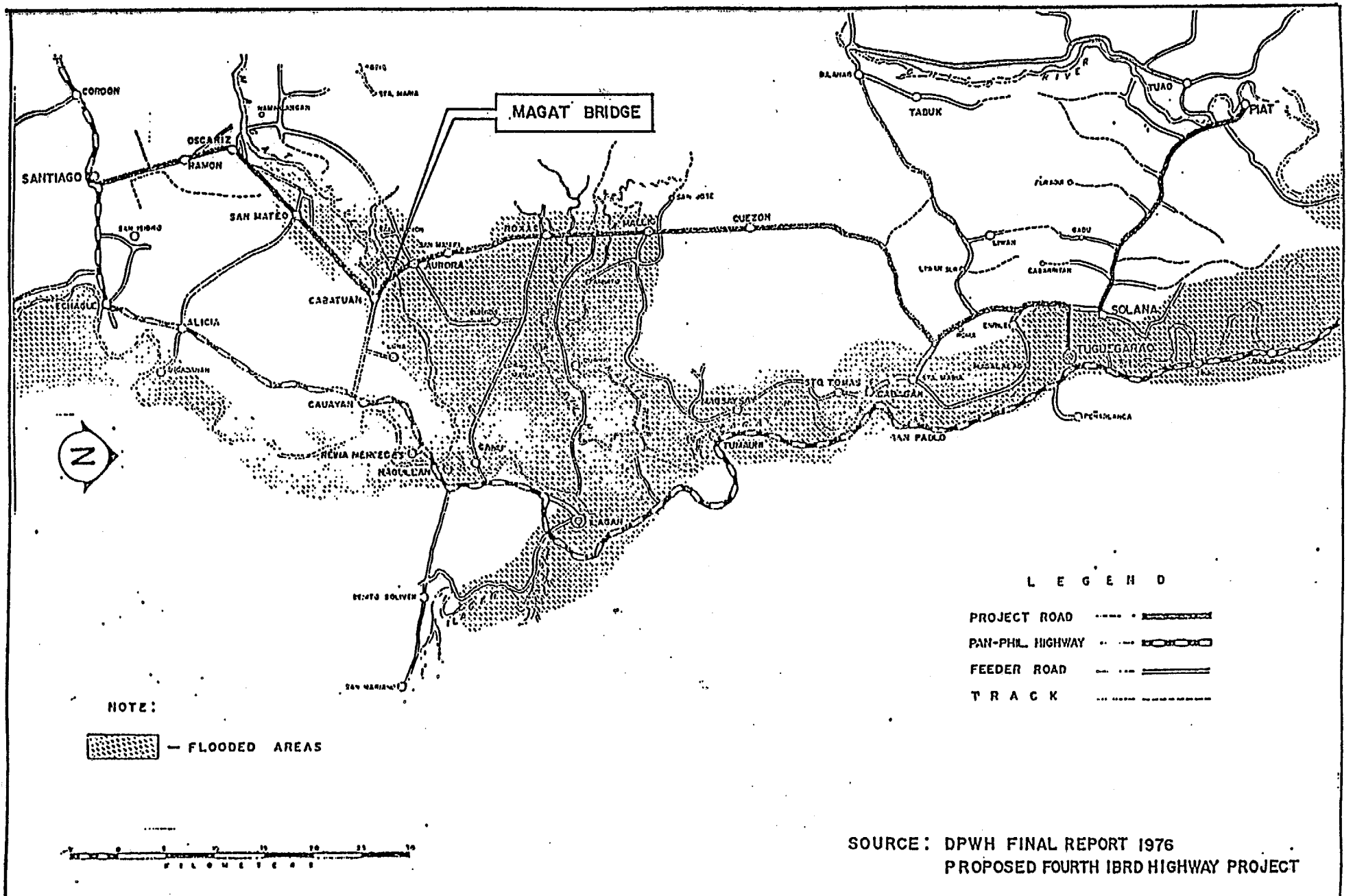
SOURCE: PCGS 2506, 2508
NATIONAL MAPPING & RESOURCE
INFORMATION AUTHORITY, 1987

MAGAT BRIDGE

RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420

FIGURE 11

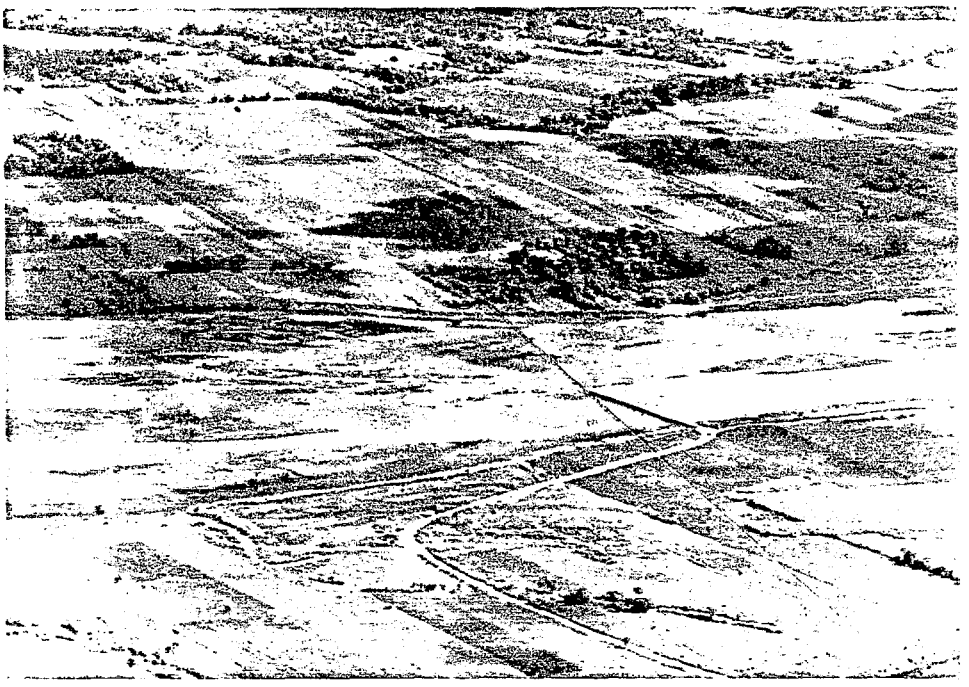
LAND COVER MAP

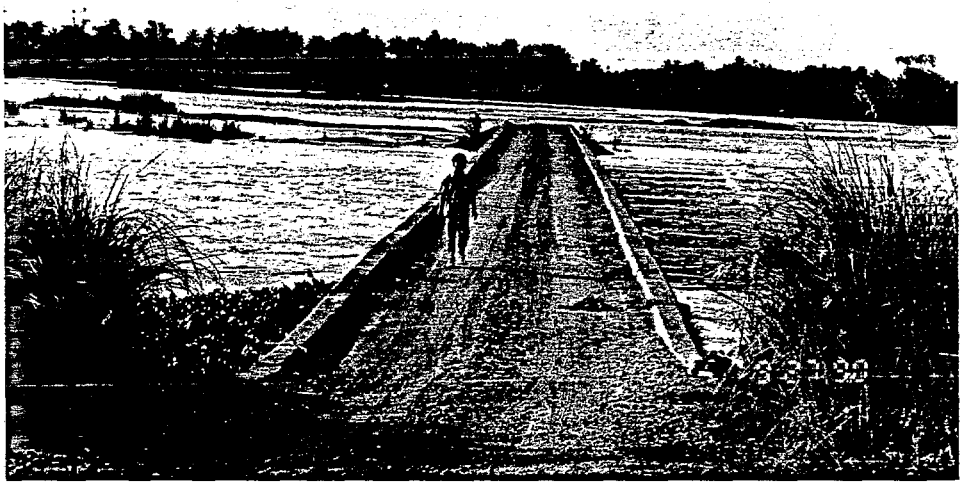


SOURCE: DPWH FINAL REPORT 1976
PROPOSED FOURTH IBRD HIGHWAY PROJECT

RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT No. 492 - 0420

AREA SUBJECT TO FLOOD — FIGURE 12

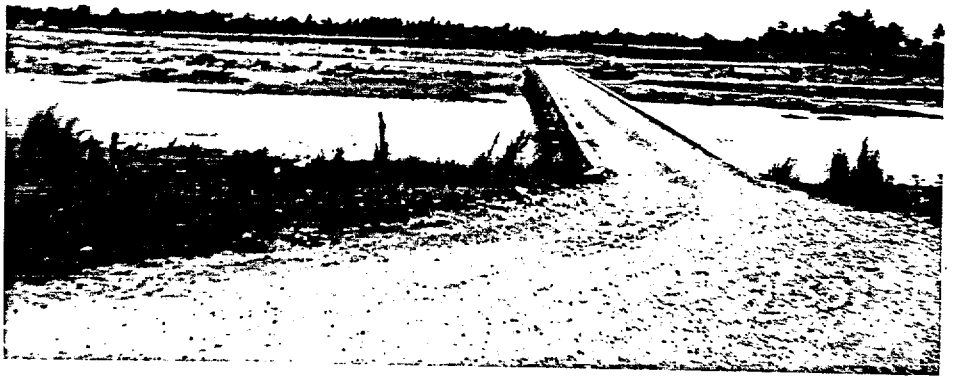




RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420

REPRESENTATIVE VIEWS OF PROJECT SITE

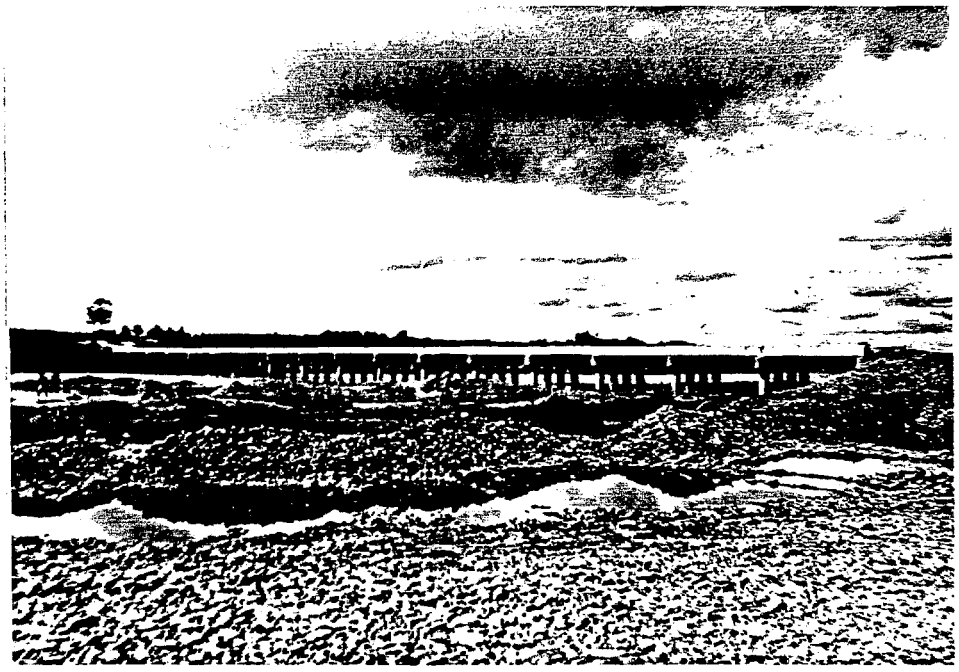
PLATE 1



RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420

REPRESENTATIVE VIEWS OF PROJECT SITE

PLATE 2



RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420	
REPRESENTATIVE VIEWS OF PROJECT SITE	PLATE 3

APPENDIX

Republic of the Philippines
Ministry of Natural Resources
OFFICE OF THE MINISTER
Diliman, Quezon City

MINES ADMINISTRATIVE
ORDER NO. MRD-27
Series of 1980

SUBJECT : RULES AND REGULATIONS GOVERNING THE ISSUANCE OF PERMITS FOR THE TAKING, REMOVAL, AND DISPOSITION OF ORDINARY EARTH, GRAVEL, SAND, PEBBLES, BOULDERS AND OTHER LOOSE OR UNCONSOLIDATED MATERIALS FROM THE BEDS OF SEAS, LAKES, RIVERS, STREAMS, CREEKS, AND OTHER PUBLIC WATERS AND FROM PUBLIC AND PRIVATE LANDS.

Pursuant to Section 2 (f) of Presidential Decree No. 463, otherwise known as the "Mineral Resources Development Decree of 1974", as amended by Presidential Decree Nos. 1385 and 1677, the following rules and regulations are hereby promulgated for the guidance of all concerned:—

ARTICLE I

SECTION I. DEFINITION OF TERMS. - Unless otherwise specified, the terms and phrases used in these rules and regulations shall have the following meaning:

1.1 "Regulations" - these rules and regulations.

1.2 " Government" - the Government of the Republic of the Philippines.

1.3 " Bureau" - The Bureau of Mines and Geo-Sciences.

1.4 " Ministry" - The Ministry of Natural Resources.

1.5 "Minister" - The Minister of Natural Resources.

1.6 "Director " - The Director of Mines and Geo-Sciences.

1.7 "Mines and Geo-Sciences Regional Officer" - the Head of a Mines and Geo-Sciences Regional Office.

1.8 "Mineral District Officer"- the Head of Mineral District Office.

1.9 "Treasurer" - City or Provincial Treasurer.

1.10 "Sand" - particles of rock passing 2mm sieves.

1.11 "Gravel" - particles of rock passing .75 mm sieve.

1.12 "Boulders" - are fragments of rock which are retained on a 75mm (3 in.) U.S. standard mesh sieve.

1.13 "Ordinary Earth" - ordinary soil ("lupa").

1.14 "Extraction" - the act or process of taking, excavating and removing.

1.15 "Public Waters"- bodies of waters belonging to the public domain such as but not limited to seas, bays, lakes, ponds, creeks, streams, rivers, and swamps.

- over -

1.16 "Public Land" - the portion of public domain to which title is still vested in the Government.

1.17 "Private Land" - those belonging to private persons with complete titles as well as those lands claimed by bonafide holder, claimant, or occupant with imperfect title.

1.18 "Permit" - commercial, foreshore, gratuitous, industrial, and special permits issued under this Order.

1.19 "Permittee" - one to whom a permit is issued under these regulations.

1.20 "Foreshore" - the area offshore beyond 100 meters from the watermark at the mean low tide extending seaward.

1.21 "Puka" - the portion of a shell that are sometimes found mixed with sand and gravel.

1.22 "River Bed" - bed pf creeks, streams, brooks, etc.- the ground covered by water during its highest flood without causing inundation.

ARTICLE II

TAKING AND DISPOSAL OF MATERIALS

SEC. 2. PERMIT TO TAKE AND DISPOSE OF MATERIALS. - No person, corporation, partnership or government entity/instrumentality shall be allowed to take and dispose of materials covered by these regulations from public waters or in public or private lands unless authorized under a permit issued in accordance with this Order.

ARTICLE III

GENERAL PROVISIONS

SEC. 2. KINDS OF PERMITS AND TERMS THEREOF. -Under this Order, there are five (5) kinds of permits that may be issued, namely:

(a) COMMERCIAL PERMIT - Shall cover an area of not more than (1) hectare in public waters or in public and private lands and is granted for a period of not more than one (1) year, renewable for the same period;

(b) FORESHORE PERMIT - Shall embrace an area of not more than one (1) hectare in beds of lakes, ponds and seas and is issued for a period of not more than one (1) year, renewable for the same period;

(c) GRATUITOUS PERMIT - shall be granted to any government entity/instrumentality is need of materials for infrastructure projects over an area of not more than two (2) hectares for a period coterminous with the duration of the project, but not more than one (1) year, renewable for a like period;

(d) INDUSTRIAL PERMIT - shall cover an area of not more than eight (8) hectares for an individual and not more than sixty-four 64 hectares for a partnership/corporation in public waters and/or in public and private lands and is granted for a period of five (5) years, renewable for a series of five-year periods but not exceeding a total of twenty-five (25) years; and

- over -

(e) SPECIAL PERMIT - shall be issued to an applicant for an industrial permit pending approval of the permit by the Minister, or to those applying to dispose of materials covered by these regulations abandoned by the mining operator/government/private contractor in the course of its operation/construction, or to those for their personal use not to exceed fifty (50) cubic meters, for a period not exceeding sixty (60) cubic meters, for a period not exceeding sixty (60) days.

SEC. 4. FILING AND REGISTRATION FEES - All applications and other related documents shall be filed and /or registered with the Mines and Geo-Sciences Regional Office or Mineral District Office having jurisdiction over he area. The following charges shall be paid upon filing and/or registration of the same;

(1) Commercial, Foreshore, Special and Gratuitous Permit Application . . . . . ₱20.00

(2) Industrial Permit Application 50.00

(3) Deed of Assignment/Transfer, Special Power of Attorney and other registrable documents 20.00

SEC. 5. WHO MAY BE GRANTED PERMIT/S - a permit shall be issued to any applicant who has complied with the requirements prescribed by these rules and regulations and other pertinent laws and who possesses the following qualifications:

(a) In case of a individual, he must be of legal age and a citizen of the Philippines;

(b) In case of a corporation or partnership, it shall be organized under the laws of the Philippines duly registered with the Securities and Exchange Commission and at least 60% of the capital of which shall at all times be owned and controlled by the Phil., and

(c) In case of a government agency/office, it must be duly recognized and existing and in need of materials for infrastructure projects as certified to by the agency concerned.

SEC. 6. AUTHORITY - The applicant/permittee may be represented by another provided said authority is contained in a public instrument duly registered with the mining recorder concerned.

SEC. 7. DEPUTIES OF THE DIRECTOR - The Mines and Geo-Sciences Regional Officer, Mineral District Officer, and City/Provincial Treasurer shall be the deputies of the Director within their respective territorial jurisdiction and as such deputies shall have the powers and duties described in the succeeding section.

SEC. 8. POWERS AND DUTIES OF DEPUTIES. - The Mines and Geo-Sciences Regional Officer and Mineral District Officer, concerned shall issue Commercial, Foreshore, Gratuitous and Special Permits for personal use, or for abandoned materials, copies of which shall be furnished the Director and the City/Provincial Treasurer whithin five (5) days from grant thereof.

- over -

The Mines and Geo-Sciences Regional Office concerned shall have original Jurisdiction to try and decide cases arising from these rules and regulations and shall have the police power to enforce and/or execute its decisions/orders; Provided, that in cases of conflict involving a quarry application and/or a mining claim with a sand and gravel application/permit, original jurisdiction shall be vested with the Director.

All applications under these rules and regulations may be rejected or denied by the Mines and Geo-Sciences Regional Officer or Mineral District Officer concerned, if in their opinions, the same do not warrant favorable consideration; Provided, that in case of industrial permit application, authority to reject or deny the same shall be vested with the Director.

In addition to the City/Provincial Treasurer's duty of collecting sand and gravel extraction fees due within their respective jurisdiction, he shall, concurrently with the representative of the Mines and Geo-Sciences Regional and Mineral District Officers, conduct inspection of book of accounts, check production against allowable volume, conduct inventory of active operations and report to the Regional or District Officer concerned from time to time or as may be required, the activities performed in connection with these rules and regulations.

SEC. 9. APPEALS. The decision/order of the Mines and Geo-Sciences Regional Officer concerned shall become final and executory if no appeal is made within five (5) days upon receipt by the losing party of a copy of such decision/order; Provided, however, that mere filing of an appeal shall not stay the execution of the decision/order sought to be appealed, unless the Director orders otherwise. The decision/order of the Director is appealable to the Minister whose decision shall be final. No formal complaint or appeal shall be entertained unless a docketing fee of twenty-five pesos (₱25.00) is paid.

SEC. 10. CONDITIONS FOR THE ISSUANCE OF THE PERMIT. Permits issued under this Order shall be subject to the following terms and conditions:

a) The Permit may be suspended or revoked at any time by the Minister, Director, Mines and Geo-Sciences Regional Officer, or Mineral District Officer, as the case may be, when in his opinion, public interest so requires or upon failure of the permittee to comply with the other terms and conditions stated in the permit.

b) The statements made in the application or those made later in support thereof shall be considered as conditions and essential parts of the Permit and any misrepresentation contained therein shall be a cause for the suspension or revocation of the Permit;

c) The permit shall be inoperative over areas covered by Mines Temporary Permits, Quarry Licenses, Permits or Mining Leases unless the prior authority of the Licensee/permittee or lessee is obtained;

d) No extraction or removal of materials shall be allowed within a distance of one(1) kilometer from the boundaries of reservoirs established for public water supply and of any public or private works or structures, unless the prior clearance of the agency or owner concerned is obtained;

e) The removal or taking of materials under the Permit shall be confined within the area specified therein, the boundaries of which, according to the application, are established on the ground with prominent marks;

- over -

f) The permittee shall assume full responsibility and shall be liable for damages to private and/or public property that may be occasioned by his extraction or operation under the permit;

g) The permit is issued for the exclusive use and benefit of the permittee and shall not be transferred to any person, partnership or corporation without prior approval of the Mines and Geo-Sciences Regional Officer concerned or the Minister, as the case may be;

h) The Permittee or his agent or representative shall post a copy of the Permit at the place of removal or taking of materials and make available at all times for inspection or examination by any representative of the Minister, the Director, the Mines and Geo-Sciences Regional Officer, Mineral District Officer and the Treasurer concerned;

i) The permittee shall keep a book of accounts wherein there shall be entered everyday the quantity and kind of materials removed from the area covered by the Permit, the fees paid therefore as well as th quantity and kind of materials disposed of or sold, their selling prices, the names and addresses of the persons or parties to whom the same were sold or disposed of, and other transactions in connection with the business. Such book of accounts shall at all times be open to inspection by the representatives of the Minister, the Director, the Mines and Geo-Sciences Regional Officer, the Mineral District Officer or the Treasurer concerned;

j) The Permittee shall within (10) days after the end of each month, submit to the Treasurer concerned, the Director and the issuing Officer copies of sworn reports stating the quantity and kind of materials removed or taken by the Permittee, the amount of fee paid, the quantity and kind of materials sold or disposed of during the peruod covered by the report, their selling prices, the names and addresses of the persons to whom the same were sold, and the quantity and kind of materials left in stock;

k) The Permit is subject to the provisions of Letter of Instructions (LOI) No. 887;

l) Unless otherwise renwed or amended, the permit shall ipso facto terminate after the whole quantity and kind of materials specified therein have been removed or taken; and to such other conditions that the Minister, the Director, the Mines & Geo-Sciences Regional Officer or Mineral District Officer may impose.

m) SEC. SURVEY PLAN- All applications under these rules and regulations shall be supported by a survey plan duly prepared, signed and sealed by a license Geodetic Engineer, Such plan shall contain general information including technical description, refrence point location map, etc. In case of Industrial Permit Application, the area shall be surveyed by a deputized Geodetic Engineer of the Bureau.

SEC. 12 SAND AND GRAVEL TAX. Except for gratuitous permittees, holders of other permits unier this Order shall pay in advance to the Treasurer concerned a fee of not more than Seventy-Five Centavos (₱ 0.75) per cubic meter for the materials to be extracted and disposed of; Provided, that in case of large scale operation, the Treasurer may allow staggered payment of fees, the conditions of which shall be stated in an instrument signed by the parties concerned.

SEC. 13 VERIFICATION OF AREAS. - The Mines and Geo-Sciences Regional Office or Mineral District Office concerned shall conduct field verification of the area applied for paying therefore, the amount of ₱200.00 for Commercial, Foreshore and Special Permit Application and ₱500.00 for Industrial Permit Applications; Provided, that the verification maybe dispensed with if warranted by circumstances; Provided, further, that no industrial permit shall be recommended for approval without the accompanying Geodetic and Mining Engineer's verification report.

SEC. 14 REHABILITATION OF EXCAVATED AREAS IN PUBLIC AND PRIVATE LANDS Holders of permit other than special permits covering public and private lands shall rehabilitate the excavated area to a condition suitable for agriculture or other economic activities; Provided that to guarantee faithful compliance with the said obligation, a surety bond in the amount of Twenty Thousand Pesos (P20,000.00) per hectare or fraction thereof shall be posted by the applicant before the grant of the permit with surety acceptable to the Director or His deputies.

SEC 15 SUSPENSION OR REVOCATION OF PERMIT. Permits issued under this Order may be suspended or revoked by the Minister, Director, Mines and Geo-Sciences Regional Officer or Mineral District Officer concerned for violation of its terms and conditions, the provisions of these rules and regulations, when public interest or peace and order conditions so demand, or for egological reasons; Provided, that in case of Industrial Permit, only the Minister or the Director shall exercise such functions.

SEC. 16. RECORDS AND INSPECTION. - The permittee shall keep a book of accounts in which shall be entered everyday, the quantity and kind of materials removed, the fees paid therefor, their selling prices, the names and addresses of the persons or entity to whom the same have been sold or disposed of and other transactions relative to the business. Said book shall at all times be available for inspection by the duly authorized representatives of the Minister, the Director, the Mines and Geo-Sciences Regional Offices, the Mineral District Officer or the City/ Provincial Treasurer concerned.

SEC. 17.MONTHLY REPORTS. - The permittee shall submit to the Mines and Geo-Sciences Regional Officer/Mineral District Officer concerned within ten (10) days after the end of each calendar month a sworn report in the prescribed form stating, among others, the quantity and kind of materials extracted, the fees paid therefor and the names and addresses of the buyer.

SEC. 18. ASSIGNMENT AND TRANSFER.- An application or a permit can be assigned or transfered by the applicant/permittee to any qualified individual/entity in an instrument duly notarized and registered with the Mines and Geo-Sciences Regional Office/Mineral District Office concerned upon payment of the required registration fee. Such assignment or transfer shall be approved by the Mines and Geo-Sciences Regional Officer/ Mineral District Officer concerned, or the Minister, as the case maybe.

SEC. 19. PERIODIC INSPECTION BY GOVERNMENT OFFICIALS. - All operations under this order shall be subject to periodic inspection by the duly authorized representative of the Director or his deputies for the purpose of determining:

a) that the operation is confined within the permit area;

b) that the materials removed are in accordance with the terms and conditions of the permit;

c) that the aesthetic and ecological value in the permit area is not seriously damaged;

d) that the operation does not threaten the ground stability of any public/private structure; and

e) that peace and order condition is maintained in the area.

SEC 20. PRIORITY IN REGISTRATION. - In cases of conflict involving areas of public domain, the application first registered and accompanied by standard requirements shall be entertained and given priority in granting the permit.

SEC. 21. DELIVERY RECEIPTS. - The permittee shall at all times issue to truck drivers engaged in hauling sand and gravel materials from the permit area, delivery receipts in the prescribed form for the purpose of inspection by the duly authorized representatives of the Minister, the Director, or his deputies. The original shall be issued to and carried by truck drivers while in transit which shall be shown upon demand. The duplicate copy shall be attached to the monthly report to be accomplished by the permittee and the triplicate copy shall be kept by the permittee and made available at all times for inspection by proper authorities.

SEC. 22. FAILURE TO CARRY DELIVERY RECEIPTS. - Truck drivers and haulers of sand and gravel materials who fail to present the required deli- delivery receipt upon demand shall pay a fine of One Hundred Pesos (100.) per cubic meter of the materials being transported. Failure to pay the fine shall be a cause for the impounding of materials and vehicles to be released only upon payment of the required amounts to the treasurer of, and shall accrue to, the city/province where the materials were apprehended.

SEC. 23. FAILURE TO ISSUE DELIVERY RECEIPTS OR ISSUING FRAUDULENT RECEIPTS. - Failure to issue genuine delivery receipts or issuing fraudulent delivery receipts shall be sufficient ground for the suspension/revocation of the permit.

ARTICLE IV

COMMERCIAL PERMIT

SEC. 24. COMMERCIAL PERMIT. - A commercial permit shall be issued to dispose of sand and gravel and other loose or unconsolidated materials which are taken in their natural or original state without undergoing processing. The permittee shall be entitled to extract and remove the materials covered by the permit to the exclusion of others except to holders of gratuitous permit.

SEC. 25. REQUIREMENTS. - The application shall be supported by a survey plan prepared by a licensed geodetic engineer, Initial Environmental Examination Report, and an operational plan which shall contain a rehabilitation plan of the area applied for, when necessary.

SEC. 26. LIMITATIONS. - Only one (1) permit shall be granted for an applicant in every municipality.

SEC. 27. SURETY BOND. - To answer for and guarantee payment for whatever actual damage that may be incurred by reason of the sand and gravel operation, the permittee shall post a surety bond in the amount of Ten Thousand Pesos (₱10,000.00) with surety acceptable to the Director or his deputies.

ARTICLE V

FORESHORE PERMIT

SEC. 28. FORESHORE PERMIT. - A foreshore permit is issued covering an offshore area beyond one hundred (100) meters from the watermark at the mean low tide extending seaward or lakeward to extract and dispose materials consisting of rounded or flattened fragments of rocks, limestone, quarts, including materials commonly known as "wash-out" or "gravitas" that have been detached from their source carried and transported by waves and accumulated in the beds of seas and lakes.

SEC. 29. REQUIREMENTS. - The application shall be supported by a survey plan prepared by a licensed geodetic engineer, initial environmental examination report and an operational plan.

SEC. 30. LIMITATIONS AND CONDITIONS OF THE PERMIT. - Only one (1) permit embracing not more than one (1) hectare shall be granted to an applicant in every municipality.

The taking of "puka" is not covered by these rules.

The foreshore area shall be marked with vertical poles of distinct colors at the corners visible at all times above the water. Unauthorized removal or transfer of the said poles by the permittee or his agent shall be a sufficient ground for the suspension or revocation of the permit.

SEC. 31. SURETY BOND. - To guarantee faithful compliance with the terms and conditions stated in the permit, a surety bond in the amount of Ten Thousand Pesos (₱10,000.00) shall be posted by the applicant with surety acceptable to the Director or his Deputies.

ARTICLE VI

GRATUITOUS PERMIT

SEC. 32. PRIVILEGES GRANTED TO GOVERNMENT OFFICES AND INSTRUMENTALITIES. - The conditions, limitations and/or requirements prescribed in this Order may be suspended or dispensed with by the Minister the Director, or his deputy in cases of gratuitous permits granted to government offices/entities, or instrumentalities in need of materials for infrastructure projects.

SEC. 33. CONDITIONS AND LIMITATIONS. - A gratuitous permit may be issued under the following conditions:

a) that the period of the grant shall be coterminous with the term of the project but not to exceed one (1) year;

b) that the applicant shall submit a project proposal where the materials to be taken shall be used and the estimated volume needed;

c) that the government office concerned shall, whenever practicable, use and utilize its own vehicles and equipment in extracting, hauling and transporting the materials; Provided, however, that the permittee may enter into a contract with a private person/entity for the purpose of hauling and transporting such materials;

d) that the materials authorized to be removed shall be strictly for infrastructure projects and in no case shall the same be disposed of commercially, otherwise, persons responsible therefor shall be liable for prosecution under appropriate laws;

e) that the permittee shall submit to the Mines and Geo-Sciences Regional Officer or Mineral District Officer concerned a monthly report in the prescribed form, copy furnished the Director and City/Provincial Treasurer concerned; and

f) in exceptional cases, more than one (1) permit may be granted to the applicant depending upon the volume of materials needed, project proposal, proximity, size and other factors.

SEC. 34. EXEMPTION FROM FEES. - A gratuitous permittee shall not be required to pay sand and gravel fees; Provided, that delivery receipts shall be issued and carried by hauling and/or transporting vehicles.

ARTICLE VII

INDUSTRIAL PERMIT

SEC. 35. INDUSTRIAL PERMIT. - An industrial permit covering an area of not more than eight (8) hectares for an individual and sixty-four (64) hectares for a partnership/corporation shall be issued for the removal of sand and gravel and other loose or unconsolidated materials that necessitate the use of mechanical processing.

SEC. 36. CONDITION PRECEDENT. - No operations shall be allowed until after the processing machinery or crushing equipment that the permittee may enter into an operating agreement with an owner of existing processing plant; Provided, further, that failure of the permittee to install the required processing equipment within six (6) months from grant of the permit may cause the revocation of the permit.

SEC. 37. REQUIREMENTS. - The application for industrial permit shall be supported by the following documents:

a) Plan of the area duly surveyed by transit and tape by a deputy Geodetic Engineer of the Bureau;

b) Clearances from the government agencies concerned that may be affected by the operation, or written permission from the owner of the area applied for;

c) Project study prepared, signed and sealed, by a registered engineer stating among others, the nature and kind of the materials applied for, production rate, equipment and machineries to be used, estimated volume of the deposit, financing scheme, marketing, technical personnel, operational and rehabilitation plans and the economic feasibility of the proposed operation;

d) Initial Environmental Examination Report (IEE) or Environmental Impact Statement (EIS);

e) Bureau of Lands certification as to whether the area is public or private property;

f) Certification by Barangay Captain attesting to the fact of survey conducted;

g) Proof of financial and technical capability of the applicant to develop and exploit the materials applied for and to rehabilitate excavated areas; and

h) Written authority of the agent or representative stated in a public instrument registered with the Mines and Geo-Sciences Regional Office concerned.

SEC. 38. SURETY BOND. - To answer for and guarantee payment for whatever damages that may result in the extraction/operation, the applicant shall post a surety bond in the amount of Twenty Thousand Pesos (P20,000.00) with surety acceptable to the Director and to the Minister.

SEC. 39. SPECIAL PERMIT. - Pending approval of the permit by the Minister, the applicant may, upon request in writing, be granted a special permit to conduct commercial operations for a period of not more than sixty (60) days, renewable only once, subject to the terms and conditions provided therein.

ARTICLE VIII

PENAL CLAUSE

SEC. 40. UNLAWFUL ACTS. - The following shall constitute unlawful acts under these rules, to wit:

1. Any extraction and removal or sale of sand and gravel and other loose and unconsolidated materials from its source without a permit duly issued;

2. Any extraction and removal or sale of materials in excess of the allowable quantity specified in the permit; and

3. Any extraction and removal or sale of materials outside the permit area.

4. All persons responsible for committing any of the foregoing acts shall be prosecuted for theft and penalized in accordance with the succeeding section.

SEC. 41. PENALTY. - Conviction of any of the acts referred to in the preceding section shall be subject to the penalty provided for by the provisions of Presidential Decree No. 463, as amended.

ARTICLE IX

MISCELLANEOUS PROVISIONS

SEC. 42. RECOGNITION OF EXISTING MINING RIGHTS. - All existing and valid mining claims, perfected and non-perfected, registered under the provisions of Commonwealth Act No. 137, as amended, Presidential Decree No. 463, as amended, and other laws relating to mining, shall be recognized and the rights acquired thereunder respected.

SEC. 43. PREFERENTIAL RIGHT. - Owners/leases of private lands shall have the preferential right to extract and remove sand and gravel materials that may be found in their land. Lands with imperfect title shall be recognized if supported by up-to-date payment of realty taxes.

SEC. 44. ABANDONED MATERIALS. - Any person desiring to dispose of abandoned materials may apply for special permit subject to the condition that the fees corresponding to the quantity applied for shall have been paid in advance and to such other conditions that may be imposed.

SEC. 45. INSPECTION AND VISITORIAL POWER. - The Minister, the Director, the Mines and Geo-Sciences Regional Officer, the Mineral District Officer and City/Provincial Treasurer concerned or their duly designated representatives shall inspect and visit from time to time the operations of the permittee to find out if the latter is faithfully complying with the terms and conditions of the permit or this Order.

SEC. 46. FAILURE TO KEEP BOOKS OF ACCOUNTS AND SUBMIT MONTHLY REPORTS, ETC. - Failure of the permittee, as required in this Order, to keep book of accounts containing the records of transactions related to the materials removed and disposed of, or repeated failure to submit the monthly reports without justifiable reasons shall be sufficient ground for the suspension or revocation of the permit, the confiscation of the bond and forfeiture of all payments made by the permittee.

SEC. 47. REPEALING CLAUSE/PROVISION. - All Mines Administrative Orders, circulars and instructions related to sand and gravel are hereby repealed and rendered unforceable.

SEC. 48. EFFECTIVITY. - The Mines Administrative Order shall take effect immediately.

Promulgated: November 7, 1980
Diliman, Quezon City

(SGD.) JOSE J. LEIDO, JR.
Minister

RECOMMENDED BY:

(SGD.) JUANITO C. FERNANDEZ
Director of Mines and Geo-Sciences

VSD/RFD
12/15/80

Agency for International Development
Washington, D.C. 20523

FACSIMILE TRANSMISSION COVER SHEET

DATE: 10/3/91

TO: Lee Hannah

FROM: Jim Tarrant

Office Name: CI

Fax Number: 887-5188

Office Number: 429-5600

Office Name: APRE/DR/TR

Fax Number: 202/663-2149

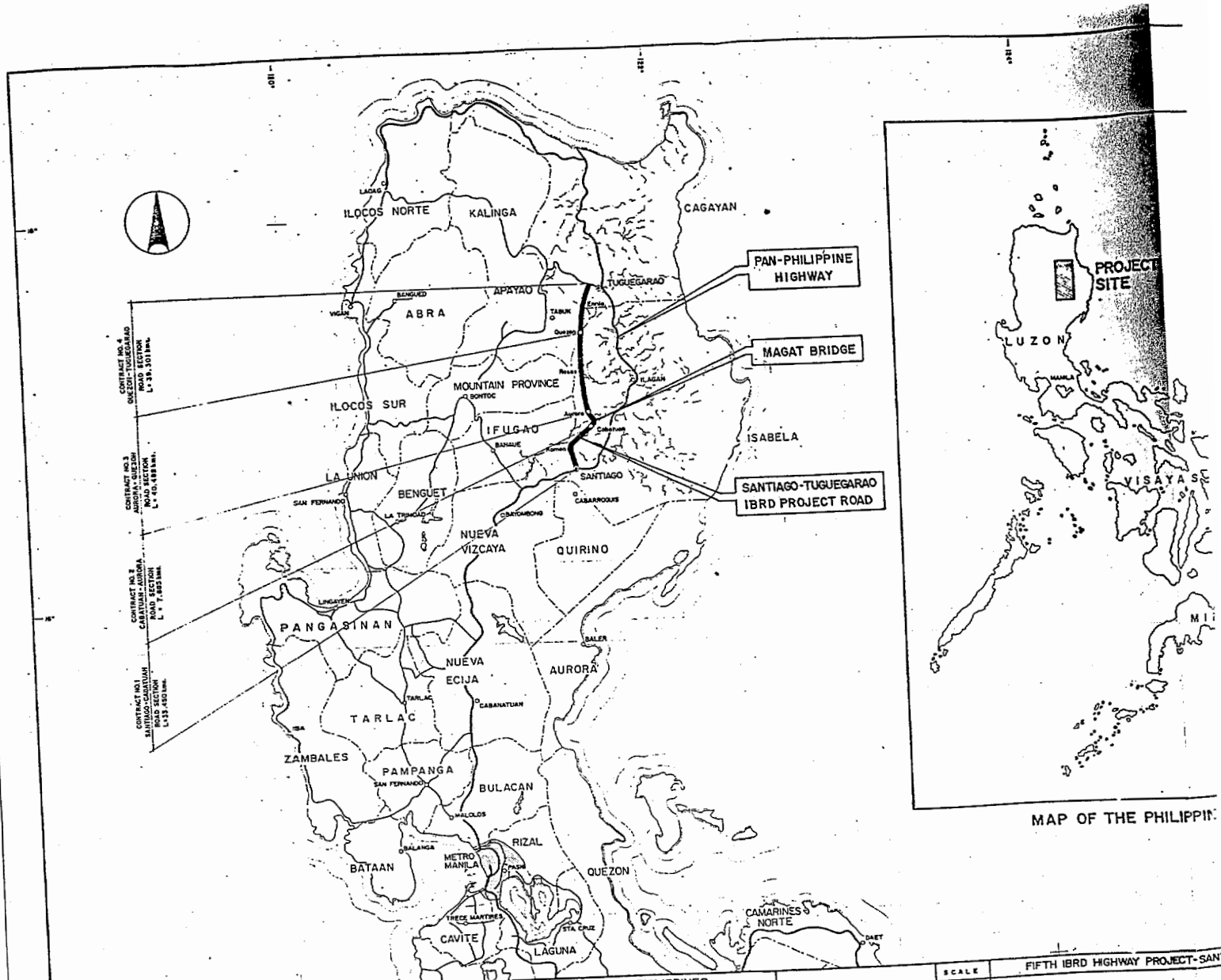
Office Number: 202/663-2288

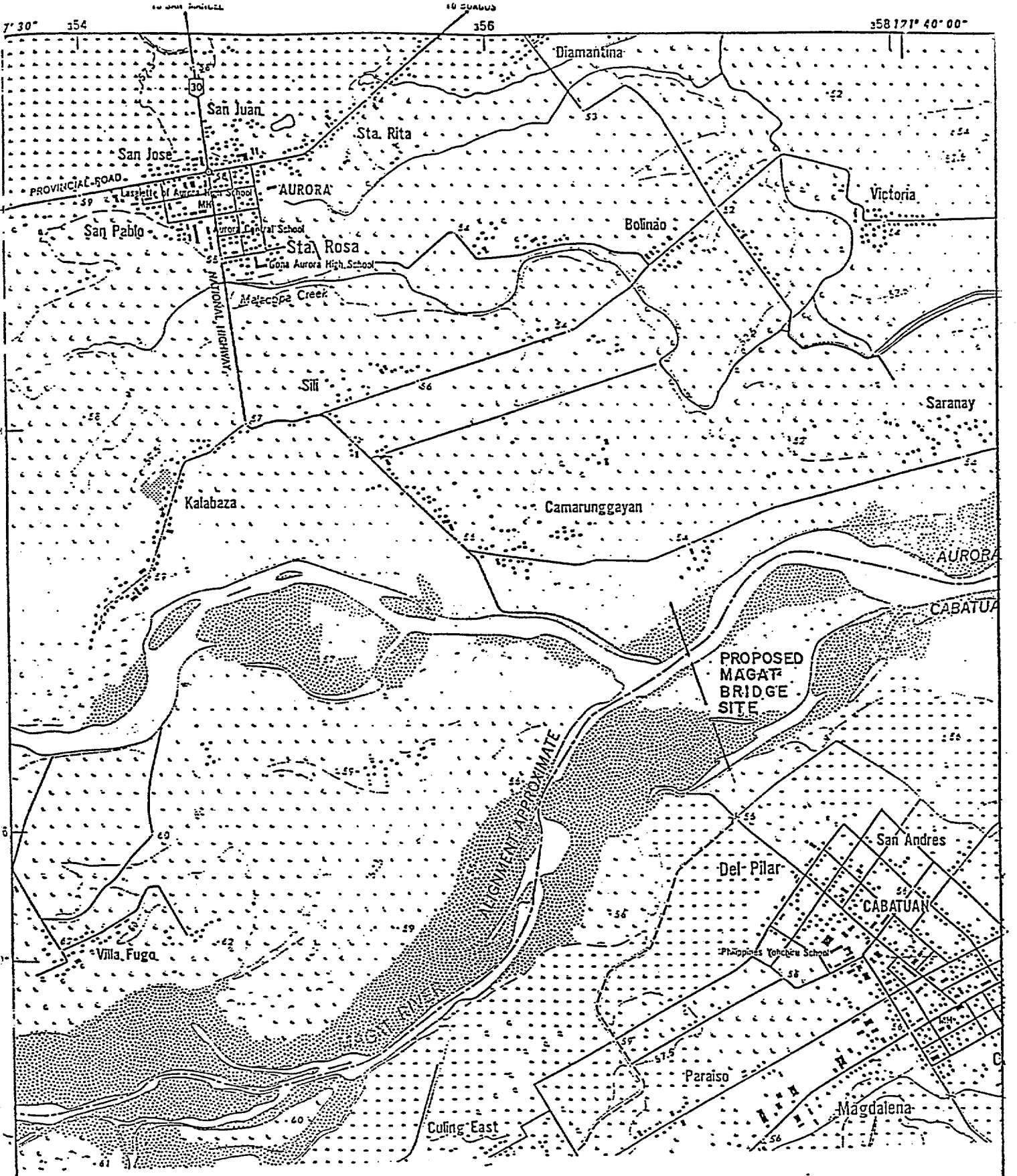
SUBJECT: IEE for Magat

Number of Pages (Including cover sheet) _____

MESSAGE:

Here are a series of maps detailing the project site. You will note that the subject road is even farther west than the Pan Philippine Highway. The question is whether the new road (upgrading to asphalt of existing alignment, actually) will put more development pressure on the Sierra Madres if the Pan Philippine Highway already runs through it on at least along the foothslopes on the west. Any comments are appreciated.





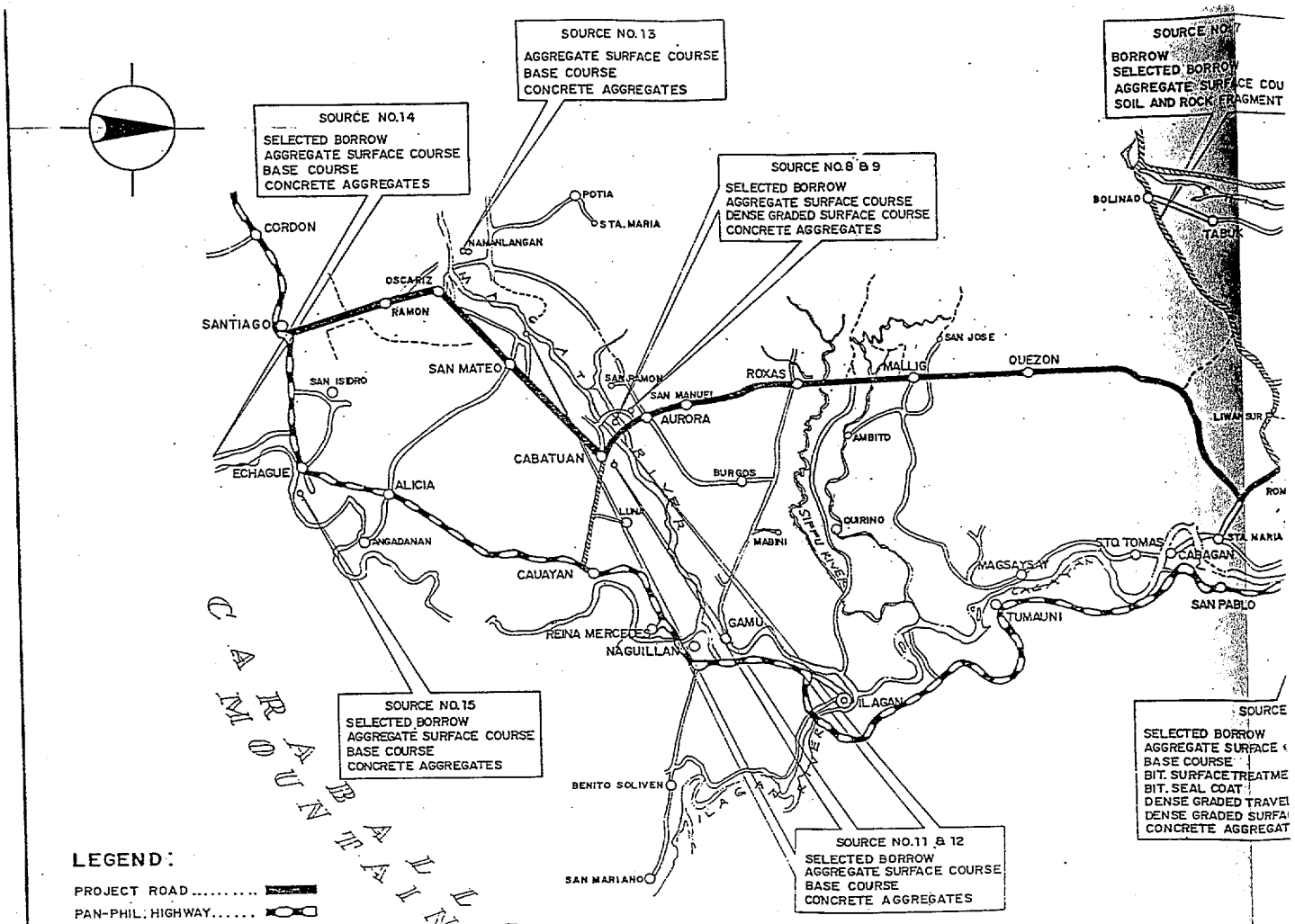
SCALE: 1:25,000

SOURCE: NAMRIA CHART 3334 - IV - A , 1983

RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-0420

TOPOGRAPHIC MAP - MAGAT BRIDGE SITE

FIGURE 8

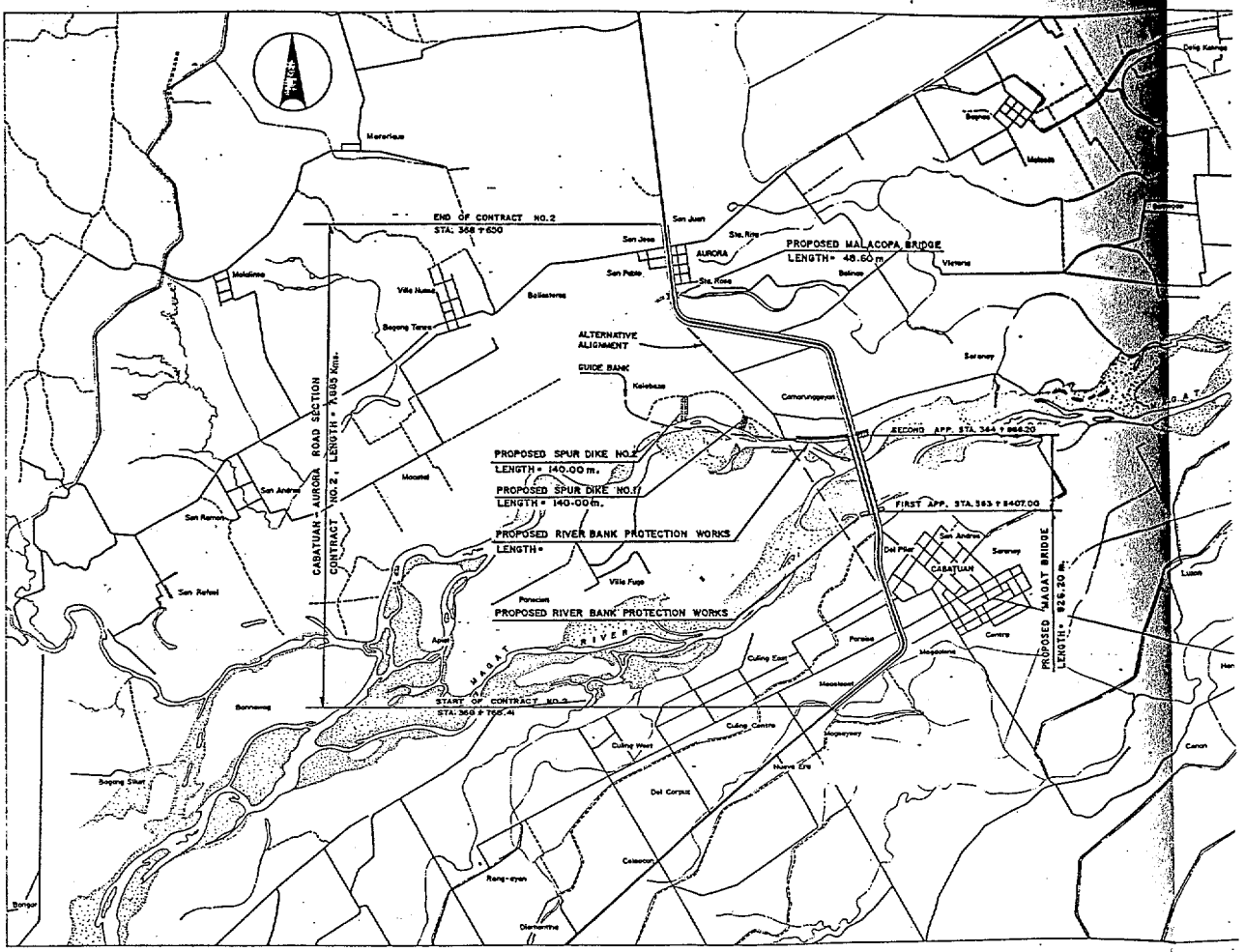


SOURCE: FINAL REPORT, PHASE I FEASIBILITY STUDIES FOR SANTIAGO - TUGUEGARAO AND SOLANA - PIAT ROAD VOLUME 2, JANUARY, 1976 DEPARTMENT OF PUBLIC WORKS AND HIGHWAY.

RURAL INFRASTRUCTURE FUND PROJECT, AID PROJECT No. 492-

MATERIAL SOURCE MAP, MAGAT BRIDGE

BEST AVAILABLE COPY



GENERAL PLAN

PROPOSED MAGAT BRIDGE PROJECT

CONSULTANT		REPUBLIC OF THE PHILIPPINES			SCALE	FIFTH IBRD HIGHWAY PROJE
philipp's technical consultants inc.	DESIGNED 9-6-89	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	REVIEWED:	RECOMMENDED:	AS SHOWN	CABATUAN - A'
	CHIEF ENGINEER 9-6-89					GENE
	PROJ. MANAGER 9-6-89					