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GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

MINISTRY OF LOCAL GOVERNMENT
RURAL DEVELOPMENT AND CO-OPERATIVES

RURAL ROADS STUDY

(US AID GRANT 388-0031)

VOLUME I

PHASE I REPORT : SUMMARY
NETWORKS FOR FOUR SELECTED AND RANKED DISTRICTS

JULY 1978
DRAFT

LOUIS BERGER INTERNATIONAL INC.
EAST ORANGE, NEW JERSEY

RAHMAN & ASSOCIATES LTD.
DACCA

GOVERNMENT

OF

THE PEOPLE'S REPUBLIC OF BANGLADESH

MINISTRY OF LOCAL GOVERMENT

RURAL DEVELOPMENT AND CO-OPERATIVES

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Rahman and Associates Ltd.
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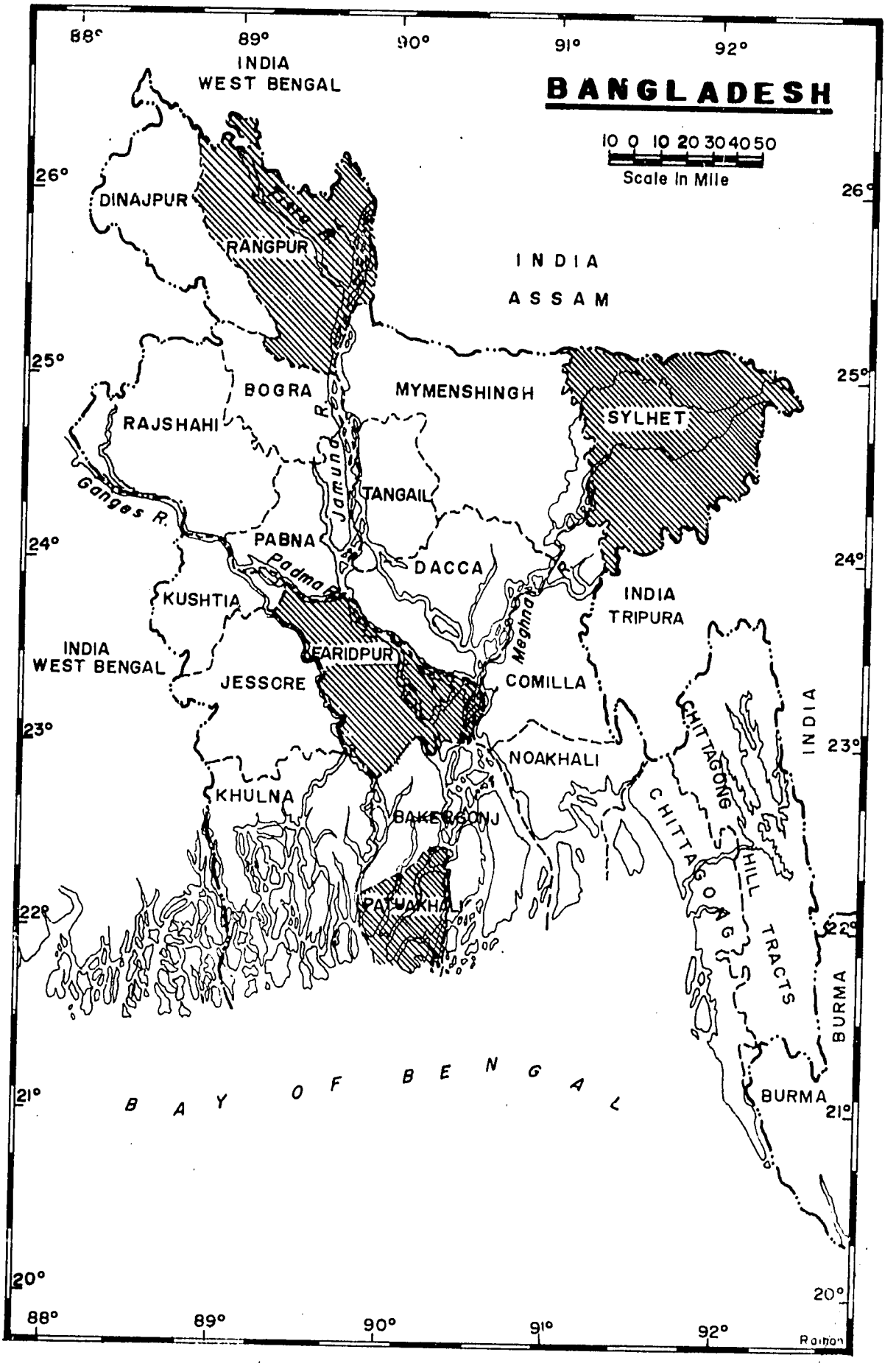
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BAY OF BENGAL
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The Secretary,
Ministry of Local Government,
Rural Development & Co-operatives,
Govt. of the People's Republic
of Bangladesh,
Secretariat Building
Dacca.

July 20, 1978

Rural Roads Study

Dear Sir,

In accordance with the provisions of the contract entered into between the Government of the People's Republic of Bangladesh and Louis Berger International Incorporated in association with Rahman and Associates Ltd. dated February 20, 1978, transmitted herewith are five copies of the draft report covering Phase I of the Study. The draft is presented in five volumes: A Summary, covering methodologies, findings, and recommendations; and four District Profiles, one for each of the districts selected for rural road development.

To our knowledge, this project is unique in the sense that the various aspects of rural life and development potential have been taken into account in framing our recommendations for the construction of rural roads networks. With the above aim, the contract specified a number of related objectives, viz.

1. The selection of four districts most in need of rural road development;

2. The construction of district profiles that describe and analyze all significant physical, economic, environmental and socioeconomic aspects and activities;

3. The development of a rural road network in each district consisting of priority roads recommended for construction;

4. The priority ranking of the four districts to determine the sequence of construction, district by district.

During the 15 day review period provided in the contract for the Phase I draft reports, the consultant will be fully at the disposal of government and USAID for consultations covering all aspects of the draft report. Simultaneously, the consultant plans to push ahead on those aspects of Phase II of the Study that do not require field work.

Sincerely,

Edward S. Prentice

EDWARD S. PRENTICE
PROJECT MANAGER

ESP:sh

Copy to: 1. The Planning Commission
2. USAID Dacca.

RURAL ROADS PROJECT
VOLUME I : SUMMARY
TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

A. District Selection

All nineteen districts of the country were subjected to intense analysis and to a scoring system that took into account the following factors:

1. Existing Transportation Network
2. Agricultural: potential for production in Food Grains
3. Socioeconomic factors
4. Institutional factors

The scoring of the districts was constructed so that the district with the highest scores in each division reflected the one most in need of rural road development. These districts were:

Faridpur
Patuakhali
Rangpur
Sylhet

B. District Profiles

A district profile has been constructed for each of the four selected districts. These are presented in separate Volumes and cover in considerable detail all significant aspects of physical, economic, environmental and socioeconomic characteristics of each district. Special emphasis was given to describing the present transport networks and soliciting nominations from district, subdivision and thana

officers for their road construction priorities. The tables alone in sections III and IV of this volume vividly illustrate the need of all four districts for an improved and more extensive rural road network.

C. Recommended Road Network

The consultant has developed a recommended road network for each district. based on data collected and more detailed information obtained by interview and questionnaire at the district, subdivision and thana levels of local government. All of the roads in the recommended network were nominated as priority requirements by local officials. The key data for each networks are given in Table 1 and are shown in the maps presented in figures 5 through 8 in Section VI that contains description of the district recommended net works.

TABLE 1

DISTRICT ROAD NETWORK SUMMARIES

Road Data	Faridpur	Patuakhali	Rangpur	Sylhet
No. of segments	29	14	28	17
Total mileage	224.5	151.0	239	169
Total cost	$ 32.7 M	$ 25.4 M	$ 20.6 M	$ 17.6 M.
Cost per mile	$145.7 T	$168 T	$ 86.4 T	$107 T

D. District Rank Order

The rank order assigned to the four selected districts by the consultant is:

Faridpur	First
Patuakhali	Second
Rangpur	Third
Sylhet	Fourth

This rank order is firmly grounded upon the data and findings that were collected and analyzed initially for the District Selection Report presented on April 20, and on additional data collected for the preparation of the District Profiles that are presented in Volumes II through V of this Report. The comparative tables drawn up covering the four selected districts in Section IV of this Summary Volume by themselves alone leave littel doubt concerning the rank order of the districts. Finally, the repeated visits to district headquarters, subdivisions and thanas and the many interviews conducted with local officials provided further evidence that the rank order assigned is indicative of the most urgent rural road needs.

II. INTRODUCTION

In any country where the agriculture sector contributes over 50 percent to its gross domestic product, adequate and efficient transportation of agricultural inputs and produce in rural areas becomes paramount in importance. Bangladesh is such a country. Though rivers are a major means of transport in many districts, in some parts of the country river transport is only possible for a part of the year. Since roads generally are an important mode of communication, it follows that in an agriculture-oriented economy, the provision of rural roads is vital to national development. The absence of a road system integrated with the river and rail transport networks constitutes a severe constraint to development activities in all sectors. Without rural roads any meaningful and sustained rural development will be difficult to achieve.

There is no doubt that the mileage of all-weather roads at the district and thana levels is sorely deficient in Bangladesh. Several districts or areas within districts have been completely bypassed in rural road construction. Statistics show that districts or areas have also been bypassed by many other development schemes, very often because of the lack of transportation facilities. Therefore a road development project would have a major impact on other development efforts in these areas.

To design this project the Scope of Work for Phase I was divided into two parts. First, a methodology was developed to select one district from each of the country's four

divisions for rural road development. Details of the methodology together with the consultant's result are to be found in the special Report, District Selection Report, April 20, 1978.

The second part of the Phase I Scope of Work required the consultant to construct a profile for each selected district that would include social, institutional, economic, environmental and transport baseline data and a preliminary network for rural road development including costs. Based upon the data contained in the District Selection Report and the profiles, the consultant was then to rank order the four districts to identify the relative urgency for rural road development.

This draft final Report, Phase I, summarizes:

1. The method of selection for the four approved districts;
2. The district profiles;
3. The rank order of priority among the four districts in terms of rural road needs;
4. District road networks with preliminary costs and construction planning data by road.

The four district profiles with details on their recommended road networks are presented in separate volumes, numbers II through V.

The five volumes - - Summary and four District Profiles - - together constitute the Phase I Report for this project.

III. DISTRICT SELECTION FOR RURAL ROAD DEVELOPMENT

The District Selection Report submitted to the Ministry and to USAID on April 20 details the approach followed and the factors considered in selecting one district from each division for rural road development. In that report, the transport networks of all nineteen districts in Bangladesh were examined. Seven districts were found to have relatively good existing transport networks and these were eliminated from further project consideration. The twelve remaining districts were subjected to further intensive analysis and then ranked on the basis of the following factors.

1. Existing transportation network
2. Agricultural potential for increased production in foodgrains
3. Socioeconomic Food grain production per person, famine area, frequent flooding
4. Institutional

The scores for each of the four factors analyzed were then summed. The districts with the highest scores were selected as being most in need of rural road development. The scopes for the highest two districts in each division are shown in Table 2.

TABLE 2
DISTRICT SELECTION SCORES

Division	District		Score
Chittagong	Sylhet	#1	21
	Comilla	#2	10
Dacca	Faridpur	#1	30
	Dacca	#2	13
Khulna	Patuakhali	#1	25
	Jessore & Barisal	#2	6
Rajshahi	Rangpur	#1	22
	Rajshahi	#2	20

The districts receiving the highest score in each division - Sylhet, Faridpur, Patuakhali and Rangpur - were recommended by the consultant for rural roads development.

Government approval of the recommended districts was communicated to the consultant on the dates noted:

Faridpur & Sylhet	April 26
Patuakhali	May 13
Rangpur	June 1

IV. DISTRICT PROFILES

The four districts selected for rural road development are described in considerable detail in the District Profile Volumes II-V. In this summary, only brief describptions and comparisons are presented.

The four districts are very different in terms of population, land utilization, agriculture and communication. However, what these districts have in common is a lack of a good transportation infrastructure, either for the district as a whole or for specific areas within the district.

As shown in Table 3 Rangpur, Sylhet and Faridpur are three of the most populous districts in Bangladesh, while Patuakhali is one of the least. All four districts are extremely rural as more than 95% of their population reside in rural areas. Faridpur is also one of the most densely populated districts in the country. All four districts rank very high in their percentages of rural population.

TABLE 3

DISTRICT DEMOGRAPHIC DATA

	Population	Density	1961-74 Population Growth	% Urban	% Rural
Faridpur	4,060,000	1,658	27.7%	3%	97%
NR	(8)	(5)	(18)	(12)	(3)
Patuakhali	1,499,000	870	25.6%	2%	98%
NR	(17)	(18)	(19)	(18)	(1)
Rangpur	5,447,000	1,577	43.5%	5%	95%
NR	(4)	(9)	(9)	(9)	(9)
Sylhet	4,759,000	1,006	36.4%	3%	97%
NR	(5)	(15)	(13)	(12)	(3)

N.R. denotes National Rank

In area, Sylhet and Rangpur are two of the larger districts in Bangladesh while Patuakhali is one of the smallest(see Table 4). Among the four districts, Faridpur has the highest cultivation intensity ratio, which is the ratio of cultivated land to cultivable land and the lowest acreage of cropped land per person. These statistics reflect Faridpur is high population density. Rangpur has the highest cropping intensity in the nation as on average it annually grows 1.79 crops or each acre of cultivated land. In contrast Patuakhali has the has the lowest cropping intensity ratio and only averages 1.25 crops per acre each year.

TABLE 4

DISTRICT LAND UTILIZATION

District	Area in Square miles	Total Cultivable Land	Net Cropped Area	Total Cropped Area	Cultivation Intensity Ratio	Cropping Intensity Ratio	Net Cropped Land per person
Faridpur	2,669	1,282	1,197	1,832	93.4%	153.1	.29
NR	13	10	8	6	3	9	13
Patuakhali	1,675	713	650	811	91.2%	124.8	.43
NR	17	17	16	16	10	18	1
Rangpur	3,701	1,845	1,698	3,035	92%	178.7	.31
NR	6	4	3	2	8	1	9
Sylhet	4,783	2,039	1,816	2,477	89.1%	136.3	.38
NR	3	2	2	3	13	14	5

N.R. denotes National Rank

Rice is the major crop grown, but because of ecological differences the particular rice crops vary greatly in each of the four districts. Mixed Aus and Broadcast Aman are the main rice crops in Faridpur, Aus and Transplanted Aman are predominate in Rangpur, Aman and Boro are the major crops in Sylhet and Transplanted Aman is the most important in Patuakhali.

As shown in Table 5, Sylhet and Rangpur are two of the largest foodgrain producing districts in the country and along with Patuakhali are self sufficient in foodgrain production. Faridpur is not, and nationally it ranks next to last in foodgrain production per person. Thus the very low foodgrain yields per acre and the extremely low usage of High Yielding Varieties in the district.

TABLE 5

DISTRICT FOODGRAIN PRODUCTION

DISTRICT	Total Food Grains Acres		Acres (1,000)	Total Foodgrain Production			Foodgrain Yield maund per acre	Foodgrain production per person in maunds
	% Local	% HYV	Total	% Local	% HYV	Total		
Faridpur	97	3	1,403	89	11	488,599	9.5	2.9
NR	1	19	8	1	19	13	19	18
Patuakhali	89	11	785	83	17	379,010	13.1	6.1
NR	8	12	17	2	17	16	10	2
Rangpur	91	9	2,432	80	20	1,078,329	12.1	4.8
NR	3	15	2	6	13	3	13	5
Sylhet	85	315	2,233	71	29	1,214,641	14.8	6.2
NR	10	9	3	10	11	2	5	1

N.R. denotes National Rank.

Low yields and low cropping intensity ratios are a result of the lack of agricultural inputs such as fertilizer and irrigation. Table 6 shows that each of the four districts ranks extremely low in fertilizer usage and that Faridpur, Patuakhali and Rangpur have very low percentages of their cultivated acreage under irrigation.

TABLE 6

DISTRICT AGRICULTURAL INPUTS

DISTRICT	District Fertilizer Consumption % of National consumption.	Intensity of Fertilizer Use	All methods total a rea Irrigated	% of Acres Irrigated
Faridpur	1	7	66,630	6
NR	-	19	15	14
Patuakhali	1	16	45,850	7
NR	-	16	18	13
Rangpur	5	17	160,480	9
NR	-	15	8	12
Sylhet	3	15	634,080	35
NR	-	17	1	1

N.R. denotes National Rank.

Many of the programs that have been developed to increase agricultural production have been hampered by the poor transportation networks in each of these districts. Faridpur and Patuakhali have very little total road mileage and even less paved road mileage. Therefore both districts are dependent upon river transportation (See Table 7). This causes particular problems in Faridpur because during the dry season when the water recedes, many people are left without transportation. In Patuakhali it is during the peak flood time that many areas

become inaccessible, because the rivers become turbulent

In Rangpur and Sylhet the problems . are quite different. These two districts have better existing ransport networks than Patuakhali and Faridpur. Even so, large portions of these districts lack basic transportation. The haor area of Sylhet is one of the most neglected areas in Bangladesh and eleven thanas there are devoid of any non-riverine transportation. The same problems, although to a lesser extent, affect Kurigram and Nilphamari Subdivisions in Rangpur District. Table 7 gives the road mileages for R&H and district roads for the selected districts.

TABLE 7
DISTRICT ROAD MILEAGES

DISTRICT	Total miles	Per 100 Sq.mile	Per 100,000 person	Paved miles	Per 100 Sq.miles	per 100,000 persons
Faridpur	305	11.4	7.5	179	6.7	4.4
Patuakhali	202	12.0	13.5	46	2.7	3.1
Rangpur	2,675	72.3	49.1	280	7.8	5.1
Sylhet	966	20.2	20.3	230	4.8	4.8

The poor transport networks not only hamper the distribution of agricultural inputs including agricultural extension services but they seriously constrain widening and diversifying marketing options of many farmers. In Madaripur and Sariatpur Subdivisions, lack of means of transport alternatives prevents jute farmers from transporting . their crop to market when the flood waters recede, even though jute prices are higher at this time.

In the haor area of Sylhet similar problems arise and the farmer often sells his paddy to the trader for 50% - 70% of the price in the major markets. Table 8 shows the number of major markets in each of the four districts and the number not served by an all-weather road.

TABLE 8

MAJOR DISTRICT MARKETS

District	No. of Major Markets	% of Markets not served by all-weather road
Faridpur	49	76
Patuakhali	9	78
Rangpur	43	83
Sylhet	24	42

V. DEVELOPMENT OF ROAD NETWORKS

The development of road networks in the rural areas of Faridpur, Patuakhali, Rangpur and Sylhet was carried out in five distinct steps:

1. establishing road and bridge design criteria;
2. soliciting road nominations from local officials;
3. preliminary screening of the nominated roads;
4. priority ranking of individual road segments; and
5. recommending integrated road networks for each district.

A. Design Criteria

The design criteria for the class, section and geometric standards for the rural roads were adopted from the recommendations prepared by an ad hoc committee for the Transport Survey Section of the Planning Commission of the Government. They were submitted to the Government and to USAID for review and approval by letters dated May 11, 1978. The road classes selected for rural road construction by the Planning Commission are Class IV and Class V. These are defined as follows:

Class IV - Paved roads connecting subdivisional and thana headquarters and other principal growth centers.

Class V - Earth roads connecting thana and union headquarters with secondary growth centers. Approximate two-way hourly traffic within 10 years of 20 passenger car equivalents.

The criteria for design of bridges for the rural roads was developed by the consultant and discussed with engineers in the Ministry of Local Government and Rural Development. It was agreed that the bridges would be designed for a single-lane roadway of 12 ft. with curb and railing only in open areas, but with curb, sidewalls and railing in developed locations.

The structures are to be reinforced concrete construction designed for a loading of H-20 trucks. Generally, structure length shall be limited to 200 feet for economy reasons. Waterway openings in excess of 200 feet shall be served by ferries.

Typical sections for Class IV and V roads, bridges, geometric design data and a proposed method for rehabilitating existing embankments are shown in Appendix I, Basic Engineering Data.

B. Road Nominations By Local Officials

The consultant visited each of the four district headquarters, subdivisions, and most of the thanas to discuss rural road requirements with local officials. The approach used by the consultant for each visit was to arrange at the outset a large meeting in the district headquarters with the Deputy Commissioner, Subdivision Officers (S.D.Os.) and district officers of government ministries.

During this meeting the objectives of the study were explained. Particular emphasis was placed upon the economic and social convenience impacts of roads rather than roads solely for administrative use. At this gathering arrangements for follow-on individual meetings with district officials and subdivisional officers were made.

Meeting with individual district officials were held to obtain an overall picture of development programs and transportation problems related to administering these programs.

Meetings were then held in each subdivision with the S.D.Os. and the Circle Officers for development and Agricultural Extension Officers of all thanas in the subdivision. Once again the objectives of the study were explained. In addition, questionnaires designed by the consultant were presented and explained to the S.D.O. and the thana officials. In these questionnaires the officials were asked to designate and describe the four most important road requirements in order or priority for the thana councils or other local officials. These questionnaires were completed and later collected to be returned to Dacca to be mapped and analyzed.

Thana officials nominated roads that were within their thana boundaries. Subdivision and district road nominations included roads that crossed thana and subdivision boundaries. Total mileage of the nominated roads and by each district was:

Faridpur	813 miles
Patuakhali	507 miles
Rangpur	916 miles
Sylhet	943 miles
Total:	3,179 miles

It was from these road nominations by the local levels of government that the preliminary road networks for each of the districts were developed. Figures 1 through 4 present maps showing the road nominations by district.

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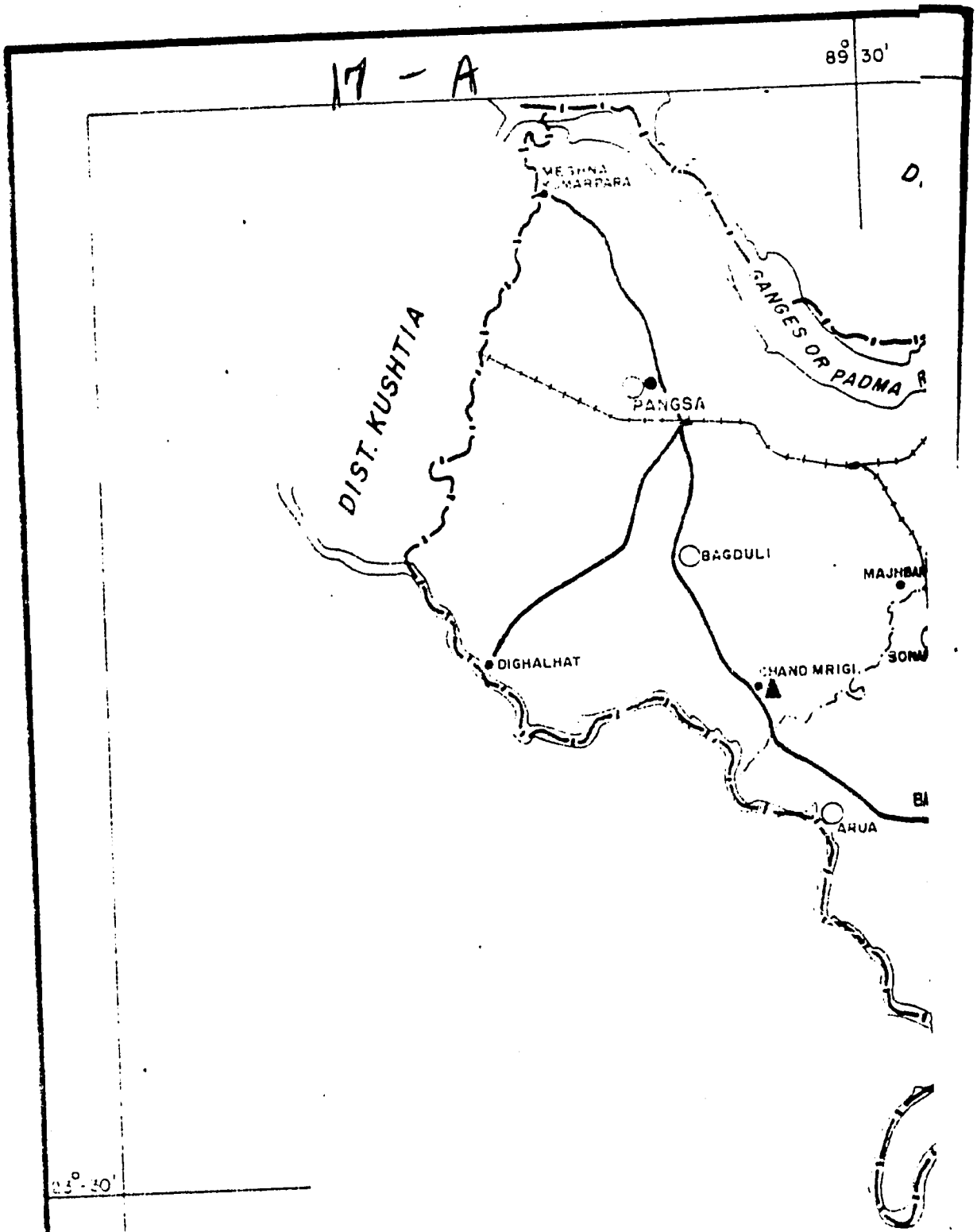
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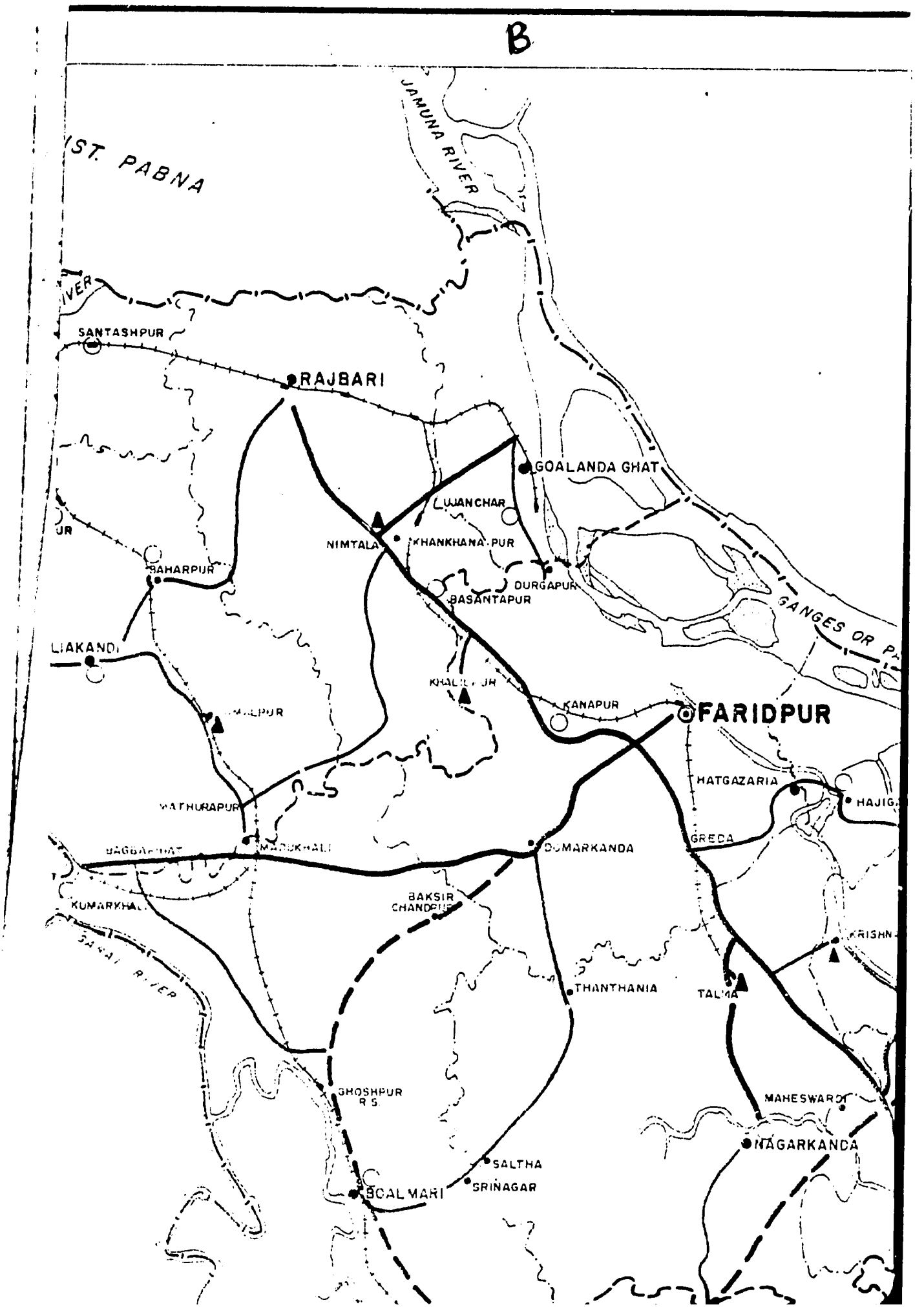
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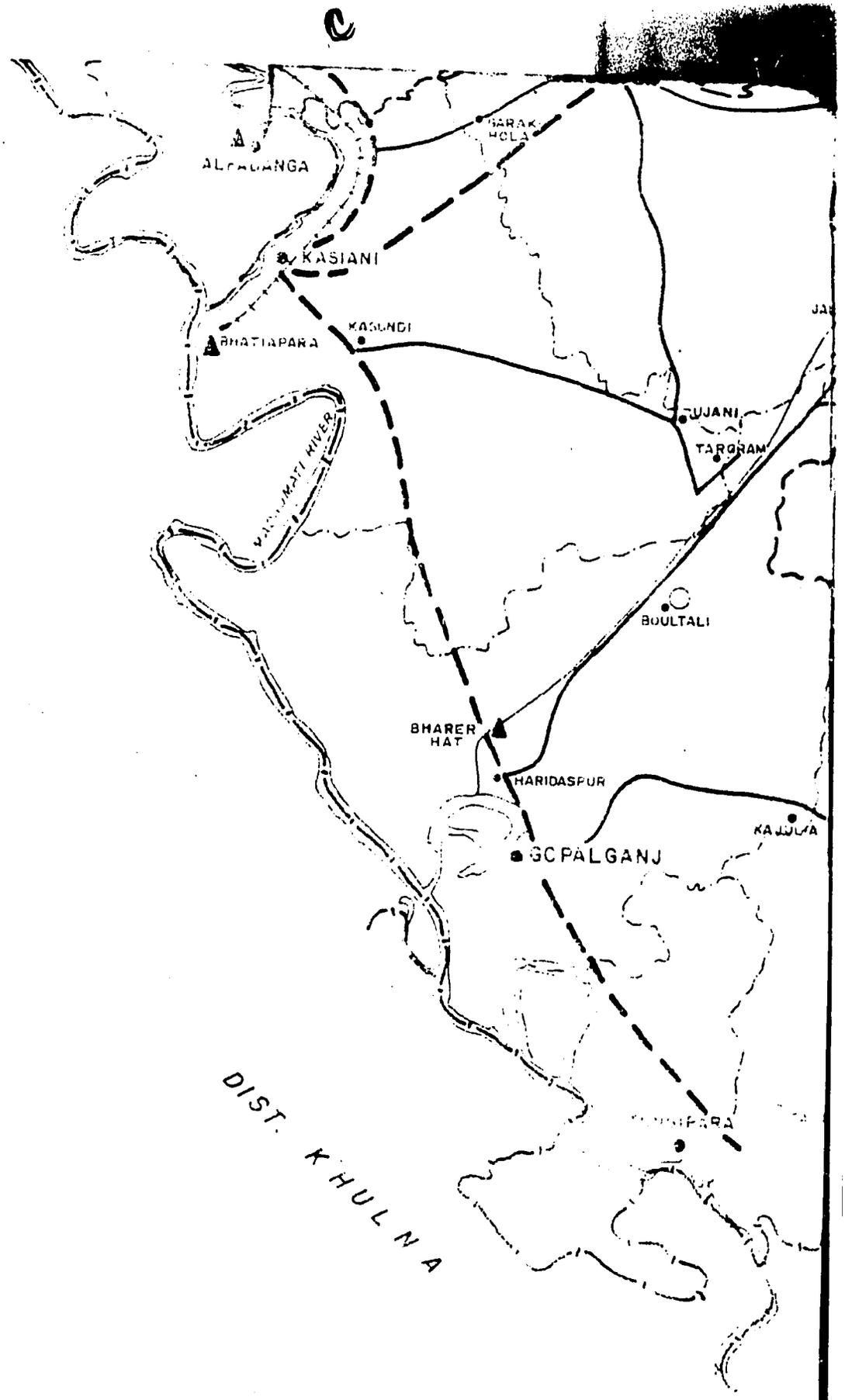
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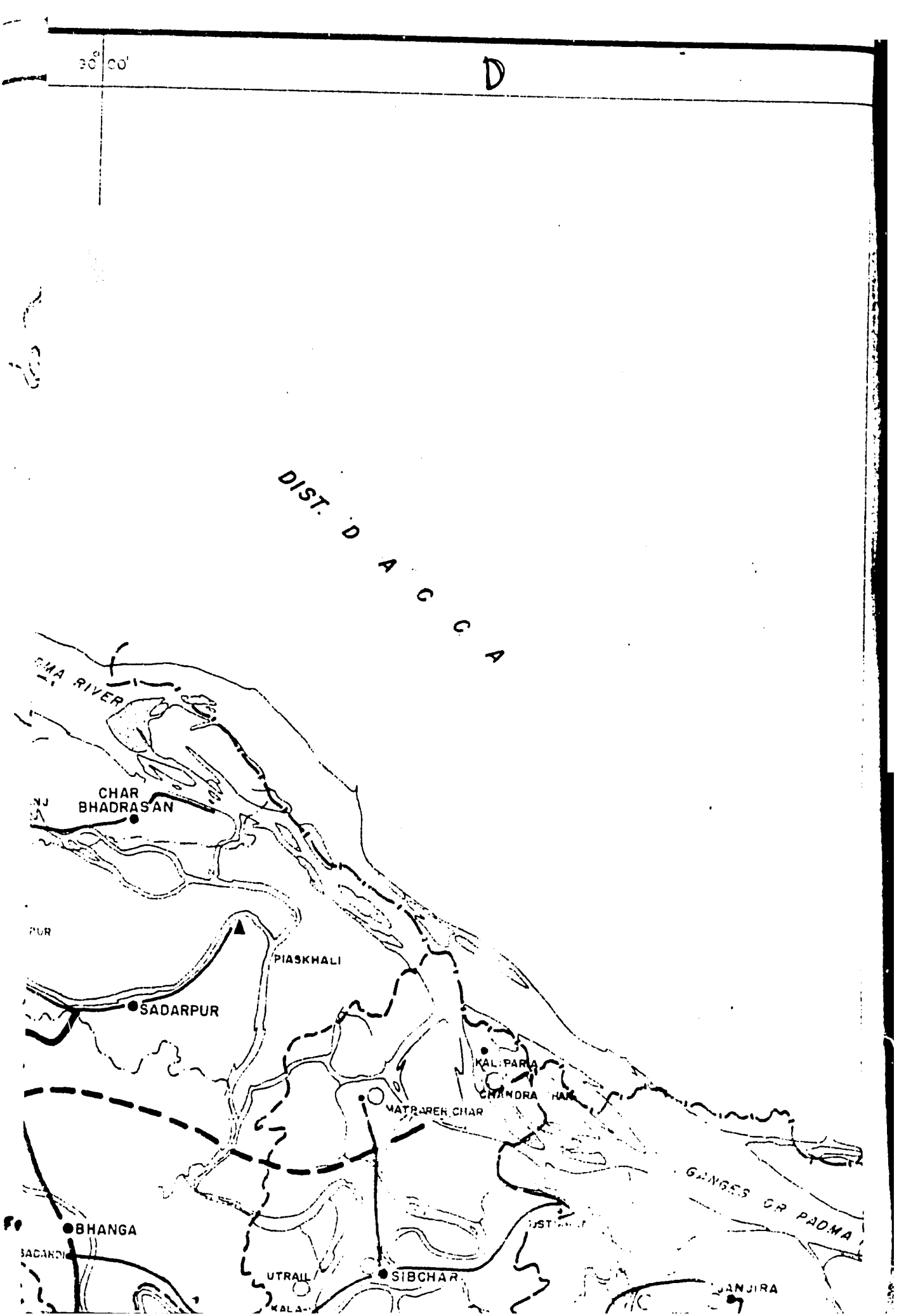
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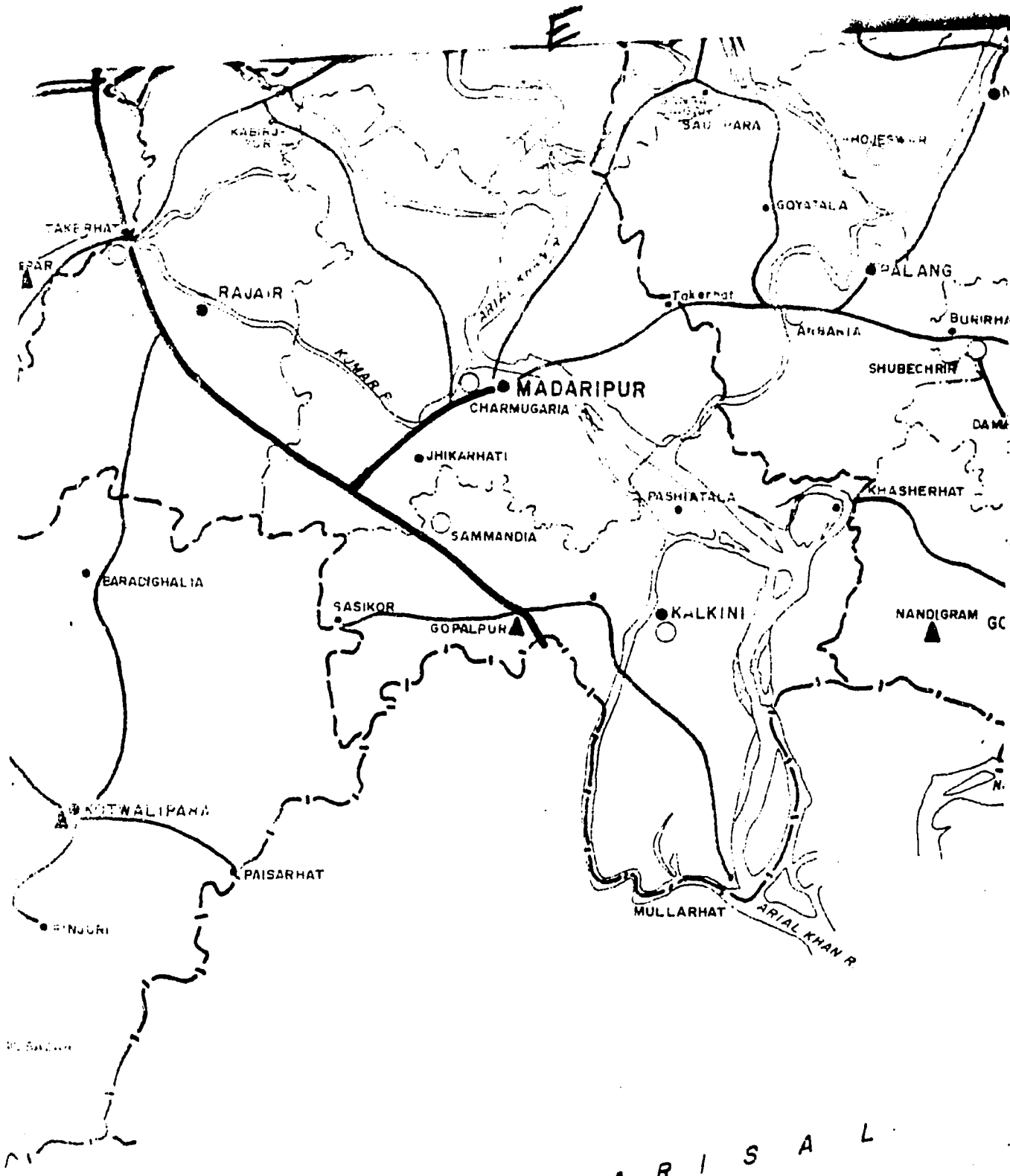
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LEGEND

Roads (R & H)

Rail Roads

Water ways

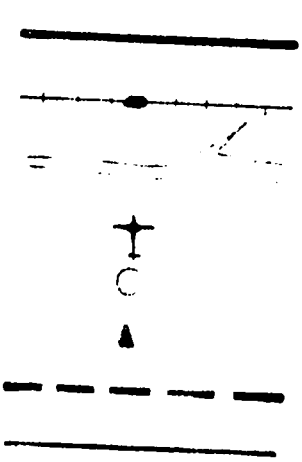
Major Airport

Prim Market (A)

Sec Market (B)

Proposed Roads (R & H)

Preliminary Road Network



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GOVERNMENT OF
THE PEOPLE'S REPUBLIC OF BANGLADESH

RURAL ROADS STUDY

SCREENED ROAD NETWORK

LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

PREPARED BY Z Abedin	RECOMMENDED
CHECKED	APPROVED
DATE :	DRG. NO.

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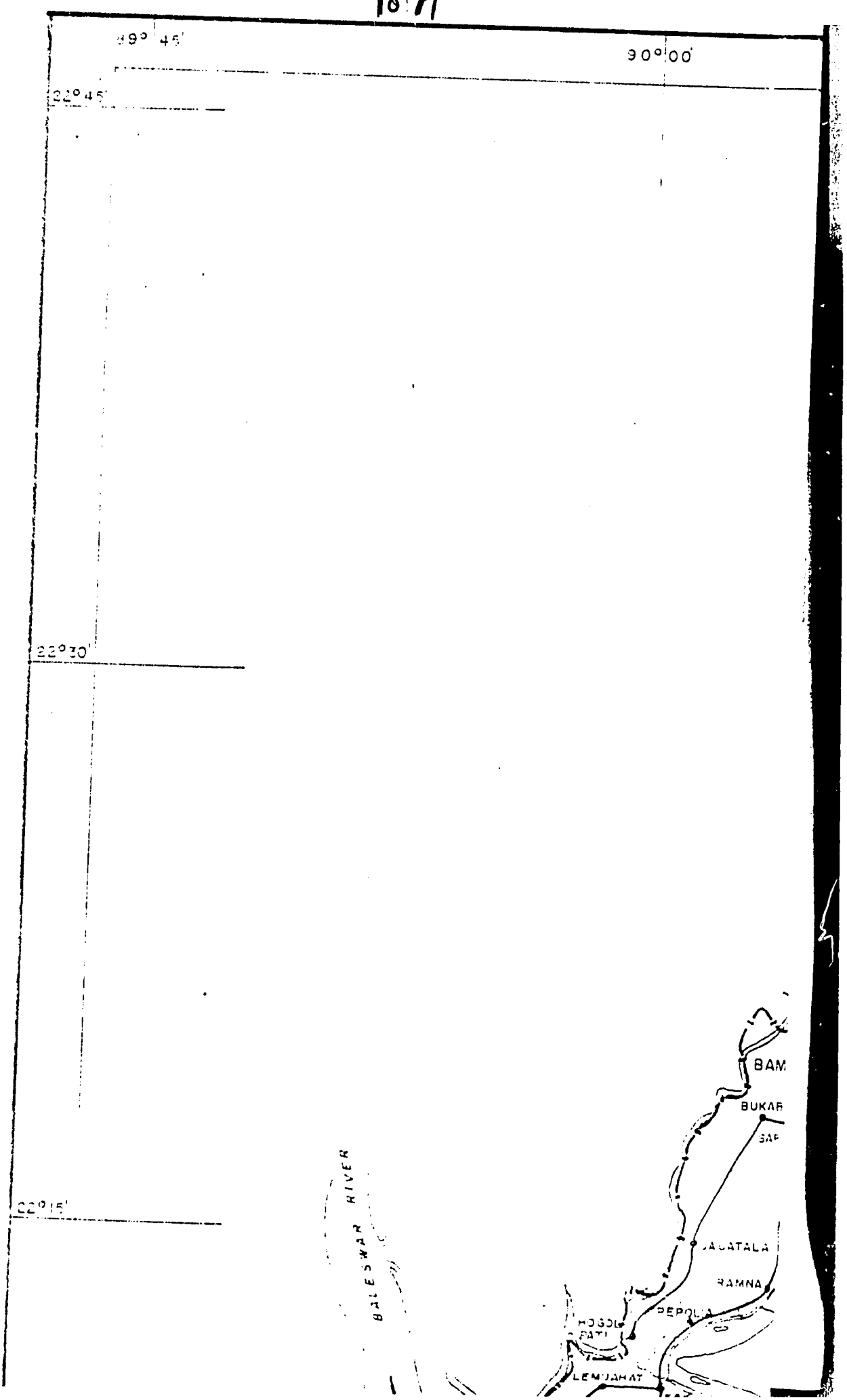
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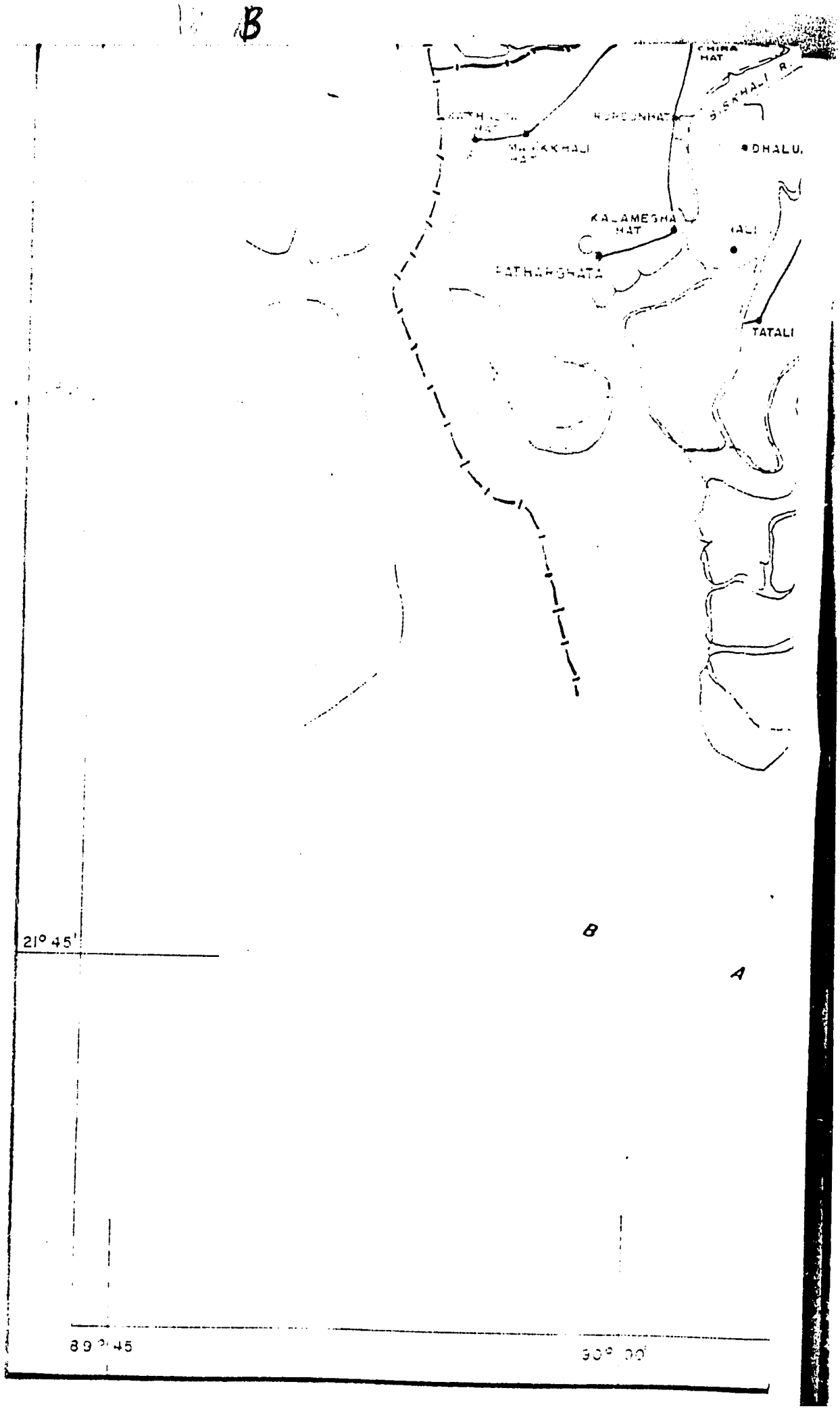
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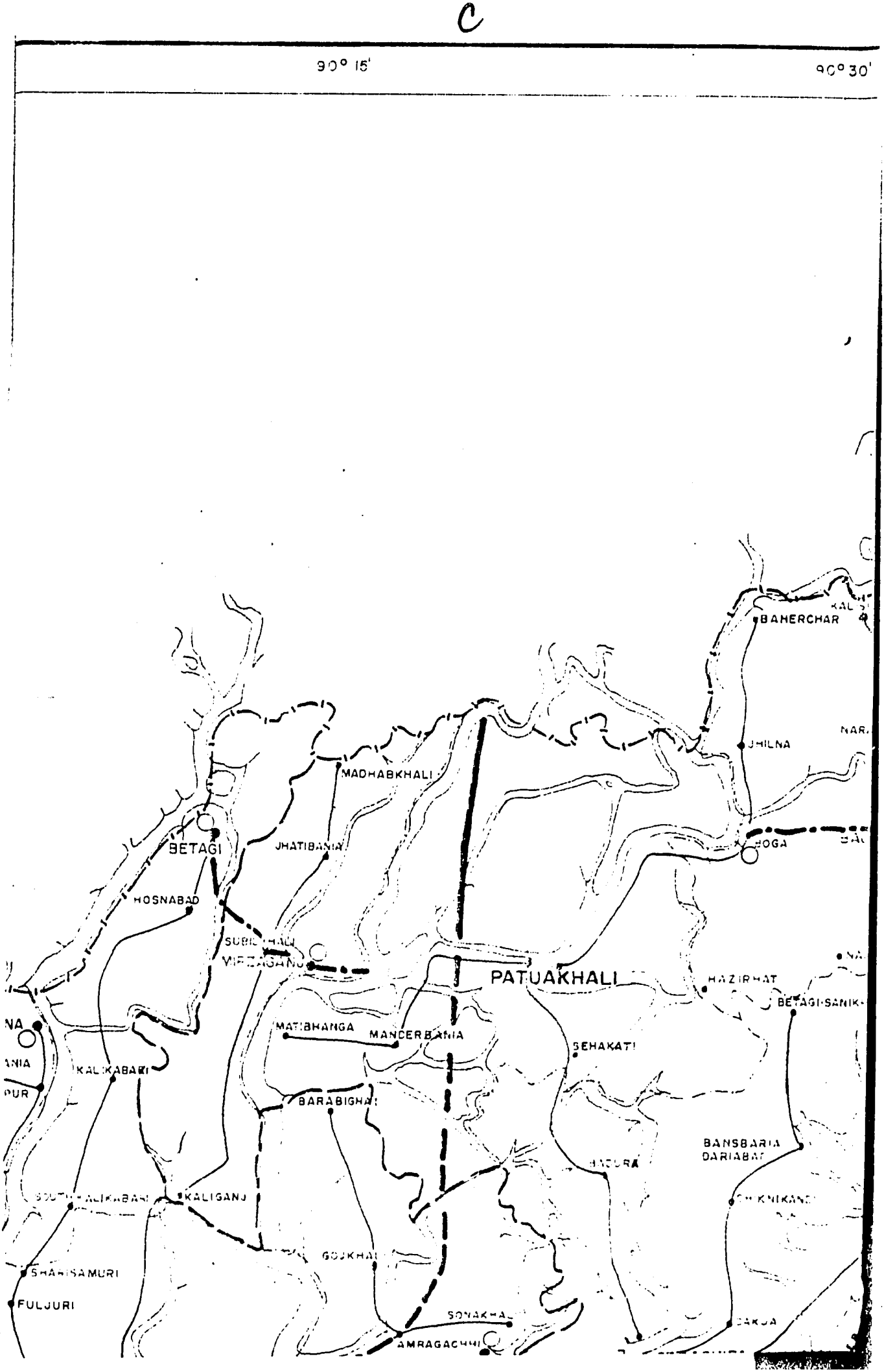
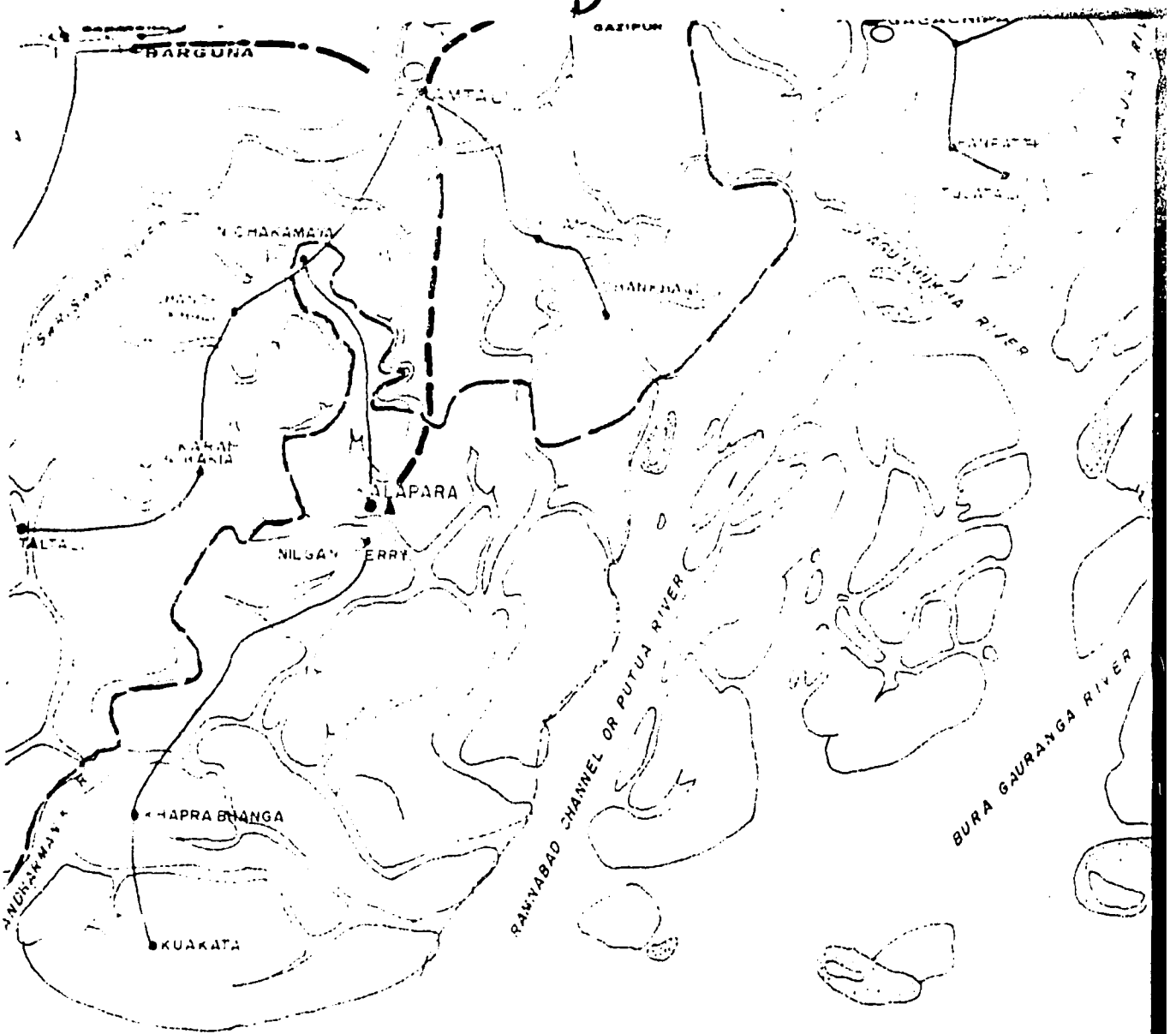
HIRA HAT
DHALU
KALAMEGHA HAT
PATHARGHATA
TATALI
21° 45'
B
A
89° 45
90° 00'

C


90° 15'
90° 30'
BAHERCHAR
JHILNA
MADHABKHALI
BETAGI
JHATIBANIA
HOGA
HOSNABAD
PATUAKHALI
HAZIRHAT
MATIBHANGA
MANCERBANIA
SEHAKATI
KALIKABARI
BARABIGHAI
BANSBARIA
DARIABAR
KALIGANJ
GOURKHALI
SHARISAMURI
FULJURI
SONAKHALI
AMRAGACHHI



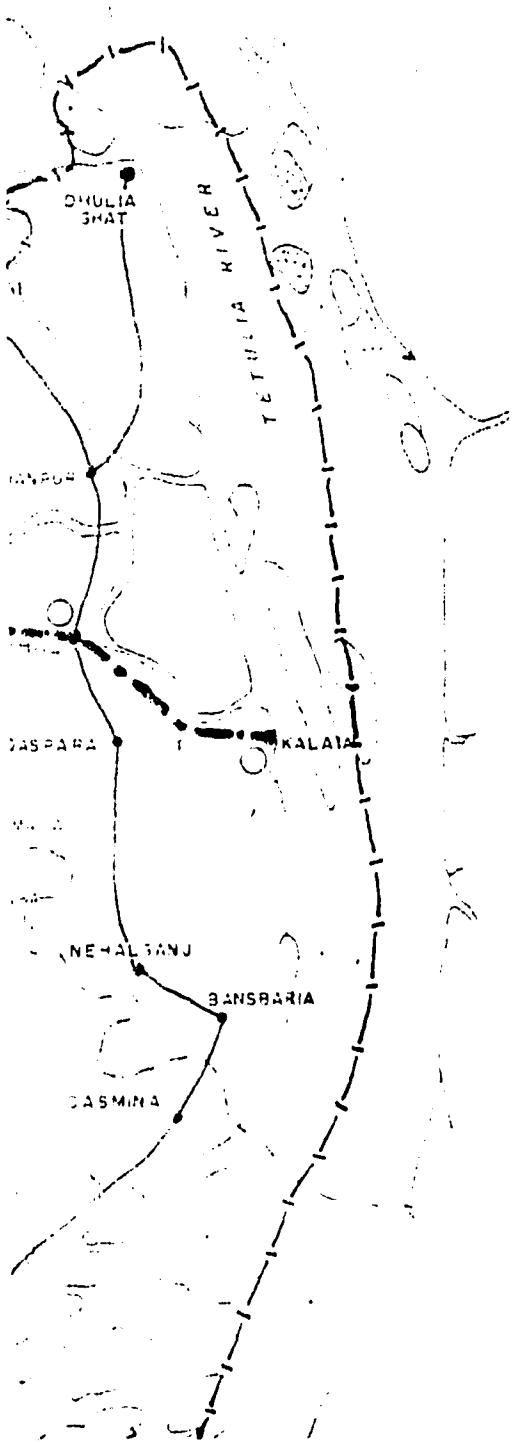
Y O F B E

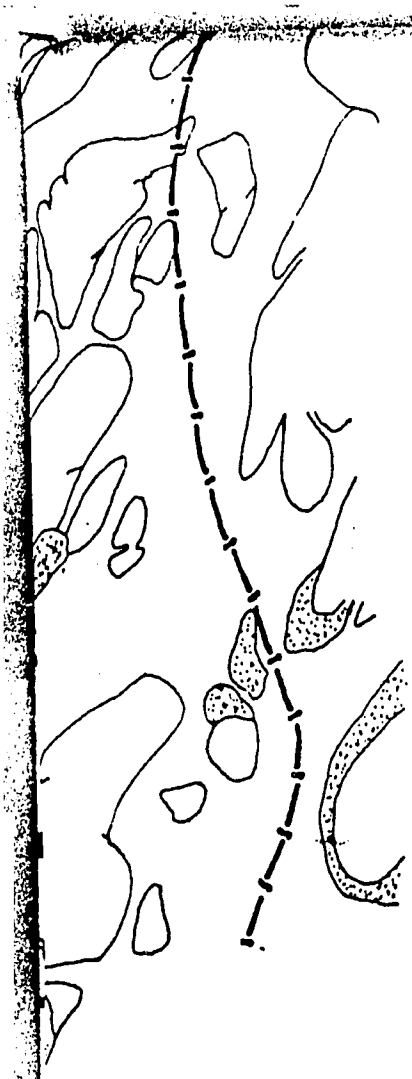
Fror

90°15'

90° 45'

E


DHULIA GHAT
TETULIA RIVER
KALAIA
NEHALGANJ
BANSBARIA
CASMINA



F

L

A

G

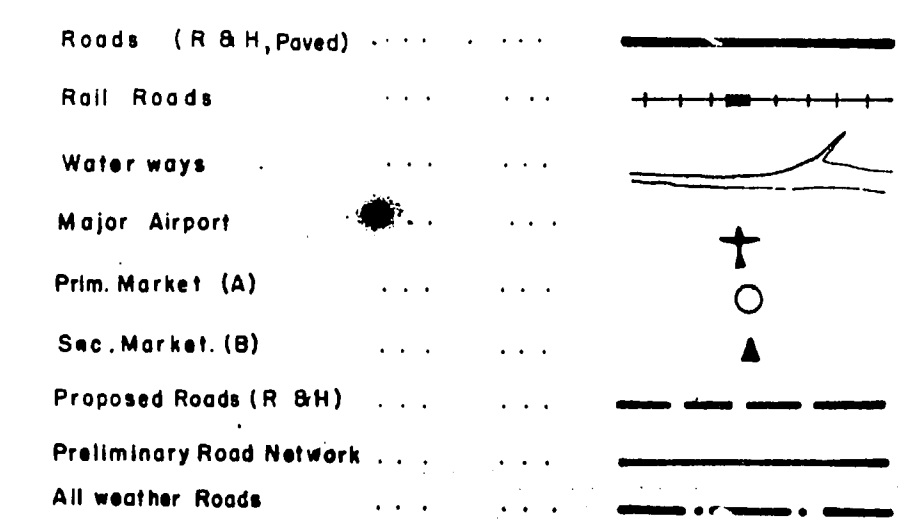
Fron

90°45'

G

DIST. PATUAKHALI

LEGEND :



11

SCALE (Inch = 4 Miles)

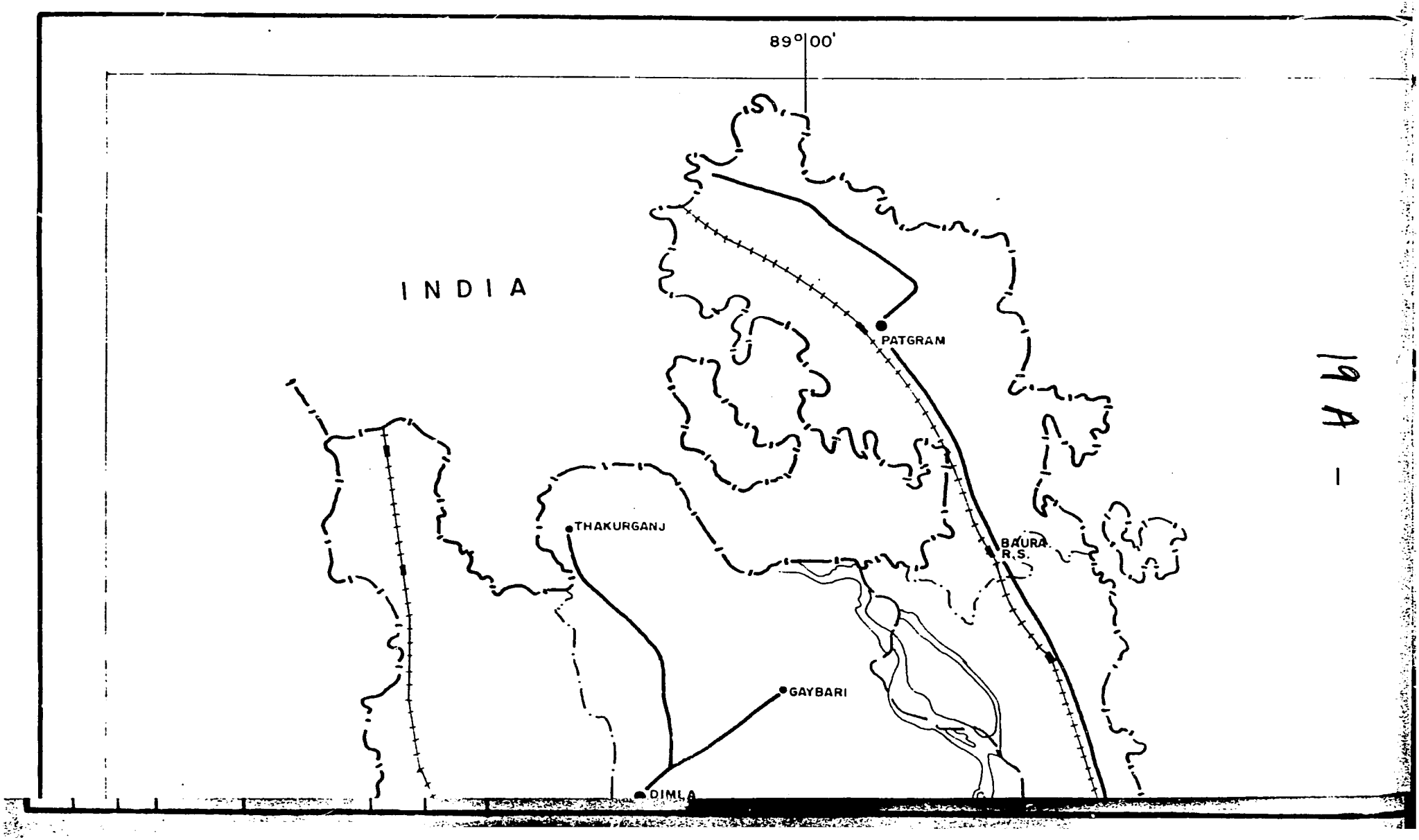
GOVERNMENT OF
THE PEOPLE'S REPUBLIC OF BANGLADESH

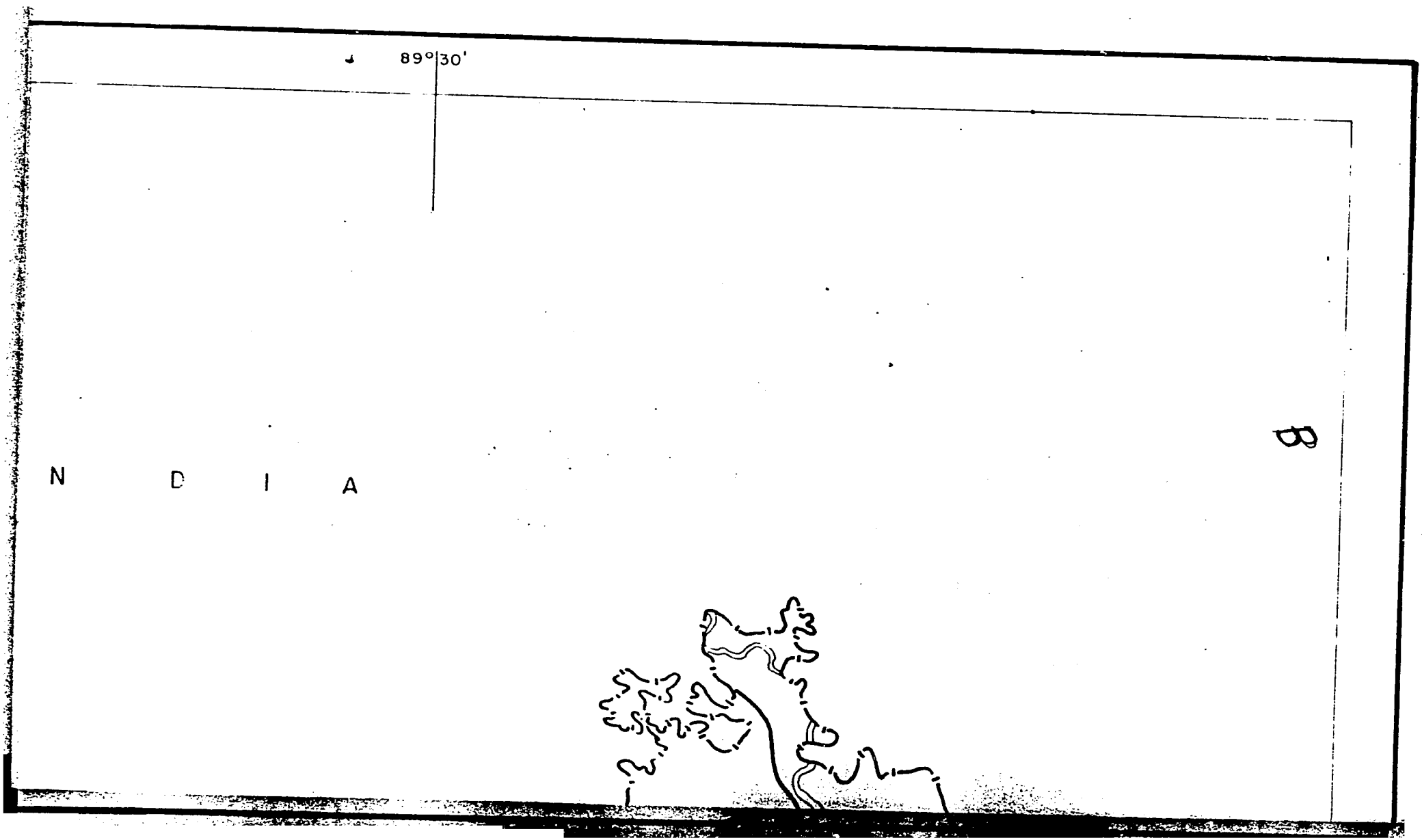
RURAL ROADS STUDY

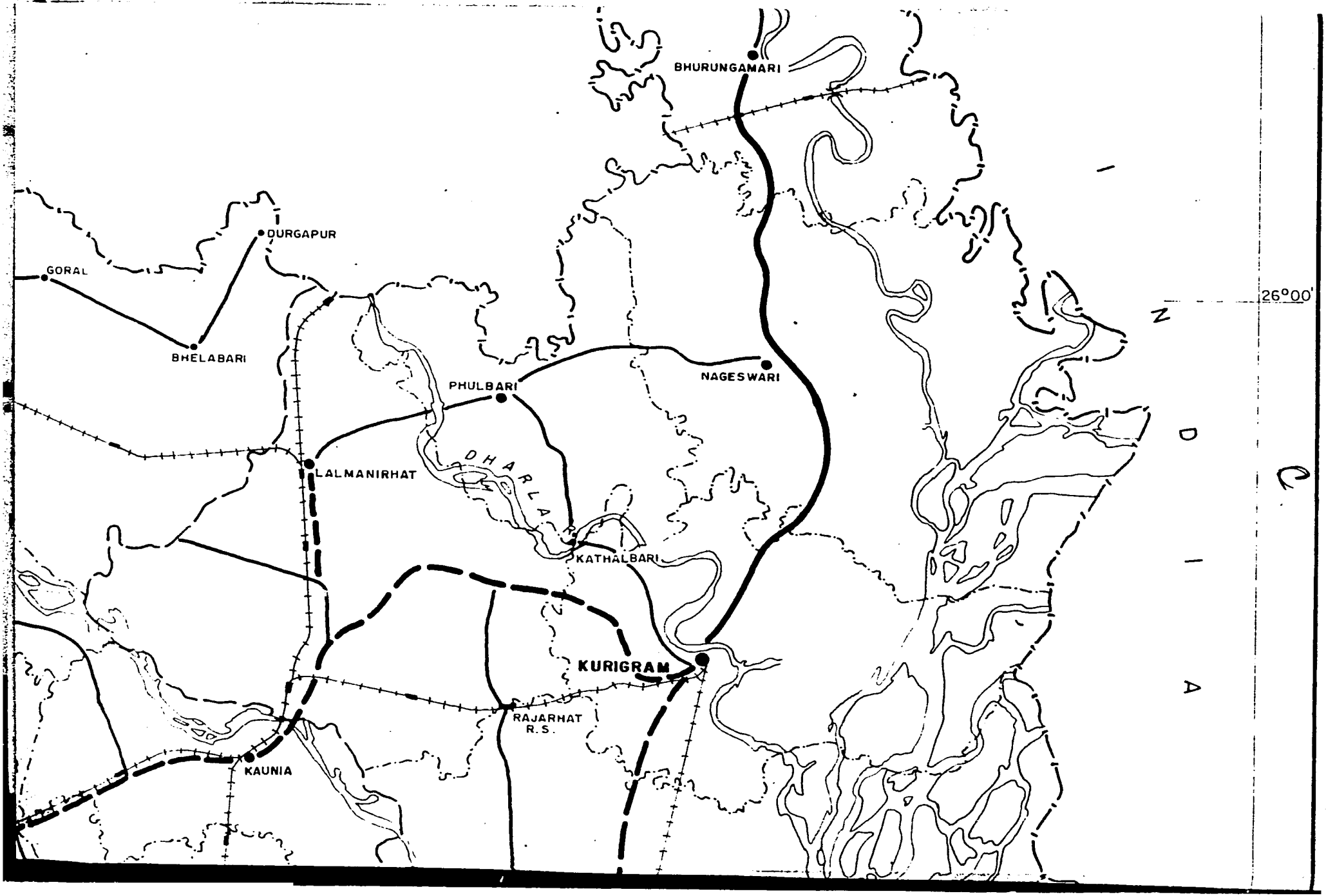
SCREENED ROAD NETWORK

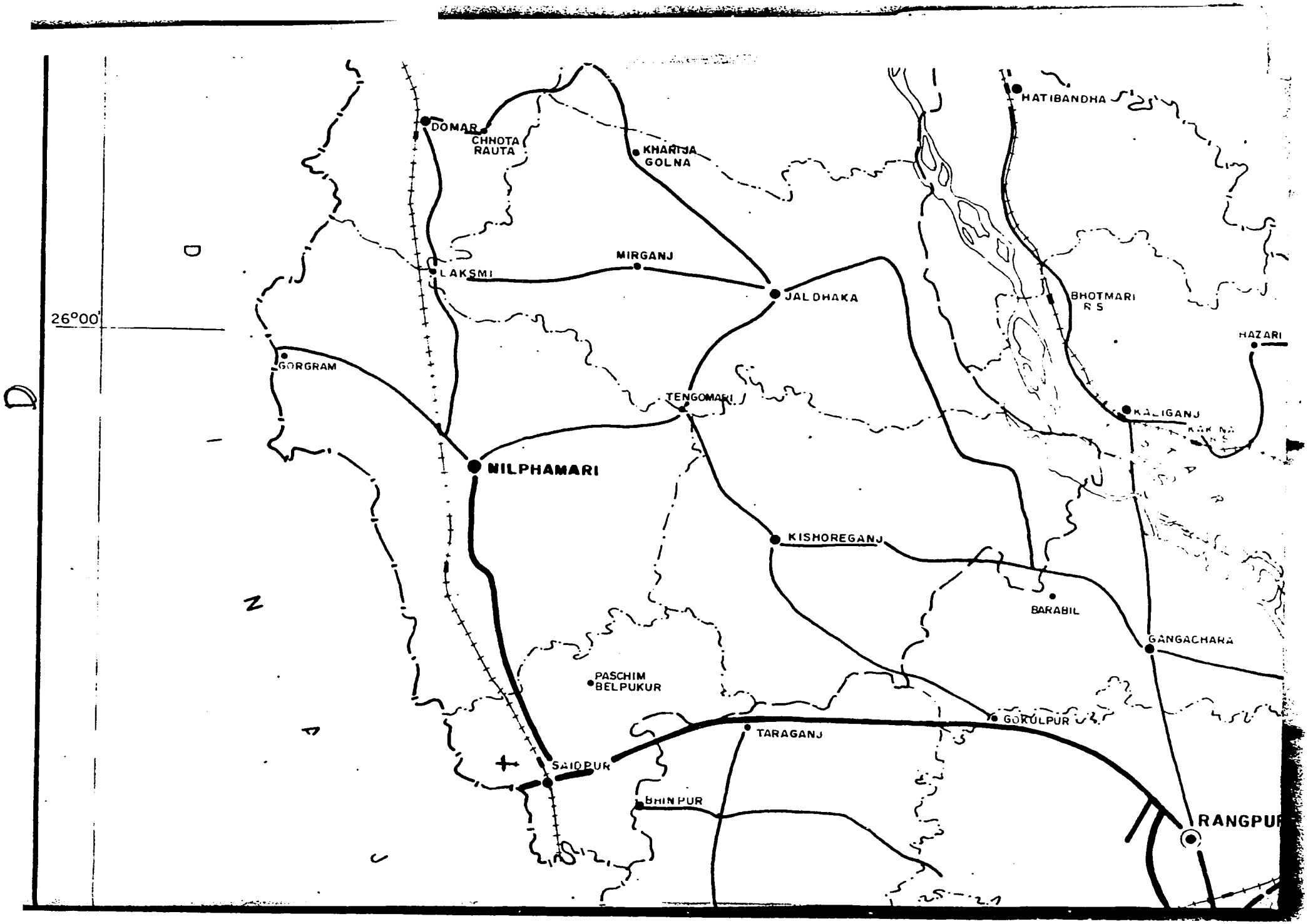
LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

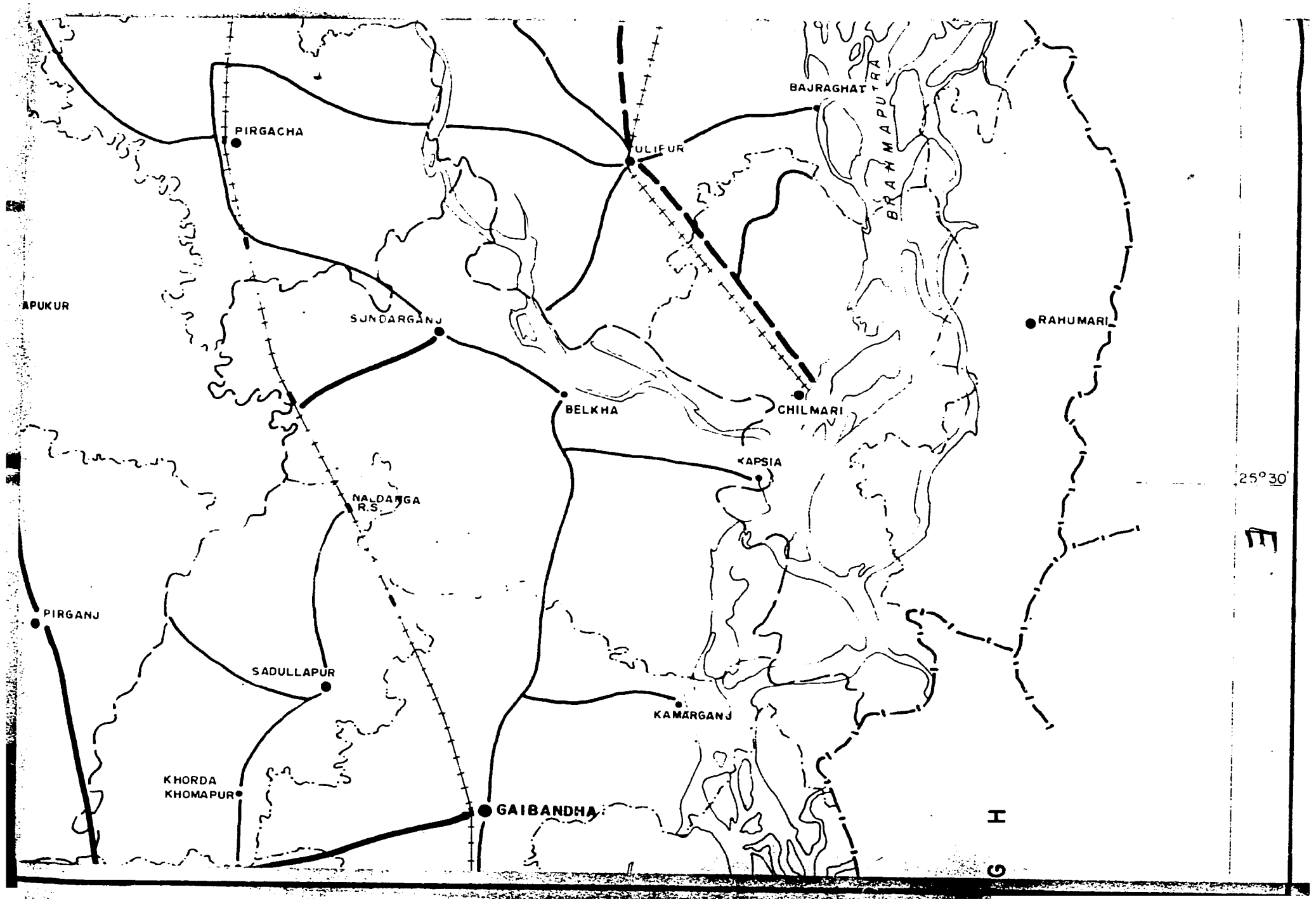
PREPARED BY : Raihan	RECOMMENDED :
CHECKED :	APPROVED :
DATE	DRG. NO.

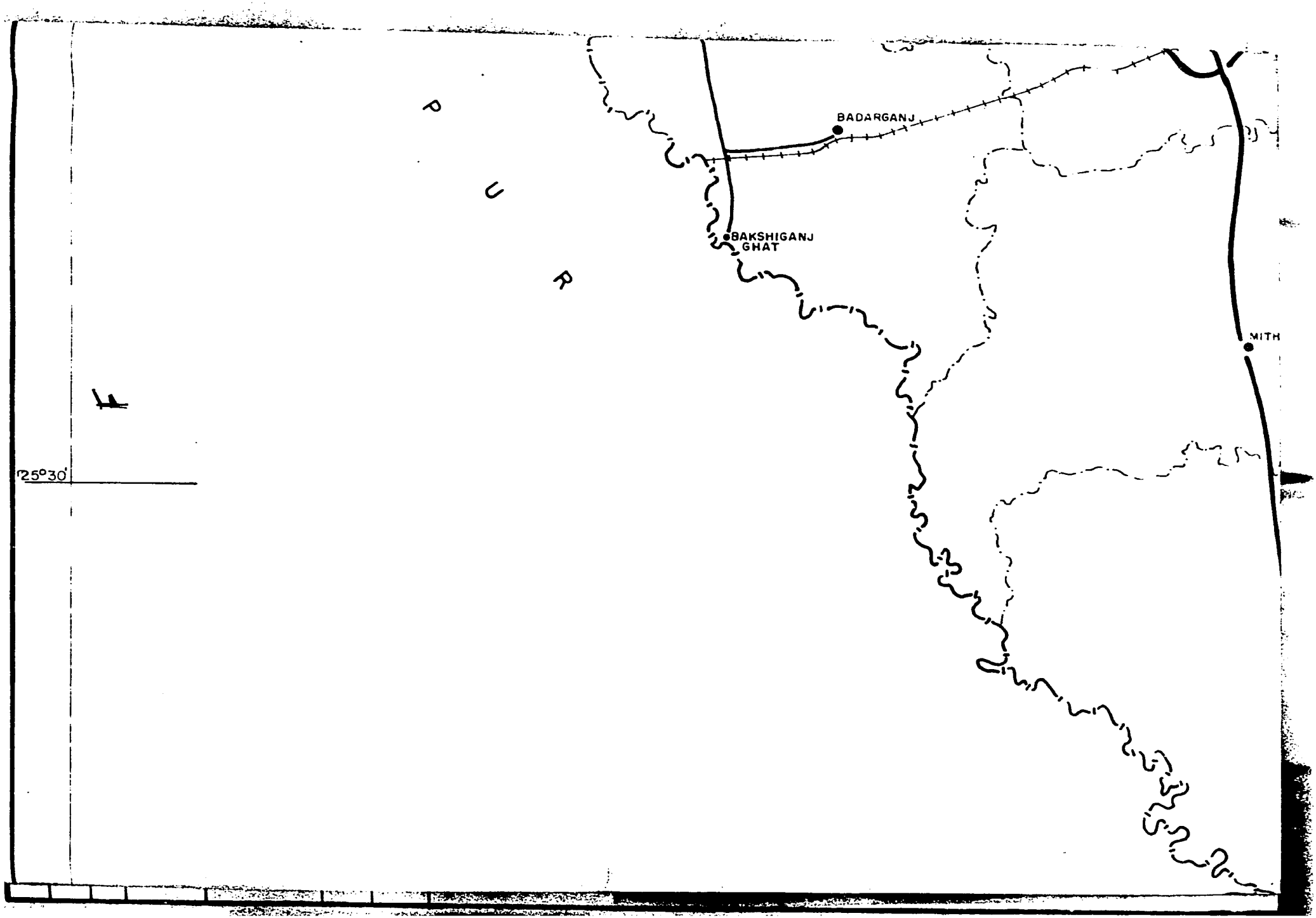

89°00'
INDIA
PATGRAM
THAKURGANJ
BAURA R.S.
GAYBARI
DIMLA


89°30'
N D I A
B


BHURUNGAMARI
DURGAPUR
GORAL
BHELABARI
PHULBARI
NAGESWARI
LALMANIRHAT
DHARLA
KATHALBARI
KURIGRAM
RAJARHAT
R.S.
KAUNIA
26°00'
N
D
I
A


HATIBANDHA
DOMAR
CHHOTA RAUTA
KHARIJA GOLNA
MIRGANJ
LAKSMI
JALDHAKA
BHOTMARI R S
HAZARI
26°00'
GORGRAM
TENGOMARI
KALIGANJ
NILPHAMARI
KISHOREGANJ
BARABIL
GANGACHARA
PASCHIM BELPUKUR
GOKULPUR
TARAGANJ
SAIDPUR
BHINPUR
RANGPUR


BAJRAGHAT
BRAHMAPUTRA
PIRGACHA
ULIPUR
APUKUR
SUNDARGANJ
RAHUMARI
BELKHA
CHILMARI
KAPSIA
25°30'
NALDANGA R.S.
PIRGANJ
SADULLAPUR
KAMARGANJ
KHORDA KHOMAPUR
GAIBANDHA


BADARGANJ
BAKSHIGANJ
GHAT
MITH
25°30'

25°00'
89°00'

From the c

DHULBANGA
PALASBARI
NAKAI
PHULCHHARI
GOBINDAGANJ
CHANDPARA
SAGHATA
HAMCHAPUR
UZIRERPUR
JUMMARBAI
H
G
R
A
M Y M E N S I N
89° 30'
25°00'

I

DIST. RANGPUR

LEGEND:

Roads (R & H)

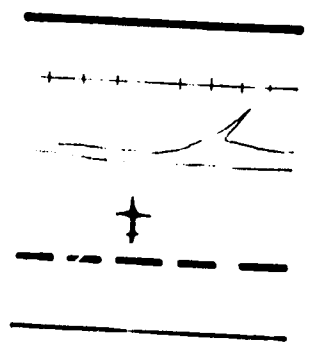
Rail Roads

Water ways

Major Airport

Proposed Roods (R & H)

Preliminary Road Network



J

SCALE : 1 Inch = 4 Miles

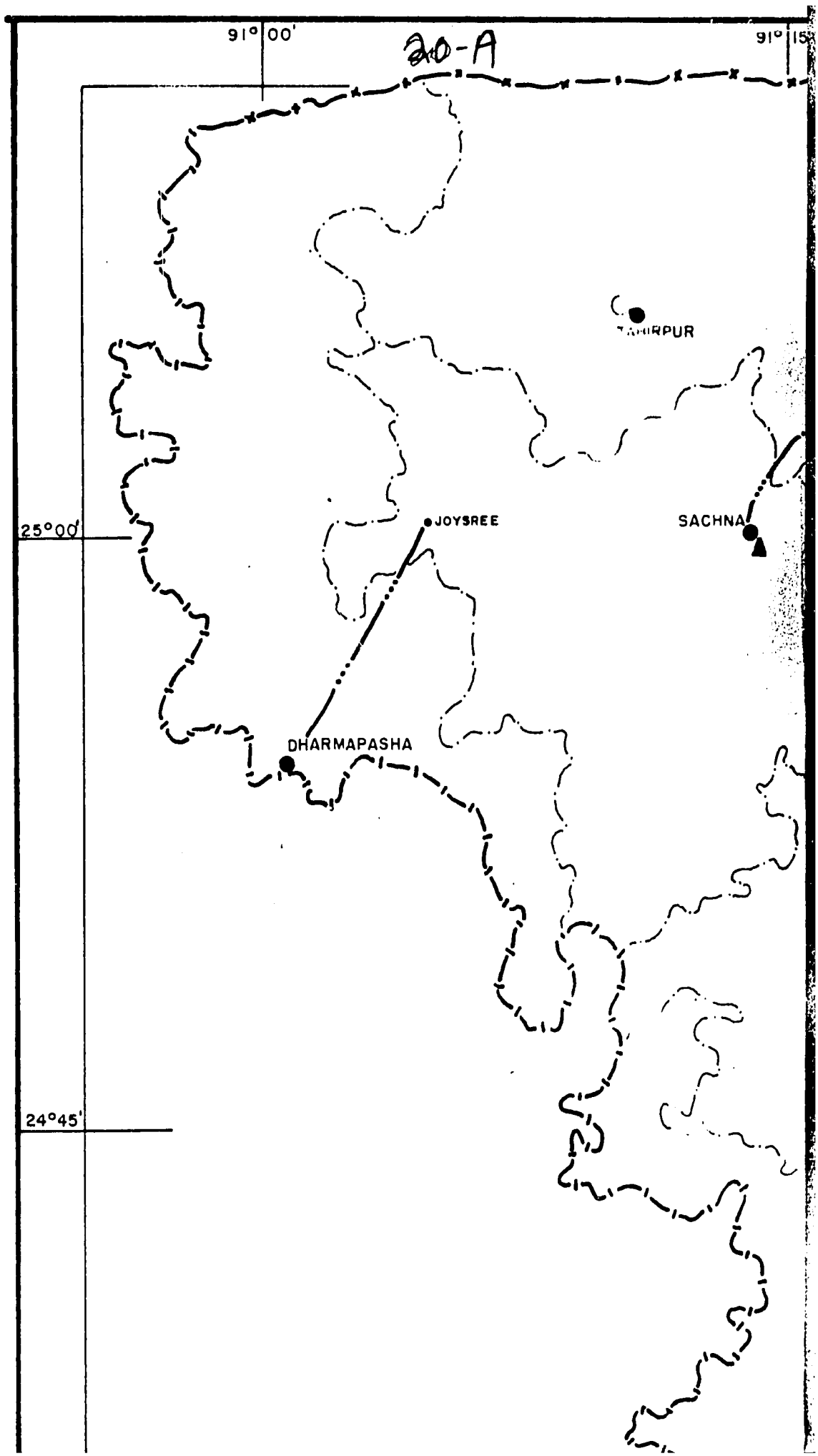
GOVERNMENT OF
THE PEOPLE'S REPUBLIC OF BANGLADESH

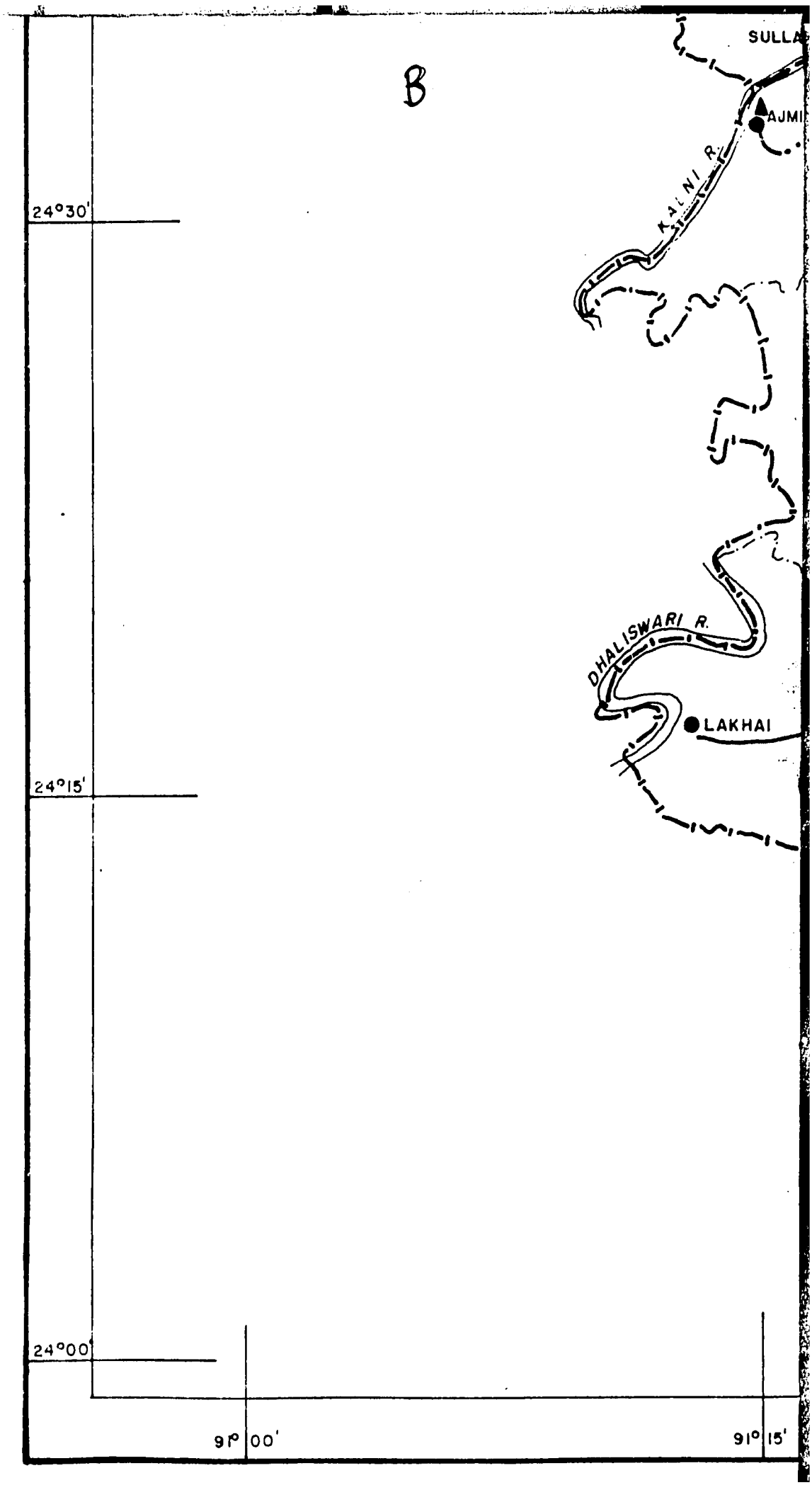
RURAL ROADS STUDY

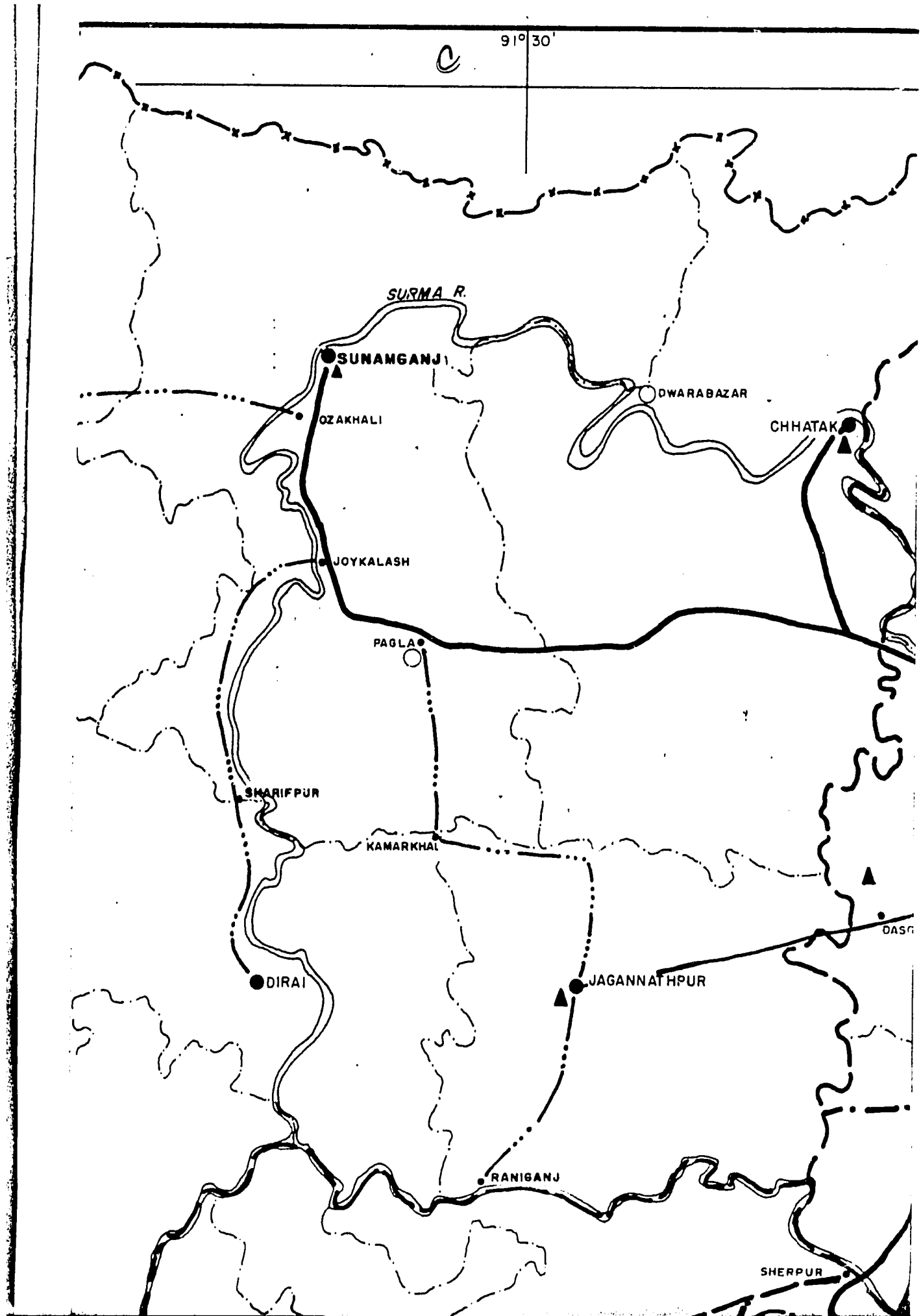
SCREENED ROAD NETWORK

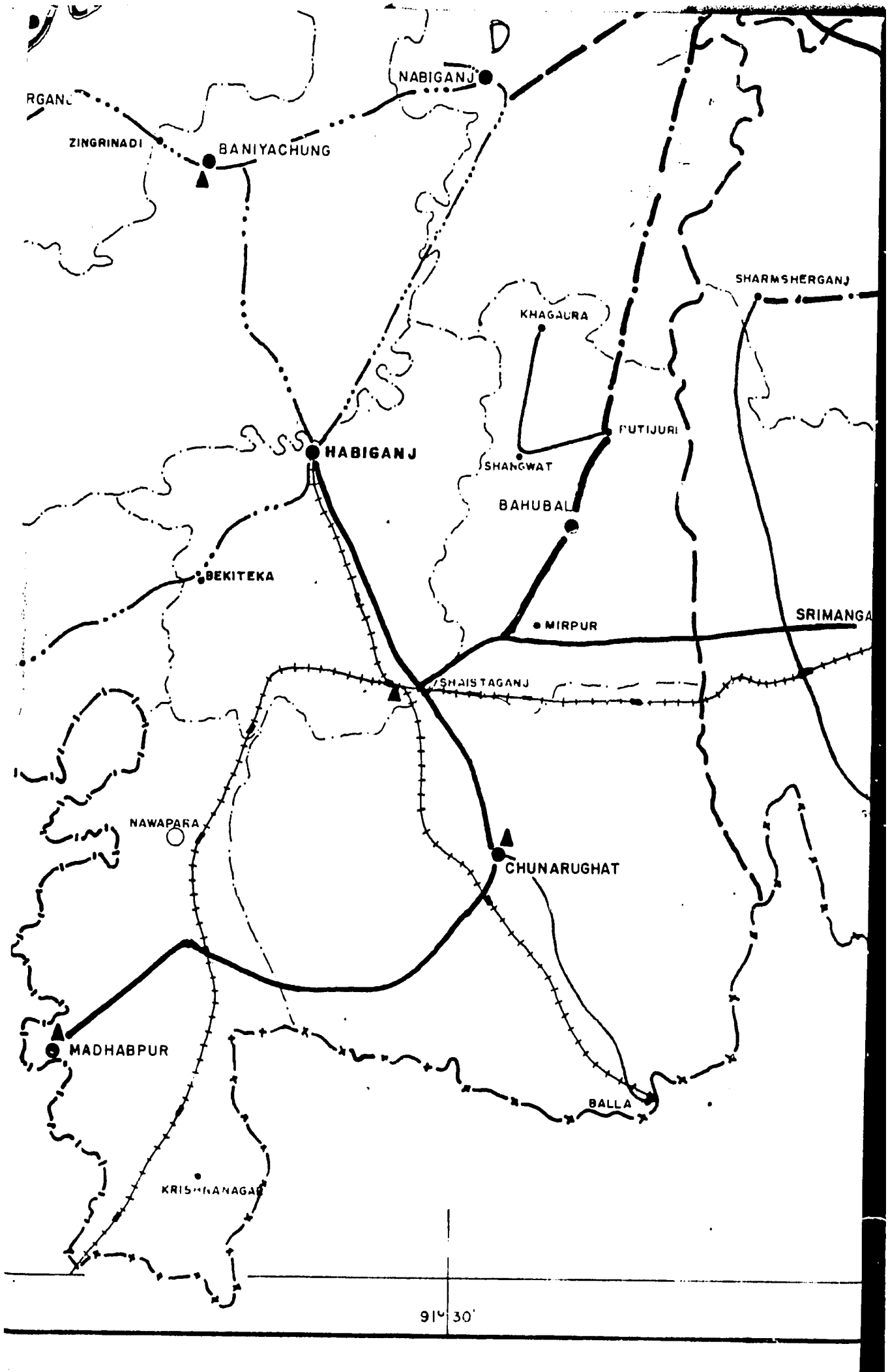
LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

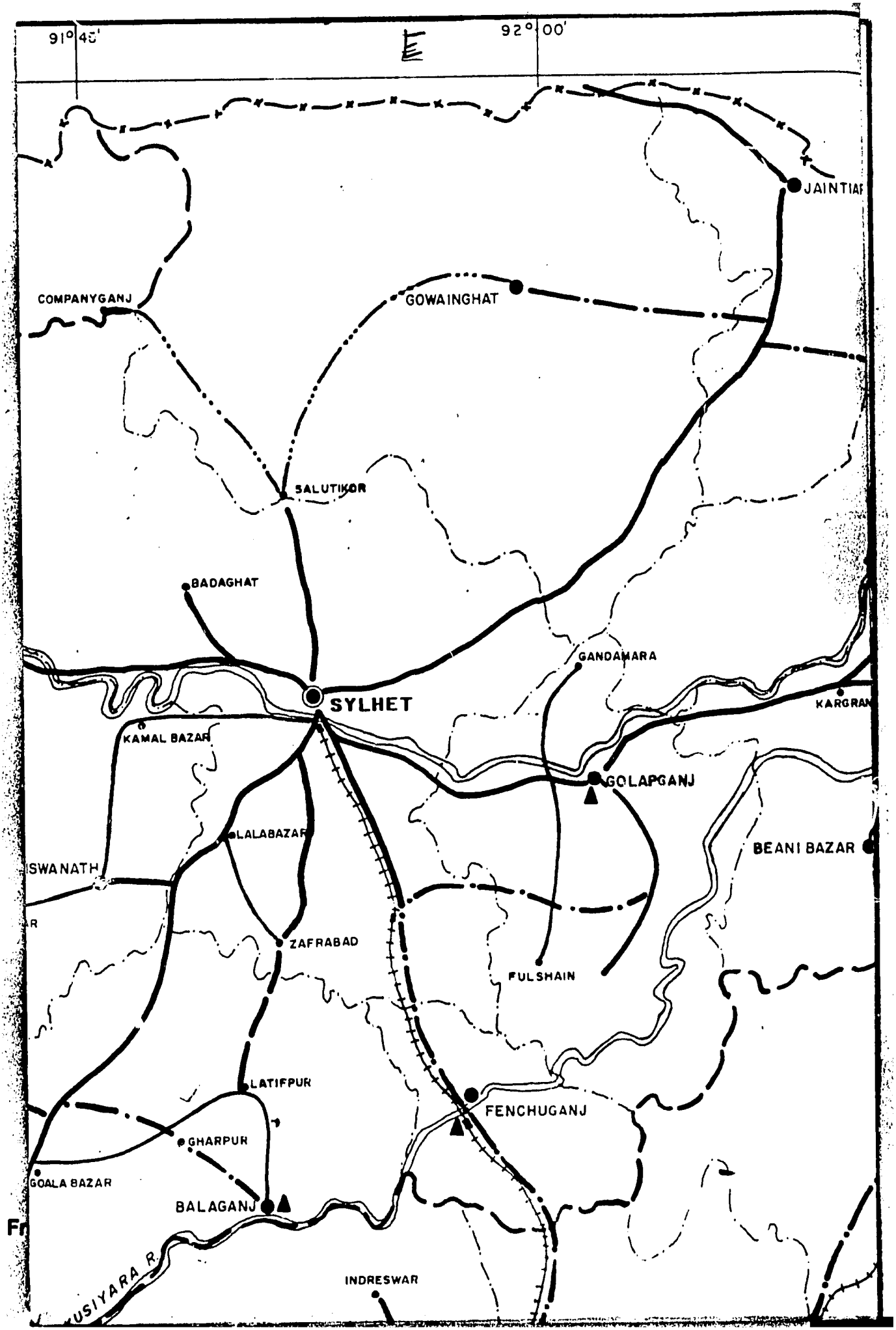
PREPARED BY Z. Abedin, Raihan	RECOMMENDED
CHECKED	APPROVED
DATE:	DRG. NO.

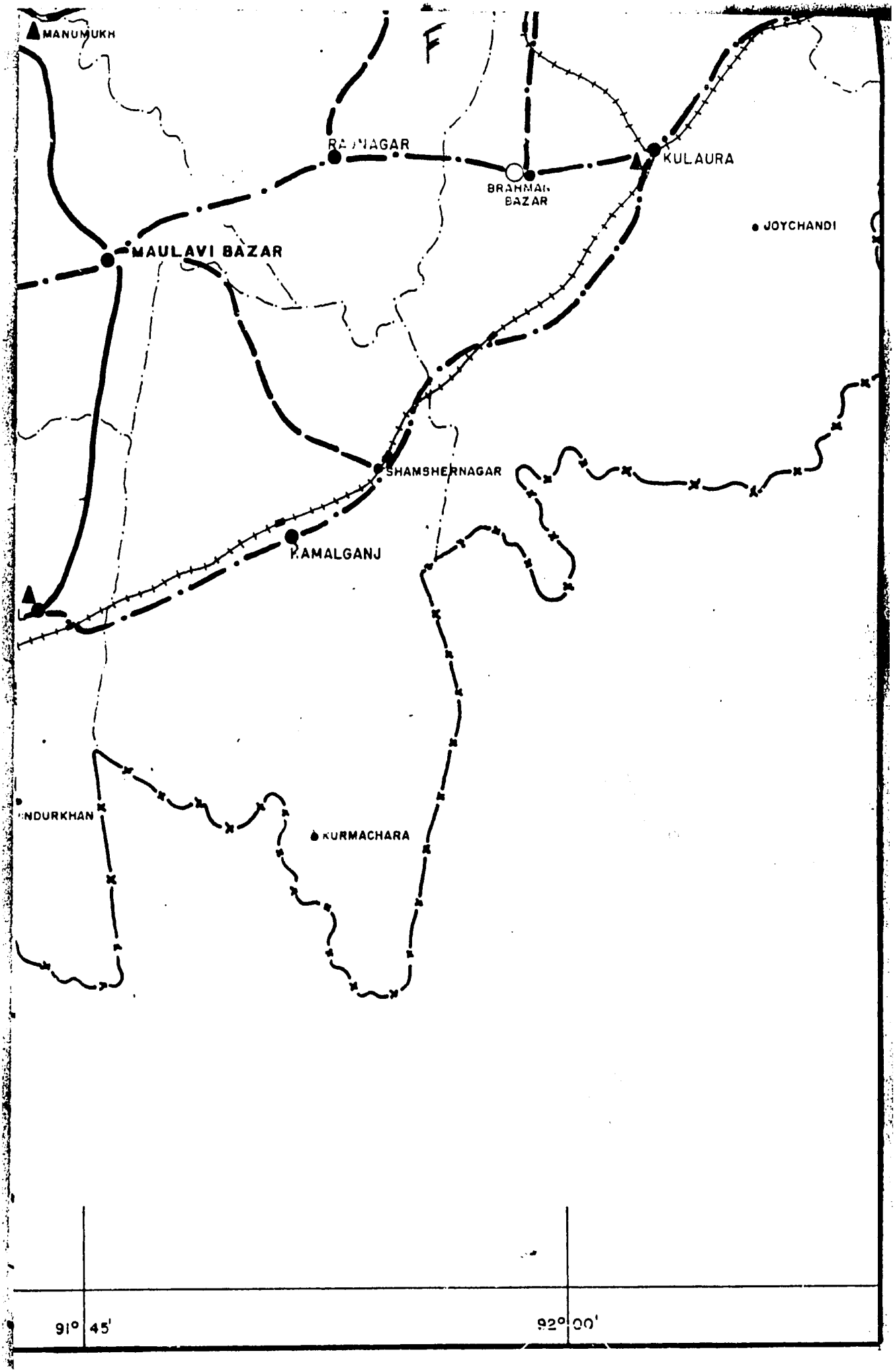

91° 00'
20-A
91° 15'
TAHIRPUR
JOYSREE
SACHNA
25°00'
DHARMAPASHA
24°45'

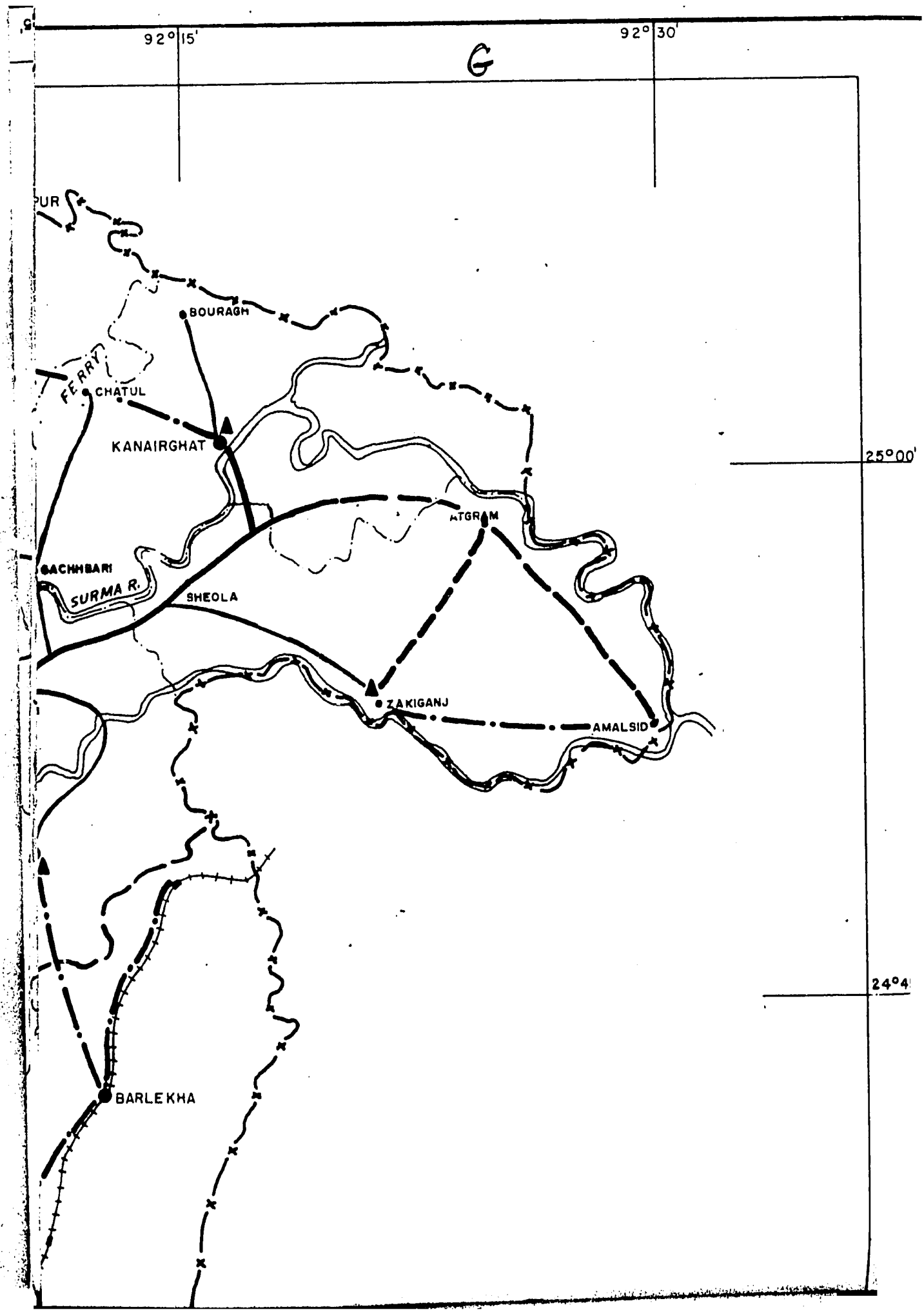

B
SULLA
AJMI
KALNI R.
24°30'
DHALISWARI R.
LAKHAI
24°15'
24°00'
91° 00'
91° 15'

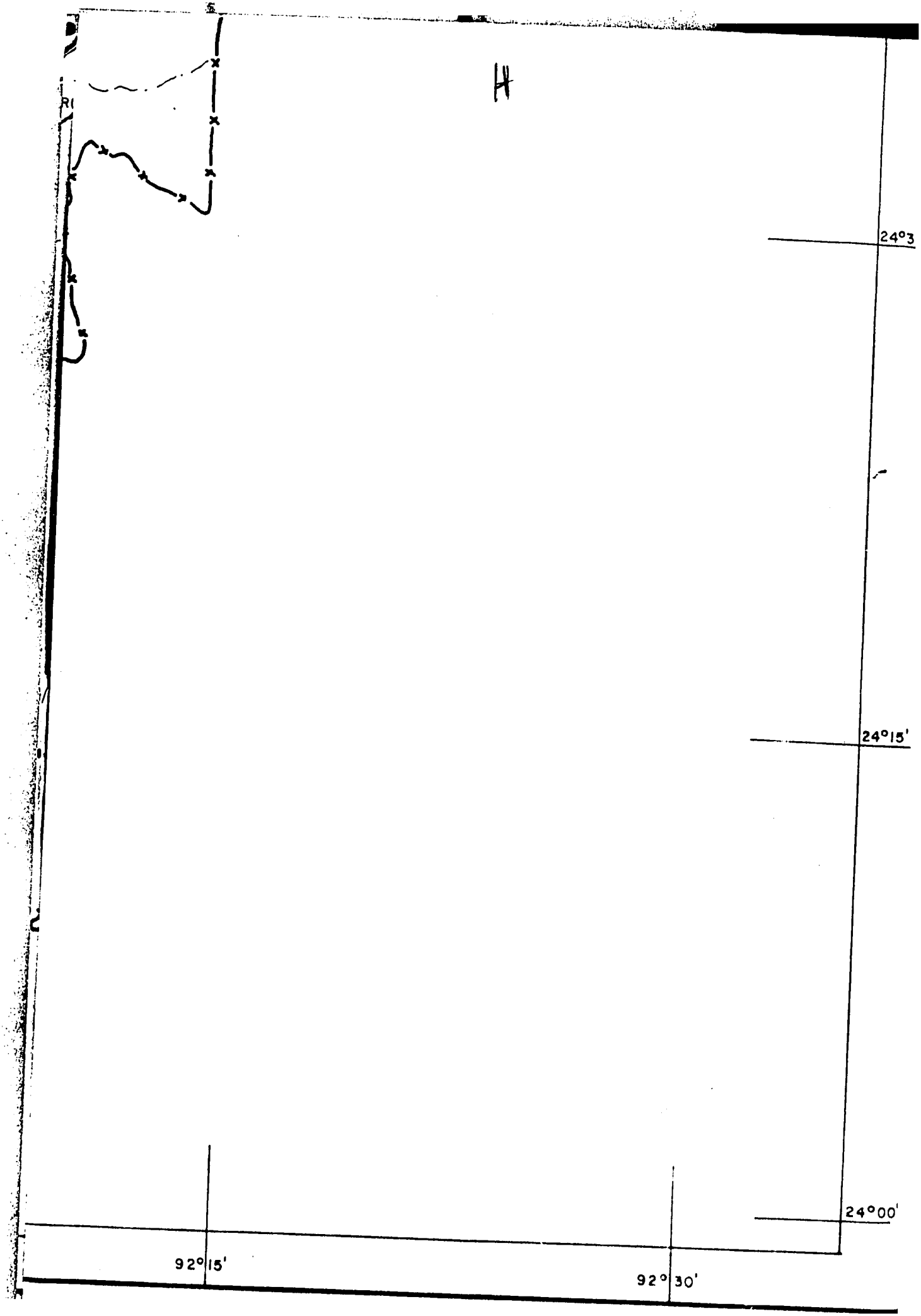

91° 30'
SURMA R.
SUNAMGANJ
DWARABAZAR
OZAKHALI
CHHATAK
JOYKALASH
PAGLA
SHARIFPUR
KAMARKHAL
DIRAI
JAGANNATHPUR
RANIGANJ
SHERPUR


NABIGANJ
ZINGRINADI
BANIYACHUNG
SHARMSHERGANJ
KHAGAURA
HABIGANJ
PUTIJURI
SHANGWAT
BAHUBAL
BEKITEKA
MIRPUR
SRIMANGA
SHAISTAGANJ
NAWAPARA
CHUNARUGHAT
MADHABPUR
BALLA
91° 30'


91° 45'
E
92° 00'
JAINTIAP
COMPANYGANJ
GOWAINGHAT
SALUTIKOR
BADAGHAT
GANDAMARA
SYLHET
KARGRAN
KAMAL BAZAR
GOLAPGANJ
LALABAZAR
BEANI BAZAR
ISWANATH
ZAFRABAD
FULSHAIN
LATIFPUR
FENCHUGANJ
GHARPUR
GOALA BAZAR
BALAGANJ
INDRESWAR


MANUMUKH
F
RAJNAGAR
BRAHMAN BAZAR
KULAURA
JOYCHANDI
MAULAVI BAZAR
SHAMSHERNAGAR
KAMALGANJ
INDURKHAN
KURMACHARA
91° 45'
92° 00'


92° 15'
92° 30'
G
25°00'
24°4
BOURAGH
FERRY
CHATUL
KANAIRGHAT
ATGRAM
GACHHBARI
SURMA R.
SHEOLA
ZAKIGANJ
AMALSID
BARLEKHA


24°3
24°15'
24°00'
92°15'
92°30'

DIST. SYLHET

LEGEND:

- Roads (R & H) Paved
- Rail Roads
- Waterways
- Major Airport
- Prim. Market (A)
- Sec. Market (B)
- Proposed Roads (R & H)
- Preliminary Road Network
- Roads in Hoor Area
- All weather Roads

J

15'

SCALE : 1 Inch = 4 Miles

5 4 3 2 1 0 5 10 Miles

GOVERNMENT OF
THE PEOPLE'S REPUBLIC OF BANGLADESH

RURAL ROADS STUDY

SCREENED ROAD NETWORK

LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

PREPARED BY : Raihan, Zainal	RECOMMENDED :
CHECKED :	APPROVED :
DATE :	DRG. NO.

4°00'

C. Preliminary Road Screening

Obviously, it was not possible to include all of the road mileage nominated by local officials in a rural roads project without considerably scrutiny and distillation. Therefore, a screening process was devised to reduce the road mileage before final priority ranking was applied.

The criteria used in the screening process are described briefly below:

1. Dual Nomination

A road was given favorable treatment if nominated by more than one level of local government (thana, subdivision or district).

2. Parallel Roads

If a proposed road was within three miles of and generally parallel to an existing road, it was omitted. If two nominated roads were roughly parallel, the one with the lower priority rating was excluded.

3. Nonconnecting Roads

Roads not connecting with an existing or proposed road, a railway station, an airport or a launch ghat were excluded.

4. Economic or Social Benefit

Roads that would serve no apparent economic or social purpose were excluded.

The resulting road network for each district was then cross-checked to ensure that:

1. There were no significant gaps in the network that needed to be closed;
2. Potentially high surplus agricultural areas were not neglected; and
3. Disaster-prone areas were included.

After the initial screening of all nominated roads and the adjustment of the road network, the mileage for each of the preliminary networks was reduced to:

Faridpur	407 miles
Patuakhali	326 miles
Rangpur	392 miles
Sylhet	294 miles
Total	1,419 miles

D. Priority Road Ranking

The approach used by the consultant to analyze the screened road networks in each of the four districts was adapted and refined from the World Bank Staff Working Paper No. 241, The Economic Analysis of Rural Road Projects (August 1976). The specific guide followed by the consultant is to be found

in Annex III of this document and is entitled, "Preliminary Screening and Selection of Rural Roads - A Framework".

The system devised by the consultant for the priority ranking of rural roads in each of the four selected districts, however, represents a considerable modification to that presented in World Bank Paper. The ranking system applied in this project has been tailored to the rural conditions existing in Bangladesh and tempered in the light of the objectives of this particular project.

The ranking system consists of the identification and weighting of selected benefit factors for each road. The total weighted per mile benefit factors are then compared to the estimated per mile costs for each road. This results in an artificial benefit/cost ratio that can easily be ranked, road by road. It should be stressed that this ratio does not give a true benefit/cost ratio and does not indicate feasibility.

2. Benefit Factors

Five "benefit" factors were selected and weighted by the consultant. These were submitted to the government and USAID for comment in the May 3, 1978 Monthly Report. Each factor was assigned a weight, with the total weights adding up to 100. The factors were then divided into twelve subcomponents and each of these was assigned a sub-weight. The benefit factors, their subcomponents and their assigned weights are listed in Table 9.

TABLE 9
BENEFIT FACTORS AND WEIGHTS

Factor	Subcomponent Factor	Weight	
		Subcomponent	Total
I. Population:	1. Population Density		10
II. Equity:			25
	2. Employment Generated	02	
	3. Thana Transport Score	13	
	4. Famine/Disaster Vulnerability	05	
	5. Present unemployment	02	
III. Agricultural Potential:			40
	6. Increase HYV acreage, increase crop intensity number of potential irrigation schemes	15	
	7. Existing irrigation schemes in road zone of influence	05	
	8. Markets linked by road	20	
IV. Other Economic Activity:			10
	9. Fishing, Agro-processing, cottage industry, repair shops.	10	
V. Institutional/ Administrative:			15
	10. Local Priority Ratings	05	
	11. Completion of Thai/ Union Infrastructure Plans	02	
	12. Public Facilities connected	08	
		100	100

With the establishment of the factors, their subcomponents and their weights, a measurement unit for each subcomponent was determined. These included such varied items as persons per square mile, an index based upon the number and size of markets in the road corridor, local priority road ranks and whether or not the area was not famine prone. With such a diverse group of measurement units and ranges, a standardized rating scale of 0-100 had to be introduced. Worksheets, instruction sheets and other details pertaining to the road ranking system are included in Appendix II.

Each road in the screened network was then given a total benefit factor score according to the ranking scheme.

3. Costs

Costs were estimated for each road in the rural road networks by using the design criteria for either a Class IV or Class V road described earlier, and applying unit cost figures for labor, material, equipment and structures. The detailed unit costs used for the above items are given in Appendix I: Basic Engineering Data. Each district profile volume also contains a table presenting construction planning data for the roads in that district.

The construction cost figures used in the ranking system do not include estimates for purchasing land required for roads that may need additional rights-of-way/on this point, with few exceptions the recommended roads follow existing alignments. However, the geometric standards adopted for the new roads will usually require widths at ground level several times as much as existing rural alignments.

4. Ranking

Having determined relative "benefit" and estimated costs, the per mile benefit factor for each road was divided by the per mile costs to give a priority rating. The roads in each district were then ranked by this rating.

In the weighted benefit ratings, road segment scores varied from a low of 21.50 to a high of 79.30. Per mile costs showed a wide spread, from $17 thousand per mile to $393 thousand per mile . The rating ratios that were calculated to rank the road segments reached from a low of 0.13 to a high of 4.18, with the bulk falling below 1,00 and above 0.25.

This rating method has the advantage of allowing the authorities to draw a cutoff line wherever they desire. If a 250 mile network of road construction is desired, the cutoff line can be drawn to include 250 miles of road. Similarly, the cutoff line can be drawn to limit the network to be constructed to 200 miles, or to 150 miles. This enables the authorities to plan the rural road project in the light of budgetary constraints and still retain the more important roads.

Because many proposed roads are dependent on the construction of other roads, some additions or deletions of individual road segments were made outside of the priority rating system. These adjustments ensured the continuity and accessibility of the recommended rural road network.

5. Data Problems

Two data problems must be noted here. As mentioned earlier, all of the basic data used in estimating costs for the road ranking system were supplied by local officials who do not have access to distance measuring equipment.

In a number of instances the consultant was faced with discrepancies so great as to question all estimates concerning road or bridge lengths. These were reconciled whenever information was available from alternate sources. It should be stressed, however, that length affects costs and hence the priority ranking given the roads.

The benefit values assigned also varied (inversely) with the estimated length of the road. Thus length estimates are important in the calculation of both benefits and costs.

The benefit values assigned to the roads were based primarily on information supplied by town officials to the consultant's field staff during one or more data collection trips. It was inevitable that the depth and quality of the information supplied would vary. It follows that the benefit values assigned in the priority rating system vary with the completeness and accuracy of the information.

VI. RECOMMENDED ROAD NETWORK

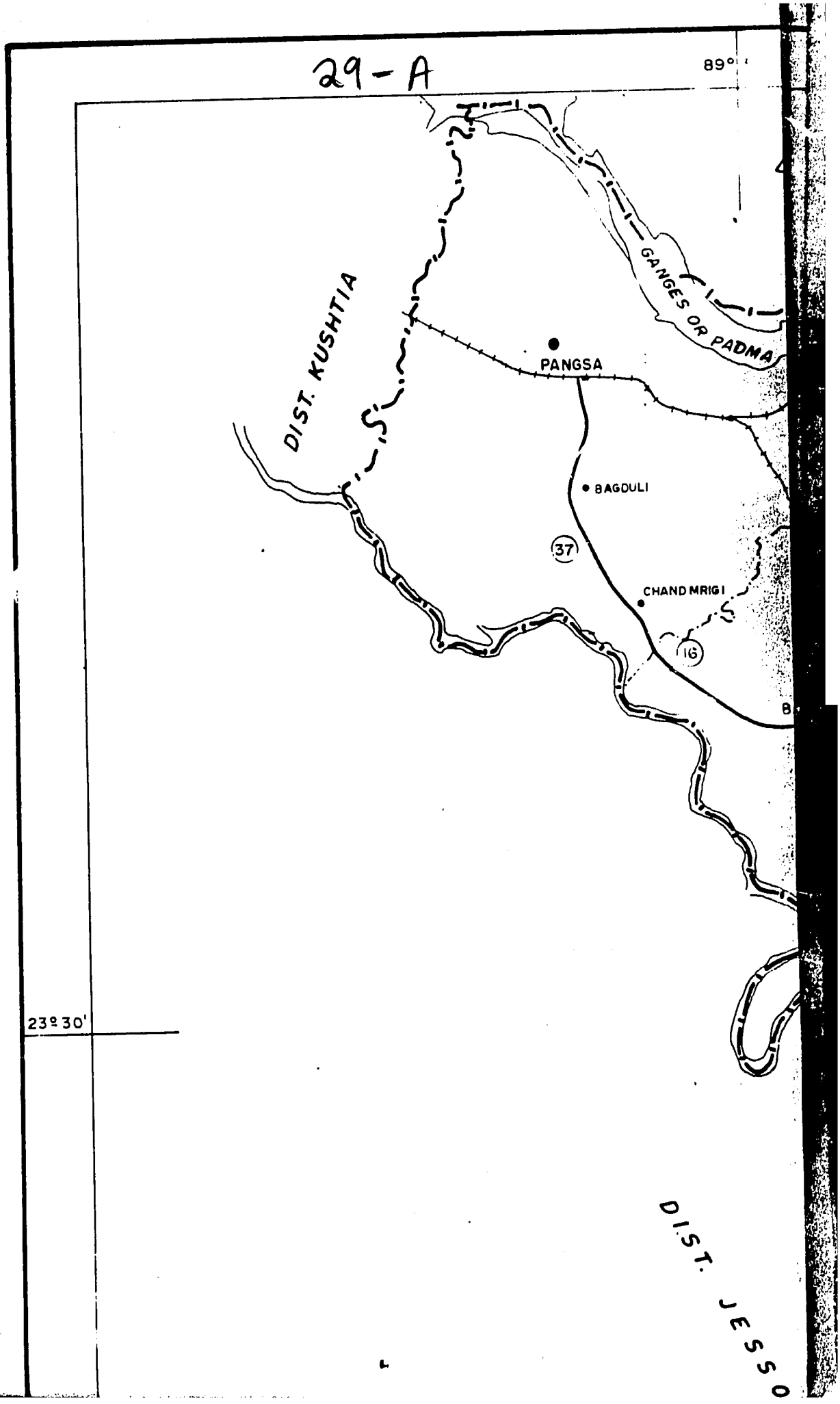
The factors, weights and measurement units described in Section V were applied to each of the four screened district rural road networks. An arbitrary cutoff length of ± 200 miles was applied to. The roads recommended are shown by district on maps 5-8 and the networks are described below.

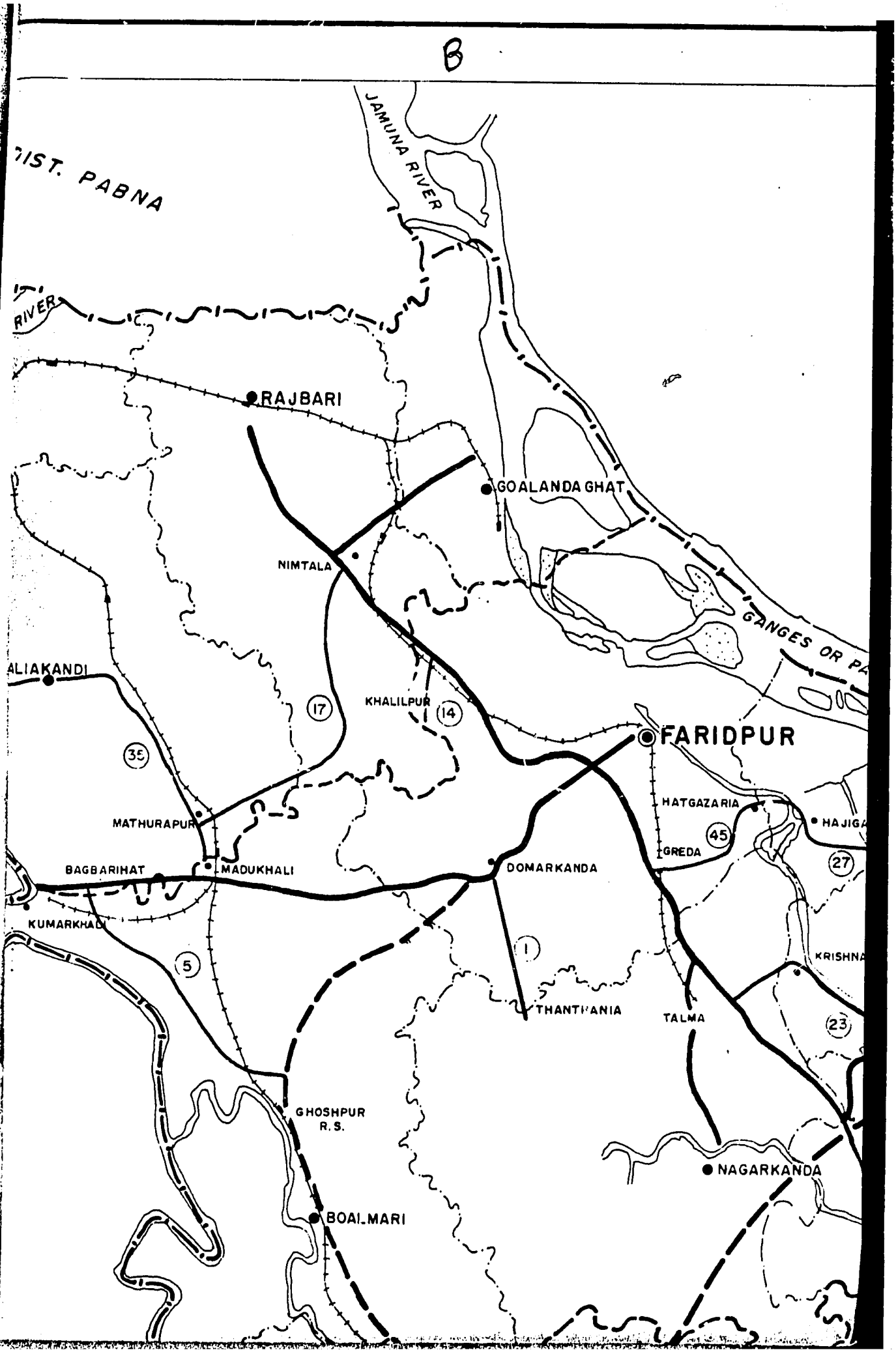
A. Faridpur

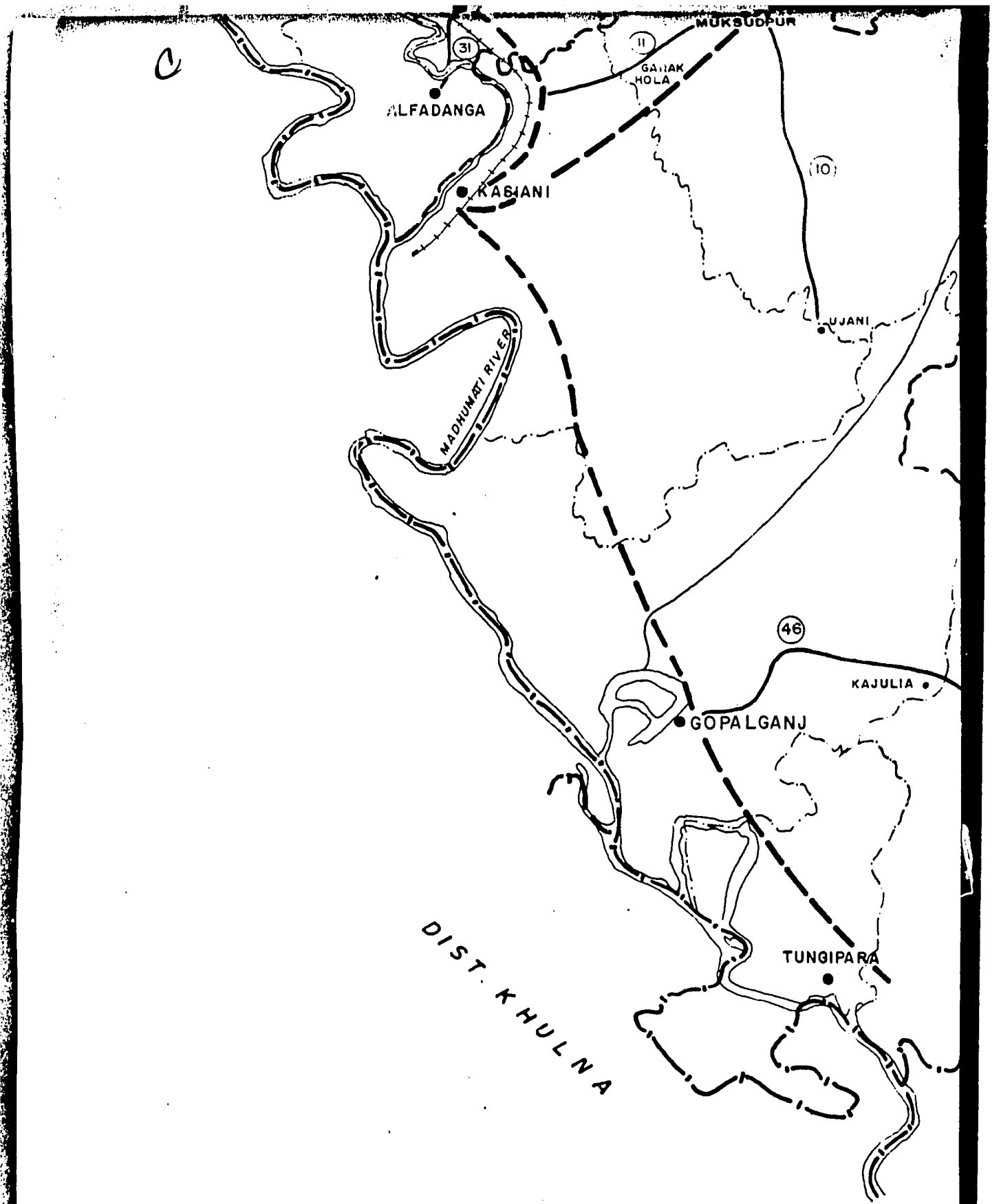
The rural road network recommended for Faridpur District consists of 29 roads totalling approximately 224.5 miles. Sixteen of these recommended roads are Class IV Roads with a total length of 131.5 miles. The remaining thirteen roads, totalling 93.0 miles, are Class V roads. The total estimated network cost is $32.7 million, which averages approximately $145.7 thousand mile. The roads and mileage are distributed by subdivision as follows:

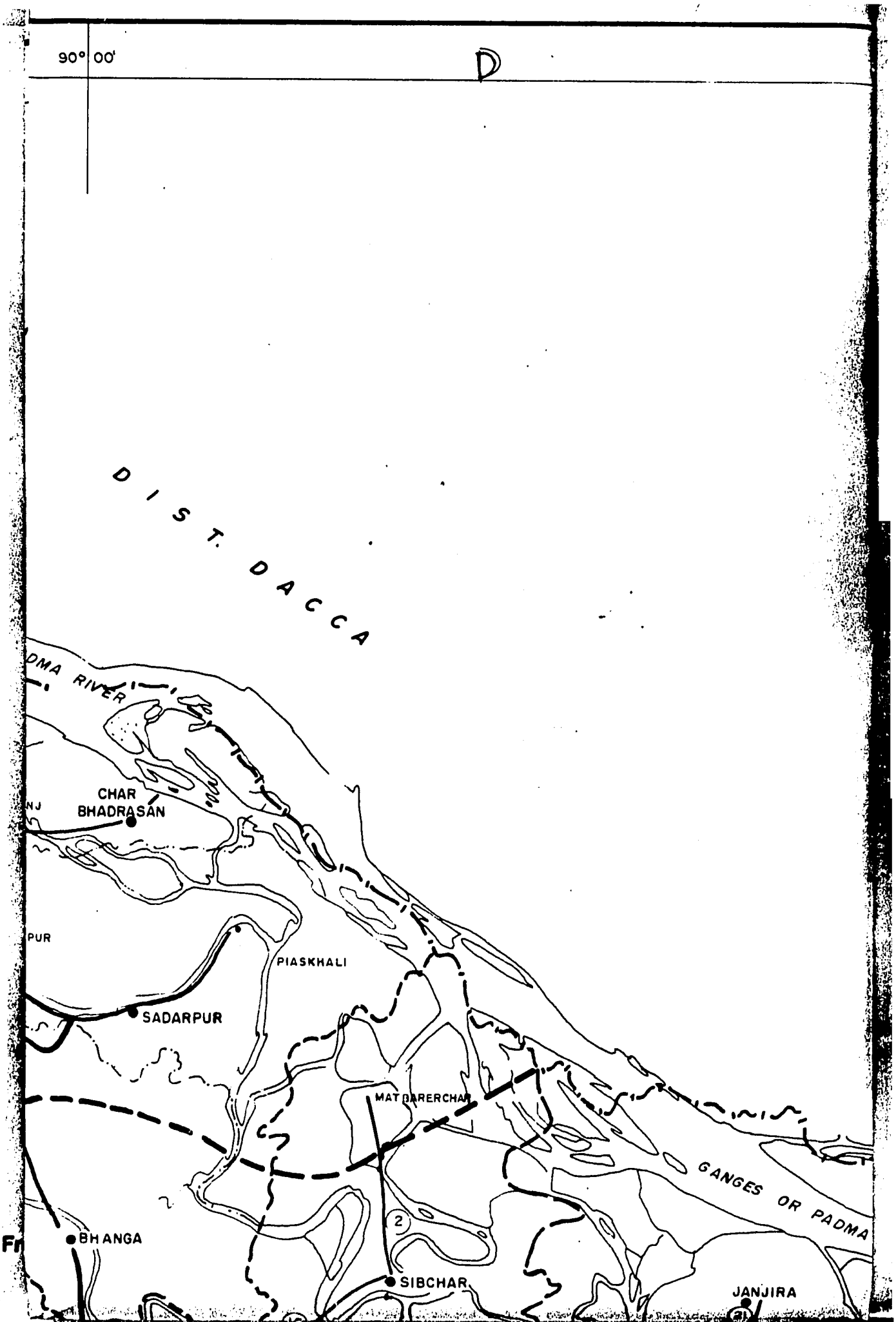
TABLE 10
FARIDPUR: ROADS BY SUBDIVISIONS

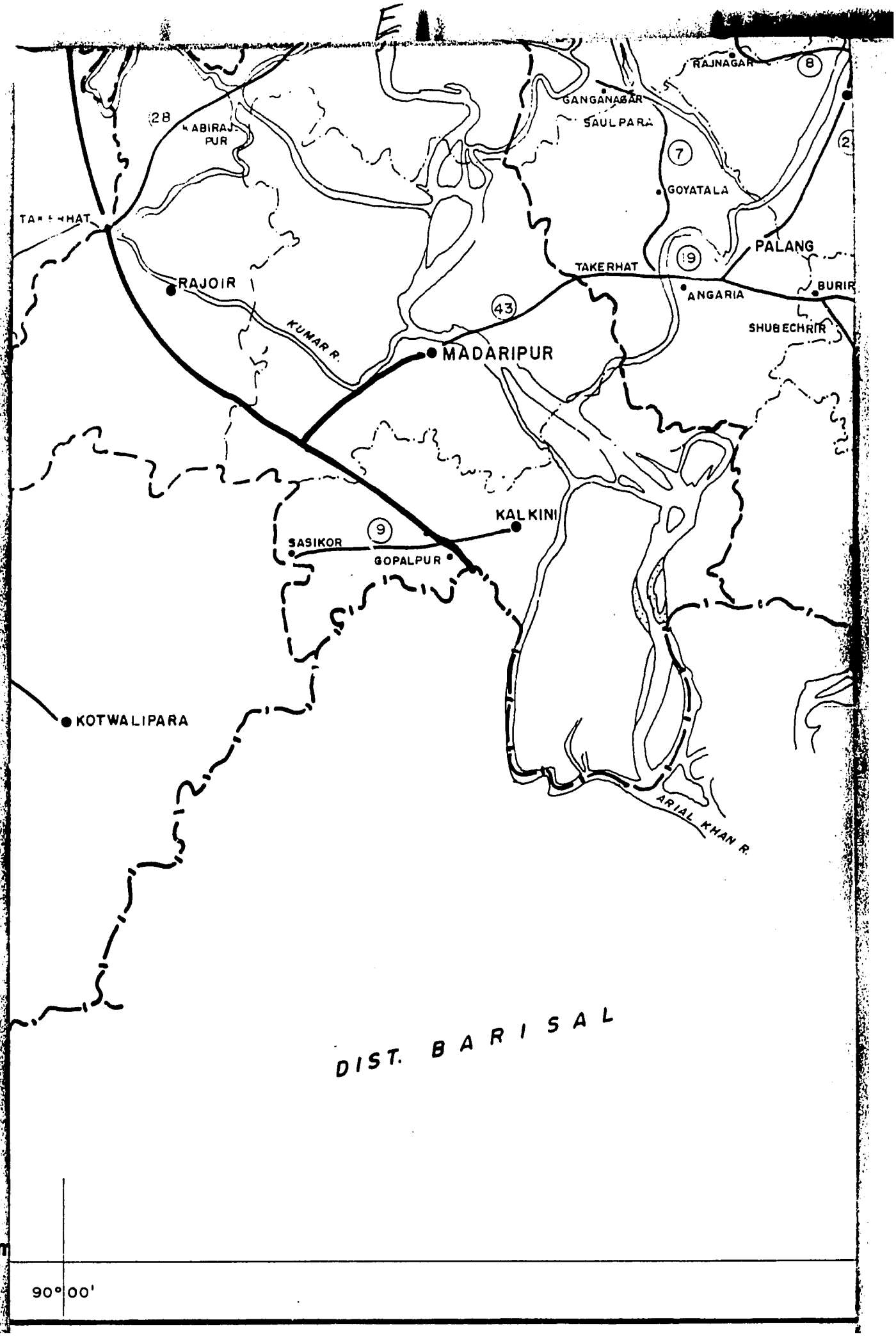
Subdivision	No. & Class of Roads		Total Mileage
Sadar	IV	5	33
	V	2	13
Total:		7	46
Goalundo	IV	3	27.5
	V	1	11
Total:		4	38.5
Gopalganj	IV	1	14
	V	2	18
Total:		3	32
Madaripur	IV	3	23
	V	2	23
Total:		5	46
Shariatpur	IV	4	34
	V	5	28
Total		9	62


29-A
89°
GANGES OR PADMA
DIST. KUSHTIA
PANGSA
BAGDULI
37
CHAND MRIGI
16
23º 30'
DIST. JESSO


B
JAMUNA RIVER
RIVER
RAJBARI
GOALANDA GHAT
NIMTALA
GANGES OR PA
KHALILPUR
FARIDPUR
HATGAZARIA
GREDA
MATHURAPUR
BAGBARIHAT
MADUKHALI
DOMARKANDA
KUMARKHALI
THANTHANIA
TALMA
GHOSHPUR
R.S.
NAGARKANDA
BOALMARI
17
14
35
45
27
5
1
23

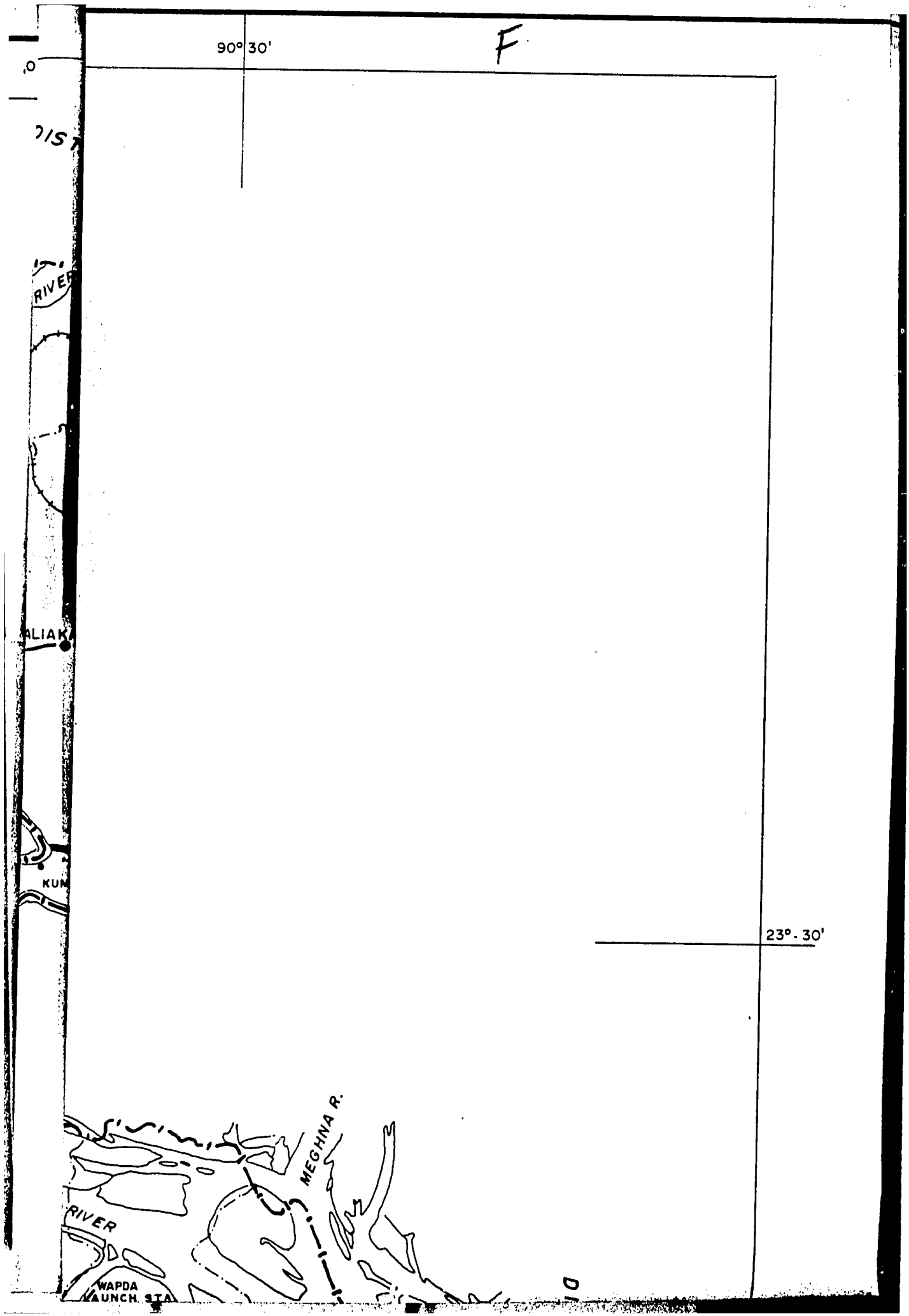

MUKSUDPUR
31
11
GANAK HOLA
ALFADANGA
KASIANI
10
UJANI
MADHUMATI RIVER
46
KAJULIA
GOPALGANJ
DIST. KHULNA
TUNGIPARA


90° 00'
D
DIST. DACCA
DMA RIVER
CHAR
BHADRASAN
NJ
PUR
PIASKHALI
SADARPUR
MATDARERCHAR
GANGES OR PADMA
BHANGA
SIBCHAR
JANJIRA
2


RAJNAGAR
8
GANGANABAR
SAULPARA
5
2
28
KABIRAJ-
PUR
7
GOYATALA
TAKERHAT
PALANG
9
TAKERHAT
RAJOIR
ANGARIA
BURIR
43
KUMAR R.
SHUBECHRIR
MADARIPUR
KALKINI
9
SASIKOR
GOPALPUR
KOTWALIPARA
ARIAL KHAN R.
DIST. BARISAL

From

90°00'


90° 30'
F
23°-30'
MEGHNA R.
WAPDA
LAUNCH STA

NARIA
ST. COMILLA
HAT (18)
BHEDARGANJ
(20)
DAMAUDYA
PADMA RIVER
(38)
IOSAIRHAT
NAYA BHANGNIR RIVER
MEGHNA RIVER
23°-00'
90° 30'

H

FIGURE - 5 PAGE - 29

DIST. FARIDPUR

LEGEND

ROADS (R & H) . . . . . .

RAIL ROADS . . . . . .

WATERWAYS . . . . . .

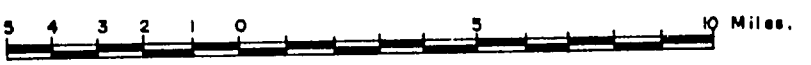
MAJOR AIRPORT . . . . . .

PROPOSED ROAD (R & H) . . . . . .

RECOMMENDED ROAD NETWORK . . . (37)

I

SCALE . 1 Inch = 4 MILES.



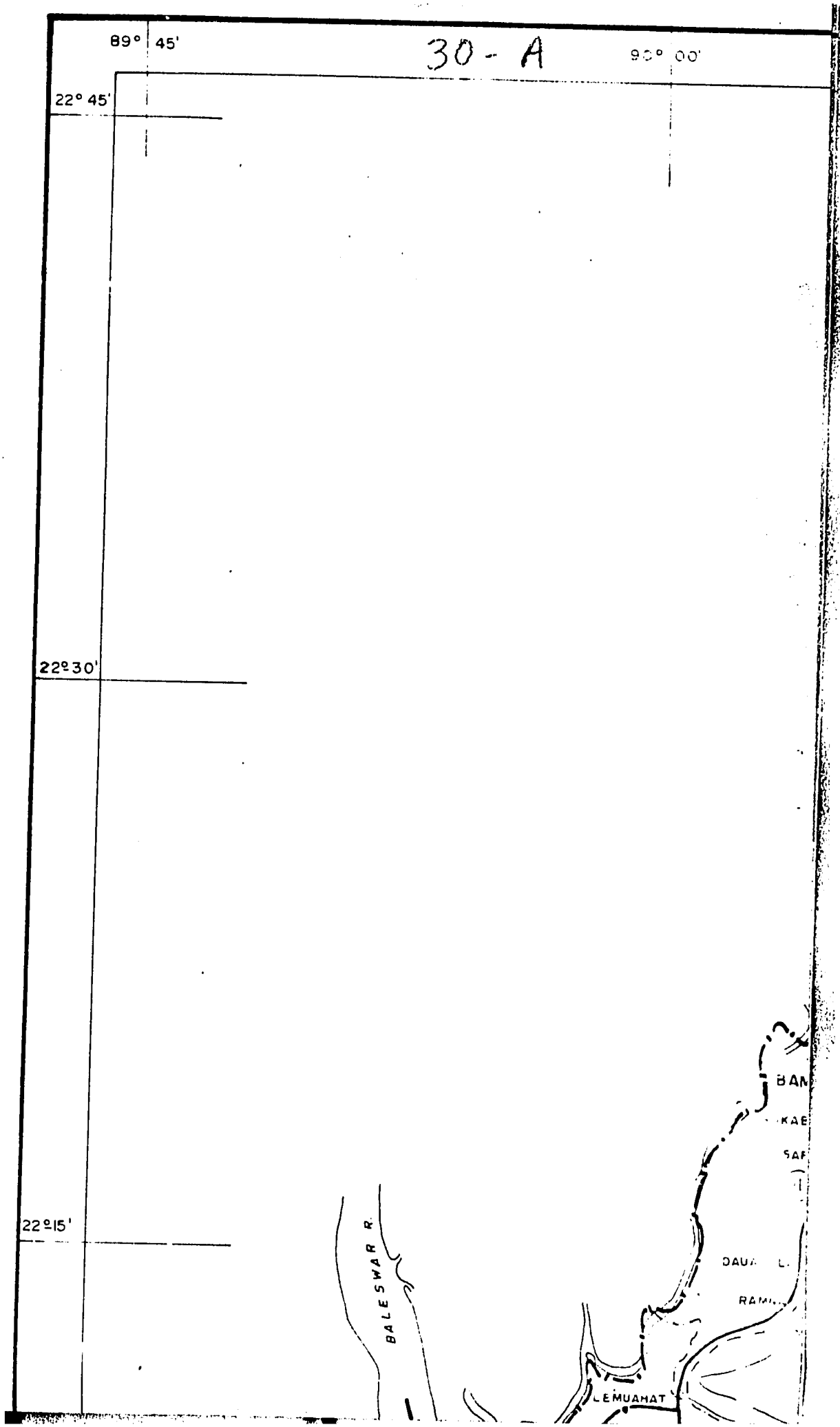
GOVERNMENT OF
THE PEOPLE S REPUBLIC OF BANGLADESH

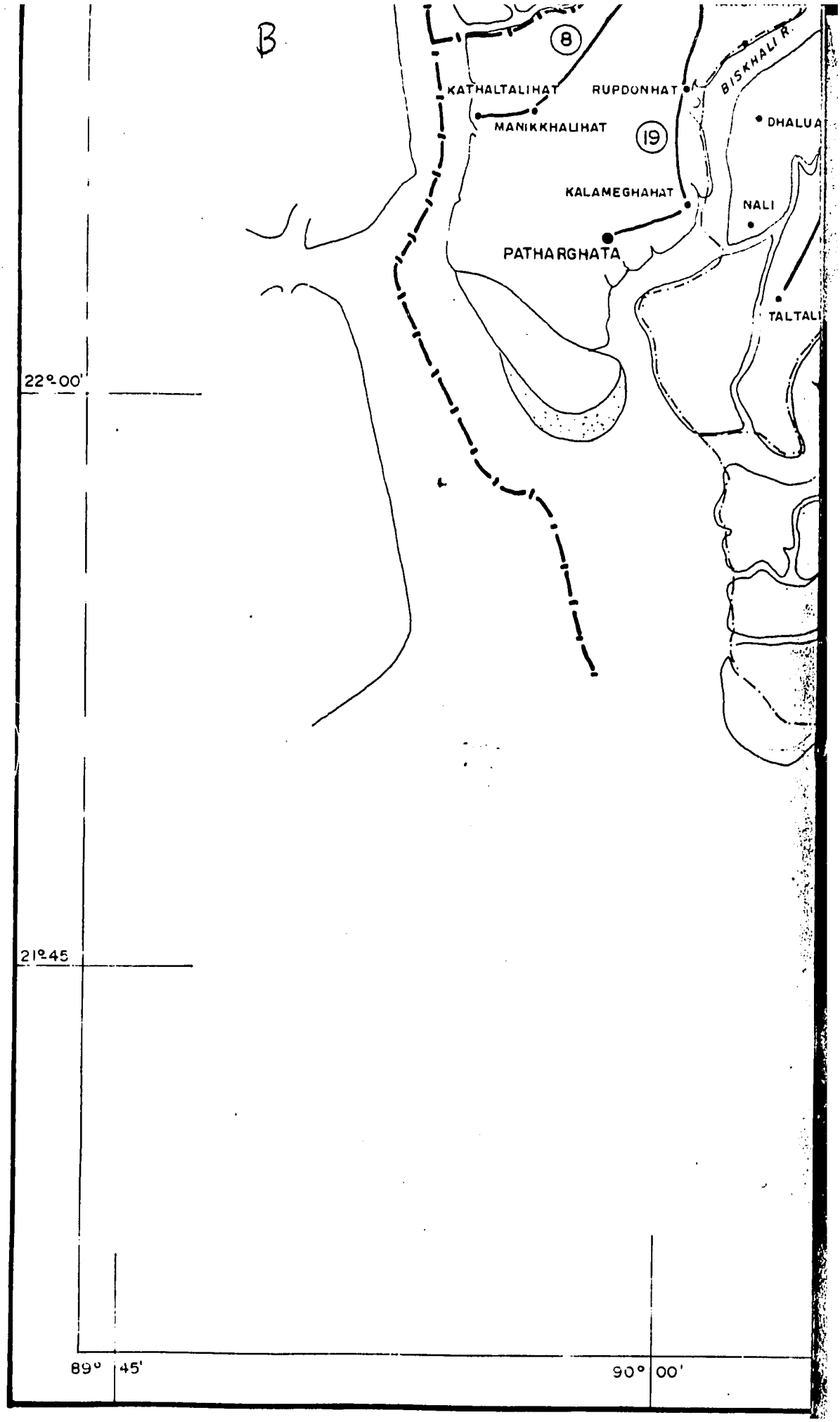
RURAL ROADS STUDY

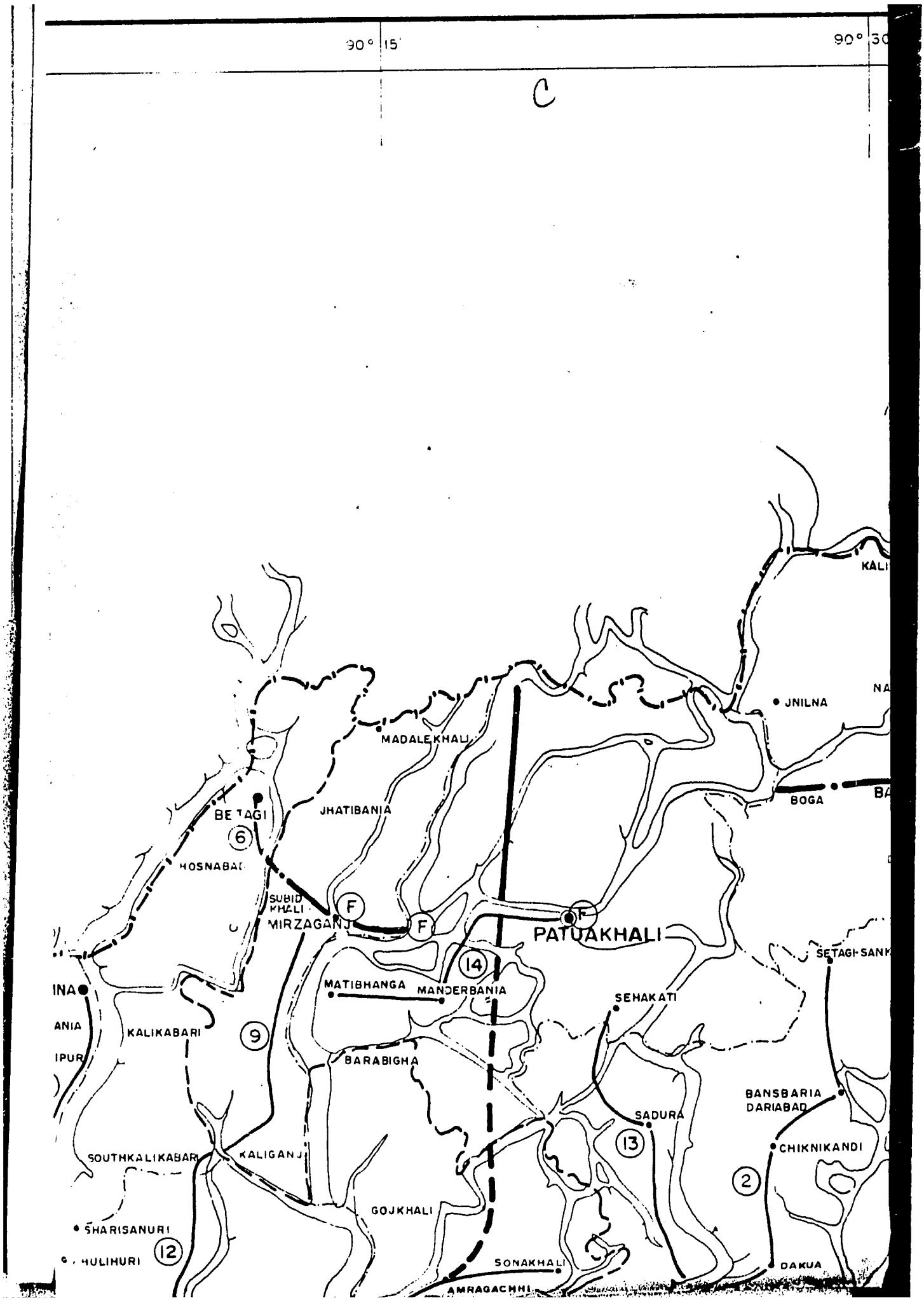
RECOMMENDED ROAD NETWORK

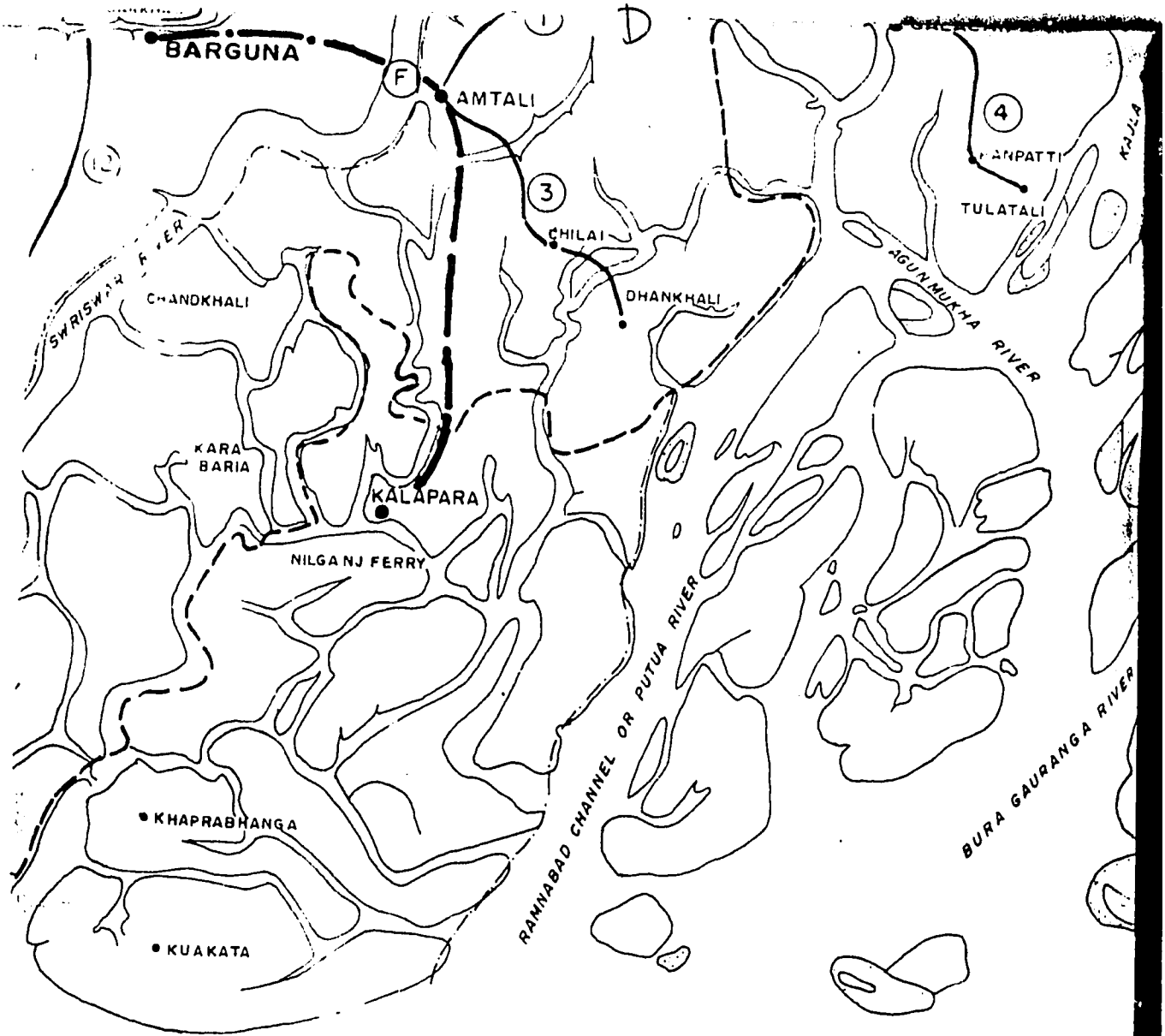
LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

PREPARED BY S. ISLAM	RECOMMENDED V. Ward
CHECKED M. Rahman	APPROVED E. Prentice
DATE 8.7.78	DRG. NO.


89° 45'
30 - A
90° 00'
22° 45'
22°30'
22°15'
BALESWAR R.
LEMUAHAT

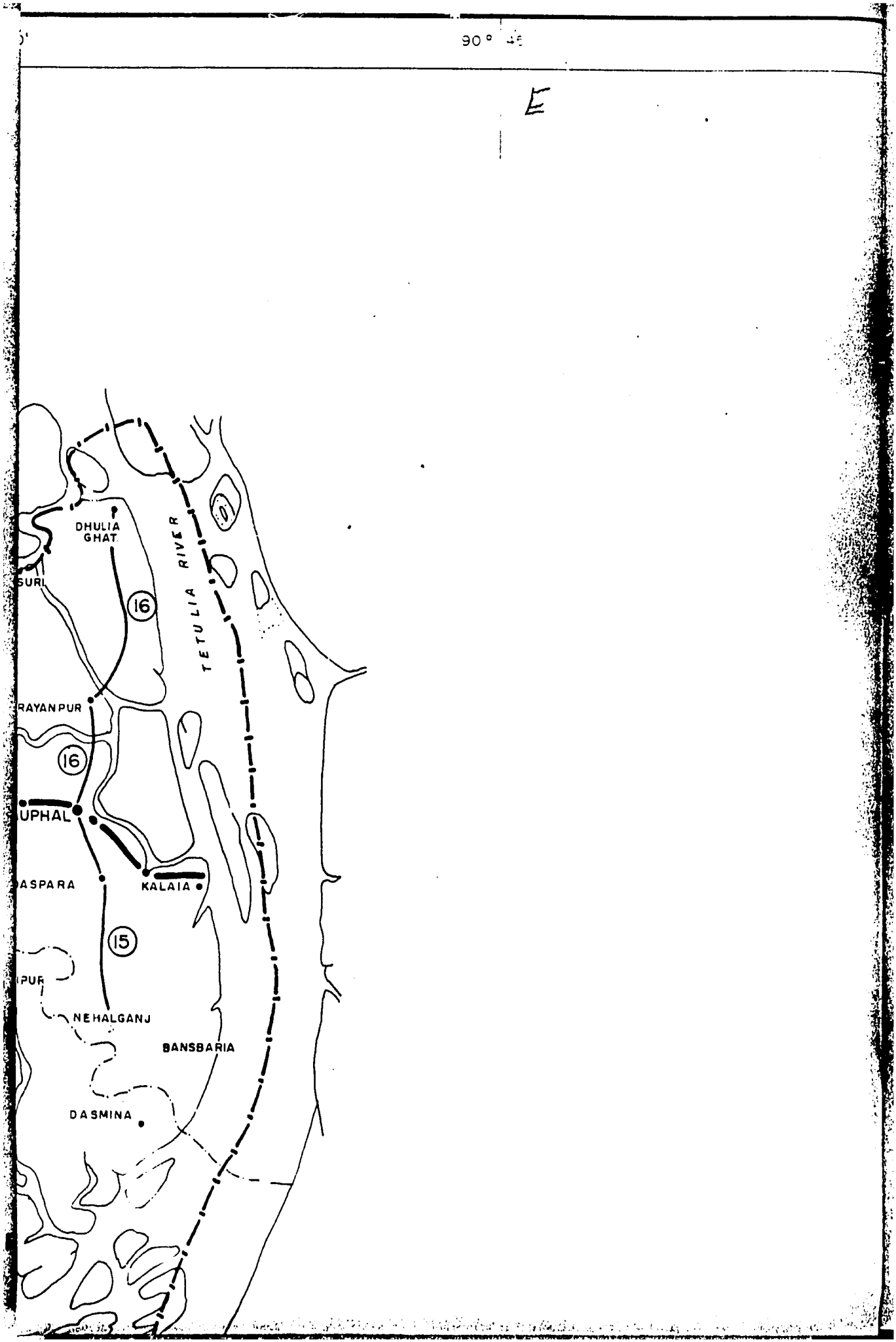

B
8
KATHALTALIHAT
RUPDONHAT
BISKHALI R.
MANIKKHALIHAT
19
DHALUA
KALAMEGHAHAT
NALI
PATHARGHATA
TALTALI
22°-00'
21°-45
89° 45'
90° 00'

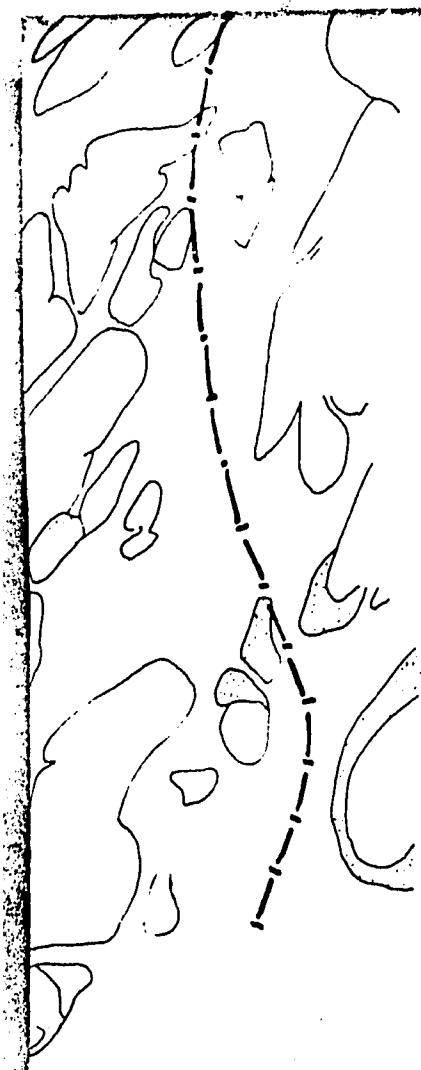

90° 15'
90° 30
C
KALI
JNILNA
NA
MADALEKHALI
BETAGI
JHATIBANIA
BOGA
BA
6
HOSNABAD
SUBID
KHALI
F
F
MIRZAGANJ
PATUAKHALI
SETAGI-SANK
14
INA
ANIA
IPUR
MATIBHANGA
MANDERBANIA
SEHAKATI
KALIKABARI
9
BARABIGHA
BANSBARIA
DARIABAD
SADURA
13
SOUTHKALIKABARI
KALIGANJ
CHIKNIKANDI
2
GOJKHALI
SHARISANURI
12
HULIHURI
SONAKHALI
DAKUA
AMRAGACHHI


BARGUNA
F
AMTALI
3
CHILAI
DHANKHALI
4
TULATALI
CHANDKHALI
SWARISWAR RIVER
AGUNMUKHA RIVER
KARA BARIA
KALAPARA
NILGANJ FERRY
RAMNABAD CHANNEL OR PUTUA RIVER
BURA GAURANGA RIVER
KHAPRABHANGA
KUAKATA

90° 15'

90° 30'


90°
E
DHULIA GHAT
TETULIA RIVER
16
16
15
KALAIA
NEHALGANJ
BANSBARIA
DASMINA



90° 45'

DIST. PATUAKHALI

LEGEND

- ROADS (R & H, PAVED)
- PROPOSED ROADS (R & H)
- WATERWAYS
- RAIL ROADS
- MAJOR AIRPORT
- RECOMMENDED ROAD NETWORK (9)
- MOTORIZED FERRY (REQUIRED) (F)
- ALL WEATHER ROADS

H

SCALE 1 Inch= 4 Miles

GOVERNMENT OF
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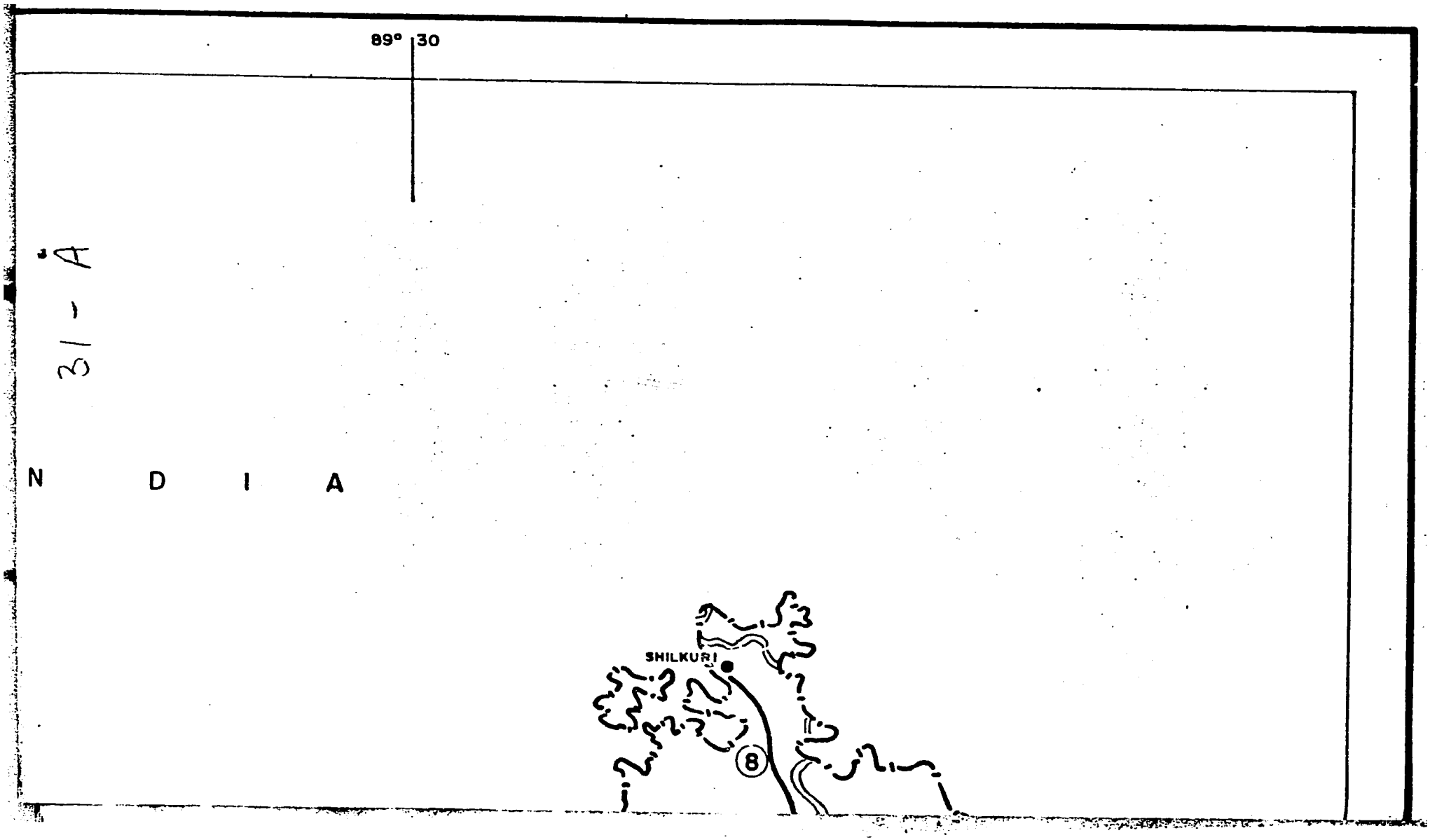
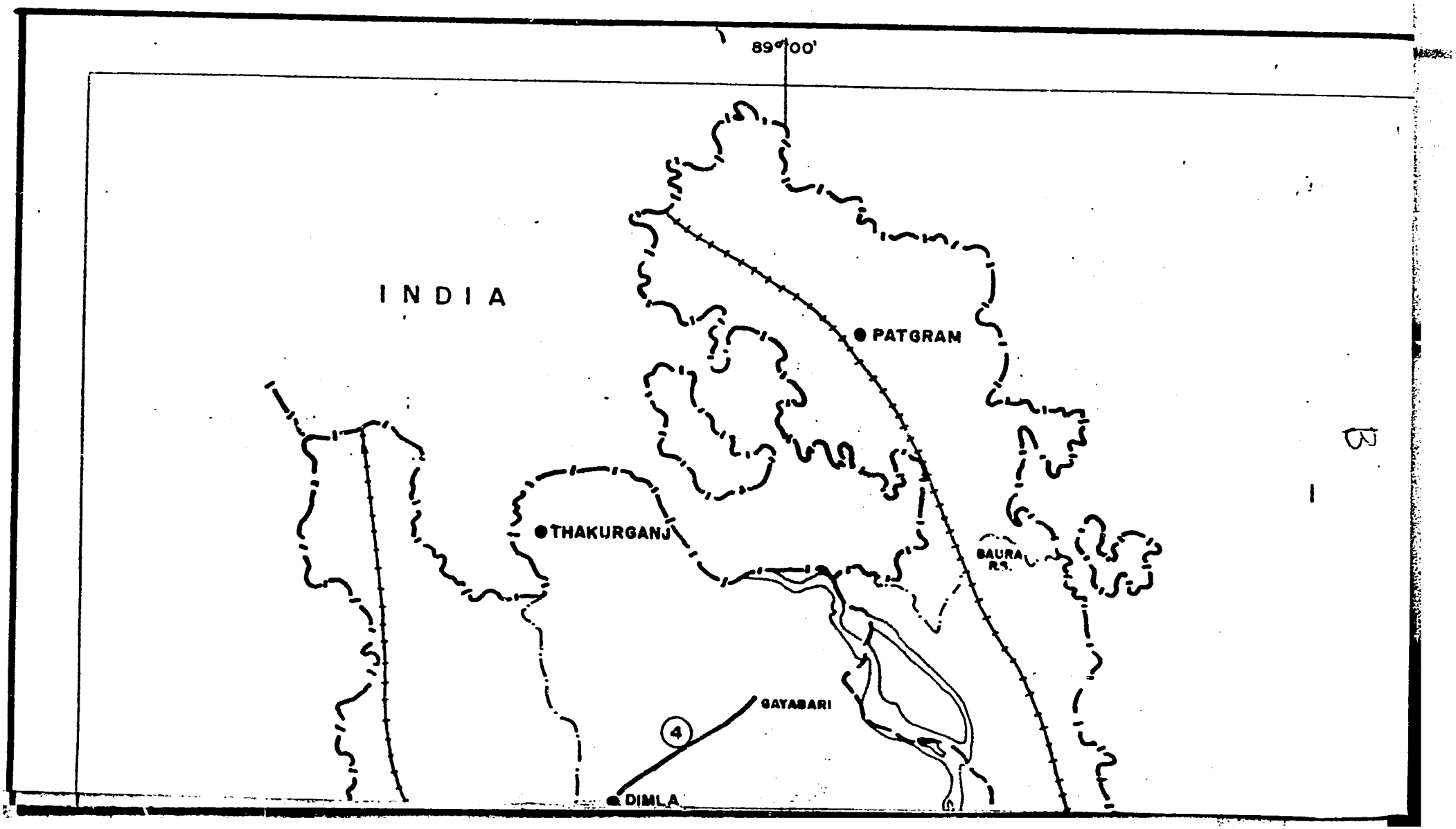
RURAL ROADS STUDY

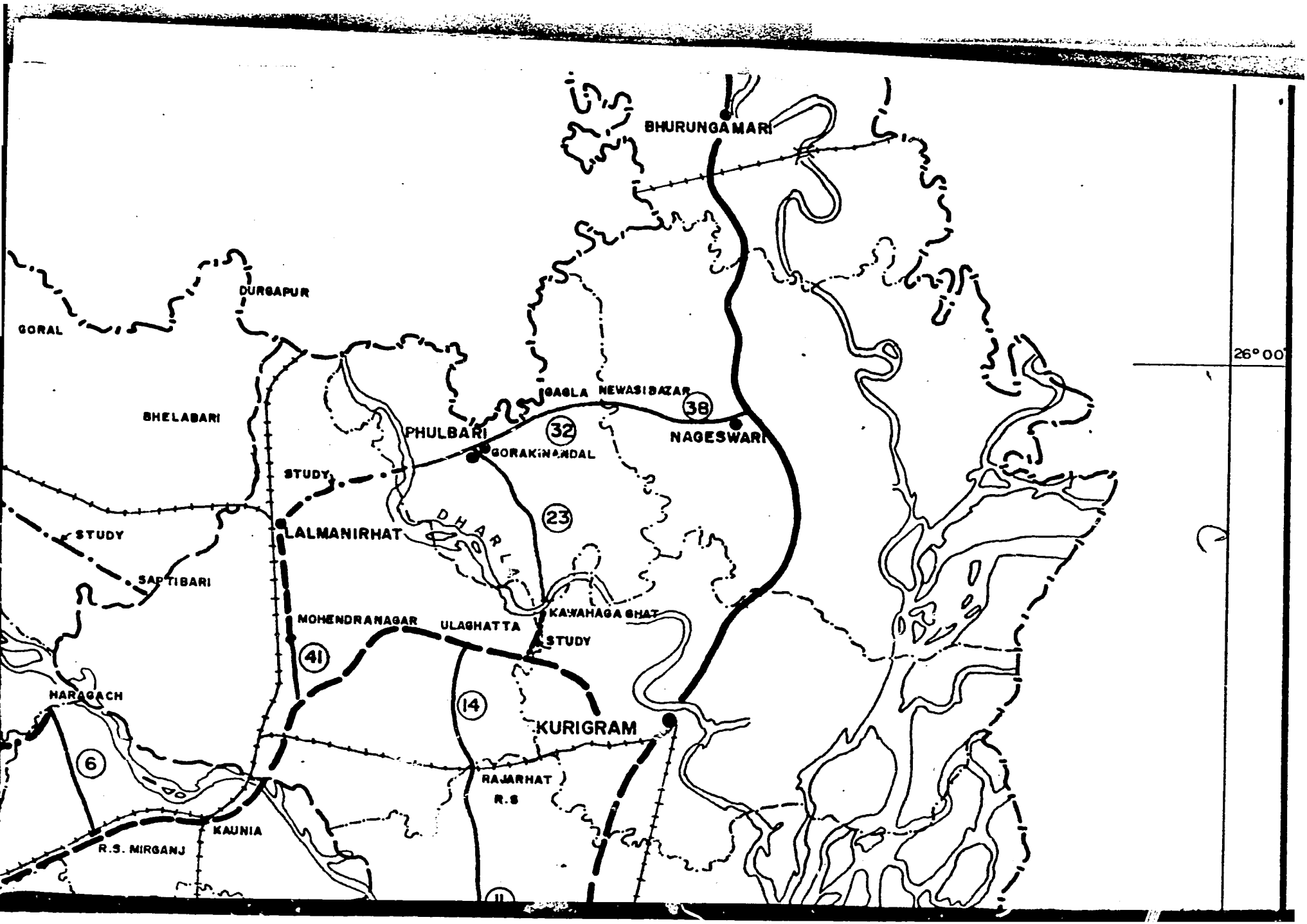
RECOMMENDED ROAD NETWORK

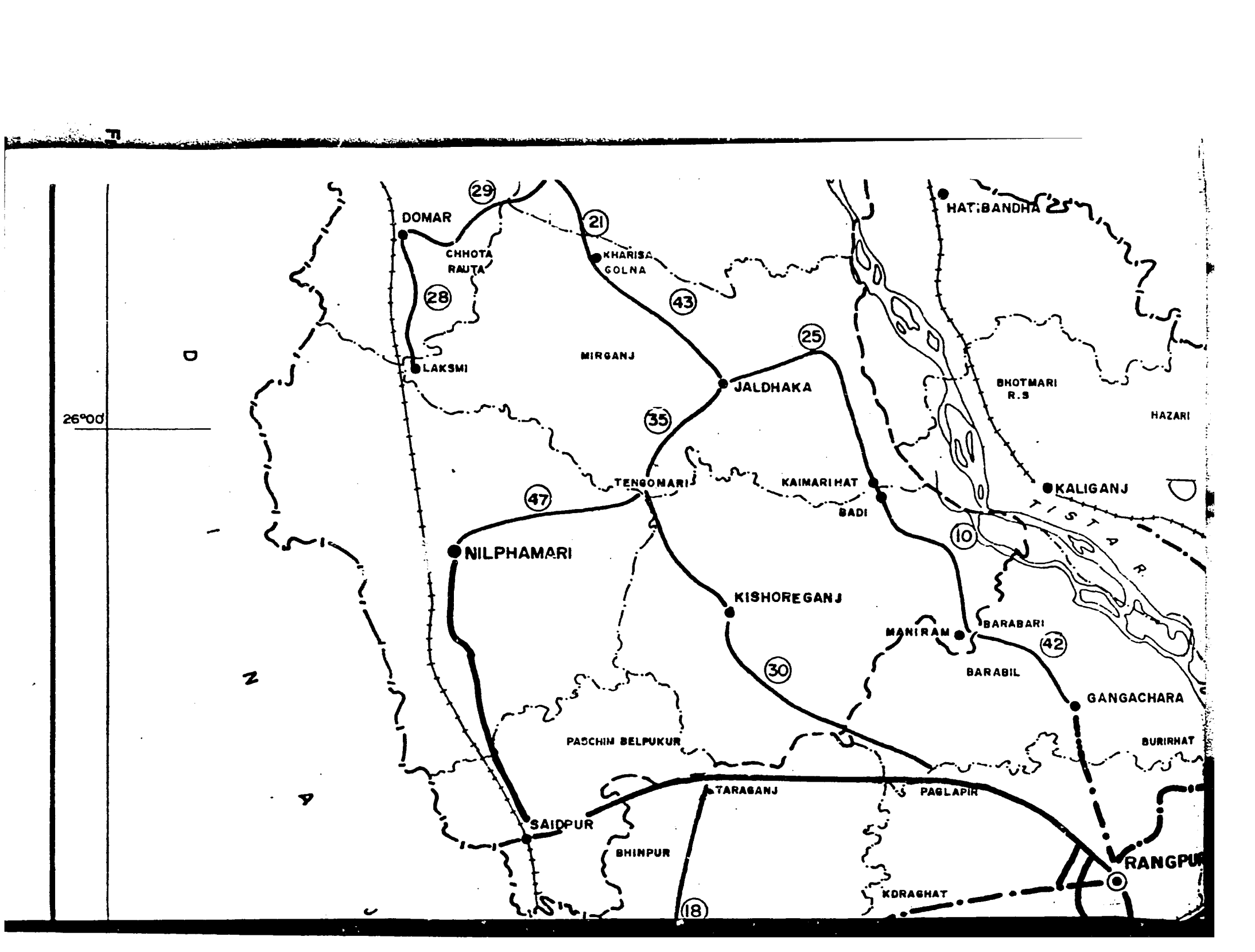
LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

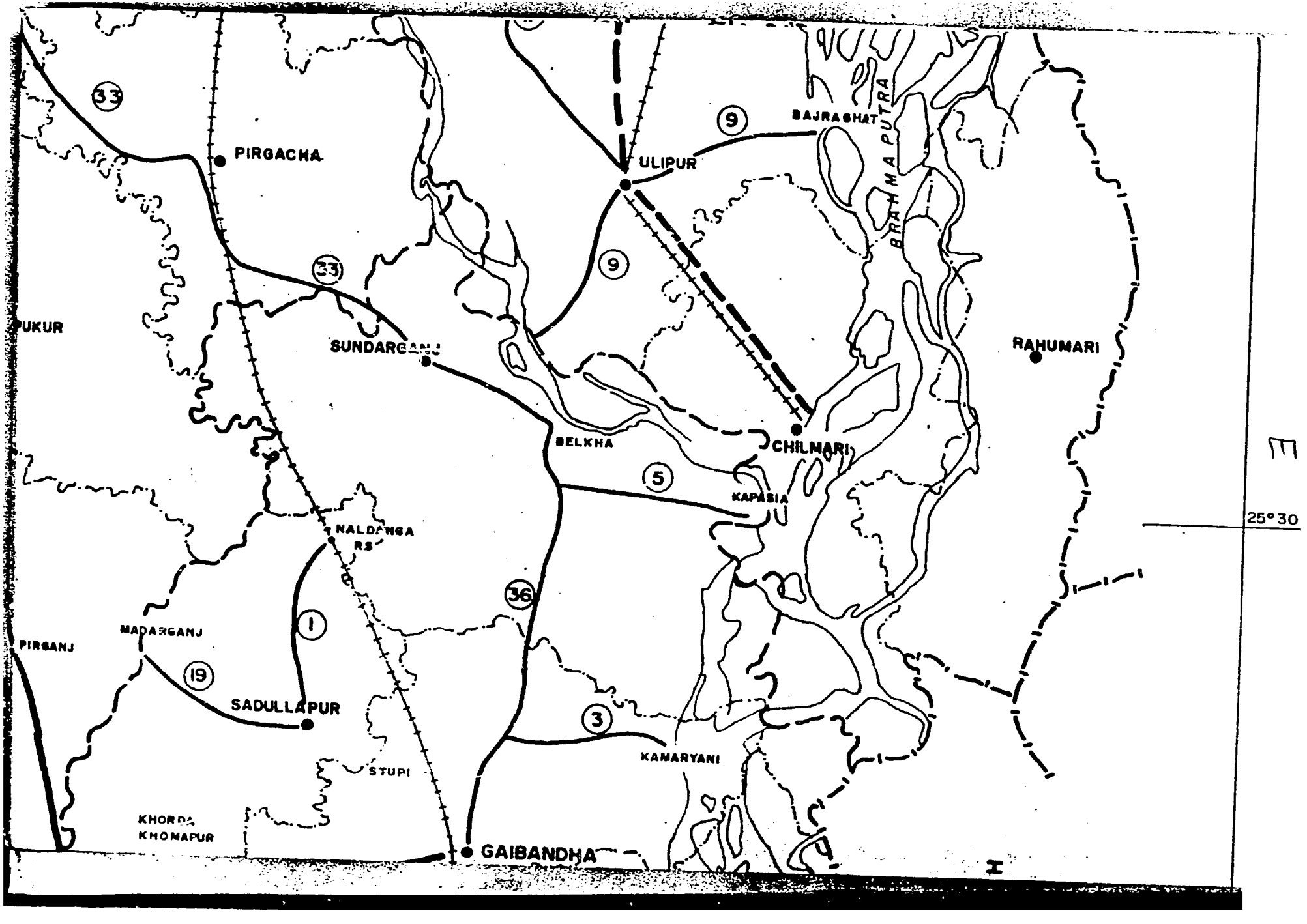
PREPARED BY S. ISLAM	RECOMMENDED
CHECKED	APPROVED
DATE 10. 7. 78	DRG. NO.

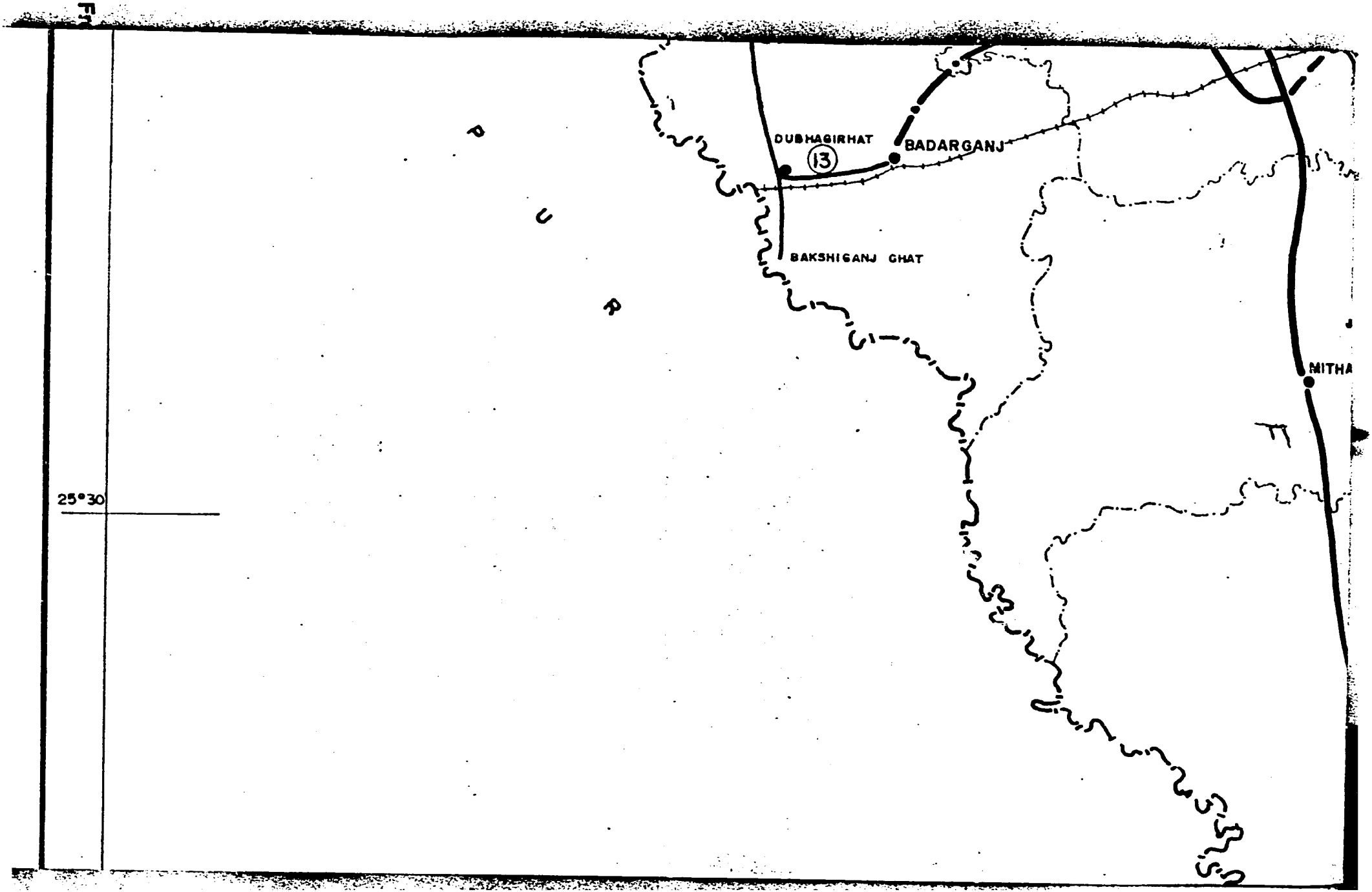

89° 30
31 - A
N D I A
SHILKURI
8

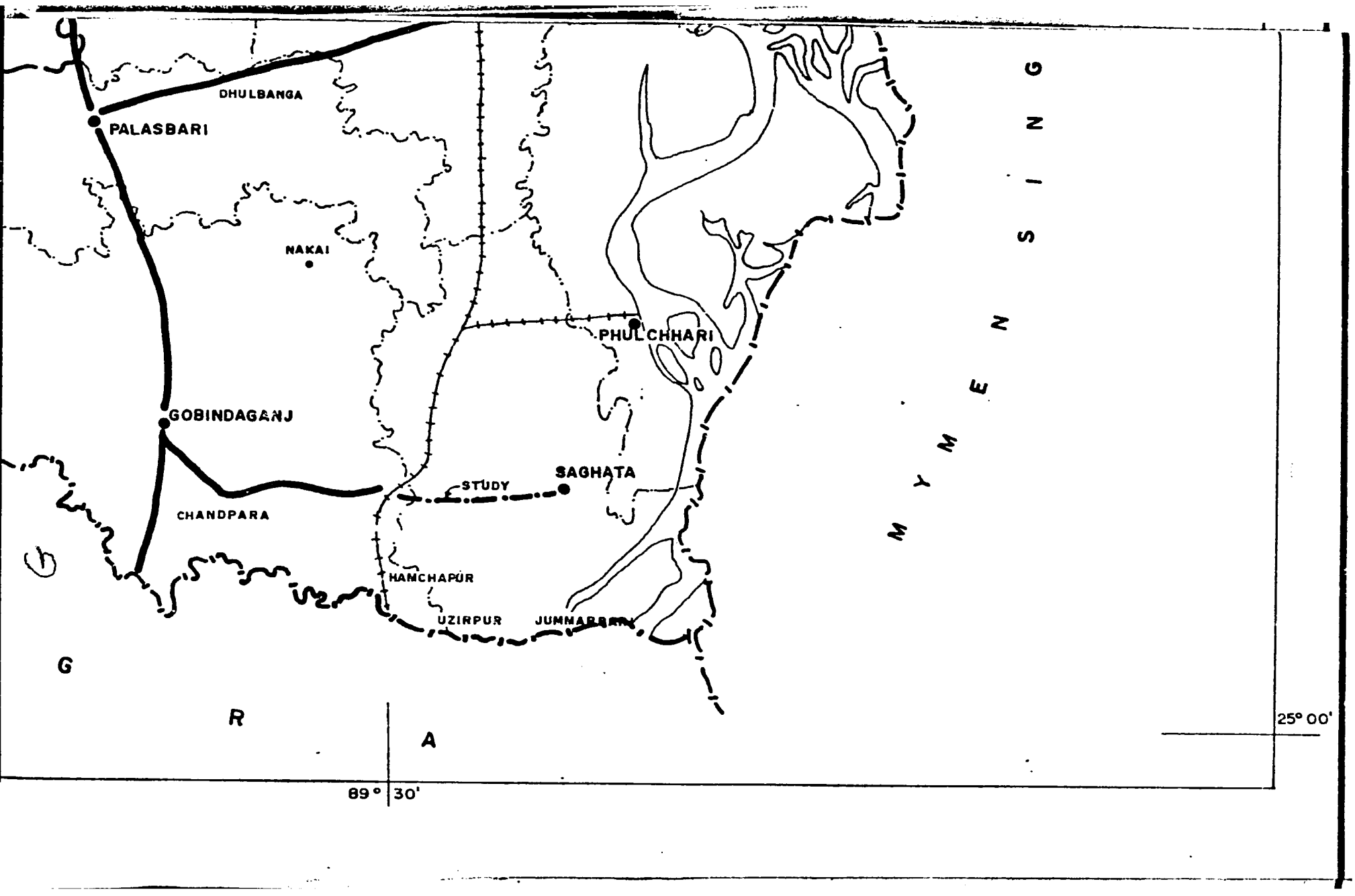

89°00'
INDIA
PATGRAM
THAKURGANJ
BAURA R.S.
GAYABARI
4
DIMLA

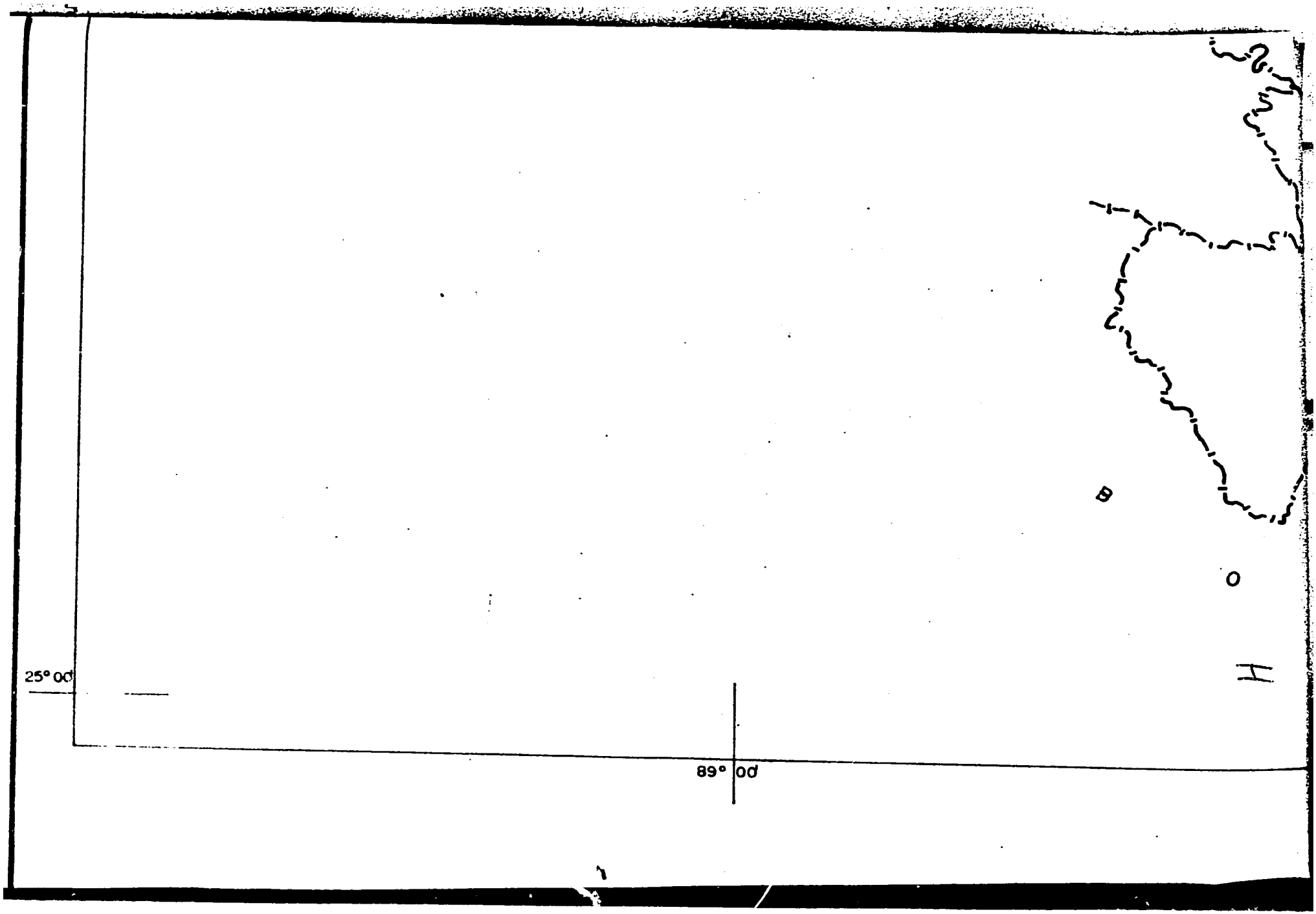

BHURUNGAMARI
DURGAPUR
GORAL
BHELABARI
PHULBARI
JAGLA
NEWASIBAZAR
38
NAGESWARI
32
GORAKINANDAL
STUDY
23
DHARLA
LALMANIRHAT
STUDY
SAPTIBARI
MOHENDRANAGAR
ULAGHATTA
KAWAHAGA GHAT
STUDY
41
HARAGACH
14
KURIGRAM
6
RAJARHAT
R.S
KAUNIA
R.S. MIRGANJ
11
26° 00'


DOMAR
CHHOTA RAUTA
KHARISA GOLNA
HATIBANDHA
LAKSMI
MIRGANJ
JALDHAKA
BHOTMARI R.S
HAZARI
26°0d
TENGONARI
KAIMARI HAT
BADI
KALIGANJ
TISTA R.
NILPHAMARI
KISHOREGANJ
MANIRAM
BARABARI
BARABIL
GANGACHARA
PASCHIM BELPUKUR
BURIRHAT
TARAGANJ
PAGLAPIR
SAIDPUR
BHINPUR
KORAGHAT
RANGPUR
29
21
28
43
25
35
47
10
42
30
18


33
PIRGACHA
9
BAJRA GHAT
ULIPUR
BRAHMA PUTRA
33
9
UKUR
SUNDARGANJ
RAHUMARI
BELKHA
CHILMARI
5
KAPASIA
NALDANGA
RS
36
1
MADARGANJ
PIRGANJ
19
SADULLAPUR
3
KAMARYANI
STUPI
KHORDA
KHOMAPUR
GAIBANDHA
25°30


DUBHAGIRHAT
13
BADARGANJ
BAKSHIGANJ GHAT
MITHA
25°30


DHULBANGA
PALASBARI
NAKAI
PHULCHHARI
GOBINDAGANJ
SAGHATA
STUDY
CHANDPARA
HAMCHAPUR
UZIRPUR
JUMMARBARI
MYMENSING
G
R
A
25° 00'
89° 30'


25° 00'
89° 00'

I

DIST. RANGPUR

LEGEND

ROADS (R & H)

PROPOSED ROADS (R & H)

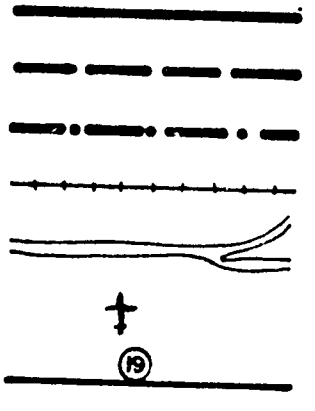
ROADS DIST.(COUNCIL)

RAIL ROADS

WATER WAYS

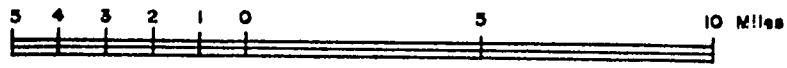
MAJOR AIRPORT

RECOMMENDED ROADS



J

SCALE 1 inch = 4 Miles



GOVERNMENT OF
THE PEOPLES REPUBLIC OF BANGLADESH

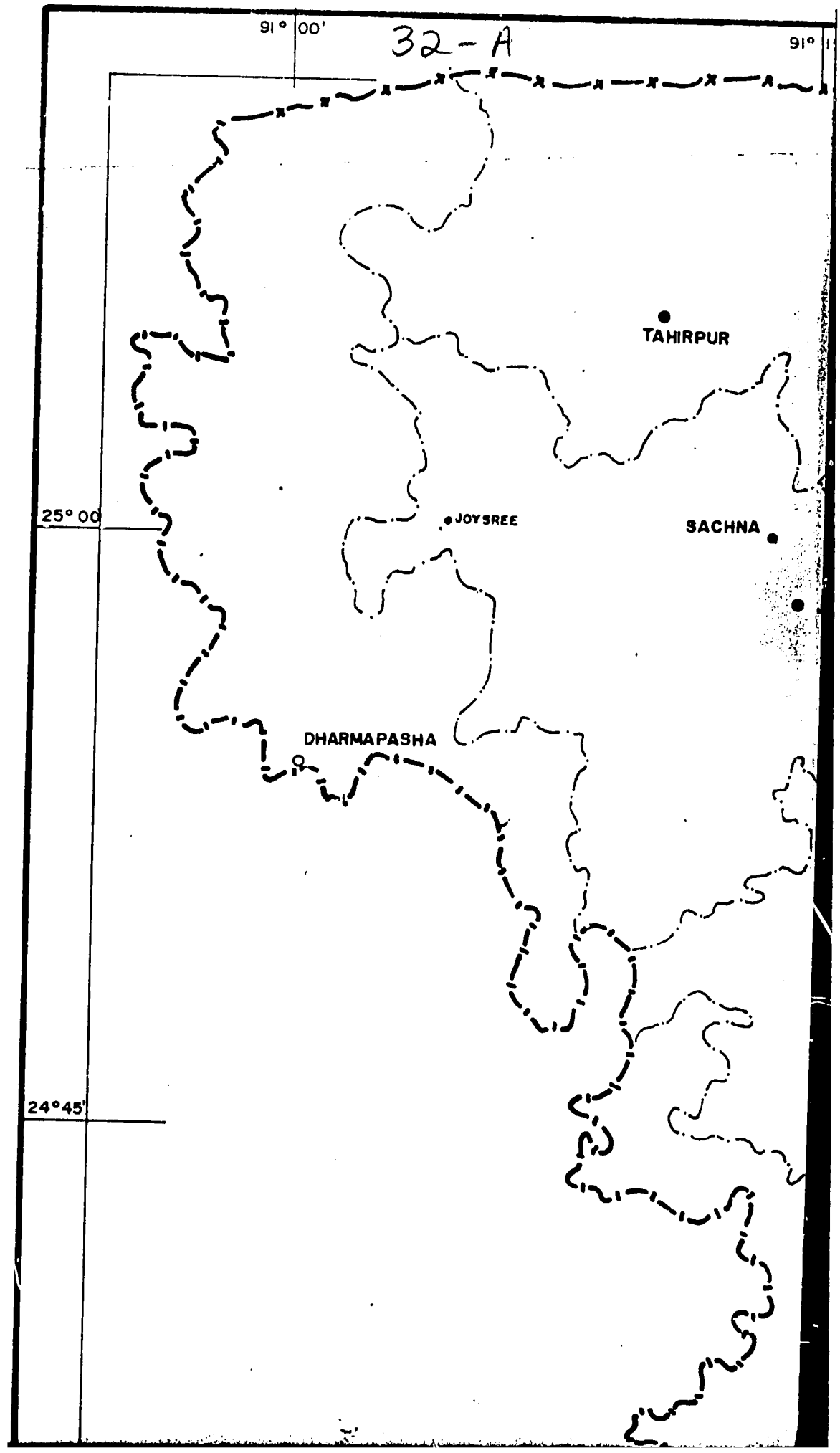
RURAL ROADS STUDY

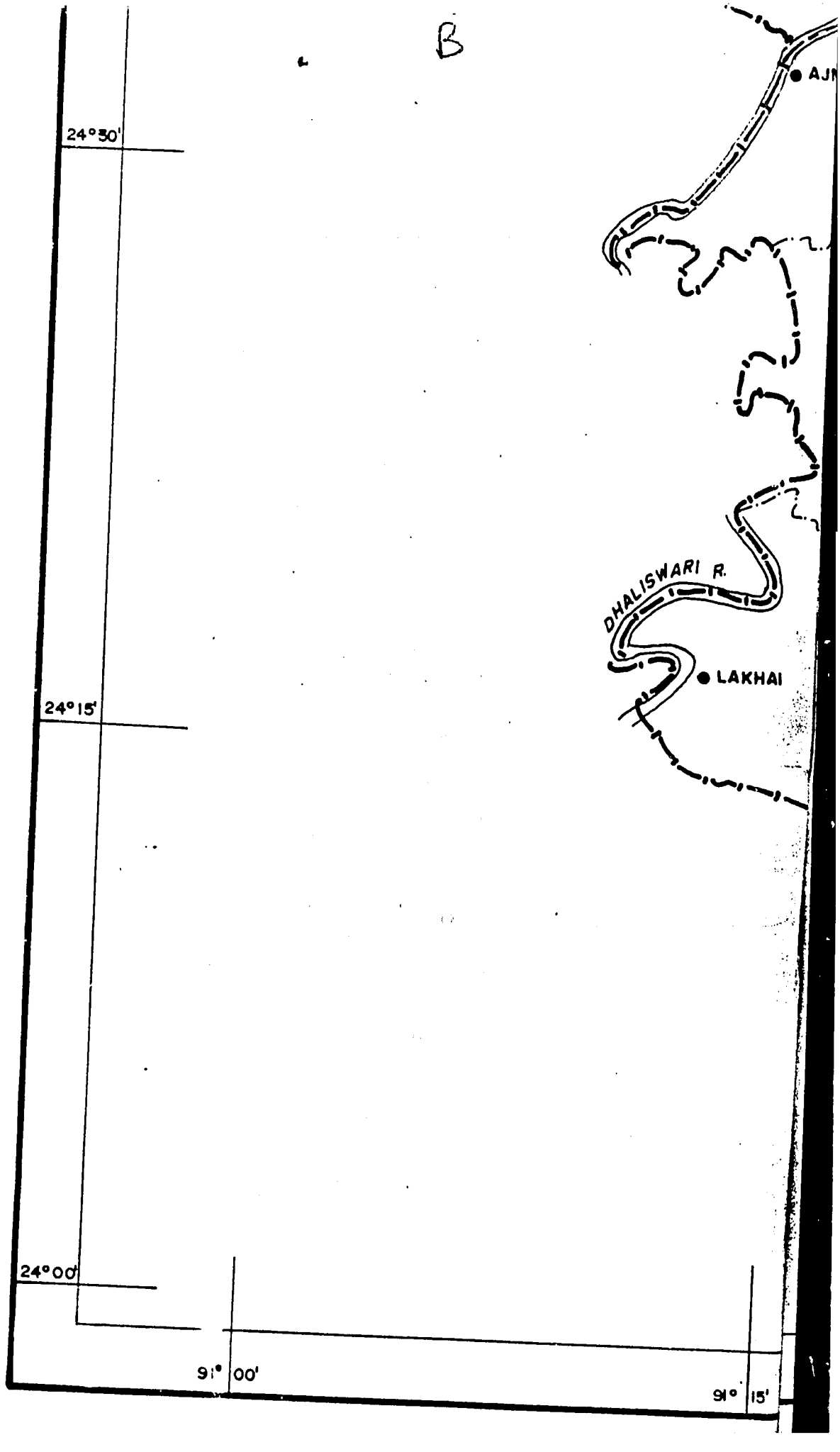
RECOMMENDED ROAD NETWORK

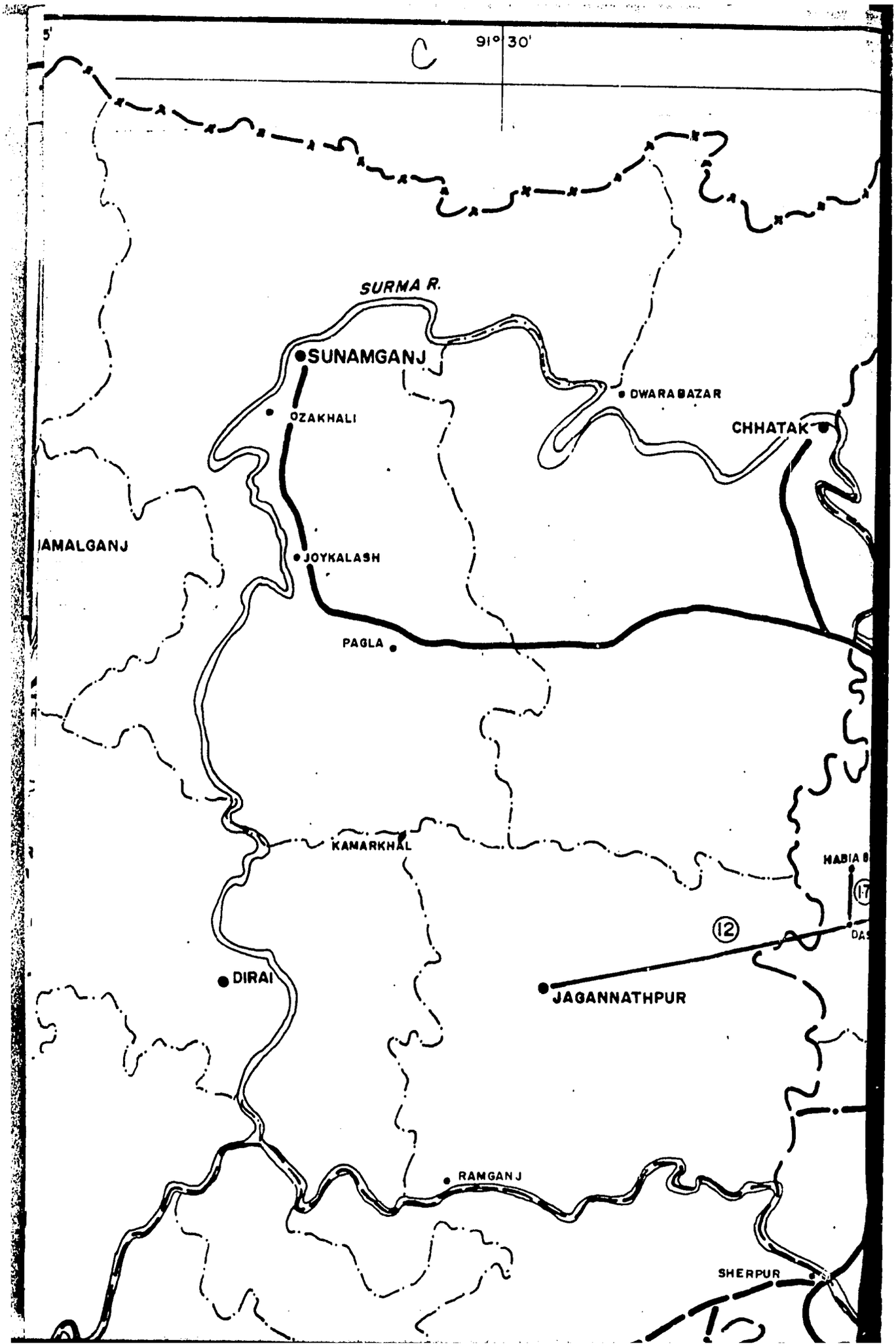
LOUIS BERGER INTERNATIONAL INC AND
RAHMAN & ASSOCIATES LTD.

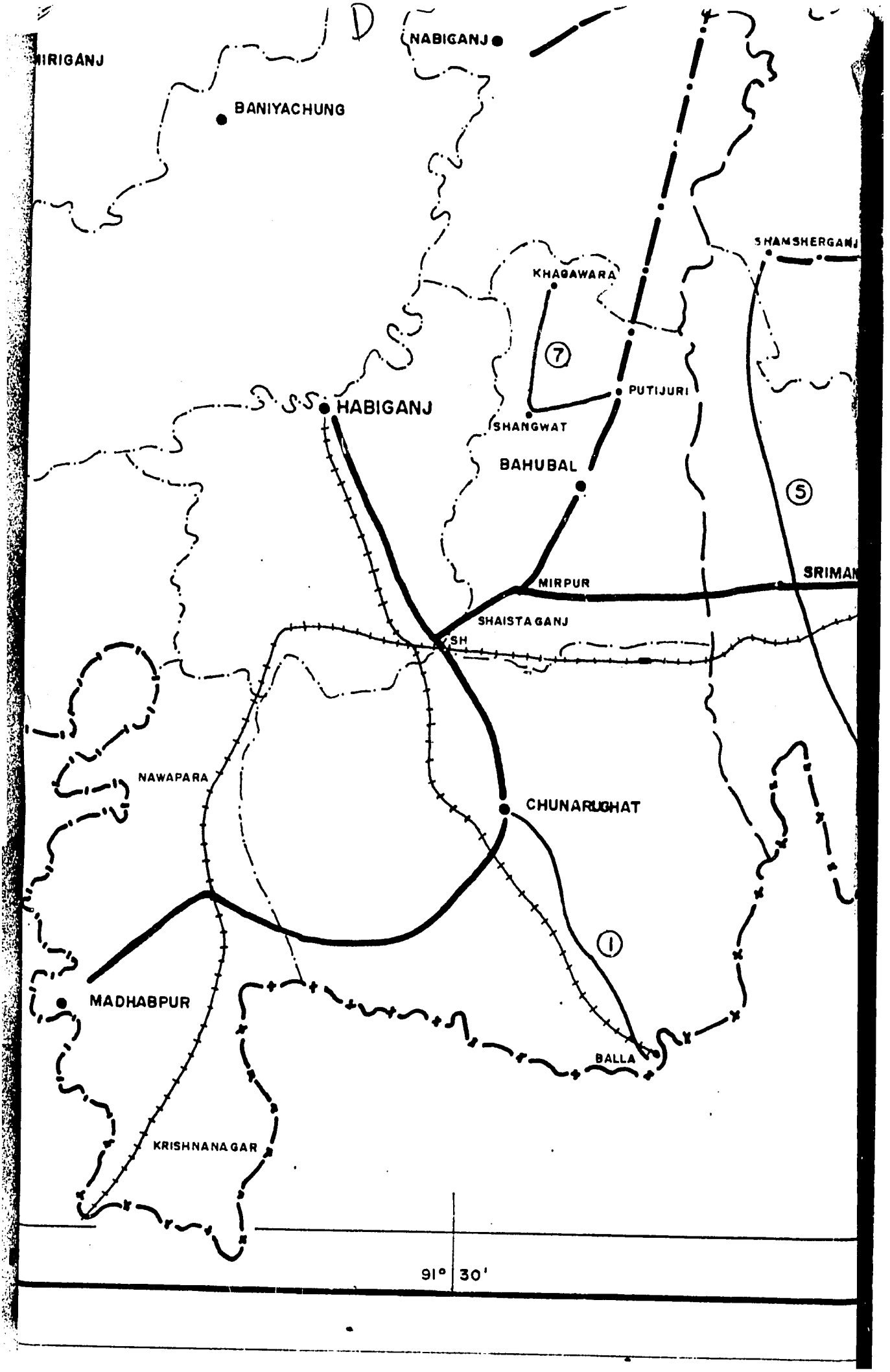
PREPARED BY S. ISLAM	RECOMMENDED W. Ward
CHECKED F. Zaman	APPROVED E. Prentice
DATE	DRG. NO.

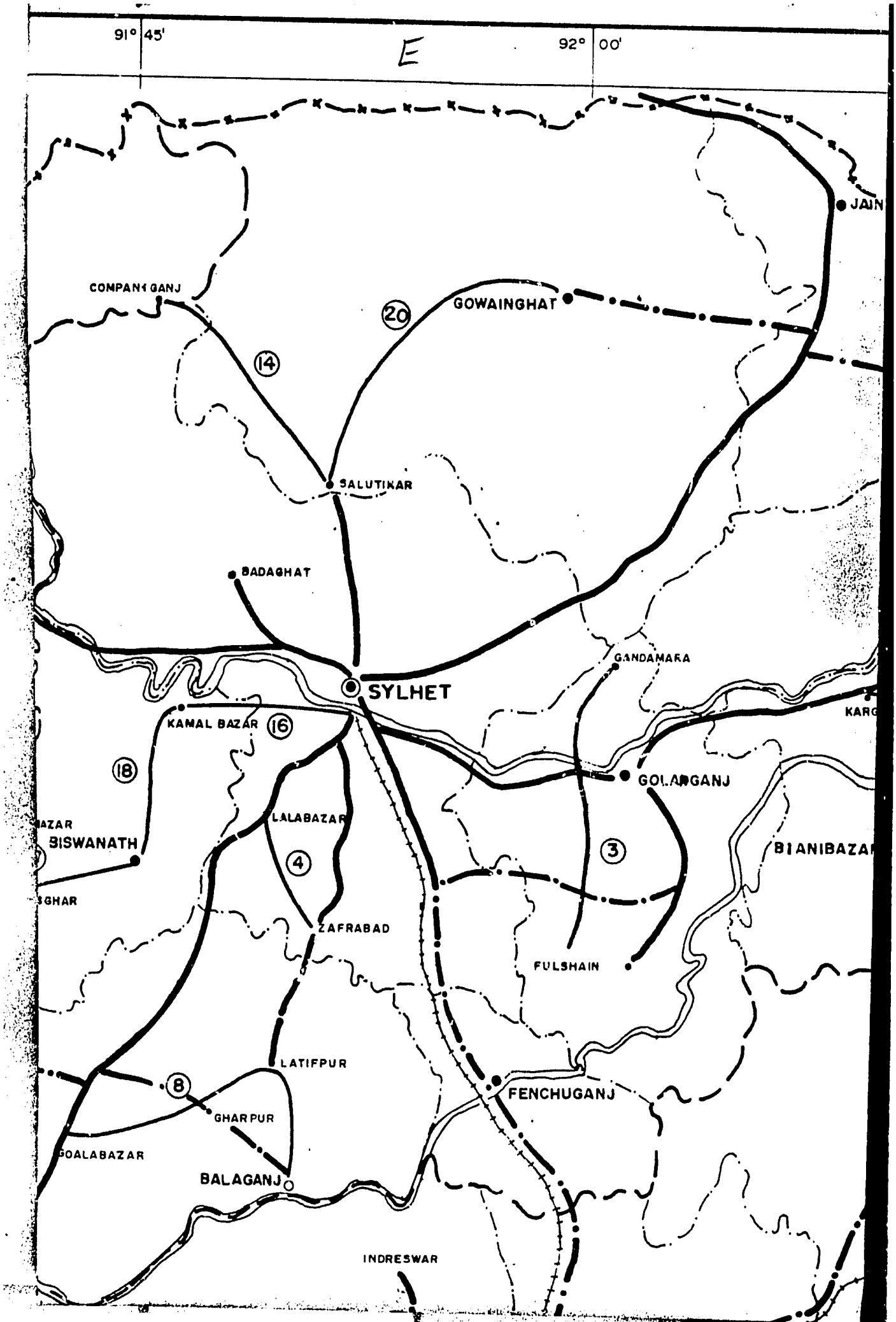
From

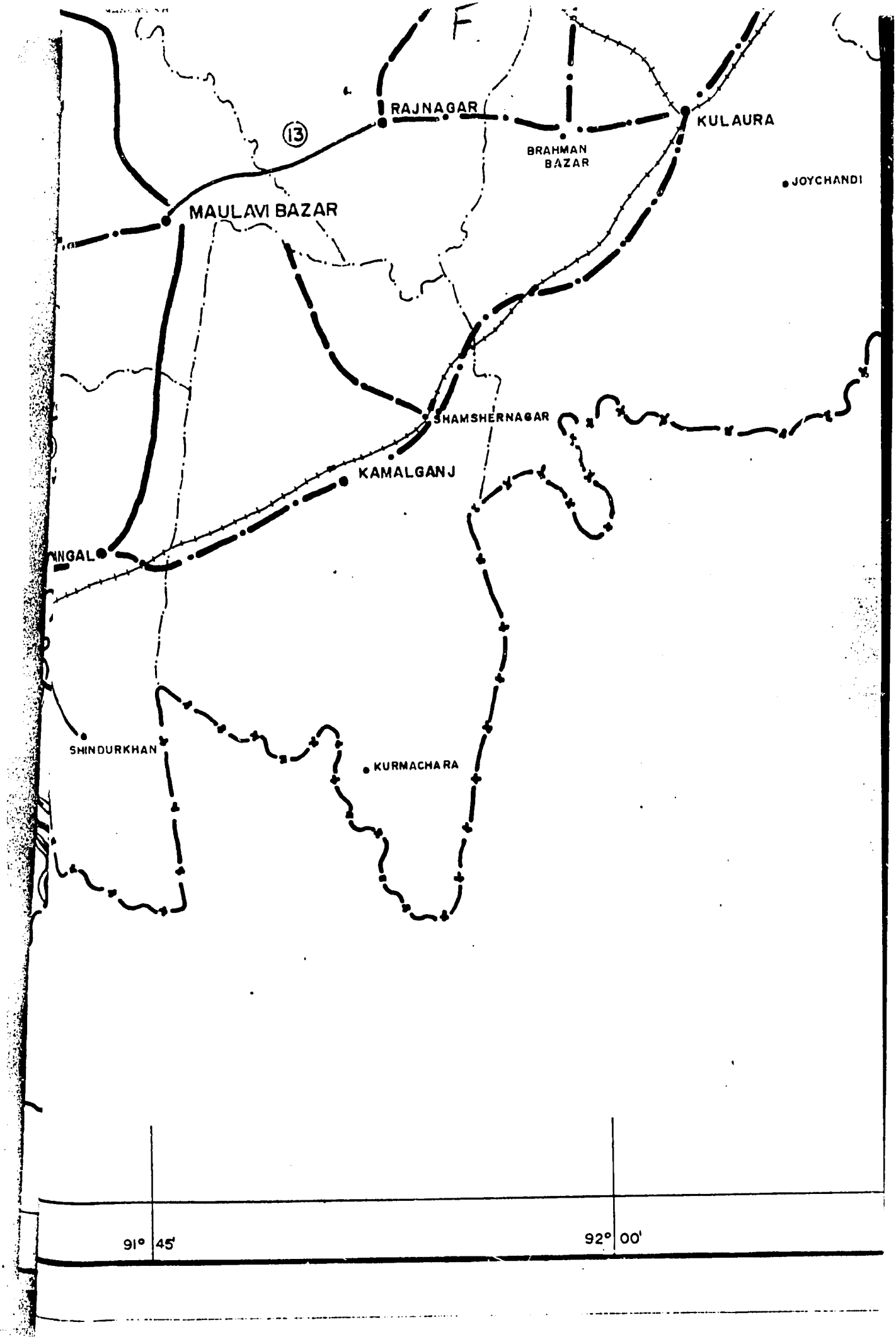

91° 00'
32-A
91°
TAHIRPUR
25° 00
JOYSREE
SACHNA
DHARMAPASHA
24°45'

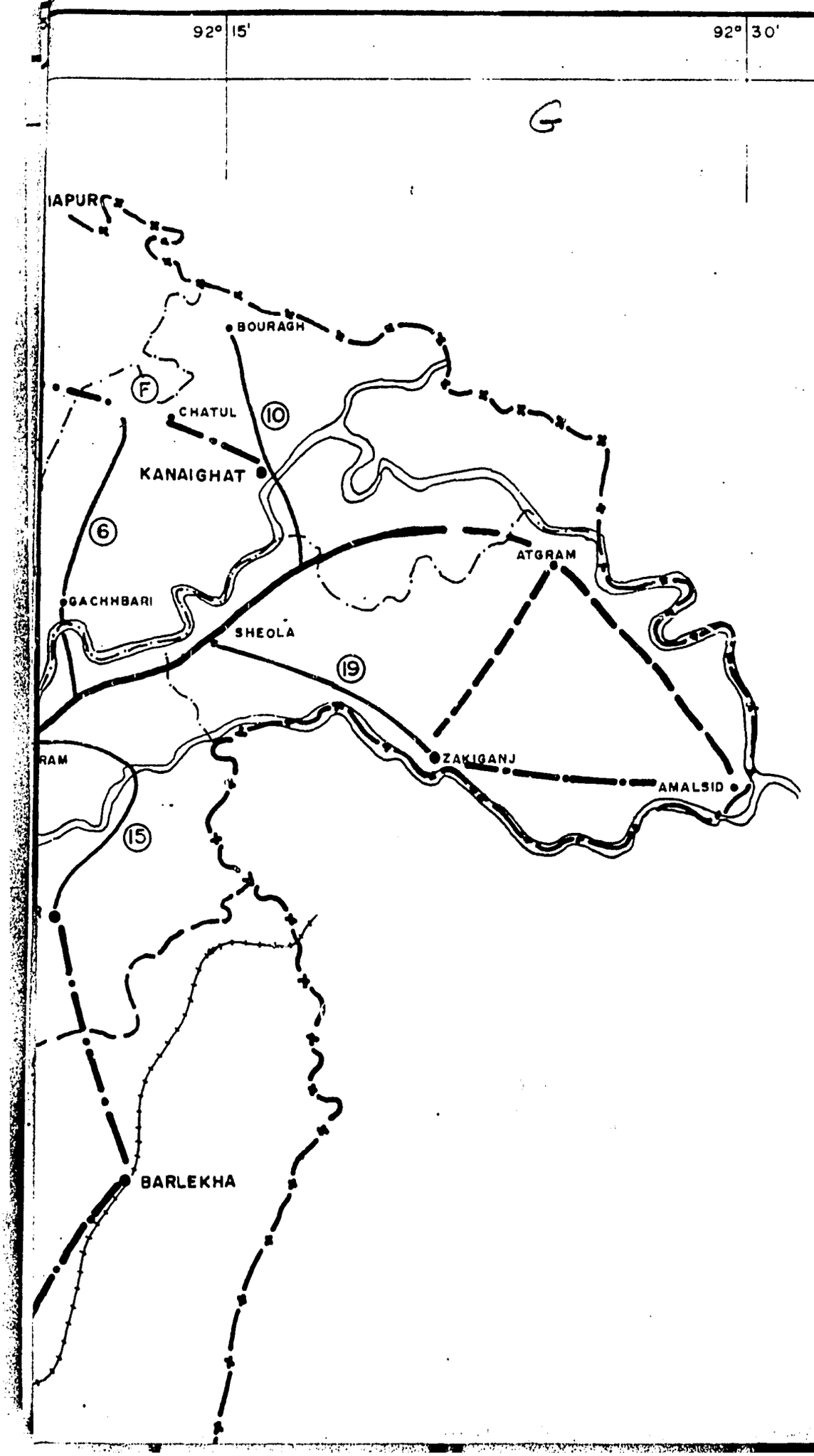

B
AJ
24°30'
DHALISWARI R.
LAKHAI
24°15'
24°00'
91° 00'
91° 15'

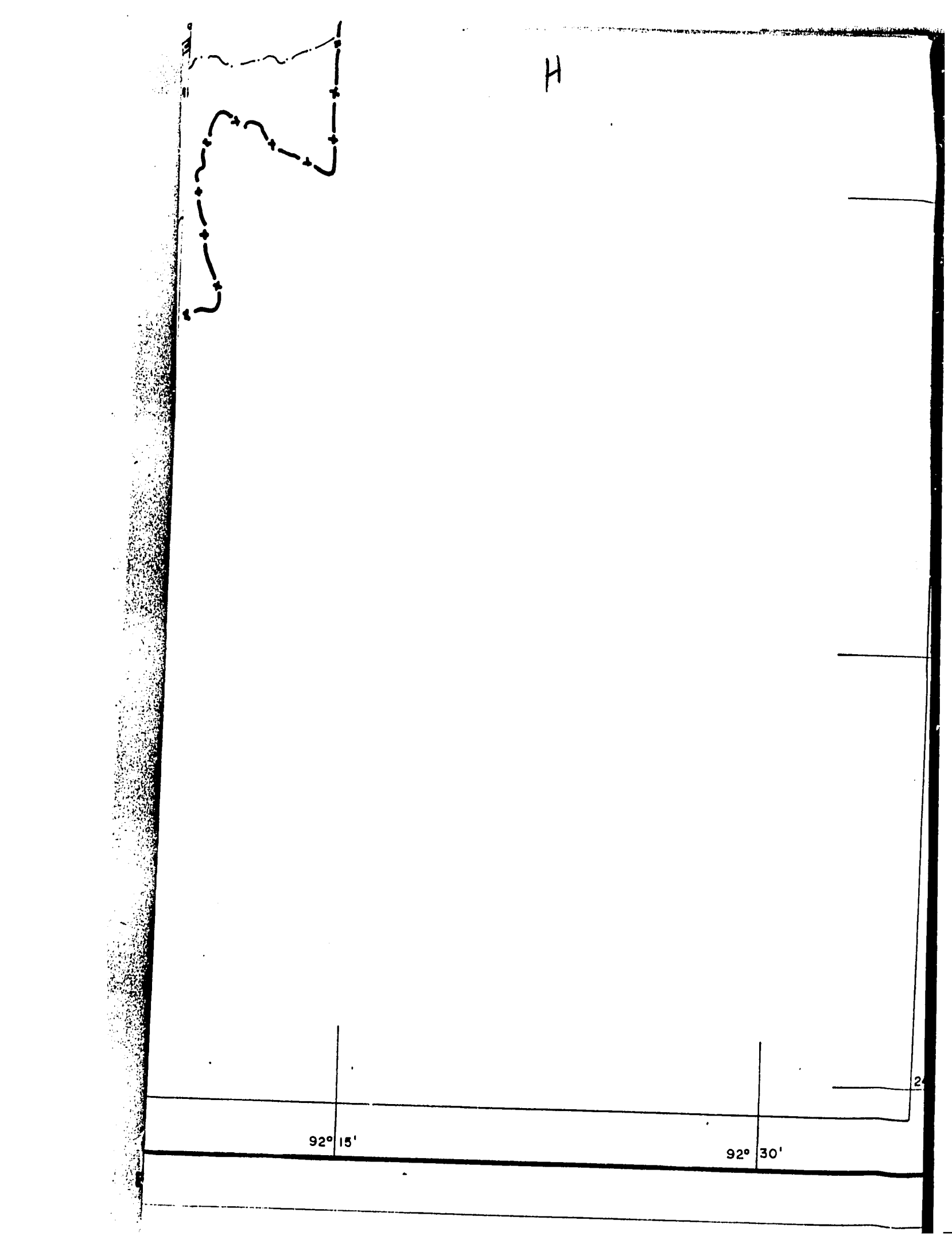

5'
C
91° 30'
SURMA R.
SUNAMGANJ
DWARABAZAR
OZAKHALI
CHHATAK
AMALGANJ
JOYKALASH
PAGLA
KAMARKHAL
HABIA
17
12
DIRAI
JAGANNATHPUR
RAMGANJ
SHERPUR


NABIGANJ
BANIYACHUNG
SHAMSHERGANJ
KHAGAWARA
7
PUTIJURI
HABIGANJ
SHANGWAT
BAHUBAL
5
MIRPUR
SHAISTAGANJ
NAWAPARA
CHUNARUGHAT
1
MADHABPUR
BALLA
KRISHNANAGAR
91° 30'


91° 45'
E
92° 00'
JAIN
COMPANIGANJ
20
GOWAINGHAT
14
SALUTIKAR
BADAGHAT
GANDAMARA
SYLHET
KAMAL BAZAR
16
18
GOLAPGANJ
LALABAZAR
SISWANATH
4
3
BIANIBAZAR
ZAFRABAD
FULSHAIN
LATIFPUR
8
FENCHUGANJ
GHARPUR
BALAGANJ
INDRESWAR


F
RAJNAGAR
13
KULAURA
BRAHMAN
BAZAR
JOYCHANDI
MAULAVI BAZAR
SHAMSHERNAGAR
KAMALGANJ
NGAL
SHINDURKHAN
KURMACHARA
91° 45'
92° 00'


92° 15'
92° 30'
G
BOURAGH
F
CHATUL
10
KANAIGHAT
6
ATGRAM
GACHHBARI
SHEOLA
19
ZAKIGANJ
AMALSID
15
BARLEKHA


H
92° 15'
92° 30'

I

DIST. SYLHET

25°-00'

24°45'

LEGEND

ROADS (R & H)

ALL WEATHER ROADS.

PROPOSED ROODS (R & H)

RECOMMENDED ROAD NETWORK (12)

MOTORIZED FERRY (F)

RAIL ROADS

WATER WAYS

MAJOR AIRPORT

24°30'

J

24° 15'

SCALE 1 inch = 4 Miles

5 4 3 2 1 0 5 10 Miles

GOVERNMENT OF
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RURAL ROADS STUDY

RECOMMENDED ROAD NETWORK

LOUIS BERGER INTERNATIONAL INC. AND
RAHMAN & ASSOCIATES LTD.

24° 00'

PREPARED BY S. ISLAM	RECOMMENDED W. Ward
CHECKED M. Rahman	APPROVED E. Prantice
DATE 11.7.78	DRG. NO.

F

As shown in Table 10 the road mileage is fairly evenly distributed throughout the district. In addition, the proposed network would link 29 major markets not now served by roads.

Initially the consultant had been favorably disposed toward more construction in Gopalganj Subdivision, but ultimately only three roads were recommended. The reasons are that (1) the subdivision will soon be linked to district headquarters by the new north-south R&H road on the western side of the district; and (2) the extremely high cost of building roads in many parts of the subdivision. With the three recommended roads and the new R&H road, every thana in the subdivision will be linked by road with subdivision headquarters.

The largest number of roads and mileage is recommended for the currently inaccessible subdivision of Shariatpur. The subdivision headquarters at Palong would be connected to Madaripur and the main R&H road. Every thana in the subdivision would then have a road link to Palong. This is very important to Shariatpur as water transport is now the only transport mode and this for only part of the year.

In Madaripur subdivision the main additions are (1) the road connecting Sibchar thana with the main R&H road and (2) a spine road through the eastern part of Kalkini Thana.

Faridpur Sadar Subdivision has a better existing road network than other areas due to the intersection of the Faridpur-Barisal and Faridpur-Jessore R&H roads. The recommended network will link currently inaccessable Char Bhadrasan and Alfadanga thanas and poorly connected Sadarpur thana. In addition it will add shorter links opening up some poorly connected areas of Boalmari and Kotwali Thanas.

In Goalundo Subdivision, the main feature of the network is a long spine road through the large Baliakandi and Pangsa Thanas, the latter which is accessable neither by road nor water. This road and the Class V road through south western Rajbari Thana would link a large sugar growing area to the new sugar mill at Madukhali as well as provide road services to several important markets. In summary, the following thanas not now linked to the existing network would be included Palang, Nagia, Janjira, Bhedarganj, Damudya, Goshairhat, Kotwalinara, Muksudpur, Alfadanga, Pangsa, Char Bhadrasan, and Sibchar. The thanas of Sadarpur and Baliakandi which are now poorly linked, would be better connected. Easier access would be provided to isolated areas - - Kalkini, Goalmari, Rajbari and Kotwali Thanas.

B. Patuakhali

The road network recommended for Patuakhali consists of 14 road segments totalling 151 miles. Nine of these recommended roads are class IV roads with a total length of 94.5 miles. The remaining 5 roads of 56.5 miles are class V roads. The estimated network cost is $ 25.4 million, which averages out to approximately $ 163 thousand per mile. The roads and mileage are distributed by subdivision as follows.

TABLE 11
PATUAKHALI: ROADS BY SUBDIVISION

Subdivision	No. & Class of Roads		Total Mileage
Sadar	IV	5	49.5
	V	2	21.5
Total :		7	71
Barguna	IV	4	45
	V	3	35
Total :		7	80

As shown in Table 11, the number of roads and the road mileage is almost equally divided between the two subdivisions. The recommended network will include roads in eight out of the ten thanas in the district and provide the thanas of Galachipa, Amtali, Barguna, Patharghata, Bamna and Mirzaganj with important roads to supplement their existing river transportation. Interior areas of some islands would be connected with major ghats.

In general the network proposed for Patuakhali will provide north/south roads throughout the district between the four main north/south river channels. However, construction of the recommended roads alone will fall short of providing a completely integrated network for the district. All thanas would still not be linked with district and subdivision headquarters.

However, in conjunction with the proposed R&H road from Patuakhali town via Amtali to Kalapara, the recommended roads will establish a skeletal road network linked with water transport.

In this district several mechanized ferries have been proposed at key points to provide east-west crossings of the major rivers. Country ferries will be used for crossing the smaller rivers.

C. Rangpur

The rural road network recommended for Rangpur consists of 28 roads totalling approximately 239 miles. Twelve of these roads are Class IV roads with a total length of 114 miles. The

remaining fourteen roads are Class V roads and total 125 miles. The total estimated network cost is $26.6 million, which averages $ 86 thousand per mile.

The roads and mileage of the recommended network are distributed by subdivision as shown in Table 12.

TABLE 12
RANGPUR: ROADS BY SUBDIVISION

Subdivision	No. & Class of Roads		Total Mileage
Sadar	IV	2	26
	V	3	29
Total		5	55
Nilphamari	IV	6	52
	V	4	28
Total:		10	80
Kurigram	IV	3	18
	V	5	45.5
Total		8	63.5
Gaibandha	IV	1	18
	V	4	22.5
Total		5	40.5

As reflected in the table, the largest number of roads in the recommended network are in Nilphamari Subdivision. This subdivision now has virtually no rural roads and the recommended network will interlink the thanas of Dimla, Domar, Jaldhak and Kishoreganj with subdivision headquarters in Nilphamari.

A large number of roads is also included in Kurigram Subdivision. Among these are important connections from Kurigram Town to Phulbari and Nageswari. Some significant road segments could not be considered because of insufficient data; these are indicated on the map in Figure 8.

In Rangpur Sadar the recommended road network includes five of eleven thanas in the subdivision. What is particularly noticeable is that the thanas north of the Tista River have been omitted. However, the local road nominations for this area ranked very low in the road ratings. Furthermore, the key roads that were proposed were close to or paralleled the existing railway. Time did not permit more than one visit to this district and alternatives were not able to be fully explored with local officials.

In Gaibandha Subdivision roads are recommended in the thanas of Gaibandha, Sadullapur and Sundarganj. In addition, one road in Shaghatta is deemed worthy of further study. The recommended roads in Sundarganj and Gaibandha thanas would open up a large rural area not currently served by the existing transport network and would link many markets with the railroad and the road network. It would also join the northern portion of Gaibandha with Kurigram Subdivision via ferry near Balkha Market connecting Ulipur and Sundarganj Thanas.

The consultant did not recommend any road segments for Mithamoukur, Pirganj, Palashbari, and Gobindaganj Thanas, since some rural road construction is planned in these areas under the World Bank integrated area development projects.

D. Sylhet

The rural road network recommended for Sylhet District consists of 17 roads totalling approximately 169 miles. Ten of the recommended roads are Class IV roads with a total length of 95 miles. The other eleven roads, totalling 76 miles, are Class V roads. The total estimated network cost is $17.7 million, an average of $105 thousand per mile.

The roads and mileages are divided among the subdivisions as shown in Table 13.

TABLE 13
SYLHET: ROADS BY SUBDIVISION

Subdivision	No. & Class of Roads	Total Mileage
Sylhet Sadar	IV 9 V 4	85 38
Total	13	123
Moulvi Bazar	IV 1 V 1	10 18
Total	2	28
Habiganj	IV Nil V 2	Nil 18
Total	2	18
Sunamganj	NIL	NIL

All roads in the haor area of Sylhet were excluded from further consideration because of prohibitive costs and the need for more detailed hydrological studies. This eliminated from the study all road nominations for the thanas of Sunamganj Subdivision and four of the thanas from Habiganj Subdivision, even though these areas are among the most desparate in the nation for adequate transport.

In addition, three thanas (Kulaura, Kamalganj and Madhabpur) were excluded from the recommended network because rural roads are planned as part of the World Bank's Integrated Rural Development Program.

As a result, fifteen of Sylhet's 32 thanas have been excluded from this project. Among these are some of the most inaccessable and least developed thanas in Sylhet. The remaining thanas in the Subdivisions of Sylhet Sadar, Moulvi Bazar, and a portion of Habiganj already enjoy a relatively good transport network.

In spite of this there are still many thanas, such as Companyganj, Golapganj, Kanaighat, Biswanath and Jaganathpur, that require rural roads. The recommended road network provides road access for these areas.

E. The Total Program

Summing up the significant elements of the four district recommended networks, estimated costs in 1978 dollars total US $97.5 million, without allowing for land acquisition costs for required rights-of-way. The program would provide four district networks totalling 88 road segments, covering 783.5 miles, of which 427 miles would be hard surfaced.

A detailed summary of the four districts is given in Table 14.

TABLE 14
SUMMARY OF RECOMMENDED ROAD NETWORKS

	Faridpur	Patuakhali	Rangpur	Sylhet	Total
Number of Class IV Roads	16	9	12	9	46
Mileage of Class IV Roads	131.5	94.5	114	87	427
Number of Class V Roads	13	5	16	8	42
Mileage of Class V Roads	93	56.5	125	82	356.5
Number of All Roads	29	14	28	17	88
Mileage of All Roads	224.5	151	239	169	783.3
Estimated Network Cost	$ 32.7 M.	$ 25.4 M..	$20.6 M.	$ 17.7 M.	$96.4 M.
Average Per Mile Cost...	$145.7 Th.	$168 Th.	$86.2 Th.	$105 Th.	$126 Th.

VII. DISTRICT RANK ORDER

According to the terms of the contract, the four selected districts were to be priority ranked to determine in which district the rural road program might be initiated. Based on the data presented in the District Selection Report and the District Profiles, Volumes II through V of this report, it is immediately apparent that all four districts badly need rural roads development.

The information contained in the profiles reinforced the score ranks that were assigned each of the four selected districts in the District Selection Report. These scores were based on no less than fifteen different quantifiable factors within the four areas of transportation, agricultural potential, socioeconomic factors and institutional aspects. In addition, visits to district, subdivision and thana headquarters by members of the consulting team and the many interviews conducted at all three levels of local government in each of the four districts provided ample evidence that the priority assigned them in the Selection Report reflected a valid ranking. The scores assigned in that Report to the selected districts were:

Faridpur	30
Patuakhali	25
Rangpur	22
Sylhet	21

These are the priority rankings of the four selected districts recommended by the consultant.

VIII. ENVIRONMENTAL ASSESSMENT

In order to insure that the potential environmental impacts of this project are given appropriate consideration, an Initial Environmental Examination (IEE) has been prepared currently with other activities during Phase I of this project. By conducting the IEE as an integral part of this early study phase, sufficient time has been provided for more detailed evaluation in subsequent study phases. The IEE, which is included in Annex II follows the AID Guidelines for Preparation of Initial Environmental Examination and provides the basis for a Threshold Decision as to whether or not an Environmental Assessment or Environmental Impact Statement will be required for this project. As such the IEE identifies and describes (1) the nature, scope and magnitude of any reasonably foreseeable effects of the project on the human environment and (2) the reasonably foreseeable effects of the identified environmental impacts on organisms in the biosphere, including human life. An Environmental Assessment which may be conducted during Phase II of this project would address reasonable alternatives to the proposed action, including the do-nothing or no-build alternative.

Major areas of impact addressed in the IEE include land use, water quality, atmospheric, natural resources, cultural, socioeconomic, health and general. Impacts are identified, described, evaluated and discussed for each of the impact categories.

The results of the Initial Environmental Examination indicate that the potential environmental impacts of the proposed action are sufficiently significant to warrant further analysis. For this reason, it is recommended that an Environmental Assessment be conducted on the priority road network selected for further study in Phase II of this project as envisaged in the contract.

IX. AN APPROACH TO FEASIBILITY

For most or highway feasibility studies the stream of discounted benefits over the assumed life of the projects are derived largely from the differences in maintenance costs, in distance and in vehicle operating costs between the existing facility and the proposed new or improved facility.

This approach is simply not suitable for the evaluation of the rural road networks recommended in this study. On these roads, the bulk of the traffic for years to come will be headloads or loads carried by bullock carts.

Under these circumstances, quantifiable benefits can only be identified and measured by defining a second investment that would produce fewer benefits in the absence of a new road. Such a second investment could be for tourism infrastructure or for an industrial complex. But in the rural areas of Bangladesh, it can only relate to a program designed to increase agricultural output within the zone of influence of the road.

The approach to feasibility to be attempted by the consultant in Phase II therefore, will be to define an agricultural program containing an optimum mix of elements, cost it out on a per acre basis and estimate the annual increase in value the agricultural plus the road investments would generate. A major dilema to be faced will be the assignment of the benefit stream to the agricultural program as against the roads.

In undertaking a joint investment appraisal approach during Phase II of the study, the preliminary project appraisal including an alternate rate of return calculation in Phase I was deferred.

APPENDIX I: BASIC ENGINEERING DATA

A. Design Data

1. Roads

The criteria for the class, section and geometric details of the rural roads was adopted from the recommendations prepared by an ad hoc committee appointed by the Transport Survey Section, Planning Commission. These criteria were submitted to Government and USAID for review and approval by letter dated May 11, 1978.

2. Bridges

The criteria for the design of bridges for rural roads was developed by the consultant and discussed with the Ministry of Local Government and Rural Development. It was agreed that the bridges shall be designed for a single-lane roadway of 12 ft. with curb and railing only in the open areas but with curb, sidewalls and railing in developed locations.

The structures shall be reinforced concrete construction designed for a loading of H-20 trucks.

Generally, structure length shall be limited to 200 feet for economy roads. Waterway openings in excess of 200 feet shall be served with ferries.

The two classes selected for the Rural Roads Study are Class IV and Class V which are defined as:

Class IV - Roads connecting subdivisional and thana headquarters and other principal growth centers.

Class V - Roads connecting thana and union headquarters or secondary growth centers.

Typical sections for Class IV and V roads and bridges are shown in Appendix I, Figures 1 through 3. A proposed method for rehabilitating existing embankments is shown in Figure 4.

3. Geometric Design Criteria

The geometric design criteria for Class IV and Class V roads are as follows:

Item	Class IV	Class V
Design Speed (MPH)	30	20
Horizontal Curve Minimum (Ft)	250	250
Vertical Curve Minimum (Ft)	G x 28 or 100' Min	G x 28 or 100' Min (G = algebraic difference (%) of grades)

Item	Class IV	Class V
Sight Distance Minimum(Ft)	200	110
Superelevation Maximum(%)	6	6
Gradient Maximum (%)	10	10
Stopping Sight Distance Minimum (Ft)	200	200
Pavement Structure	BIT/Brick	Earth
Pavement Axle Design Loading	18,000 Lbs	
Bridge Width Roadway	128-0"	12'0"
Bridge Loading	H-20	H-20

B. Cost Data

All construction cost factors are based upon current costs of the various inputs, such as labor, equipment, materials, and the development of unit prices for each item of work considering the proper matrix of these factors plus production rates, time and supervision.

For the rural roads study, this generally accepted practice was followed after collection of local data. The results

of these investigations and computations are grouped under the following headings:

1. Labor Rates

Category	Cost Per Day (Taka)
Unskilled Laborer	15.00
Skilled Laborer	20.00
Mason	35.00
Carpenter	35.00
Driver	20.00

2. Material Costs

Type	Unit	Costs	
		Taka	US $
Local Sand	100 cf	100.00	-
Sylhet Sand	100 cf	600.00	-
Ist Class Bricks	1 000 ea	456.00	15.23
Boulders	100 cf	600.00	-
Mild Steel	100 lbs	240	8.48
Cement	Bag	27.00	3.00
Bitumen	Ton	960.00	140.00
Lumber	100 cf	400.00	-
Coal	Ton	160.00	40.00

3. Equipment

Equipment	Cost per Hour	
	Taka	US $
Tractor	30.00	9.25
Sheepsfoot Roller	-	1.00
3-Wheel Steel Roller	30.00	6.80
Truck - 5 Ton	30.00	0.15

4. Earthwork

	Item	Unit	Unit Price Taka LC Comp.	Unit Price US $ FC. Comp
	0-5'	1000 cf	190.00	4.40
	5-8'	1000 cf	216.00	4.40
	8-11'	1000 cf	242.00	4.40
5.	Pavement Course	Mile	625,000.00	24,000.00
6.	Culvert	Rft	5,000.00	193.00
7.	Structures:			
	10'-60'Span	Rft	9,000.00	225.00
	60'-200'Span	Rft	13,500.00	338.00
9.	Ferry Cost Range			
	Country boat	Each	20,000.00	937,500.00
	Motorized	Each	1,000,000.00	
10.	Other			
	Contingencies			25%
	Final Engineering			6%
	Construction Supervision			10%

APPENDIX TABLE I

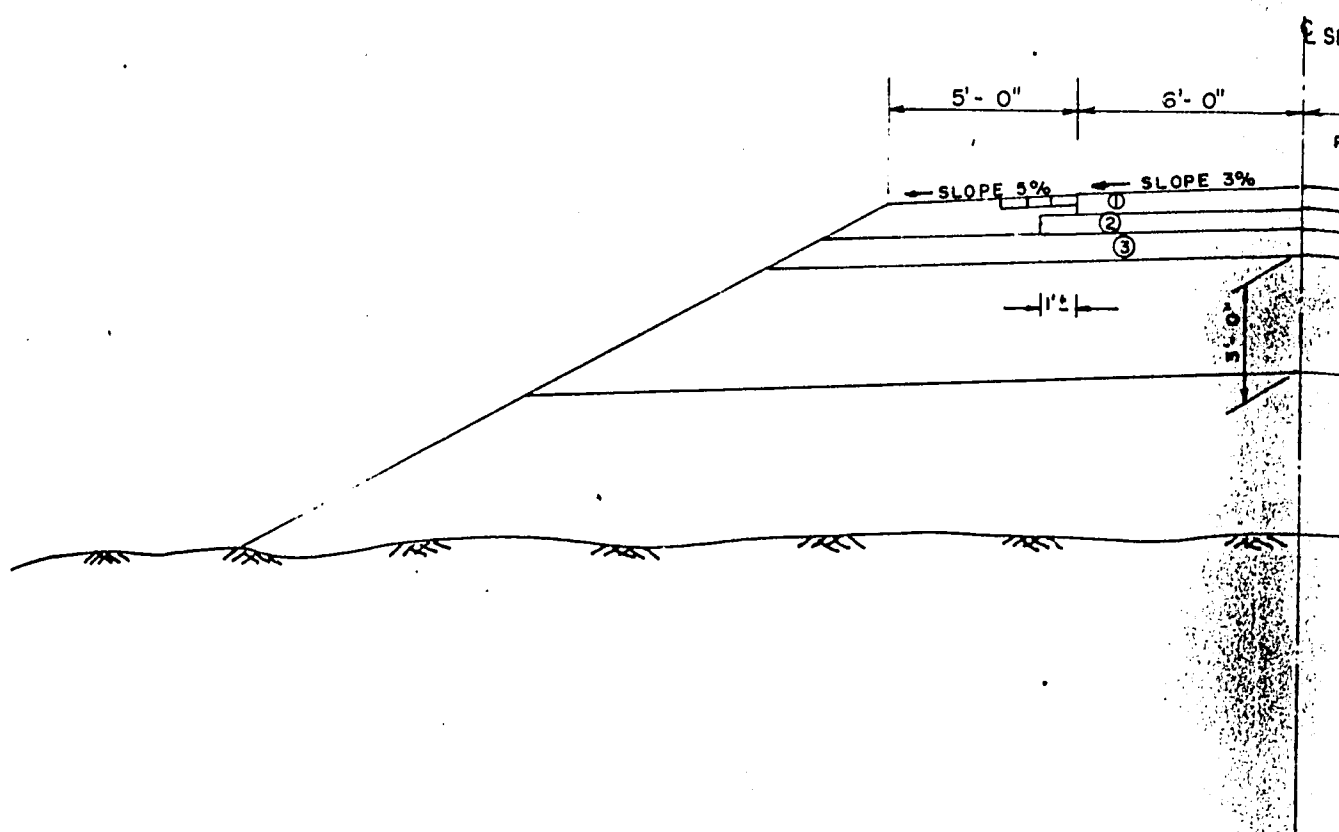
PER MILE AND RUNNING FOOT COSTS

WITH/WITHOUT TAXES AND LOCAL/FOREIGN CURRENCY COMPONENTS

Type of Work	Total Costs including Taxes and Duties	Taxes and Duties		Costs excluding Taxes and Duties	Local Currency		Foreign Currency in Take Equiv.	
		Amount	Percentage		Costs	percentage	Costs	Percentage
Pavement Course per mile	11,26,116	117,116	10.4	1,009,000	625,000	62	384,000	38
Box Culverts per rft	11,217	3,130	27.9	8,008	5,000	62	3,088	38
Bridge 10' - 60' Span per rft	18,311	5,711	31.19	12,600	9,000	71	3,600	29
Bridge 60' - 200 Span	27,019	8,111	30.02	18,908	13,500	71	5,408	29

7 A

CROSS SECTION, C



CLASS IV
ADT 400-12

PAVEMENT STRUCTURE *

1. 6" W.B.MACADAM WITH BIT. SEAL COAT.
2. 3" BRICK BASE LAYER
3. 6" SAND SUB-BASE LAYER

* PAVT D
BASED
SUBGRA

EMBANKMENT STRUCTURE

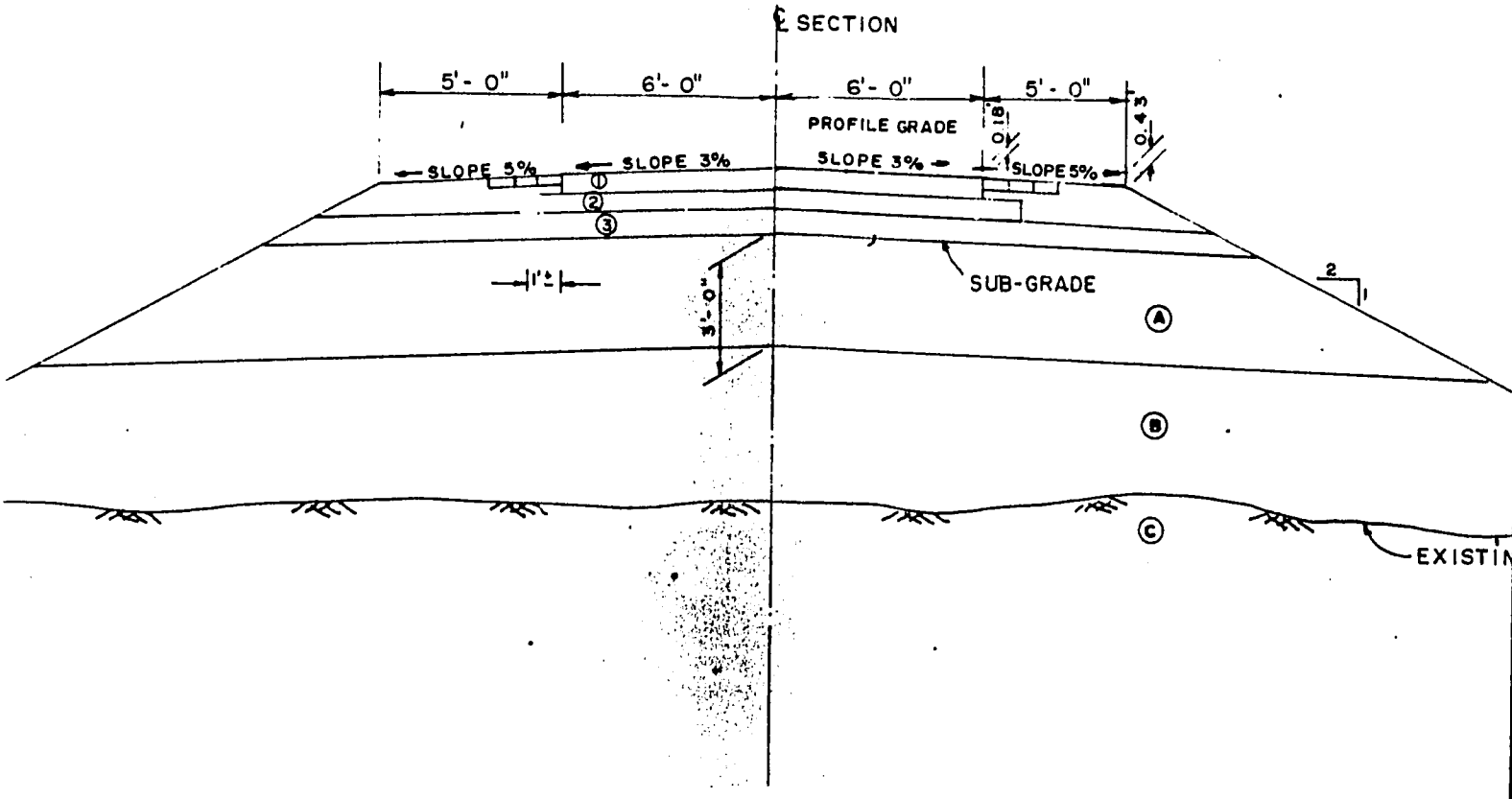
Ⓐ TOP 3' COMPACTED TO MIN. 95 % AASHO T-180.

Ⓑ REMAINING HEIGHT COMPACTED TO MIN. 90 % AASHO T-180.

Ⓒ TOP 6" SCARIFIED & RECOMPACTED TO MIN. 90 % AASHO T-180.

7-B

CROSS SECTION, CLASS IV ROAD



CLASS IV ROAD
ADT 400-1200PCE

AL COAT.

* PAVT DESIGN TO BE
BASED UPON 18,000 AXLE LOAD.
SUBGRADE CLEARANCE ABOVE FLOOD - 3.0 FT.

5 % AASHO T-180.

ED TO MIN. 90 % AASHO T-180.

CTED TO MIN. 90 % AASHO T-180.

APPENDIX-1 FIGURE - 1 PAGE-7

SS IV ROAD

7-C

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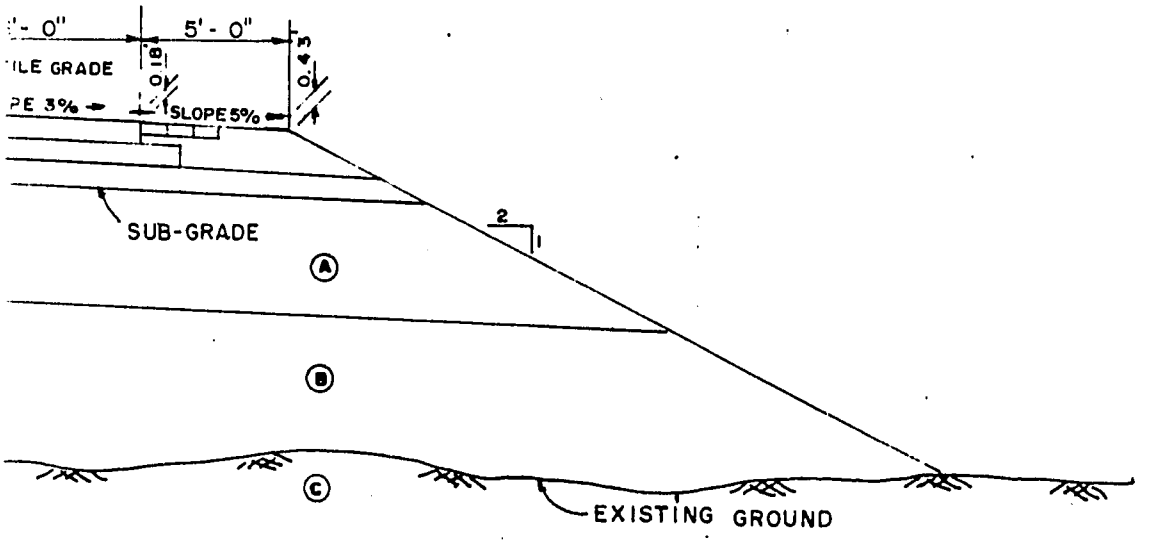

AD
PCE

IGN TO BE
ON 18,000 AXLE LOAD.
E CLEARANCE ABOVE FLOOD - 3.0 FT.

SCALE: Hor. & Ver. 1/2cm = 1'-0"

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH	
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ROAD TYPICAL	
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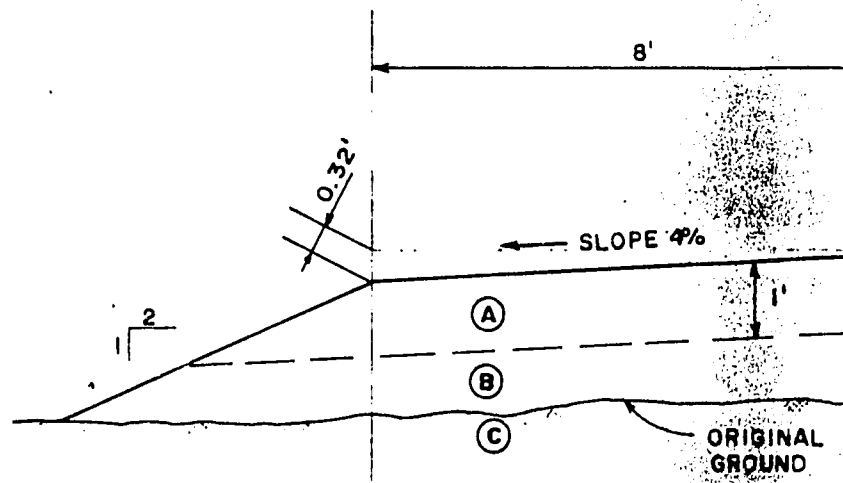
DATE	DRG. NO.

8-A

CROSS SECTI



NOTES :

(A) TOP 1' LAYER COMPACTED TO MIN 95% AASHO T-180.

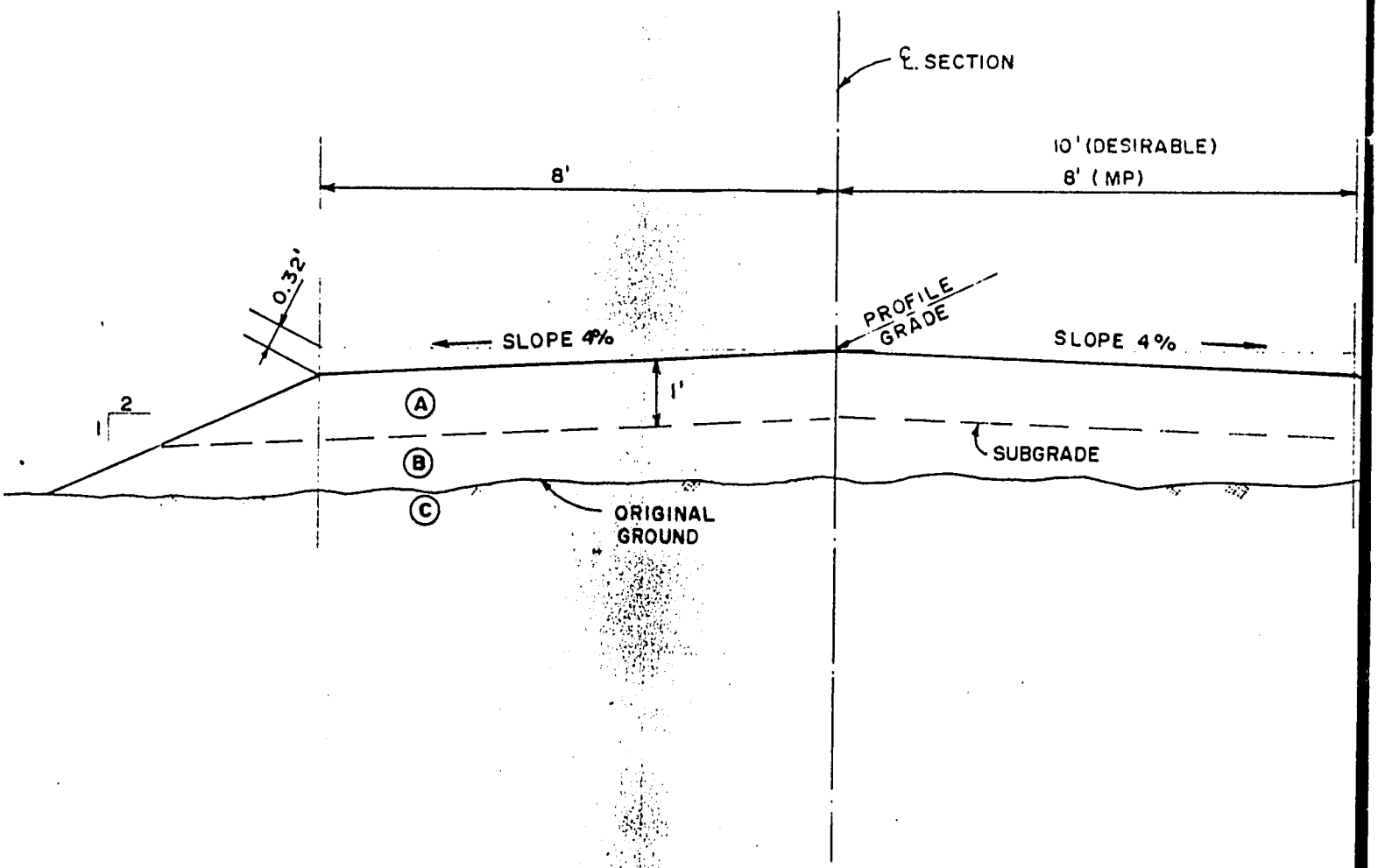
(B) REMAINING EMBANKMENT MATERIAL COMPACTED TO MIN. 90% AASHO T-180.

(C) ORIGINAL GROUND WITHIN EMBANKMENT LIMITS TO BE SCARIFIED TO DEPTH OF 6" AND RECOMPACTED TO 90% AASHO T-180

MIN. ROW LIMIT T
SUB-GRADE CLEAR

8-B

CROSS SECTION, CLASS V ROAD



CLASS V ROAD
ADT 0-400 PCE

MIN 95% AASHO T-180.

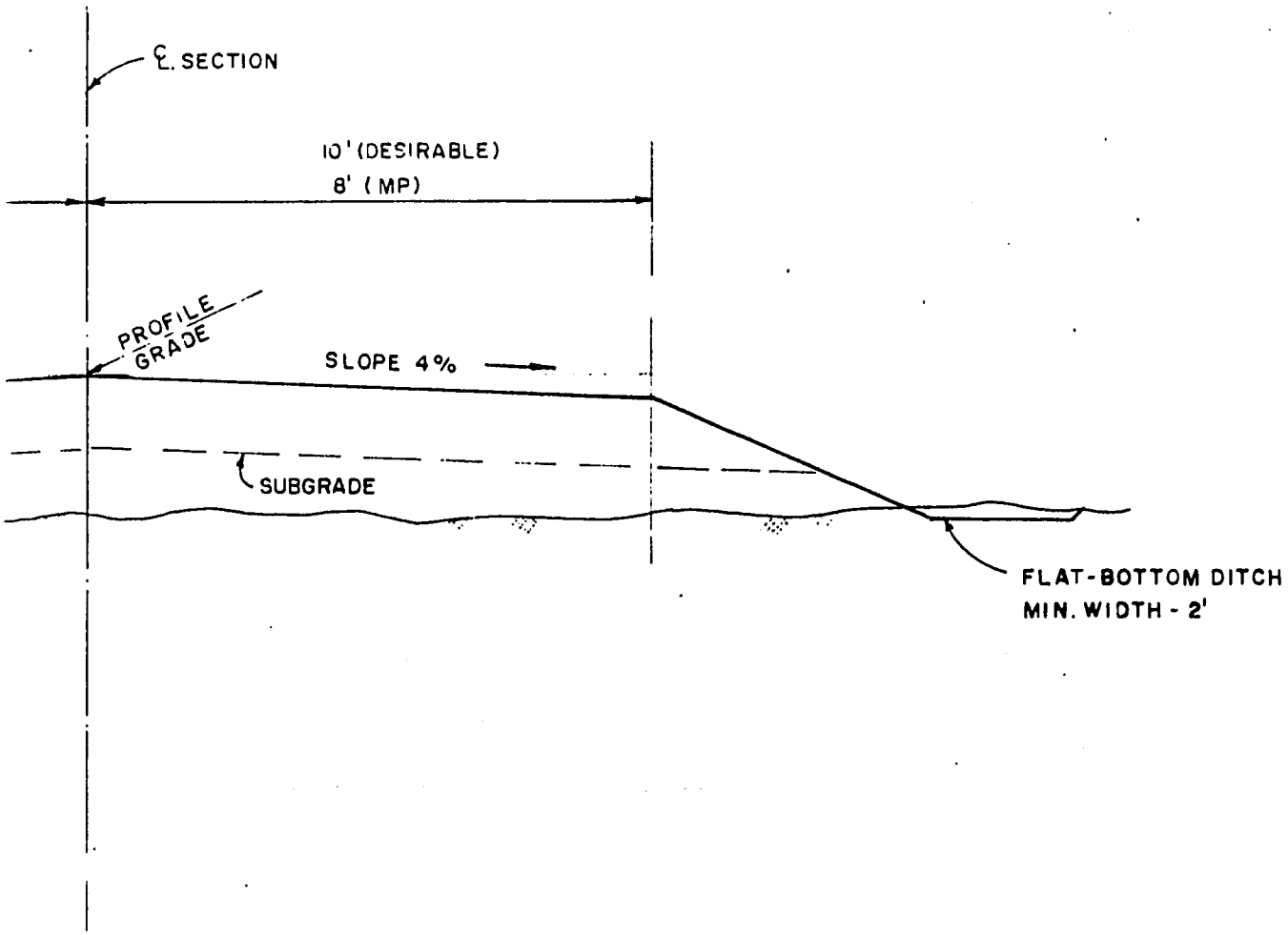
RIAL COMPACTED

ANKMENT LIMITS
F 6" AND RECOMPACTED

MIN. ROW LIMIT TO BE 3' BEYOND CONST. LIMITS.
SUB-GRADE CLEARANCE ABOVE FLOOD - 1 5 FT.

I, CLASS V ROAD

8-C



CLASS V ROAD
ADT 0-400 PCE

SCALE Hor. & Ver. : 1 cm = 1' - 0"

BE 3'BEYOND CONST. LIMITS.
CE ABOVE FLOOD - 1 5 FT

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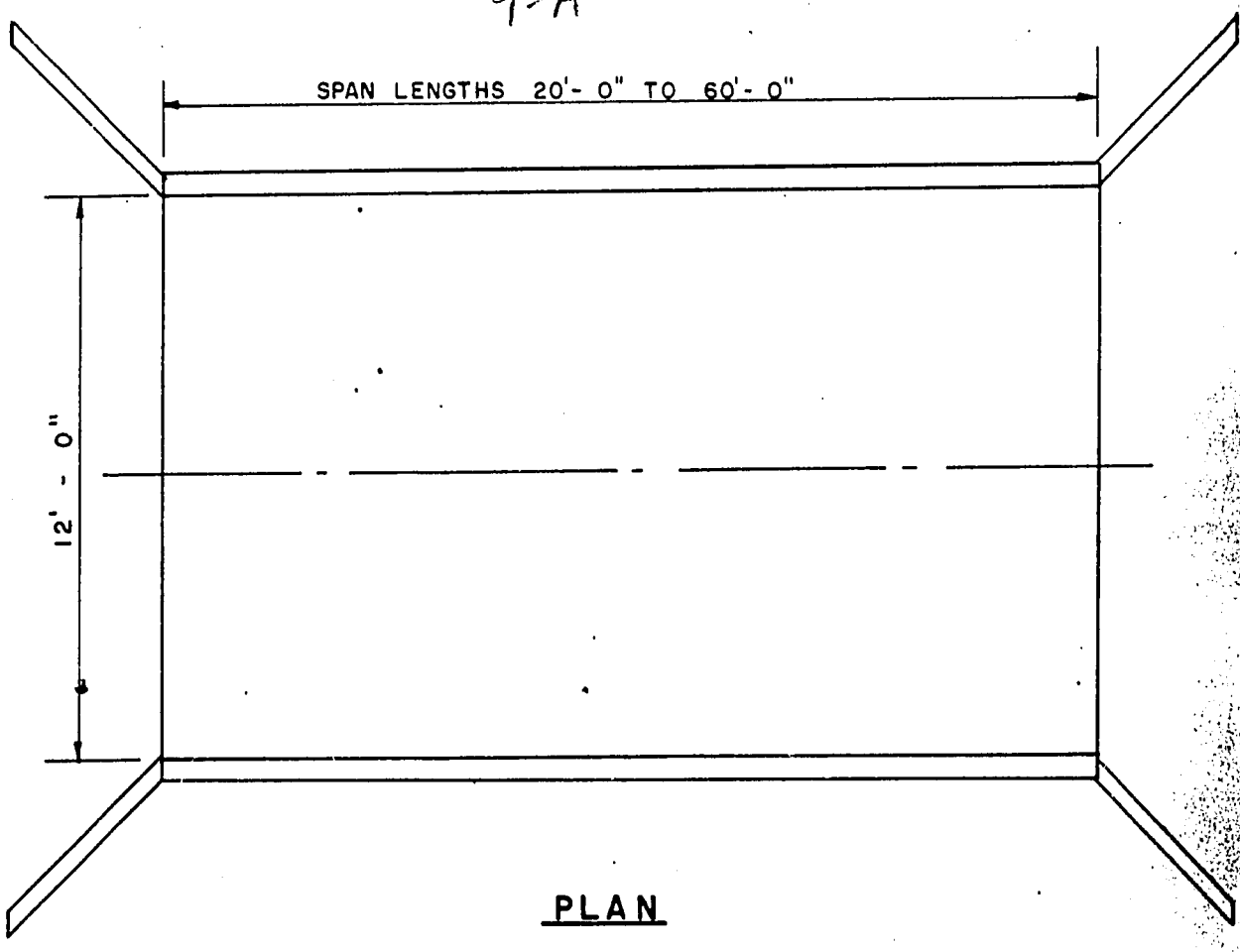
9-A



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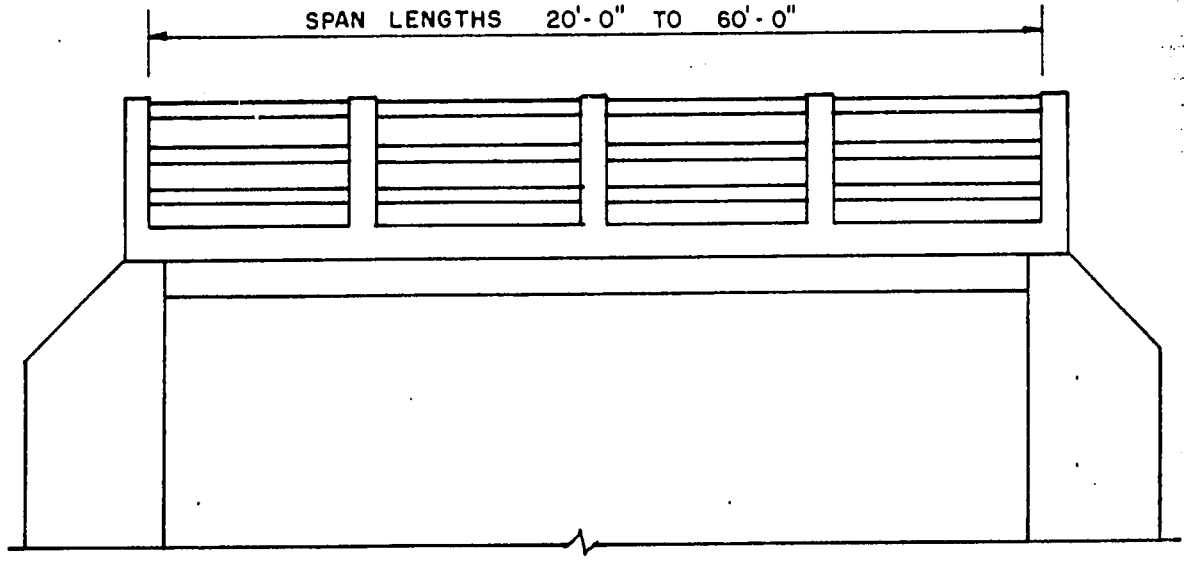
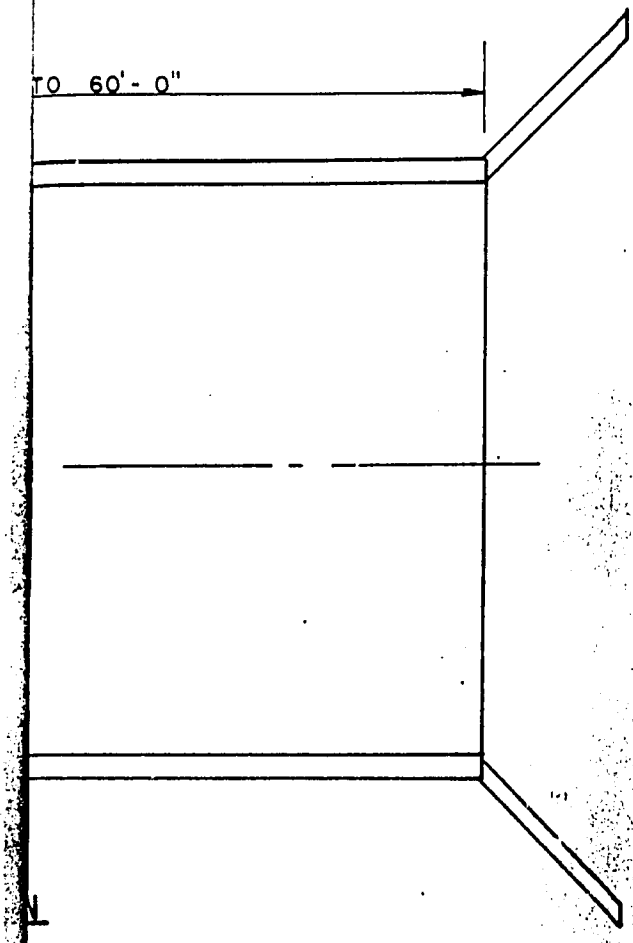
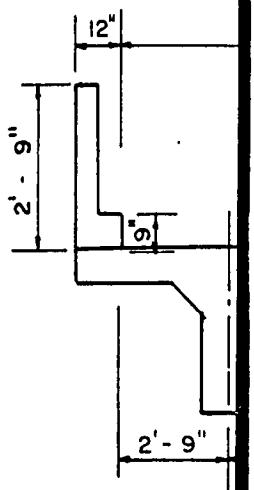


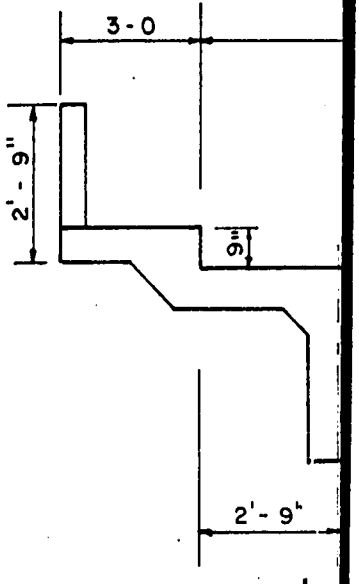
ELEVATION

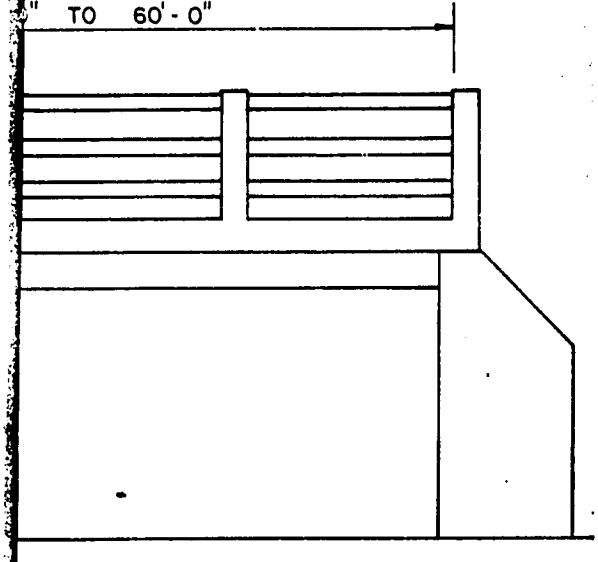
CROSS SECTION, BRIDGES

9-B









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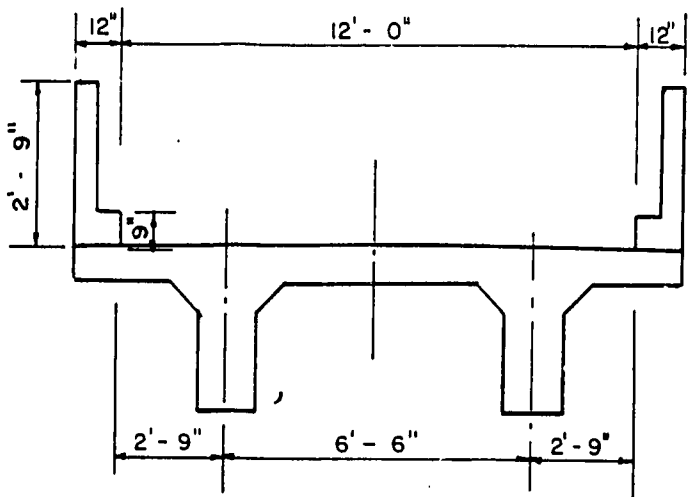
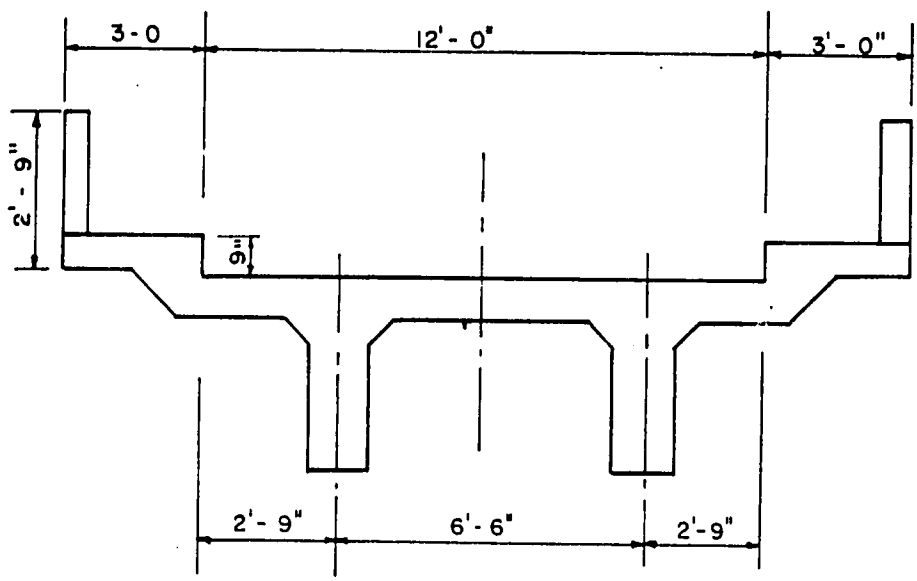


CROSS SECTION
OPEN AREAS



CROSS SECTION
DEVELOPED AREAS

Scale : 1"= 4'- 0"

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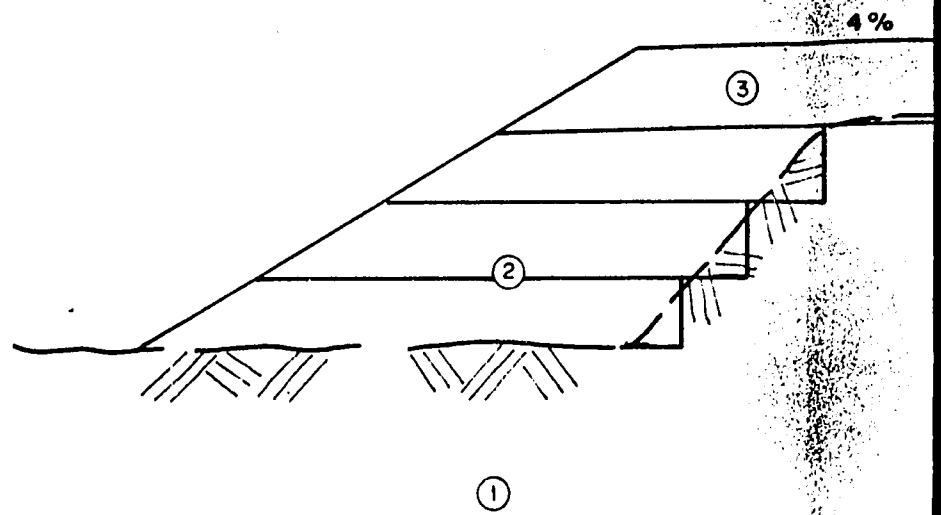
10-A

REHABILITATION EXISTING



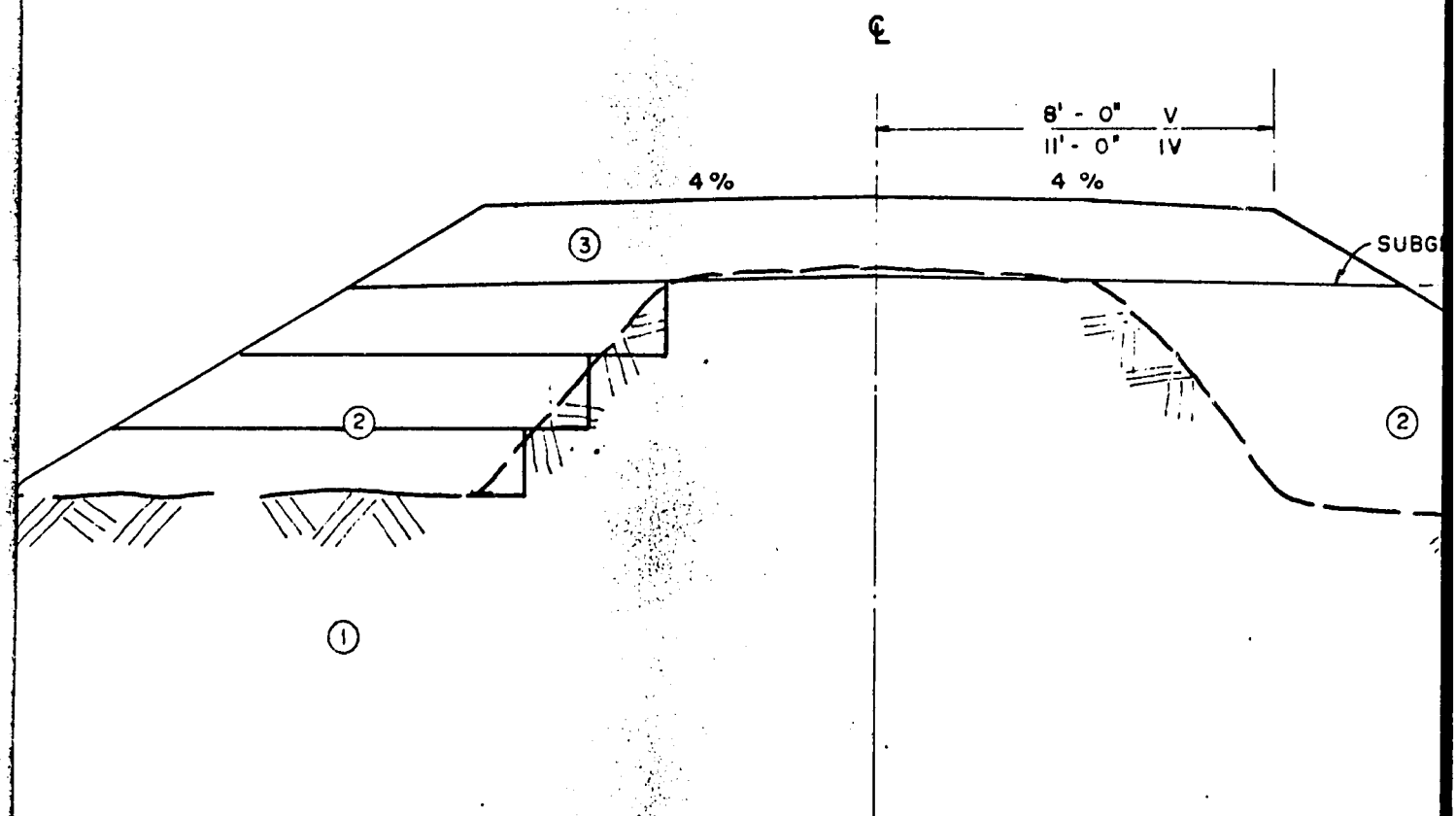
① EXISTING SOD AND TOPSOIL TO BE REMOVED.

② ADDITIONAL EMBANKMENT CONSTRUCTED IN LAYERS. BENCHES-MIN. WIDTH 8', MIN. DEPTH 2'.

③ PAVEMENT STRUCTURE.

REHABILITATION EXISTING EMBANKMENTS

10-B



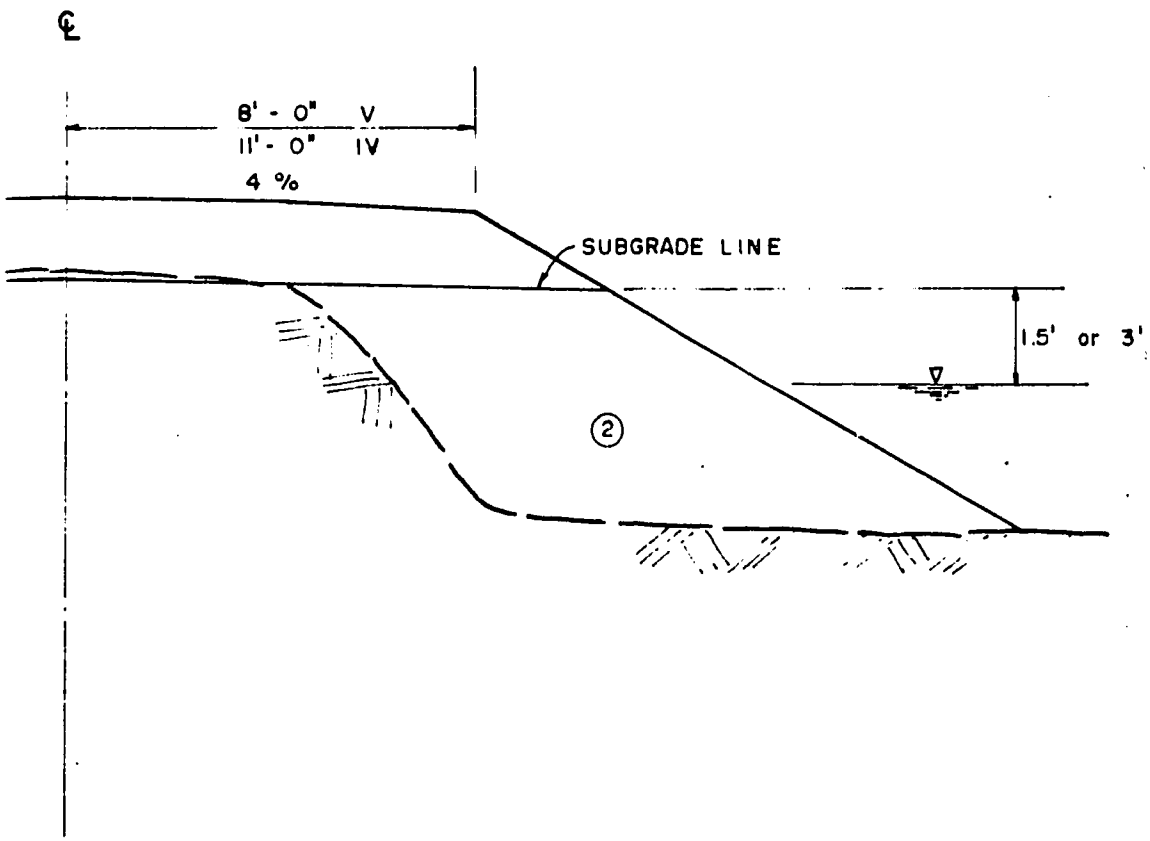
PSOIL

NT CONSTRUCTED IN LAYERS.
', MIN. DEPTH 2'.

MBANKMENTS

APPENDIX-1 FIGURE – 4 Page-10

10-C



Scale : ½ cm = 1' Ft.

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APPENDIX II: DETAILS ON THE ROAD PRIORITY RANKIG SYSTEM

A. Introduction

The approach used by the consultant for Sections III & IV above relating to preliminary road screening and road ranking are adaptations and refinements of an approach contained in World Bank Staff Working Paper No.241, The Economic Analysis of Rural Road Projects (August 1976). The specific guide followed by the consultant is to be found in Annex III of this document and is entitled, "Preliminary Screening and Selection of Rural Roads - A Framework".

A significant deviation of the rating system employed in this report from the example cited lies in the handling of road construction costs. In the World Bank example these are treated as a sub-criterion of economic activity and are thus included as part of the total rating scheme (the lower the cost the higher the rating for this item). In the present report criteria termed benefit factors have been developed. The total scores for each road have been divided by the per mile costs for that road. This results in a relative benefit/cost ratio that can easily be ranked, road by road. Care should be taken not to regard this as a true benefit/cost evaluation.

B. The Ranking System

The consultant adapted the methodology and approach which appears in the cited World Bank Staff Working Paper only after reviewing a number of ranking and rating schemes.

The schemes devised for the priority ranking of rural roads in each of the four selected districts, however, is a considerable modification to that presented in the referenced Annex 3

of the World Bank paper. In addition to a radically different treatment of road construction costs, the criterion and factors used here and the weights given them have been tailored to the rural conditions existing in Bangladesh, and have been tempered in the light of the objectives of this particular project.

1. Criteria for Priority Ranking

Five overall criteria were selected to be taken into account in assigning priority ratings to the roads being ranked in each district. Each criteria was assigned a weight, with total weights adding up to 100. Within the criteria twelve component factors were selected and each was assigned a subweight. The criteria, their component factors and the weights assigned are listed in Table 9 of Section V in the body of this volume and is not repeated here.

2. Measurement Units

The component factors selected and the units of measurement employed are dependent in the first instance on the availability of specific data within the zone of influence of the road.

With the establishment of the factors, their subcomponents and their weights, the measurement unit for each subcomponent was determined. The range of the factor values for each measurement unit is different; hence a common rating scale was introduced.

Each road in the screened district rural road network was given a score or rating in this system of priority ranking. The hypothetical range of the rating could be between 0 and 100. This rating method has the advantage of drawing a cut-off line wherever the authorities decide. If a 250 mile network of road construction is desired, the cutoff line can be drawn to include 250 miles of road. Similarly, the cutoff line can be drawn to limit the network to be constructed to 200 miles, or to 150 miles. This anables the authorities to plan the rural road projects in the light of budgetary restraints while retaining the more important roads.

3.7 Worksheets and Instruction Sheet Guides.

Appendix II table 1 through 3 are samples of the worksheets and instruction sheets issued to define the data and calculate the priority rating scores for each of the road segments evaluated and rated in the screened road network.

APPENDIX II, TABLE 1

ROAD PRIORITY RATING SCHEME

	Component Factor	Measurement Units	Measuring Parameters: Range of Factor values	Measuring Parameters: Common Rating Scale	Component Factor Weight	Factor Weight
1	2	3	4	5	6	7
POPULATION	1.Population Density in Road Corridor	Thana population Density(Pop/Sq.Mi)	500-3000	0-100	10%	10
	2.Employment Generated for construction	Man-months	To be supplied by engineers.	0-100	5%	
	3.Thana Transport Score.	Additive Index from thana transport connections	4-Poor connections 14-Good connections	0-100	13%	
EQUITY	4.Famine/Disaster Vulnerability	Whether thana is recorded as a Famine or Disaster Prone Area	Yes No	100 0	5%	25%
	5.Percent Unemployment (Subdiv.Level)	% of Male Adults Unemployed	To be supplied	0-100	2%	
	6.Agricultural Potential:					
	A.Increase HYV Acreage	Much/Some/or Little Increase possible	Much Some Little	100 50 0	2% 3%	

Table Continued on next page

APPENDIX II, TABLE 1 (CONTINUED)

ROAD PRIORITY RATING SCHEME

1	2	3	4	5	6	7
AGRICULTURE.	B. By Increasing Cropping Intensity	Much/Some/or Little Increase Possible	Much Some Little	100 50 0	10%	40%
	C. # of Potential Irrigation Schemes	Acres per road mile	Varied by District	0-100		
	7. Existing Irrigation Schemes in Corridor	Acres irrigated per road mile	Varied by District	0-100	5%	
	8. Markets Linked	Additive Index based on # and size of markets linked & Distance from Road	Varied by district	0-100	20%	
OTHER ECONOMIC ACTIVITY	9. Fishing, agroprocessing, cottage industry, mechanical repair electrification.	Additive Index divided by Road length	Varied by district	0-100	.10%	10%
	10. Local Priority Rankings	Index based on priority ratings by thana, subdivision, & district officials		0-100	.05	
INSTITUTIONAL & ADMINISTRATIVE	11. Completion of thana /union plans	% completion % completion	0-100	0 100	.02	
	12. Public Facilities connected.	Additive Index Divided by Road length	Varied by District.	0-100	.08	

APPENDIX II, TABLE 2
ROAD PRIORITY RATING - CALCULATION SHEET

Proposed Road:

From_____Thana(s)_____

To_____Subdiv/Dist_____

Miles_____# Bridges_____Surface_____Class_____

Estimated Total Cost_____Estimated Cost Per Mile_____

Component Factor	Raw Input Data	Rating 0-100	Component Weight	Weighted Rating	Factor Weight
1. Population in Road Corridor (Thana Density)			.10		10%
2. Construction Employment in Manmonths			.05		
3. Thana Transport Score			.13		25% Equity
4. Famine/Disaster Vulnberability			.05		Factor
5. Percent Unemployed(Subdivision level)			.02		
6. Agriculture Potential					
A. % of Potential HYV rice acreage increase			.02		
B.Cropping Intensity			.03		
C.Potential New Irrig. Acres			.10		
7. No.of Irrigated Acres in Corridor Per Miles			.05		40% Agriculture
8. Markets/Ghats Linked(Index/ Miles)			.20		Potential

Continued on next page

APPENDIX II, TABLE 2 (CONTINUED)
ROAD PRIORITY RATING - CALCULATION SHEET

Component Factor	Raw Input Data	Rating 0-100	Component Weight	Weighted Rating	Factor Weight
9. Other Economic Activity(Fishing Industry, Agro-processing electrified locations			.10		10% Other Economic Activity.
10. Local Priority Ranking			.05		15%
11. Thana/Union Plan			.02		Institutional and Administrative.
12. Local Facilities Connected or in Corridor			.08		
	TOTAL	Range 0-1400	1.00		

Ratios : $\frac{\text{Total Weighted Rating}}{\text{Cost per Mile}} \times 1000 =$ _____

APPENDIX II, TABLE 3

INSTRUCTION SHEET FOR RECORDING RAW INPUT DATA ON "ROAD PRIORITY RATING - CALCULATION SHEET"

Component Factors	Measurement Units	Input Data Instructions
1.Population in Road Corridor	Thana Population Density or Mean Union Population Density	Take the Popul tion Density for each Union(Persons per Square Mile) and r cord in the raw input data column.
2.Construction Employment Generated	Manmonths	An estimate to be provided by engineers during costing.
3.Thana Transport Score	Additive Index	(A) Record the Road Transport Scores used in the District Selection Report.
4.Famine/Disaster Vulberability	Yes/No	Use the famine maps prepared by Bruce Currey. If any of the shaded areas cover the thana,write"yes". If the thana is not on the shaded area in any of the maps, write "no".
5. Percent Unemployed	% of adult population	Record the unemployment percent of that subdivision from the 1974 census (unpublished data).
6.Agricultural Potential		
(A) Potential HYV grain acreage increase	Much Increase Some Increase None possible	(A) Take General Thana Agriculture Information proforma,page 3,question 7. (B) Record answer from question 7-C,potential in thana for increase in production by change to HYV from deshi

Table continued on next page

APPENDIX II, TABLE 3 (CONTINUED)

Component Factor	Measurement Units	Input Data Instructions
(B)Possible Cropping Intensity Increase	Much Some Little or None	(1)Check question 7-B on Thana Agricultural Information Proforma. (2)Record answer to question: (Much, some or little/none)
(C)Potential Irrigation Increase	Est.Additional possible Irrigated Acres/Mi (All types)	(1)Check Priority Road Agricultural Information Proforma, question 4. (2)Add Nos.of additional schemes reported possible in road corridor. (3)Multiply by average acres/scheme of each type in thana; divide by length of road.
7. Existing Irrigation in Road Corridor (All Types)	Acres/Mile	(A)Priority Road Agricultural Proforma, Q.7. (B)Add Nos.of Existing Schemes of Deep tubewells,Low-lift pumps, and Shallow Tubewells.
8. Markets/Ghats linked	Additive Index divided by Road length	(A)Data to be taken from 'Priority' road Information sheet filled by C.O.and corridor sketch. (B)Class of market to be determined on basis of Agricultural Marketing Directorate. All classes A&B to be counted same others assumed to be class C.

Table continued on next page

APPENDIX II, TABLE 3 (CONTINUED)

<table>
<tr><th>Component Factor</th><th>Measurement Units</th><th>Input Data Instructions</th></tr>
<tr><td></td><td></td><td>(C)From the sketch of the road and/or the thana map corridor, check whether each market is directly along the road, or whether it is elsewhere in the 3 mile corridor.
(D)Using the chart below, determine the number of points for each market.
(E)Add the points for each market in the road corridor. Divide by road mileage.</td></tr>
<tr><td colspan="3"><table>
<tr><th></th><th>Class A or B Markets</th><th>Class C Markets</th></tr>
<tr><td>Directly along proposed road</td><td>10</td><td>6</td></tr>
<tr><td>Linked with proposed road on major road within 3 miles</td><td>8</td><td>4</td></tr>
<tr><td>In 3-mile corridor, but not linked by major</td><td>5</td><td>2</td></tr>
</table>
Note: Count major ghats as Class A/B markets, and smaller ghats as class C Markets.</td></tr>
<tr><td>9.Other Economic Activity</td><td>Additive Index divided by road length</td><td>(1) Source of Data:
(a)Priority Road Corridor Information sheet last page and corridor sketch.
(b)General thana information proforma, questions 6,7,8.
(c)Earlier thana unit information sheet, Question 7(for fish)</td></tr>
</table>

APPENDIX II, TABLE 3 (CONTINUED)

Component Factor	Measurement Units	Input Data Instructions
		(2) Give points for each of the following: (a) Each important Fish Market, Fisheries Scheme or Ice Plant -- 10 points. (b) Every Rice Mill, Wheat Mill, Oil Seed Press, Jute Baling Press, or other local agro-processing industry -- 5 points. (c) Every Cottage Industry Cente - 5 points (d) Every motor or electrical repair shop -- 5 points (e) Every electrified market or location on road - 10 points (f) Major Factory linked by road -- 10 points (3) Add points. (4) Divide by road length.
10. Local Priority Ranking	Thana choice Dist. or Subdivision choice	3 points for Thana 1st choice; 2 points for 2nd choice; 1 point for 3rd choice; Plus 2 more points if road was in first 3 choices of district or subdivision officials.(Max. 5 points)
11. Completion of Thana/Union plans	% completion	Check earlier Thana information forms.
12. Local Public facilities connected	Additive Index divided by road length	Check priority road proforma, last page and sketch maps. (A) Add 10 points for each of the following public facilities directly linked: Union Council Office, Mother-child Health Center, Thana Health Complex, High School, College, TTDC, Grain Storage Godown. (B) Divide total by length of road.

ANNEX

INITIAL ENVIRONMENTAL EXAMINATION

Project location	:	Bangladesh
Project title	:	Rural Roads Study (338-0031)
Funding	:	$46.42 Million
Life of Project	:	4-6 years
IEE prepared by	:	Louis Berger Int, Inc.
Environmental action Recommended	:	Environmental Assessment
Date	:	July 20, 1978
Concurrence	:	
	:	Date:
Asst. Administrator/ Director Decision		Date:

ANNEX

INITIAL ENVIRONMENTAL EXAMINATION

TABLE OF CONTENTS

I. INTRODUCTION

This initial environmental examination has been prepared under the AID Guideline for Preparation of Initial Environmental Examination. As such, its purpose is to (1) identify reasonably foreseeable environmental impacts, (2) to determine the relative degree of impact and (3) to recommend the kind of further environmental evaluation that will be required.

To assure that this IEE becomes an integral part of early project design, it has been prepared during and as an integral part of Phase I of this study. This allows sufficient time for further environmental evaluation during Phase II of this Study. In addition, the IEE and further environmental evaluation will be available for use in subsequent related studies.

II. DESCRIPTION OF PROJECT

The purpose of the Bangladesh Rural Roads Study is to improve the transport network linking the small farmers to markets and government/private services in selected districts. Phase I of the study consisted of investigations and surveys leading to the selection of four priority districts for rural road development, the preparation of a profile and road network for each of the four priority districts and the subsequent evaluation and rank ordering of the priority areas.

Upon government and AID approval of the preliminary profiles and rank order of district under Phase I, a full feasibility study and project design will be carried out in Phase II for the ranking district recommended road network.

The four districts which were selected for further analysis in Phase I include Faridpur, Patuakhali, Rangpur and Sylhet. Profiles were developed for each district and included in the Phase I Report. The profiles are detailed descriptions of the environmental setting of the district including major land and water forms, land use, socioeconomic characteristics, flora, fauna, special cultural features, as well as the recommended network of roads for the district.

III. DISCUSSION OF PROBABLE ENVIRONMENTAL IMPACTS

A. Land Use

1. Changing the Character of the Land Through:

a. Increasing Population

Construction of rural roads in any of the four districts is not expected to increase population overall or cause any significant shifts in population. It is expected to facilitate administration of the nation's highest priority program, family planning. Existing programs are severely hampered by lack of communication and access for delivery of educational materials, contraceptives and related medical care. Supervision and follow up activities, an important part of the family planning programs, will also be facilitated.

b. Extracting Natural Resources

Of the four districts selected, only Sylhet District has natural resources in economically developable quantities. Of the two available resources, forests and minerals, only the latter is likely to be affected by the proposed action. Due to limited production capability, no significant increase in forest products is anticipated. Some limited increases in ongoing gravel extraction activities are likely to result from the proposed action.

c. Land Clearing

With rare exception, all lands to be affected, either directly or indirectly, have already been cleared of natural vegetation and are used for agricultural purposes. Virtually no new lands

are available for clearing in any of the four districts. In addition, most of the nominated roads follow existing rights-of-way, although requirements for additional rights-of-way could be considerable under the program.

d. Changing Soil Character

The proposed project will have no direct effects on soil characteristics. As improved access combined with other influences encourages farmers to shift from traditional agricultural practices, however, alteration of soil characteristics is likely especially through the introduction of HYV, fertilizer, irrigation and pesticides. Improper application of modern agricultural techniques, could possibly result in the depletion of existing soil resources. It is expected that increased access to modern agricultural technology through agricultural extension services will mitigate potential adverse impacts to a large extent.

2. Altering Natural Defenses

Disturbance of vegetation during construction will alter natural defenses against soil erosion during the construction season which lasts approximately 5 or 6 months per year. Rainfall during this period is low and revegetation of all exposed areas will minimize erosion. Perpetuation of existing natural drainage patterns will minimize, to a large extent, the potential adverse effects of drainage alterations. Erosion will continue to be a problem, especially during the rainy season, for those roads to be constructed to Class V standards.

3. Foreclosing Important Uses

Land taken for use as roadway or borrow area is removed from agricultural production. In Bangladesh, where agricultural land is scarce, this effect can be significant. It is unfortunately true, however, that insufficient land has been reserved for transportation uses in the four selected districts. It is inevitable, therefore, that development of rural roads will remove some land from agricultural production. A number of factors will work to offset the adverse effects of removing land from cultivation.

First, it is highly likely that increases in yields on other lands, especially those adjacent to the roadway, will offset the production lost from lands removed from cultivation for right-of-way or borrow areas. Second, increased access to primary and secondary markets, storage godowns or distribution centers will reduce spoilage. Third, increased access will encourage crop diversification, an important factor in agricultural stability.

4. Jeopardizing Man or his Works

Many of the proposed roads would be built on land that is flooded every year. Since 56% of the land in the four selected districts is normally flooded at least once per year, this is unavoidable. Proper design, construction and maintenance of ditches and culverts will minimize adverse affects. Two areas are particularly hazardous. They are the haor area of Sylhet District and the southern region of Patuakhali District which is often hit by cyclones and accompanying tidal waves. Particular attention will need to be paid to the design,

construction and maintenance of roadways in these two areas to assure their long-term existence. Class V roads are particularly vulnerable to erosion.

B. Water Quality

1. Physical State of Water

Physical changes in water quality will be from erosion and resultant siltation during the construction of the roadways. It is proposed that all exposed surfaces be promptly revegetated to minimize long-term effects. Class V roads will continue to change the physical state of nearby waters throughout their lifetime.

2. Changing the Chemical or Biological Status of the Water

Biological changes in the water are likely during construction where significant sewage loads will be introduced into waters adjacent or near the proposed roadways. These changes are expected to be temporary in nature. After construction, chemical or biological changes in the state of the water will be limited to the potential adverse impacts of increased fertilizer or pesticide use resulting from the new roads. Overall adverse impacts on water quality are expected to be limited in scope, especialy in light of proposed and ongoing agricultural education and training programs for rural areas of Bangladesh.

3. Changing the Ecological Balance of the Water

Provided that structures such as culverts and bridges allow for adequate movements of fish to historic breeding and rearing areas, little change in the ecological balance of water is foreseen. Although Class V roads will result in increased siltation, most affected water courses are already subject to heavy siltation.

C. Atmospheric

1. Air Additives

No air additives are expected to result from the proposed action.

2. Air Pollution

A slight increase in particulates from fugutive dust during construction is to be expected. No significant amounts of other pollutants are expected to result during either construction, which is highly labor intensive, or operation, which will involve only a limited number of motorized vehicles. Dust, however, could be a problem during the dry season for proposed Class V roads.

3. Noise Pollution

Since essentially only two motorized vehicles, a tractor and a roller, will be used during construction, noise pollution will be minimal. As stated, only a very limited number of motorized vehicles are expected to use the proposed roadways after construction.

D. Natural Resources

1. Diversion, Storage or Increased Use of Water

Only limited diversion of water is expected since existing drainages will be perpetuated to the largest extent feasible. A slight increase in water use, either surface or ground water for irrigation, is expected as modern agricultural inputs become more readily available.

2. Irreversible or Inefficient Commitments of Natural Resources

Since only limited expansion of existing natural resource extraction operations is expected, few irreversible or inefficient commitments of natural resources are likely to result from the proposed action.

3. Fisheries

Fisheries provide a vital source of protein and employment, and it is essential that adequate consideration be given to perpetuating natural, migratory movements of fish. In addition, developing fish tanks in conjunction with roadway construction, especially in borrow areas, is a distinct possibility.

E. Cultural

1. Altering Physical Symbols

The proposed roads are not expected to directly affect existing monuments, mosques, shrines, temples or historic places. Increased access to those symbols lying near a proposed roadway may have, although slight, both beneficial and adverse effects.

2. Cultural Dilution

Since the character of the proposed roads is rural in nature, increased access to either foreign cultures or their influence will continue to be severely restricted. It is possible that, through the construction and operation of the proposed roads, a slight hastening in the changing role of women in rural Bangladesh could result. Cultural impacts resulting from rural development in Bangladesh are inevitable.

F. Socioeconomic

1. Changes in Economic/Employment Patterns

No substantial changes in economic or employment patterns are expected to result from the proposed action. Small rural developments such as cottage industries may result but are not expected to be significant. The construction of rural roads as proposed in this project is designed to perpetuate and upgrade the existing agricultural economy of the proposed districts.

2. Changes in Population

No substantial movements or resettlements of people are expected. Changes in socioeconomic relationships either among people or between people and their community are not expected to be significant.

3. Changes in Cultural Patterns

Limited changes in the status of women are expected to result from their employment during construction and from increased access to and communication with other parts of the thana, subdivision or district.

4. Equity

Equity, as used here, refers to the goal of the proposed action that benefits due to the project, to the greatest extent possible, accrue to the small farmer, either landed or tenant. It is felt that short-term benefits are more likely to accrue to traders and larger landholders and it is hoped that, in time, benefits such as increased prices for farm products and increased access to modern agricultural technology, inputs, markets and storage facilities will raise the lot of the small farmer. At this time, however, data are insufficient to make a determination with any reasonable certainty.

G. Health

1. Altering or Destroying a Natural Environment

The proposed action is not likely to result in any significant changes in the natural environment.

2. Eliminating an Ecosystem Element

No ecosystem elements will be eliminated, either directly or indirectly, by the proposed action.

H. General

1. International Impacts

The only possible international impact from the proposed action would be if significant reductions in winter habitat for migratory waterfowl, especially in the haor areas of Sylhet, were likely. Although some adverse impacts on such habitats are likely to result from the proposed action, they are not expected to be significant.

2. Controversial Matters

The proposed action will not affect or create controversial matters of a local, national or international nature.

3. Larger Program Impacts

The proposed action is not a part of a larger development program.

IV. RECOMMENDATION FOR ENVIRONMENTAL ACTION

As indicated in the Impact Identification and Evaluation Form which follows, impacts resulting from the proposed action are anticipated to range from "no environmental impact" to "moderate environmental impact". Potential impacts are considered sufficiently significant to warrant the preparation of an Environmental Assessment in Phase II of this project. This Environmental Assessment would cover the recommended district's network of priority roads and their attendant social, economic and environmental impacts, as well as mitigation of adverse impacts, unavoidable adverse effects, short-term use vs. long-term productivity trade-offs, and irreversible and irretrievable commitments of resources.

V. IMPACT IDENTIFICATION AND EVALUATION FORM

This form uses the following symbols:

N	-	No environmental impact
L	-	Little environmental impact
M	-	Moderate environmental impact
U	-	Unknown environmental impact

Impact Areas and Sub-Areas	Impact Identification and Evaluation
A. Land Use	
1. Changing the character of land through:	
a. Increasing the population	L
b. Extracting Natural Resources	L
c. Land Clearing	L
d. Changing Soil Character	L
2. Altering Natural Defenses	M
3. Foreclosing Important Uses	M
4. Jeopardizing Man or his Works	M
B. Water Quality	
1. Physical State of Water	M
2. Chemical and Biological States	M
3. Ecological Balance	M

Impact Areas and Sub-Areas	Impact Identification and Evaluation
C. Atmospheric	
1. Air Additives	N
2. Air pollution	N
3. Noise Pollution	N
D. Natural Resources	
1. Diversion, altered use of water	L
2. Irreversible, inefficient commitments	N
3. Fisheries	L
E. Cultural	
1. Altering physical symbols	L
2. Dilution of cultural traditions	L
F. Socioeconomic	
1. Changes in economic/ employment patterns	L
2. Changes in population	L
3. Changes in cultural patterns	L
4. Equity	U

Impact Areas and Sub-Areas	Impact Identification and Evaluation
G. Health	
1. Changing a natural environment	N
2. Eliminating an ecosystem element	N
H. General	
1. International impacts	N
2. Controversial impacts	N
3. Larger program impacts	N

FLORA AND FAUNA LISTS

Following are selected flora and fauna lists. Where possible, species have been listed as district specific. It should be noted, however, that in many instances, data were insufficient or inconclusive. In these cases, reasonable extensions of existing data were made, when possible. Acknowledgement is given to those who assisted in supplying the raw data for these lists : Mr. Md. Samsul Alam, Jr. Documentation Officer, Bangladesh National and Technical Documentation Center; Mr. Zahingir Kabir, Editor and Publication Officer, Bangladesh Agricultural Research Council; Prof. Kazi Zakir Husain, Associate Professor and former director of the Zoology Dept., Dacca University and Prof. M. Ismail, Director of Special Studies, Water Development Board.

Annex II

SELECTED DISTRICT FLORA

The species presented here were compiled from existing data sources. This annex represents those species which are (1) most common and (2) present (or likely to be present) in at least one of the four districts of Faridpur, Patuakhali, Rangpur and Sylhet.

SELECTED DISTRICT FLORA *

(* Where available, common names are given in parenthesis)

FOREST RELATED VARIETIES

1. Overstory (Both Evergreen and Deciduous)
   Dipterocarpus xylocarpa (Garjan,Karal)
   Artocarpus chaplasha (Chaplash)
   A. intrgrifolia (Jack tree)
   Mychelia sp. (Chympa, Shundi)
   Ficus glomerata
   Dedrela toona (Tun or Puma)
   Terminalia bellerica (Bohera)
   T. chebula (Horitaki)
   Mesua ferrea (Nagkeshar)
   Anthocephalus cadamba (Kadam)
   Alstonia scholaris (Chhatim)
   Gmelina arborea (Gamairr)
   Tretrameles nudiflora(Tuta)
   Duabanga sonneratioides
   Bombax malabaricum
   Albizzia spp.(Koroi,Sirish,Harish)
   Amoora wallichii
   Xylia dolabriformus (Ironwood)
   Tectona grandis (Teak)
   Hydrocarpus kurzii(Chalmugra)
   Chikrassia tabularis (Hatia)
   Lophopetallum fimbriatum(Sutron Rakton)
   Pongamia glabra
   Spondias magnifera (Amra or Am)
   Taluama phellocarpa (Tilsundi)
   Cinnamomum cecidophne(Condroi)
   C.glanduliferum(Gondroi)
   Phyllanthus emblica (Amloki)
   Bauhinia sp.(Kanchan)
   Grewia asiatica
   Ironanda polvantha (Kurta)
   Dysoxylum bineetariferum (Rate)
   Bombax malabaricum (Simul, red cotton)
   Cynometra pobjandra (Ping)
   Echinocarpus titiacous(Sitarijhat)
   Odina wodier (Jival)
   Phoenix acaulis (Date palm)
   Areca catechu (Betel nut)
   Ficus indica (Banyan)
   F. religiosa (Pipal)

Dalbergia sissoo (Sissoo)
Shorea robusta (Sal)
Acacia arabica (Babul)
Lagerstroemia speciosa (Jarul,Myrtle)
L. flos-regina
Eugenia jambolana(Jam,Myrtle)
Salmalia malabarica(Simul)
Terminalia arjuna (Arjun)
T. chebula (Haritaki)
Mimusops elengi (Bakul)
Adenthera pavonina (Raktachandan)
Odinawodier roburghii (Jaga, Jeul)
Melia azadirach (Gora Nim)
Melia azadirachta (Nim)
Cinnamomum tamala (Tezpat)
Barringtonia acutengula (Hijal)

2. Understory

Dracaena spicata
D. terniflora
Eleocarpus floribundus (Belpoi)
Grewia microcos
Aguillaria agallocha (Agor Yielding Plant)
Clerodendron infortunatum
Lantuna camara
L. indica
Melastoma malabathricum
Amorphophallus campanulatus (oil)
Alocasia cucullata
A. indica (Phenkachu)
A. macrorrhiza
Colocasia antiguerum(Kachu)
Scindapsus officinalus (Gajpipul)

EPIPHYTES, CLIMBERS AND LIANAS

Dioscorea sp. (Peraterpa)
Pothos scandeus
Hoya parasitica
Hemidermus indicus (Anantamul)
Abrus precatorius
Cuscuta refleca (Swarnalata)
Ichnocarpus frutescens (Symalata)
Smilax macrophylla (Kumarica)
S. prolifera, roxburghiana
Gnetum scandens

Ioranthus longiflorus
L. globosus

FERNS

Gleichenia linearis
Adinantum unulatum, caudatum
Cheilanthes varians, tenuifolia
Onychium auratum, japonicum
Pteris longifolia
Ceratopteris thalictroides
Nephrodium calcaratum
Nephrolepis volubilis
Polypodium punctatum
Lygodium flexuosum
Angiopteris evecta
Marattia pinnata
Salvinia cucullata, natans
Azolla pinnata
Marsilea quadrifolia

ORCHIDS

Dendrobium formosum
D. pierardi
D. fimbriatum
D. moschatum
D. chrysotoxum
Cirrhopetalum roxburghii
Oberonia gammiei
Aerides odoratum
Rhynchostylis retusa
Vandapteris roxburghii

CANES

Daemonoros jenkinsianus (Golla cane)
Calamus tenuis (Jallibet)
C.latifolius (Horna)
C. erectus
C. gracilus
C. guraba (Sundi)

REEDS AND GRASSESS

Erianthus ravinae (Ekra)
Phragmites karka (Nal)
Saccharanum spontaneum (Khagra)
S. Officinarum(Ak, Kushar)
Cynodon dactylon(Durba ghash)

Jussiaea repens (Keshardam)
Trapa bispinosa (Shingara)
Hydrolea zeylanica
Nelumbium sp. (Badma)
Nymphaea nouchali (Shapla, salook)
N. lotus
N. stellata
N. rubra
N. pubescence
Andropogon sp. (Char kanta, Spear grass)

Aguatic Ferns

Ceratopteris thalictroides
Salvinia cucullata
S. natans
Azolla pinnata
Marsilea quadrifolia

Marsh Plants

Drossera burnanni
Rosa involucrata (Ban golap)
Ludwigia sarviflora
L. prostrata
Hydroctyle asiatica (Thankuni)
H. Rotundifolia
Oldenlandia corymbosa(Khetapapra)
Cleome viscosa
Gynandropsis pentaphylla(Hurhuri)
Crataeva religiosa (Barun tree)
Argemone mexicana(Shialkanta)
Rananculus seteratus
Oxalis Corniculata(Amrul)
Biophytum sensitivum
B. reinwardlii
Hygrophila polysperma (Kulekhara)
Polygonum plebejum
P. orientale (Panimarich)
P. hydropiper (Panimarich)
P. Chinense (Panimarich)
Rumex maritimus (Banpalang)
Chenopodium album (Bathua)
Pandanus foetidus (Keya)
P. minor
P. faecucularis

Oriza sativa (Dhan)
Cannabis Sativa (Bhang. Wild Hemp)

NON-FOREST RELATED VARIEITIES

Aguatic Plants

Euryle ferox (Makhna, Water lily)
Nelumbo nucifera (Padma)
Utricularia steliaris (Jhanji)
Aerotophyllum demersum
Hydrilla verticilatta
Valisnaria spiralis
Lagarosiphon roxburghii
Hydrocharis cellulosa
Ottelia alismoides
Monochoria hastaefolia
M.vaginalis
M. plantaginea
Pistia stratiotes (Topapana)
Typhonium trilobatum
Lemna paucicostata (Khudipana)
Wolffia arrhiza
Sagittaria sagittifolia
Alisma plantago
Potamogeton indicus
P. crispus
P. plectinatus
Najas marina
N. foveolata
N. graminea
Cyperus cuspidatus
C. flavidus
C. deformis
C. selletensis
C. babakensis
C. thomsoni
C. nutans
C. articulatus
C. corymbosus
C. rotundus
C. radiatus
C. digitatus
Eleocharis plantaginata
Scirpus chinensis
S. michelianus
S. squarrosus
S. supinus
S. erectus
S. articulatus
Care filicina

This list was compiled in large part from A.K. Ataur Rahman, A Checklist of Fresh Water Bony Fishes of Bangladesh and includes 56 families, 144 genera and 257 species. The list also includes a number of estuarine and marine forms known to enter rivers and other freshwater areas during their lifetimes. It is expected that most of these species are likely to be present in at least one of the districts of Faridpur, Patuakhali, Rangpur or Sylhet.

Order PLEURONECTIFORMES (Estuarine and marine; enters rivers)

Family Bothidae (Left-hand Flounders)
Pseudorhombus arsius

Family Soleidae (Soles)
Synaptura pan
Synaptura orientalis

Family Cynoglossidae (Tongue-soles)
Cynoglossus cynoglossus
Cynoglossus lingua
Cynoglossus arel
Paraplagusia bilineata

Order SYNGNATHIFORMES (Estuarine amd marine; enters rivers)

Family Syngnathidae (Pipe fishes)
Ichthyocampus carce
Dorichthys cunculus
Dorichthys sp.
Microphis deocata

Order ANGUILLIFORMES (Estuarine and marine; enters rivers)

Family Anguillidae (Freshwater eels)
Anguilla nebulosa
Muraena tile

Family Ratabouridae (Thread eels)
Rataboura rataboura

Family Muraenesocidae (False conger eels)
Muraenesox cinereus

Family Ophichthyidae (Snake eels)
Pisodonophis boro

Order SYMBRANCHIFORMES

Family Symbranchidae (Shore-eels; estuarine and marine; enters tidal rivers)
Symbranchus bengalensis

Family Cuchiidae (Mud-eels; freshwaters)
Cuchia cuchia

Order TETRADONTIFORMES (Freshwater and estuarine)

Family Tetradontidae (Puffer-fishes)
Tetraodon cutcutia
Tetraodon fluviatilus
Tetraodon lunaris
Chelonodon patoca

Order BELONIFORMES

Family Belonidae (Freshwater Gars)
Xenentodon cancila

Family Itemirhamphidae (Half-beaks; estuarine and marine; entersrivers)
Zenarchopterus ectuntio
Zenarchopterus brachynotopterus
Hyporhamphus gaiimardi
Dermogenys pusillus

Order CYPRINODONTIFORMES

Family Cyprinodontidae (Top-minnows)
Aplocheilus panchax
Oryzias melastigma

Order OPHICEPHALIFORMES

Family Ophicephalidae (Snake-heads)
Ophicephalus punctatus
Ophicephalus striatus
Ophicephalus marulus
Ophicephalus gachua
Ophicephalus barca

Order SCOPELEIFORMES

Family Synodontidae (Lizzard fishes)
Harpodon nehereus

Order CYPRINIFORMES (Freshwater; one family(Tachysuridae)is estuarine)

Sub-Order CYPRINOIDEI

Family Cyprinidae (Carps,Barbs,Minnows,etc.)

Sub-family Abraminae

Chela atpar
Chela laubuca
Oxygaster bacaila
Oxygaster phulo
Oxygaster gora

Sub-family Rasborinae

Rasbora elanga
Rasbora daniconius
Rasbora rasbora
Danio devario
Danio (Brachydanio) rerio
Danio danglia
Danio acquipinnatus
Esomus danricus

Sub-family Cyprininae

Labeo rohita
Labeo caibasu
Labeo nandina
Labeo gonius
Labeo angra
Labeo pangusia
Labeo dyocheilus
Labeo bata
Labeo dero
Labeo boga
Labeo boggut
Labeo sp.
Cirrhinus mrigala
Cirrhinus reba
Catla catla
Barilius (Raiamas) bola
Barilius bandilensis var.chedra
Barilius bandilensis var. cosca
Barilius telio
Barilius shacra
Barilius barna
Barilius vagra
Barilius spp.
Chagunius chagunio
Tor tor
Tor putitora
Puntius sarana
Puntius chola
Puntius titius
Puntius ticto
Puntius conchonius
Puntius ambassis
Puntius gelius
Puntius phutinio
Puntius stigma
Puntius chrysoptorus
Puntius terio
Puntius cosuatis
Puntius puntio
Puntius sp.

Amblypharyngodon mola
Amblypharyngodon microlepis
Aspidoparia morar
Aspidoparia jaya
Rohtee cotio
Osteochilus spp.

Sub-family Garrinae
Garra gotyla
Garra annandalei
Crossocheilus latius

Family Homalopteridae
Balatoria brucei

Family Psilorhynchidae
Psilorhynchus sucatio
Psilorhynchus balitoria

Family Cobitidae
Botia dario
Botia lohachata
Botia dayi
Botia geto
Lepidocephalus guntea
Acanthopthalmus pangia
Nemachilus botia
Nemachilus corica
Nemachilus savona
Nemachilus rupicola
Nemachilus sp.
Somileptes gongota

Sub-order SILUROIDEI

Family Clariidae
Clarias batrachus

Family Siluridae (Butter Catfishes;Freshwater Shark)
Wallago attu
Ompok pabda
Ompok bimaculatus

Family Heteropneustidae
Heteropneustes fossilis

Family Plotosidae (River Catfish)
Plotosus canius

Family Chacidae (Square-head Catfish)
Chaca chaca

Family Schilbeidae
- Silonia silondia
- Pangasius pangasius
- Clupisoma garua
- Clupisoma murius
- Pseudeutropis atherinoides
- Eutropiichthys vacha
- Ailia coila
- Ailiichthys punctata

Family Amblycipitidae
- Amblyceps mangois

Family Bagridae
- Mystus (Osteobagrus) aor
- Mystus (Osteobagrus) seenghala
- Mystus menoda
- Mystus gulio
- Mystus tengara
- Mystus vittatus
- Mystus cavasius
- Mystus bleekeri
- Leiocassis rama
- Rita rita
- Batasio tengana
- Batasio batasio

Family Sisoridae
- Sisor rhabdophorus
- Bagarius bagarius
- Gagata gagata
- Gagata cenia
- Gagata viridescens
- Gagata nangra
- Gagata youssoufi
- Hara hara
- Hara jerdoni
- Erethistes pusillus
- Conta conta
- Glyptothorax telchitta
- Glyptothorax botius
- Glyptothorax cavia
- Laguvia ribeiroi
- Laguvia shawi
- Pseudecheneis sulcatus

Family Tachysuridae (Estuarine, enters rivers)
- Tachysurus gagora
- Tachysurus nenga
- Tachysurus thalassinus
- Tachysurus jatius
- Tachysurus arius
- Batrachocephalus mino
- Osteogeneiosus militaris

Order CLUPEIFORMES

Sub-order NOTOPTEROIDEI

Family Notopteridae (Feather-backs)
- Notopterus notopterus
- Notopterus chitala

Sub-order CLUPEOIDEI

Family Megalopidae (Tarpons; marine, enters rivers)
- Megalops cyprioides

Family Engraulidae (Anchovies; estuarine and marine, enters rivers)
- Coilia ramcarati
- Coilia dussumieri
- Setipinna phasa
- Setipinna taty
- Thryssa purava
- Thryssa hamiltoni
- Thryssa dussumieri

Family Clupeidae (Shads, Herrings; Fresh-water, estuarine and marine)

Sub-family Dorosomatinae
- Anodontostoma chacunda
- Gonialosa manminna
- Nematalosa nasus

Sub-family Alosinae
- Hilsa ilisha
- Hilsa toli
- Gudusia chapra

Sub-family Clupeinae
- Corica soborna

Sub-family Pristigasterinae
- Ilisha motius
- Pellona ditchela

Order PERCIFORMES

Sub-order TRICHIUROLDEI (Estuarine and marine; enters tidal waters)

Family Trichiuridae (Ribbon Fishes)
- Trichiurus savala
- Trichiurus haumela
- Trichiurus muticus

Sub-order MASTACEMBELOIDEI (Freshwater)

Family Mastacembelidae (Spiny eels)
- Mastacembelus armatus
- Mastacembelus pancalas
- Macrognathus aculeatus

Sub-order STROMATEOIDEI (Estuarine and marine; enters tidal rivers)

Family Stromateidae
- Pampus chinensis
- Pampus argentus
- Stromateus niger

Sub-order POLYNEMOIDEI (Estuarine and marine; enters rivers)

Family Polynmidae (Thread-fins, Indian Salmon)
- Polynemus paradiseus
- Eleutheronema tetradactylum
- Polydactylus indicus
- Polydactylus sexfius

Sub-order MUGILOIDEI (Estuarine and marine; enters rivers)

Family Mugilidae (Mullets)
- Rhinomugil corsula
- Mugil parsia
- Mugil cascasia
- Mugil oiligolepis
- Mugil tade

Sub-order ANABANTOIDEI(Freshwater)

Family Anabantidae (Climbing Perches, Goramies)
- Anabas testudincus
- Macropodus cupanus
- Ctenops nobilis
- Colisa fasciata
- Colisa lalia
- Colisa chuna

Sub-order GOBEOIDEI(Freshwater, estuarine and marine)

Family Gobiidae

Sub-family Gobiinae
- Glossagobius giuris
- Awaous garammepomus
- Awaous stamineus
- Brachygobius nunus

Stigmatogobius sudanandio
Stigmatogobius oligactis
Acentrogobius viridipunctatus
Acentrogobius caninus
Acentrogobius puntang
Acentrogobius cyanomos
Pogonobius planifrons
Oxyurichthys microlepis

Sub-family Apocrypteinae
Apocryptes bato
Parapocryptes batoides
Scartelaos viridis
Boleopthalmus boddarti

Sub-family Sicydiaphiinae
Gobiopterus chuno

Sub-family Periopthalminae
Periopthalmus barbarus
Periopthalmodon schlosseri

Family Taenioididae

Sub-family Taenioidinae
Taenioides cirratus
Taenioides buchanni
Odontamblyopus rubicundus

Sub-family Trypaucheninae
Trypauchen vagina

Family Eleotridae
Eleotris fusca
Eleotris lutea
Butis butis

Sub-order COTTOIDEI (Estuarine and marine; enters rivers)

Family Platycephalidae
Platycephalus indicus

Sub-order PERCOIDEI (Estuarine and marine; enters rivers; 2 families, Nandiae and Pristolepeidae are entirely freshwater)

Family Sillaginidae (Whitings)
Sillaginopsis panijus

Family Nandiae (Mu-perches)
Nandus nandus

Family Pristolepeidae
Badis badis

Family Lobotidae (Tripple-tails)
Lobotes surinamensis
Datnoibes polota

Family Spariidae
Acanthopagrus datnia

Family Scatophagidae (Butter-fish)
Scatophagus argus

Family Sciaenidae (Jewfish,Croakers)
Pama pama
Johnius coitor
Johnius diacanthus
Otolithes maculatus

Family Toxotidae (Archer Fish)
Toxotes chatareus

Family Leiognathidae(Pony fishes,slip-mouths)
Leiognathus equulus
Secutor ruconius
Secutor insidiator
Gerres setifer
Gerres filamentosa

Family Centropomidae (Giant perches,glass perches)
Lates calcarifer
Chanda nama
Chanda ranga
Chanda daculis

Family Therapenidae
Therapon jarbua

EXOTIC SPECIES

Family Cyprinidae
Cyprinus carpio (Common Carp)
Ctenopharyngodon idellus(Grass Carp)
Hypothalmichthys molitrix(Silver Carp)

Family Cichlidae
Tilapia mossambica
Tilapia nilotica

BIRD LIST BY DISTRICT

The following bird list was compiled in large part from Rashid, H.E., Systematic List of the Birds of East Pakistan, Asiatic Society, Dacca, 1967. Only those species which are considered resident, winter or monsoon visitor or are likely to be found in the district are included here. The "X" indicates presence in the district under which it is marked: Faridpur (F), Patuakhali (P), Rangpur (R) and/ or Sylhet (S).

BIRD LIST BY DISTRICT

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Family Podicipedidae	Grebes	x	x	x	x
Podiceps c. cristatus	Great Crested Grebe	x	x	x	x
Podiceps c. caspicus	Blacknecked Grebe	x	x		
Podiceps ruficollis capensis	Little Grebe	x	x	x	x
Family Hydrobatidae	Storm Petrel		x		
Fregetta tropica melanogaster	Duskyvented Storm Petrel		x		
Family Phaethontidae	Tropic Bird		x		
Phaethon aethereus indicus	Short-tailed tropic Bird		x		
Family Pelecanidae	Pelicans		x		x
Pelecanus onocrotalus	White Pelican		x		
Pelecanus p. philippensis	Spotted Billed Pelican		x		
Pelecanus p. crispus	Spotted Billed Pelican				x
Family Sulidae	Boobies				x
Sula sula rubripes	Red-footed Booby				x
Family Phalacrocoracidae	Cormorants	x	x	x	x
Phalacrocorax carbosinensis	Cormorant	x	x	x	x
Phalacrocorax fuscicollis	Shag	x	x	x	x
Phalacrocorax niger	Little Cormorant	x	x	x	x
Anhinga rufa melanogaster	Darter	x	x	x	x
Family Ardeidae	Herons	x	x	x	x
Ardea imperialis	Giant White-bellied Heron			x	x
Ardea cinerea rectirostris	Grey Heron	x	x	x	x
Ardea purpurea manilensis	Purple Heron	x	x	x	x
Butorides striatus jananicus	Little Green Heron	x	x	x	x
Ardeola gra grayii	Pond Heron or Paddy Bird	x	x	x	x
Ardeola bacchus	Chinese Pond Heron				x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Bubulcus ibis coromandus	Cattle Egret	x	x	x	x
Egretta alba modeota	Large Egret	x	x	x	x
Egretta intermedia palleuca	Intermediate Egret	x	x	x	x
Egretta g. garzetta	Little Egret	x	x	x	x
Nycticorax n. nyctocorax	Night Egret	x	x	x	x
Gorsachus m. melanolophus	Tiger Bittern	x	x	x	x
Ixobrychus m. minutus	Little Bittern	x	x	x	
Ixobrychus cinnamomeus	Chestnut Bittern	x	x	x	x
Ixobrychus sinensis	Yellow Bittern	x	x	x	x
Dupetor f. flavicollis	Black Bittern	x	x	x	x
Family Ciconiidae	Storks	x	x	x	x
Ibis leucocephalus	Painted Stork	x	x	x	x
Anastomus oscitans	Openbill Stork	x	x	x	x
Ciconia e. episcopus	White-necked Stork	x	x	x	x
Ciconia ciconia asiatica	Eastern White Stork	x	x	x	x
Ciconia nigra	Black Stork	x	x	x	x
Xenorhynchus a. asiaticus	Black-necked Stork	x	x	x	x
Leptoptilos dubius	Greater Adjustant	x	x	x	x
Leptoptilos javanicus	Lesser Adjustant	x	x	x	x
Family Threskiornidae	Ibises	x	x	x	x
Threskiornis melanocephala	White Ibis	x	x	x	x
Pseudibis p. papillosa	Black Ibis	x	x	x	x
Plegadis f. falcinellus	Glossy Ibis	x	x	x	x
Platalea leucorodia major	Spoonbill	x	x		
Family Phoenicopteridae	Flaming	x	x		
Phoenicopterus roseus	Common Flamingo	x	x		
Family Anatidae	Ducks, Geese	x	x	x	x
Branta ruficollis	Siberian Red-breasted Goose	x	x	x	x
Anser fabalis middendorffi	Forest Bean Goose	x	x	x	x
Anser fabalis brachyrhynchus	Pink-footed Goose	x	x	x	x
Anser a. albifrons	White -fronted Goose	x	x	x	x
Anser er ythropus	Lesser White-fronted Goose	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Anser anser rubrirostris	Greylag Goose	x	x	x	x
Anser indicus	Bar-headed Goose	x	x	x	x
Dendrocygna javanica	lesser Whistling Teal	x	x	x	x
Dendrocygna bicolor	Large Whistling Teal	x	x	x	x
Tadorna ferruginea	Brahminy Duck	x	x	x	x
Tadorna tadorna	Common Shield-duck	x	x	x	x
Anas angustirostris	Marbled Teal	x	x	x	x
Anas acuta	Pintail	x	x	x	x
Anas c. crecca	Common Teal	x	x	x	x
Anas formosa	Baikal Teal	x	x	x	x
Anas p. poecilorhyncha	Spotbill Duck	x	x	x	x
Anas p. zonorhyncha	Eastern Spotbill	x	x	x	x
Anas platyrhynches	Mallard	x	x	x	x
Anas s. strepera	Gadwall	x	x	x	x
Anas falcata	Falcated Teal	x	x	x	x
Anas penelope	Wigeon	x	x	x	x
Anas guerguedula	Garganey	x	x	x	x
Anas clypesta	Shoveller	x	x	x	x
Rhodonessa caryophyllacea	Pink-headed Duck	x	x	x	x
Netta rufina	Red-crested Pochard	x	x	x	x
Aythya ferina	Common Pochard	x	x	x	x
Aythya nyroca	White-eyed Pochard	x	x	x	x
Aythya baeri	Baer's Pochard	x	x	x	x
Aythya fuligula	Tufted Duck	x	x	x	x
Aythya m. marila	Scaup Duck	x	x	x	x
Nettapus c. ceromandelianus	Cotton Teal	x	x	x	x
Sarkidornis m. melanotos	Nukhta or Comb Duck	x	x	x	x
Cairina scutulata	White-winged Wood Duck	x	x	x	x
Bucephala c. clagula	Goldeneye Duck		x		x
Mergus m. orientalis	Eastern Merganser			x	x
Mergus serrator	Red-breasted Merganser	x	x		
Mergus albellus	Smew			x	x
Family Acciptridae	Eagle, Buzzard, Vulture	x	x	x	x
Elanus caeruleus vociferus	Black-winged Kite	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Aviceda j. jerdoni	Blyth's Baza	x	x	x	x
Aviceda leuphotes syama	Blackerested Baza	x	x	x	x
Pernis ptilorhyncus orientalis	Siberian Honey Buzzard	x	x	x	x
Pernis p. ruficollis	Indian Honey Buzzard	x	x	x	x
Milvas migrans govinda	Pariah Kite	x	x	x	x
Milvas migrans lineatus	Large Pariah Kite	x	x	x	x
Haliastur i. indus	Brahminy Kite	x	x	x	x
Accipter badius dussumieri	Shikra	x	x	x	x
Accipter trivirgatus indicus	Crested Goshawk				x
Accipter nisus nisosimilis	Sparrow Hawk	x	x	x	x
Accipter nisus melanoschistos	Sparrow Hawk			x	x
Accipter virgatus affinus	Besra Sparrowhawk	x	x	x	x
Accipter virgatus gularis	Besra Sparrowhawk	x	x	x	x
Butastur teesa	White-eyed Buzzard Eagle	x	x	x	x
Spizaetus n. nipalensis	Hodgson's Hawk Eagle	x	x	x	x
Nisaetus f. fasciatus	Bonelli's Hawk Eagle	x	x	x	x
Hieraaetus pennatus	Booted Hawk Eagle	x	x	x	x
Lophotriorchis k. kienerii	Rufous-bellied Hawk Eagle	x	x	x	x
Aquila h. heliaca	Imperial Eagle	x	x	x	x
Aquila rapay vindhiana	Tawny Eagle	x	x	x	x
Aquila n. nipalensis	Steppe Eagle	x	x	x	x
Aquila clanaga	Greater Spotted Eagle	x	x	x	x
Aquila pomarina hastata	Lesser Spotted Eagle	x	x	x	x
Ictinaetus malayensis	Black Eagle		x		x
Haliacetus ieucogaster	White-bellied Sea Eagle	x	x	x	x
Haliaeetus leucoryphus	Pallas' Fishing Eagle	x	x	x	x
Ichthyophaga i. ichthyaetus	Large Grey-headed Fishing Eagle	x	x	x	x
Torgos calvus	Black or King vulture	x	x	x	x
Aegypius monachus	Cinereous Vulture	x	x	x	x
Gyps indicus tenuirostris	Long-billed Vulture	x	x	x	x
Gyps bengalensis	White-backed vulture	x	x	x	x
Circus c. cyaneus	Hen Harrier	x	x	x	x
Circus macrourus	Pale Harrier	x	x	x	x
Circus pygargus	Montagu's Harrier	x	x	x	x
Circus melanoleucos	Pied Harrier	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Circus a. aeruginosus	Marsh Harrier	x	x	x	x
Circus a. spilonotus	Eastern Marsh Harrier	x	x	x	x
Circaetus g. gallicus	Short-toed Eagle	x	x	x	x
Spilornis c. cheela	Crested Serpent Eagle	x	x		
Spilornis c. melanotis	Crested Serpent Eagle	x	x	x	x
Spilornis c. burmanicus	Crested Serpent Eagle	x	x	x	x
Pandion haliaetus	Osprey	x	x	x	x
Michrohierax c. caerulescens	Red-breasted Falconet	x	x	x	x
Microhierax melanoleucos	White-legged Falconet	x	x	x	x
Falco biarmicus jugger	Laggar Falcon	x	x	x	x
Falco peregrinus japonensis	Eastern Peregrine Falcon	x	x	x	x
Falco p. peregrinator	Shahin Falcon	x	x	x	x
Falco s. subbuteo	Hobby	x	x	x	x
Falco s. centralasiae	Central Asian Hobby	x	x	x	x
Falco severus rufipedoides	Oriental Hobby	x	x	x	x
Falco s. severus	Oriental Hobby	x	x	x	x
Falco c. chicquera	Red-headed Merlin	x	x	x	x
Falco vespertinus amurensis	Eastern Red-legged Falcon	x	x	x	x
Falco naumanni pekinensis	Lesser Kestrel	x	x	x	x
Falco t. tinnunculus	Kestrel	x	x	x	x
Falco t. interstinetus	Eastern Kestrel	x	x	x	x
Family Phasianidae	Partridge, Quail, Pheasant	x	x	x	x
Frankolinus francolinus melanonatus	Assam Black Partridge	x	x	x	x
Frankolinus qularis	Swamp Partridge	x	x	x	x
Coturnix c. coturnix	Common Quail	x	x	x	x
Conturnix c. japonica	Japanese Grey Quail	x	x	x	x
Coturnix coromandelica	Rain Quail	x	x	x	x
Coturnix c. chinensis	Blue-breasted Quail	x	x	x	x
Perdicula m. manipurensis	Manipur Bush Quail				x
Perdicula m. inglisi	Manipur Bush Quail	x	x	x	x
Arborophila atrogularis	White-cheeked Hill Partridge				x
Bambusicola fytchii hopkinsoni	Bamboo Partridge				x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Lophura leucomelana lathami	Blackbreasted Kalij				x
Gallus gallus murghi	Red Junglefowl				x
Polyplectron bicalcaratum bakeri	Peacock Pheasant				x
Pavo cristatus	Common Peafowl	x	x	x	
Family Turnicidae	Bustard-Quail	x	x	x	x
Turnix sylvatica dussumier	Little Bustard-Quail	x	x	x	x
Turnix t. tanki	Button Quail	x	x	x	x
Turnix t. blanfordi	Button Quail		x		x
Turnix suscitator plumbipes	Common Bustard Quail	x	x	x	x
Turnix s. bengalensis	Common Bustard Quail	x	x	x	x
Family Gruidae	Cranes	x	x	x	x
Grus grus lilfordi	Common Crane	x	x	x	x
Grus a. antigone	Sarus Crane	x		x	
Grus a. sharpii	Sarus Crane				x
Anthropoides virgo	Demoiselle Crane	x	x	x	x
Family Rallidae	Rails, Crakes, Coots	x	x	x	x
Rallus aquaticus indicus	Water Rail	x	x	x	x
Rallus striatus albiventer	Blue-breasted Banded Rail	x	x	x	x
Rallina fasciata	Red-legged Banded Rail	x	x	x	x
Rallina eurizonoides a amouroptena	Banded Crake	x	x	x	x
Porzana p. pusilla	Baillon's Crake	x	x	x	x
Porzana porzana	Spotted Crake	x	x	x	x
Amaurornis fuscus	Ruddy Crake	x	x	x	x
Amaurornis bicolor	Elwes Crake				x
Amaurornis a akool	Brown Crake	x	x	x	x
Amaurornis phoenicurus chinensis	White-breasted Waterhen	x	x	x	x
Gallicrex c. cinerea	Kora	x	x	x	x
Gallinula chloropus indica	Moorhen	x	x	x	x
Porphyrio porphyrio poliocephalus	Purple Moorhen	x	x	x	x
Fullica a. atra	Coot	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Family Heliornithidae	Finfeet	x	x	x	x
Heliopais personata	Masked Finfoot	x	x	x	x
Family Otidae	Bustards	x	x	x	x
Eupodotis b. bengalensis	Bengal Florican	x	x	x	x
Sypheotides indica	Likh Florican	x		x	
Family Jacanidae	Jacana	x	x	x	x
Hydrophasianus chirurgus	Pheasant-tailed Jacana	x	x	x	x
Metopidius indicus	Bronze-winged Jacana	x	x	x	x
Family Haematopodiae	Oystercatcher		x		
Haematopus ostralegus osculans	Oystercatcher		x		
Family Charadriidae	Lapwing, Plover, Sandpipers, Snipe	x	x	x	x
Sub-family Charadriinae	Plover, Lapwing	x	x	x	x
Vanellus leucurus	White-tailed Lapwing	x	x	x	x
Vanellus gregarius	Sociable Lapwing	x		x	
Vanellus vanellus	Lapwing	x	x	x	x
Vanellus cinereus	Grey-headed Lapwing	x	x	x	x
Vanellus i. indicus	Red-wattled Lapwing	x	x	x	x
Vanellus i. atronuchalis	Red-wattled Lapwing	x	x	x	x
Vanellus spinosus duvancelli	Spur-winged Lapwing	x	x	x	x
Vanellus malabaricus	Yellow-wattled Lapwing	x	x	x	
Pluvialus squatarola	Grey or Black-bellied Plover	x	x	x	x
Pluvialus a. apicaria	Golden Plover	x	x	x	x
Pluvialus dominica fulva	Eastern Golden Plover	x	x	x	x
Charadrius l. leschenaulti	Large Sand Plover	x	x	x	x
Charadrius dubins curonicus	Little Ringed Plover	x	x	x	x
Charadrius d. jerdoni	Little Ringed Plover	x	x	x	x
Charadrius alexandrinus dealbatus	Chinese Kentish Plover	x	x	x	
Charadrius placidus	Long-billed Ringed Plover	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Subfamily Scolopacinae	Curlews, Sandpipers, Snipe	x	x	x	x
Numenius phaeopus variegatus	Eastern Whimbrel	x	x	x	x
Nimenius arquata orientalis	Curlew	x	x	x	x
Limosa limosa melanuroides	Black-tailed godwit	x	x	x	x
Tringa erythropus	Spotted Redshank	x	x	x	x
Tringa t. totanus	Common Redshank	x	x	x	x
Tringa stangnatilis	Marsh Sandpiper	x	x	x	x
Tringa nebularia	Greenshank	x	x	x	x
Tringa ochropus	Green Sandpiper	x	x	x	x
Tringa glareola	Wood Sandpiper	x	x	x	x
Tringa guttifer	Nordmann's Sandpiper	x	x	x	x
Tringa terek	Terek Sandpiper	x	x	x	x
Tringa h. hypoleucos	Common Sandpier	x	x	x	x
Arenarie i. interpres	Turnstone	x	x	x	x
Limnodromus semipalmatus	Snipe-billed Godwit	x	x	x	x
Capella nemoricola	Wood Snipe	x	x	x	x
Capella stenura	Pintail Snipe	x	x	x	x
Capella megala	Swinhoe's Snipe	x	x	x	x
Capella g. gallinago	Fantail Snipe	x	x	x	x
Capella minima	Jack Snipe	x	x	x	x
Calidris tenuirostris	Eastern Knot		x		
Calidris albus	Sanderling		x		
Calidris minutis	Little Stint	x	x	x	x
Calidris temminckii	Temminck's Stint	x	x	x	x
Calidris subminutus	Long-toed Stint	x	x	x	x
Calidris alpinus centralis	Dunlin	x	x	x	x
Calidris testaceus	Curlew Sandpiper	x	x	x	x
Eurynorhynchus pygmeum	Spoon-billed Sandpiper	x	x	x	x
Limicola falcinellus sibirica	Broad-billed Sandpiper	x	x	x	x
Philomachus pugnax	Ruff and Reeve	x	x	x	x
Sub-family Phalaropinae	Phalarope		x		
Phalaropus lobatus	Red-necked Phalarope		x		
Family Rostratulidae	Painted Snipe	x	x	x	x
Rostratula b. bengalensis	Painted Snipe	x	x	x	x
Family Recurvirostridae	Stilt, Avocet	x	x	x	x
Himantopus h. himantopus	Blackwinged Stilt	x	x		
Recurvirostra avosetta	Avocet	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Family Burhinidae	Stone Curlews	x	x	x	x
Burbinus oedicnemus indicus	Stone Curlew	x		x	
Esacus magnirostris recurvirostris	Great Stone Plover	x	x	x	x
Family Glareolidae	Courser, Pratincoles	x	x	x	x
Cursorius coromandelicus	Indian Courser	x		x	
Glareola pratincola maldivarum	Collared Pratincole	x	x	x	x
Glarcola lactea	Small Indian Pratincole	x	x	x	x
Family Laridae	Fulls, Terns	x	x	x	x
Larus argentatus mongolicus	Herring Gull	x	x	x	x
Larus ichthyaetus	Great Blackheaded Gull	x	x	x	x
Larus brunnicephalus	Brownheaded Gull		x		
Larus r. ridibundus	Black-headed Gull	x	x	x	x
Childonias hybrida indica	Whiskered Tern	x	x	x	x
Chilidonias h. javanica	Whiskered Tern	x	x	x	x
Childomias leucoptera	White-winged Black Tern	x	x	x	x
Gelochelidon nilotica affinis	Gull-billed Tern		x		
Hydroprogne c. caspia	Caspian Tern	x	x	x	x
Sterna aurantia	Indian River Tern	x	x	x	x
Sterna hirundo tibetana	Common Tern	x	x	x	x
Sterna dougallii korustes	Rosy Tern		x		
Sterna s. sumatrana	Black-naped Tern		x		
Sterna acuticauda	Black-bellied Tern	x	x	x	x
Sterna fuscata nubilosa	Sooty Tern		x		
Sterna albifrons pusilla	Little Tern	x	x	x	x
Sterna bergii velox	Large Crested Tern		x		
Sterna b. bengalensis	Lesser Crested Tern		x		
Rychops albicollis	Indian Skimmer	x	x	x	x
Family Columbidae	Pegeons, Doves	x	x	x	x
Treron a. apicauda	Pintailed Green Pigeon			x	x
Treron s. sphenura	Wedgetailed Green Pegeon				x
Treron curvirostra	Thick-billed Green Pigeon	x	x	x	x
Treron pompador phayrei	Grey-fronted Green Pigeon	x	x	x	x
Treron b. bicincta	Orange-breasted Green Pigeon	x	x	x	

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Treron b. praetermissa	Orange-breasted Green Pigeon				x
Treron p. phoenicoptera	Yellow-footed Green Pigeon	x	x	x	x
Treron p. viridifrons	Yellow-footed Green Pigeon				x
Ducula aenea sylvatica	Green Imperial Pegeon	x	x	x	x
Ducula badia insignis	Mountain Imperial Pigeon	x	x	x	
Ducula badia griseicapilla	Mountain Imperial Pigeon	x	x	x	x
Columba livia intermedia	Blue Rock Pigeon	x	x	x	x
Columba punicea	Purple Wood Pigeon	x	x	x	x
Streptopelia orientalis agricola	Rufous Turtle Dove	x	x	x	x
Streptopelia d. decaocto	Ring Dove	x	x	x	x
Streptopelia t. tranquebarica	Red Turtle Dove	x	x	x	
Streptopelia t. humilis	Red Turtle Dove	x	x	x	x
Streptopelia suratensis	Spotted Dove	x	x	x	
Streptopelia chinensis tigrina	Spotted Dove	x	x	x	x
Chalcophaps i. indica	Emerald Dove	x	x	x	x
Family Psittacidae	Parrots	x	x	x	x
Psittacula eupatria nipalensis	Large Indian Parakeet	x	x	x	x
Psittacula krameri borealis	Rose-ringed Parakeet	x	x	x	x
Psittacula alexandri fasciata	Red-breasted Parakeet	x	x	x	x
Psittacula cyanocephala bengalensis	Blossomheaded Parakeet	x	x	x	
Psittacula r. roscata	Eastern Blossomheaded Parakeet	x	x	x	x
Psittacula r. junae	Eastern Blossomheaded Parakeet				x
Psittacula h. himalayana	Slaty-headed Parakeet			x	
Psittacula h. finschii	Slaty-headed Parakeet				x
Loriculus v. vernalis	Lorikeet				x
Family Cuculidae	Cuckoes	x	x	x	x
Clamator coromandus	Redwinged Crested Cuckoo	x	x	x	x
Clamator jacobinus serratus	Pied Crested Cuckoo	x	x	x	x
Cuculus v. varius	Common Hawk Cuckoo	x	x	x	x
Cuculus fugax niscolor	Hodgson's Hawk Cuckoo				x

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Cuculus m. micropterus	Indian Cuckoo	x	x	x	x
Cuculus c. canorus	The Cuckoo	x	x	x	x
Cuculus c. bakeri	The Cuckoo	x	x	x	x
Cuculus c. saturatus	Himalayan Cuckoo	x	x	x	x
Cuculus p. poliocephalus	Small Cuckoo	x	x	x	x
Cacomantis s. sonnerati	Banded Bay Cuckoo	x	x	x	x
Cacomantis merulinus passerinus	Plaintive Cuckoo	x	x	x	
Cacomantis merulinus querulus	Plaintive Cuckoo	x	x	x	x
Chalcites maculatus	Emerald Cuckoo				x
Chalcites x. xanthorhynchus	Violet Cuckoo				x
Surniculus lugibris dicruroides	Drongo Cuckoo	x	x	x	x
Eudynamys s. scolopacea	Indian Koel	x	x	x	
Eudynamys s. malayana	Malayan Koel	x	x	x	x
Rhopodytes t. tristis	Large Green-billed Malkoha	x	x	x	x
Taccocua leschenaultii infuscata	Sirkeer Cuckoo	x	x	x	x
Centropis s. sinensis	Crow-pheasant	x	x	x	
Centropis s. intermedius	Crow-pheasant	x	x	x	x
Centropis toulou bengalensis	Lesser Coucal	x	x	x	x
Family Strigidae	Owls	x	x	x	x
Tyto alba stertens	Barn Owl	x	x	x	x
Tyto capensis longimembris	Grass Owl	x	x	x	x
Phodilus badius saturatus	Bay Owl				x
Otus s. spilocephalus	Spotted scops Owl				x
Otus scops sunia	Scops Owl	x	x	x	x
Otus bakkamoena gangeticus	Collared Scops Owl	x	x	x	x
Otus bakkamoena lettia	Collared Scops Owl	x	x	x	x
Bubo bubo bengalensis	Eagle Owl	x	x	x	x
Bubo n. nipalensis	Forest Eagle Owl	x	x	x	x
Bubo coromandus klossi	Malayan Dusky Eagle Owl	x	x	x	x

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Bubo zeylonensis leschenault	Brown Fish Owl	x	x	x	x
Bubo flavipes	Tawny Fish Owl				x
Bubo ketupu	Malay Fish Owl		x		x
Glaucidium b. brodeii	Pigmy Owlet				x
Glaucidium b. radiatum	Jungle Owlet	x	x	x	x
Glaucidium cuculoides rufescens	Barred Owlet				x
Ninox scutulata ingubris	Brown Hawk Owl	x	x	x	
Ninox scutulata burmanica	Brown Hawk Owl	x	x	x	x
Athene brama indica	Spotted Owlet	x	x	x	x
Strix ocellata grisescens	Mottled Wood Owl	x	x	x	x
Strix o. ocellata	Mottled Wood Owl	x		x	x
Strix leptogrammica newarensis	Brown Wood Owl	x	x	x	
Asio f. flammeus	Short-eard Owl	x	x	x	x
Family Caprimulgidae	Nightjars	x	x	x	x
Eurostopodus macrotis cerviniceps	Great Eared Nightjar	x	x	x	x
Caprimulgus indicus hazarae	Jungle Nightjar				x
Carimulgus indindicus	Jungle Nightjar	x	x	x	x
Caprimulgus macrurus albonotatus	Long-tailed Nightjar	x	x	x	x
Caprimulgus a. asiaticus	Common Indian Nightjar	x	x	x	x
Caprimulgus affinis monticolus	Franklin's Nightjar	x	x	x	x
Family Apodidae	Swifts	x	x	x	x
Chaetura caudacuta nudipes	White-throated Spinetail Swift.			x	x
Chaetura caudacuta cochinchinensis	White-throated Spinetail Swift			x	x
Chaetura gigantea indica	Large Brown-throated Spinetail Swift				x
Chaetura sylvatica	White-rumped Spinetail Swift	x	x	x	x
Apus melba nubifuga	Alpine Swift	x	x	x	x
Apus acuticaudus	Dark-backed Swift				x
Apus p. pacificus	Large white-rumped Swift	x	x	x	x
Apus p. leuconyx	Large white-rumped Swift	x			x
Apus a. affinus	House Swift	x		x	
Apus affinus nipalensis	House Swift	x	x	x	

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Apus affinus subfurcatus	House Swift	x	x	x	x
Cypsiurus parvus batasiensis	Palm Swift	x	x	x	x
Cypsiurus parvus infumatus	Palm Swift	x	x	x	
Hemiprocne longipennis coronata	Crested Swift	x	x	x	x
Family Trogonidae	Trogons				x
Harpactes erythrocephalus hodgsoni	Red-headed Trogon				x
Harpactes e. erythrocephalus	Red-headed Trogon				x
Family Alcedinidae	Kingfishers	x	x	x	x
Ceryle lugubrus continentalis	Great Pied Kingfisher			x	
Ceryle lugubrus guttulata	Great Pied Kingfisher				x
Ceryle rudis leucomelanura	Lesser Pied Kingfisher	x	x	x	x
Alcedo hercules	Blyth's Kingfisher				x
Alcedo athis bengalensis	Common Kingfisher	x	x	x	x
Alcedo meninting coltarti	Blue-eared Kingfisher				x
Ceyx e. erithacus	Threetoed Kingfisher				x
Pelargopsis amauroptera	Brown-winged Kingfisher	x	x	x	x
Pelargopsis c. capensis	Storkbilled Kingfisher	x	x	x	x
Halcyon c. coromanda	Ruddy Kingfisher				x
Halcyon smyrnensis perpulchra	White-breasted Kingfisher	x	x	x	x
Halcyon pileata	Blackcapped Kingfisher				x
Halcyon chloris humei	White-collared Kingfisher				x
Family Meropidae	Bee-eaters	x	x	x	x
Merops l. leschenaulti	Chestnut-headed Bee-eater	x	x	x	x
Merops p. philippinus	Blue-tailed Bee-eater	x	x	x	x
Merops o. orientalis	Green Bee-eater	x	x	x	x
Nyctyornis a. athertoni	Blue-bearded Bee-eater				x
Family Coraciidae	Rollers	x	x	x	x
Coracias b. bengalensis	Indian Roller	x	x	x	x
Coracias b. affinis	Indian Roller	x	x	x	x
Eurystomus orientalis cyanicollis	Broad-billed Roller				x
Eurystomus orientalis calonyx	Broad-billed Roller				x
Family Upupidae	Hoopoes	x	x	x	x
Upupa epops saturata	Hoopoe	x	x	x	x
Upupa epops ceylonensis	Hoopoe	x	x	x	x
Upupa epops longirostris	Hoopoe				x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Family Bucerotidae	Hornbills	x		x	x
Tockus birostris	Common Grey Hornbill	x		x	
Anthracoceros m. malabaricus	Pied Hornbill				x
Buceros bicornis homrai	Great Hornbill				x
Family Capitonidae	Barbets	x	x	x	x
Megalaima lineata hodsoni	Lineated Barbet	x	x	x	x
Megalaima a. asiatica	Blue-throated Barbet	x	x	x	x
Megalaima australis cyanotis	Blue-eared Barbet				x
Megalaima haemacephala indica	Crimson-breasted Barbet	x	x	x	x
Family Picidae	Woodpeckers	x	x	x	x
Jynx t. torquilla	Wryneck	x		x	
Jynx t. chinensis	Wryneck	x	x	x	x
Picumnus i. innominatus	Speckled Piculet			x	x
Sasia o. ochracea	Rufous Piculet			x	
Sasia o. reichenowi	Rufous Piculet				x
Micropternus brachyrus phaioceps	Rufous Woodpecker	x	x	x	x
Picus myrmecophoneus	Little Scaly-bellied Green Woodpecker	x	x	x	
Picus canus gydenstolpei	Black naped Green Woodpecker				x
Picus f. flavinucha	Large Yellow-naped Woodpecker	x	x	x	x
Picus c. chlorolophus	Small Yellow-naped Woodpecker	x	x	x	x
Dinopium b. benghalense	Lesser Golden-backed Woodpecker	x	x	x	x
Gecinulus g. grantia	Pale Headed Woodpecker				x
Mulleripicus pulverulensis harterti	Great Slaty Woodpecker				x
Dendrocopus stratui	Stripe-breasted Pied Woodpecker				x
Dendrocopus m. macei	Fulvous-breasted Pied Woodpecker	x	x	x	x
Dendrocopus m. mahrattensis	Yellow-fronted Pied Woodpecker	x	x	x	x
Dendrocopus canicapullus Semicoronatus	Grey-crowned Pigmy Woodpecker			x	x
Dendrocopus c. canicapullus	Grey-crowned Pigmy Woodpecker				x
Dendrocopus n. nanus	Pigmy Woodpecker	x	x	x	x
Hemicircus c. canente	Heart-spotted Woodpecker	x	x	x	x
Blythipicus p. pyrrhotis	Red-eared Bay Woodpecker			x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Chrysocolaptes lucidus guttacristatus	Large golden-backed Woodpecker	x	x	x	x
Family Eurylaimidae	Broadbills			x	x
Scrilopus lunatus rubropygius	Gould's Broadbill				x
Psarisomus d. dalhousiae	Longtailed Broadbill			x	x
Family Pittidae	Pittas	x	x	x	x
Pitta n. nipalensis	Blue-naped Pitta				x
Pitta b. brachyura	Indian Pitta	x	x	x	x
Pitta moluccensis megarhyncha	Blue-winged Pitta	x	x		
Pitta sordida cucullata	Green-breasted Pitta	x	x	x	x
Pitta c. cyanea	Blue Pitta	x	x	x	x
Family Alandidae	Larks	x	x	x	x
Miratra javanica cantillans	Singing Bush Lark	x	x	x	
Miratra a. assamica	Assam Bush Lark	x	x	x	x
Bremopterix grisea	Ashycrowned Finch Lark	x	x	x	x
Calandrella cinerea dukhunensis	Rufous Short-toed Lark	x	x	x	x
Calandrella acutirostris tibetana	Humes Short-toed Lark	x	x	x	x
Calandrella r. raytal	Sand Lark	x	x	x	x
Alauda g. gulgula	Eastern Skylark	x	x	x	x
Family Hirundinidae	Swallows, Martins	x	x	x	x
Riparia riparia dilute	Collared Sand Martin			x	
Riparia riparia ijimae	Collared Sand Martin				x
Riparia paludicola chinensis	Plain Sand Martin	x	x	x	x
Hirundo r. rustica	Plain Sand Martin	x	x	x	x
Hirundo r. gutturalis	Plain Sand Martin	x	x	x	x
Hirundo r. tytleri	Plain Sand Martin	x	x	x	x
Hirundo smithi filifera	Wire-tailed Swallow	x		x	x
Hirundo daurica nipalensis	Striated Swallow	x	x	x	x
Hirundo daurica gephyra	Striated Swallow	x	x	x	x
Hirundo daurica japonica	Striated Swallow	x	x	x	x
Hirundo striolata myri	Larger Striated Swallow				x
Delichon urbica cachmeriensis	House Martin	x		x	

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Family Laniidae	Shrikes	x	x	x	x
Lanius t. tephronotus	Tibetan Shrike	x	x	x	x
Lanius schach tricolor	Black-headed Shrike	x	x	x	x
Lanius c. cristatus	Brown Shrike	x	x	x	x
Family Oriolidae	Orioles	x	x	x	x
Oriolus oriolus kundoo	Golden Oriole	x		x	
Oriolus chinensus diffusus	Black-naped Oriole	x	x	x	x
Oriolus c. tenuirostris	Black-naped Oriole	x	x	x	x
Oriolus x. xanthornus	Black-headed Oriole	x	x	x	x
Oriolus t. traillii	Maroon Oriole				x
Family Dicruridae	Drongos	x	x	x	x
Dicrurus adsimilis albirictus	Black Drongo	x	x	x	x
Dicrurus leucophaeus longicaudatus	Ashy Drongo	x		x	
Dicrurus leucophaeus hopwoodi	Ashy Drongo	x	x	x	x
Dicrurus c. caurulescens	White-bellied Drongo	x		x	
Dicrurus annectans	Crow-billed Drongo	x	x	x	x
Dicrurus a. aenus	Bronzed Drongo	x	x	x	x
Dicrurus remifer tectirostris	Lesser Rackettailed Drongo				x
Dicrurus h. hottentottus	Hair-crested Drongo				x
Dicrurus paradiseus grandis	Greater Rackettailed Drongo				x
Family Artamidae	Swallow-shrikes	x	x	x	x
Artamus fuscus	Ashy Swallow Shrike	x	x	x	x
Family Sturnidae	Starlings	x	x	x	x
Saroglossa spiloptera	Spotted-winged Stare	x	x	x	x
Aplonis panayensis affinis	Glossy Starling	x	x	x	x
Sturnus m. malabaricus	Greyheaded Myna	x	x	x	
Sturnus pagodarum	Brahminy Myna	x	x	x	x
Sturnus vulgaris poltaratskyi	Fiasch's Starling	x	x	x	x
Sturnus c. contra	Pied Myna	x	x	x	x
Sturnus c. dehrae	Pied Myna	x	x	x	
Acridotheres t. tristis	Common Myna	x	x	x	x
Acridotheres ginginianus	Bank Myna	x	x	x	
Acridotheres f. fuscus	Jungle Myna	x	x	x	x
Acridotheres javanicus infuscatus	Short-crested Jungle Myna	x	x	x	x

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Gracula religiosa intermedia	Grackle or Hill Myna				x
Family Corvidae	Crows, Magpies	x	x	x	x
Kitta c. chinensis	Green Magpie				x
Kitta erythrorhyncha magnirostris	Red-Billed Blue Magpie				x
Dendrocitta v. vagabunda	Rufous Tree-pie	x	x	x	x
Dendrocitta f. frontalis	Black-browed Tree-Pie				x
Dendrocitta formosa himalayensis	Grey Tree-Pie			x	x
Corvus s. splendens	House Crow	x	x	x	x
Corvus m. levaillanti	Jungle Crow	x	x	x	x
Family Campephagidae	Minivets, Cuckoo-shrikes	x	x	x	x
Hemipus picatus capitalis	Pied Flycatcher Shrike	x	x	x	x
Hemipus p. picatus	Pied Flycatcher Shrike	x	x	x	x
Tephrodornis virgatus pelvica	Large Wood Shrike	x	x	x	x
Tephrodornis p. pondicerianus	Common Wood Shrike	x	x	x	x
Coracina novaehollandia macei	Large Cuckoo-shrike	x	x	x	
Coracina novaehollandiae nipalensis	Large Cuckoo-Shrike	x	x	x	x
Coracina m.melaschistos	Smaller Grey Cucko Shrikes	x	x	x	x
Coracina melanoptera sykesi	Black-headed Cuckoo-Shrike	x	x	x	x
Pericrocotus flammeus speciosus	Scarlet Minivet	x	x	x	x
Pericrocotus flammeus fraterculus	Scarlet Minivet				x
Pericrocotus ethologus laetus	Long-tailed Minivet				x
Pericrocotus s. solaris	Yelow-throated Minivet				x
Pericrocotus r. roseus	Rosy Minivet	x	x	x	x
Pericrocotus cinnamomeus peregrinus	Small Minivet	x	x	x	x
Pericrocotus cinnamomeus thai	Small Minivet	x		x	x
Pericrocotus cinnamemeus vividus	Small Minivet	x	x	x	x

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Family Irenidae	Ioracs, Ghloropsis, Fairy Bluebird	x	x	x	x
Aegithina t. tiphia	Common Iora	x	x	x	x
Chloropsis a. aurifrons	Gold-fronted Chloropsis	x	x	x	x
Chloropsis h. hardwickii	Orangebellied Chloropsis				x
Chloropsis c. cochinchinensis	Blue-winged Chloropsis				x
Irena puella sikkimensis	Fairy Bluebird				x
Family Pycnonotidae	Bulbuls	x	x	x	x
Pycnonotus atriceps cinereou cinereoventris	Black-headed Bulbul				x
Pycnonotus melanicterus flaviventris	Black-headed Yellow Bulbul	x	x	x	x
Pycnonotus jocosus pyrrhotis	Red-whiskered Bulbul	x	x	x	x
Pycnonotus jocosus emeria	Red-whiskered Bulbul	x	x		
Pycnonotus jocosus peguensis	Red-whiskered Bulbul	x	x	x	x
Pycnonotus cafer bengalensis	Redvented Bulbul	x	x	x	x
Pycnonotus cafer burmanicus	Redvented Bulbul	x	x	x	x
Criniger f. flaveolus	White-throated Bulbul				x
Hypsipetes viridescens cacharensis	Olive Bulbul				x
Hypsipetes virescens mcclellandi	Rufousbellied Bulbul				x
Hypsipetes f. flavalus	Brown-eared Bulbul				x
Hypsipetes madagascariensis nigrescens	Black Bulbul				x
Family Muscicapidae	Babblers, Flycatchers, Warblers	x	x	x	x
Sub-Family Timaliinae	Babblers	x	x	x	x
Pelloreneum ruficeps chamelum	Spotted Babbler				x
Pelloreneum palustre	Marsh Spotted Babbler				x
Pelloreneum a. albiventre	Brown Babbler				x
Trichastoma tickelli assamensis	Tickell's Babbler				x
Trichastoma a. abbotti	Abbott's Babbler	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Pomatorhinus s. shisticeps	Slatyheaded Scimitar Babbler	x	x	x	x
Pomatorhinus s. cryptanthus	Slatyheaded Scimitar Babbler				x
Pomatorhinus ruficollis bakeri	Rufous-necked Scimitar Babbler				x
Pomatorhinus erythrogenys mcclellandi	Rusty cheeked Scimitar Babbler				x
Pomatorhinus h. hypoleucos	Large Scimitar Babbler				x
Xiphirhynchus superciliaris intextus	Slenderbilled Scimitar Babbler				x
Xiphirhynchus p. pusilla	Lesser Slenderbilled Scimit r Babbler				x
Spelaeornis formosus	Spotted Wren Babbler				x
Stachyris rufifrons ambigua	Red-fronted Babbler				x
Stachyris nigriceps spadix	Black-throated Babbler				x
Dumetia h. hyperythra	Rufous-bellied Babbler	x		x	
Macronous gularis rubricapilla	Yellowbreasted Babbler	x	x	x	x
Timalia pileata bengalensis	Redcapped Babbler	x	x	x	x
Chrysomma s. sinensis	Yellow-eyed Babbler	x	x	x	x
Chrysomma altirostre griseigularis	Jerdon's Babbler	x	x	x	x
Paradoxornis a. atrosuperciliaris	Black-browed Suthora				x
Paradoxornis ruficeps bakeri	Redheaded Parrotbill				x
Paradoxornis gularis transfluvialis	Greyheaded Parrotbill				x
Turdoides c. caudatus	Common Babbler	x		x	
Turdoides e. earlei	Striated Babbler	x	x	x	x
Turdoides longirostris	Slender-billed Babbler				x
Turdoides s. striatus	Jungle Babbler	x	x	x	
Garrulax m. moniligerus	Greater Necklaced Laughing Thrush				x
Garrula pectoralis melanotis	Lesser Necklaced Laughing Thrush				x
Garrulx leucolophus patkaicus	White-crested Laughing Thrush				x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Garrulax delesserti gularis	Dellesert's Laughing Thrush				x
Garrulax ruficolis	Rufous-necked Laughing Thrush				x
Garrulax phoenicus bakeri	Crimson-winged Laughing Thrush				x
Pteruthius m. melanotis	Chestnut-throated Shrike Babbler				x
Gampsorhynchus r. rufulus	White-headed Shrike Babbler				x
Actinodura egertoni kaasiana	Barwing	x	x	x	x
Minla i. ignotincta	Red-tailed Minla				x
Yuhina bakeri	Baker's Yuhina				x
Yuhina g. gularis	Stripe-throated Yuhina				x
Yuhina n. nigramenta	Black-chinned Yuhina				x
Yuhina s. xantholeuca	White-bellied Yuhina				x
Alcippe cinerea	Yellow-throated Tit Babbler				x
Alcippe c. castaneceps	Chesnut-headed Tit Babbler				x
Alcippe rufogularis collaris	Red-throated Tit Babbler				x
Alcippe poioicephala fusca	Quaker Babbler				x
Alcippe n. nipalensis	Nepal Babbler				x
Alcippe n. commoda	Nepal Babbler				x
Sub-family Muscicapinae	Flycatchers	x	x	x	x
Muscicapa sibirica cacabata	Sooty Flycatcher	x	x	x	x
Muscicapa latirostris	Brown Flycatcher	x	x	x	x
Muscicapa ruficauda	Rufous-tailed Flycatcher				x
Muscicapa p. parva	Red-breasted Flycatcher	x	x		
Muscicapa p. albicilla	Red-breasted Flycatcher	x	x	x	x
Muscicapa s. strophiata	Orange-gorgetted Flycatcher				x
Muscicapa h. hyperythra	Redbreasted Blue Flycatcher				x
Muscicapa westermanni collini	Little Pied Flycatcher	x	x	x	
Muscicapa westermanni australorientis	Little Pied Flycatcher	x	x	x	x
Muscicapa superciliaris aestigma	Whitebrowed Blue Flycatcher	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Muscicapa l. leucomelanura	Staty Blue Flycatcher	x	x	x	x
Muscicapa sapphira	Sapphire-headed Flycatcher				x
Muscicapa g. grandis	Large Niltava				x
Muscicapa m. macgrigoriae	Small Niltava	x		x	
Muscicapa m. signata	Small Niltava	x	x	x	x
Muscicapa s. sundara	Rufous-bellied Niltava				x
Muscicapa p. poliogenys	Brooks Flycatcher				x
Muscicapa u. unicolor	Pale Blue Flycatcher				x
Muscicapa r. rubeculoides	Blue-throated Flycatcher	x	x	x	x
Muscicapa banyumas magnirostris	Large-billed Blue Flycatcher				x
Muscicapa t. tickelliae	Tickell's Blue Flycatcher	x	x	x	x
Muscicapa t. thallassina	Verditer Flycatcher	x	x	x	x
Muscicapella h. hodgsoni	Pigmy Blue Flycatcher				x
Culicicapa ceylonenis calochrysaea	Grey-headed Flycatcher	x	x	x	x
Rhipidura hypoxantha	Yellow-bellied Fantail Flycatcher				x
Rhipidura a. aureola	White-browed Fantail Flycatcher	x	x	x	
Rhipidura a. burmanica	White-browed Fantail Flycatcher		x		x
Rhipidura a. albicellis	White-throated Fantail Flycatcher	x	x	x	x
Rhipidura a. stanleyi	White-throated Fantail Flycatcher		x		x
Terpsiphone paradisi leucogaster	Paradise Flycatcher	x	x	x	
Terpsiphone p. paradisi	Paradise Flycatcher	x	x	x	
Terpsiphone p. saturatior	Paradise Flycatcher	x	x	x	x
Monarcha azurea styani	Blacknaped Flycatcher	x	x	x	x
Sub-family Pachycephalinae	Thickheads		x		
Pachycephala c. cinerea	Mangrove Whistler		x		

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Sub-family Sylviinae	Warblers	x	x	x	x
Tesia cyaniventer	Dull Slaty bellied Ground Warbler	x	x	x	x
Tesia olivea	Dull Slaty bellied Ground Warbler	x	x	x	x
Cetlia p. pallidipes	Pale-footed Bush Warbler			x	x
Cetlia f. fortipes	Strongfooted Bush Warbler				x
Cetlia flavolivaceus stressemanni	Aberrant Bush Warbler				x
Cetlia p. brunnifrons	Rufous-capped Bush Warbler	x	x	x	
Cetlia b. muroides	Rufouscapped Bush Warbler	x	x	x	x
Bradypterus t. thoracicus	Spotted Bush Warbler			x	x
Bradypterus t. tacsanowskius	North Chinese Bush Warbler	x	x	x	x
Bradypterus l. luteoventris	Brown Bush Warbler				x
Cisticola exilis tytleri	Yellowheaded Fantail Warbler	x	x	x	x
Cisticola juncidus coursitans	Streaked Fantail Warbler	x	x	x	x
Prinia r. rufescens	Beavens Longtail Warbler	x	x	x	x
Prinia hodgsonii rufula	Franklin's Longtail Warbler	x	x	x	x
Prinia h. hodgsonii	Franklin's Longtail Warbler	x	x	x	
Prinia cinereocapilla	Hodgson's Longtail Warbler	x		x	
Prinia gracilus stevensi	Streaked Longtail Warbler	x	x	x	x
Prinia subflava inornata	Tawnyflanked Longtail Warbler	x	x	x	
Prinia subflava fusca	Tawnyflanked Longtail Warbler	x	x	x	x
Prinia socialis inglisi	Ashy Longtail Warbler	x	x	x	x
Prinia sylvatica gangetica	Jungle Longtail Warbler	x		x	
Prinia f. flaviventris	Yellowbellied Longtail Warbler	x	x	x	x
Prinia crinigor yunnanensis	Brown Longtail Hill Warbler				x
Prinia burnesi cinerasceus	Longtailed Grass Warbler	x		x	

Scientific Name	Common Name	PRESENT IN F	P	R	S
Graminicola b. bengalensis	Large Grass Warbler	x	x	x	x
Orthotomus sutorius patia	Tailor Bird	x	x	x	x
Orthotomus atrogularis	Blacknecked Tailor Bird				x
Orthotomus cucultatus coronatus	Goldenheaded Tailor Bird			x	x
Locustella certhiola rubescens	Pallas Grasshopper Warbler	x	x	x	x
Locustella lanceolata	Temminck's Grasshopper Warbler	x	x	x	x
Locustella naevia straminea	Boddaerts Grasshopper Warbler	x	x	x	x
Chaetornis striatus	Bristled Grass Warbler	x	x	x	x
Megaluris palustris toklao	Striated Marsh Warbler	x	x	x	x
Phragmaticola a. aedon	Thickbilled Warbler	x	x	x	x
Phragmaticola a. rufescens	Thickbilled Warbler	x	x	x	x
Acrocephalus stentoreus	Great Reed Warbler	x	x	x	x
Acrocephalus a. amyae	Great Reed Warbler	x	x	x	x
Acrocephalus orientalis	Eastern Great Reed Warbler				x
Acrocephalus bistrigiceps	Black-browed Reed Warbler				x
Acrocephalus a. agricola	Paddy Field Warbler	x	x	x	x
Acrocephalus dumentorum	Blyth's Reed Warbler	x	x	x	x
Acrocephalus c. concinens	Bluntwinged Paddyfield Warbler	x	x	x	x
Acrocephalus c. stevensi	Bluntwinged Paddyfield Warbler	x	x	x	x
Hippolais c. caligata	Bootted Paddyfield Warbler	x	x	x	x
Hippolais c. rama	Booted Warbler	x	x		
Phylloscopus collybita	Chiffchaff	x	x	x	
Phylloscopus affinis	Tickell's Leaf Warbler	x	x	x	x
Phylloscopus griscolus	Olivaceous Leaf Warbler	x	x		
Phylloscopus f. fluvigiventer	Smoky Willow Warbler	x	x	x	x
Phylloscopus fuscatus weigoldi	Dusky Leaf Warbler	x	x	x	x
Phylloscopus f. fuscatus	Dusky Leaf Warbler	x	x	x	x
Phylloscopus inornatus humei	Yellow-browed Leaf Warbler	x	x	x	
Phylloscopus inornatus mandellii	Yellow-browed Leaf Warbler	x	x	x	x
Phylloscopus i. inornatus	Yellow-browed Leaf Warbler	x	x	x	x
Phylloscopus trochileides viridanus	Dullgreen Leaf Warbler	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Phylloscopus t. trochiloides	Dullgreen Leaf Warbler	x	x	x	x
Phylloscopus t. plumbeitarsus	Dullgreen Leaf Warbler				x
Phylloscopus nitidus	Brightgreen Leaf Warbler	x	x	x	
Phylloscopus o. occipitalis	Large-crowned Leaf Warbler	x	x	x	x
Phylloscopus occipitalis coronatus	Large-crowned Leaf Warbler				x
Phylloscopus r. reguloides	Blyth's Leaf Warbler	x		x	
Phylloscopus r. assamensis	Blyth's Leaf Warbler			x	x
Phylloscopus r. claudiae	Blyth's Leaf Warbler				x
Phylloscopus c. cantator	Black-browed Leaf Warbler	x	x	x	x
Seicercus affinis	Allied Flycatcher Warbler			x	x
Seicercus b. burkei	Yellow-eyed Flycatcher Warbler				x
Seicercus xanthoschistos	Greyheaded Flycatcher Warbler				x
Albroscopus superciliaris albigularis	Yellow-bellied Flycatcher Warbler	x	x	x	x
Albroscopus a. albogularis	White-throated Flycatcher Warbler	x	x	x	x
Sub-family Turdinae	Thrushes and Chats	x	x	x	x
Brachypterix leucophrys nipalensis	Lesser Shortwing				x
Brachypterix montana cruralis	White-browed shortwing				x
Erithacus calliope	Ruby-throat	x	x	x	x
Erithacus svecicus abbotti	Blue-throat	x	x	x	x
Erithacus pectoralis confusus	Himalayan Ruby-throat	x	x	x	x
Erithacus p. tschebaiewi	Himalayan Ruby-throat	x	x	x	x
Brithacus p. brunneus	Blue Chat	x	x	x	x
Erithacus c. cyane	Siberian Blue Chat			x	x
Erithacus c. chrysaeus	Golden Bush Robin		x		
Copsychus s. saularis	Magpie-Robin	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Copsychus s. erimelas	Magpie-Robin	x	x	x	x
Copsychus malabaricus	Shama	x	x	x	x
Phoenicurus ochruros rufiventris	Black Redstart	x	x	x	x
Phoenicurus hodgsoni	Hodgson's Redstart	x	x	x	x
Phoenicurus suroreus leucopterus	Daurian Redstart	x		x	x
Phoenicurus erythrogaster grandis	Goldenstadt's Redstart	x		x	
Rhyacornis f. fuliginosus	Plumbeus Redstart			x	x
Cinclidium leucurum	White-tailed Blue Robin			x	x
Enicurus scouleri	Little Forktail				x
Enicurus immaculatus	Black-backed Forktail				x
Enicurus schistaceus	Slaty-backed Forktail				x
Enicurus leschenaulti indicus	Leschenault's Forktail				x
Enicurus maculatus gutlatus	Spotted Forktail				x
Saxicola insignis	Hodgson Bush Chat	x		x	
Saxicola torquata przevalskii	Stone Chat	x	x	x	x
Saxicola torquata indica	Stone Chat	x	x	x	x
Saxicola torquata stejnegeri	Stone Chat	x	x	x	x
Saxicola leucura	White-tailed Stone Chat	x	x	x	x
Saxicola caprata bicolor	Pied Bush Chat	x	x	x	
Saxicola caprata burmanica	Pied Bush Chat	x	x	x	x
Saxicola jerdoni	Jerdon's Bush Chat	x	x	x	x
Saxicola ferrea	Dark-grey Stone Chat	x	x	x	x
Chaimarronis leucocephalus	White-capped Redstart				x
Saxicoloides fulicata erythrura	Indian Robin	x		x	
Monticola rufiventris	Chestnutbellied Rock Thrush			x	x
Monticola solitarius pandoo	Blue Rock Thrush	x	x	x	x
Monticola solitarius affinis	Blue Rock Thrush		x		x
Myiophoneus caeruleus temminckii	Himalayan Whistling Thrush				x
Zoothera c. citrina	Orange-headed Ground Thrush	x	x	x	x
Zoothera d. dauma	Golden Mountain Thrush	x	x	x	x
Zoothera m. monticola	Large Long-billed Ground				x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Zoothera marginata	Lesser Long-billed Ground Thrush	x	x	x	x
Turdus d. dissimilis	Black-breasted Thrush				x
Turdus unicolor	Tickell's Thrush	x	x	x	x
Turdus boulboul	Greywinged Blackbird	x	x	x	x
Turdus r. rubrocanus	Grey-headed Thrush			x	x
Turdus r. gouldi	Greyheaded Thrush				x
Turdus obscurus	Dark Thrush				x
Turdus ruficollus atrogularis	Black-throated Thrush	x	x	x	x
Turdus r. ruficollus	Red-throated Thrush	x	x	x	x
Turdus naumanni eunomus	Dusky Thrush	x	x	x	x
Family Paridae	Tits	x	x	x	x
Melanochlora s. sultanea	Sultan Tit	x	x	x	x
Farus major nipalensis	Grey Tit	x	x	x	x
Parus m. monticolus	Green Tit	x	x	x	x
Family Sitlidae	Nuthatches	x	x	x	x
Sitla castanea cinnamoventris	Chestnut-bellied Nuthatch				x
Sitla c. castanea	Chestnut-bellied Nuthatch	x	x	x	x
Sitla f. frontalis	Velvet-fronted Nuthatch	x	x	x	x
Gamily Certhiidae	Tree Creepers				x
Certhia himalayana infima	Himalayan Tree Creeper				x
Family Motacillidae	Pipits and Wagtails	x	x	x	x
Anthus h. hodgsoni	Chinese Tree Pipit	x	x	x	x
Anthus h. unnanensis	Chinese Tree Pipit	x	x	x	x
Anthus t. trivialis	Chinese Tree Pipit	x	x	x	x
Anthus novaeseelandiae richardi	Paddy-field Pipit	x	x	x	x
Anthus novaeseelandiae rufulus	Paddy-field Pipit	x	x	x	x
Anthus c. campestris	Tawny Pipit	x	x	x	
Anthus c. kastehenkoi	Tawny Pipit	x		x	
Anthus godlewski	Siberian Pipit	x	x	x	x
Anthus similis jerdoni	Brown Rock Pipit	x	x	x	
Anthus spiroleta japonicus	Water Pipit			x	

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Motacilla flava thunbergi	Yellow Wagtail	x	x	x	x
Motacilla flava beema	Yellow Wagtail	x	x	x	x
Motacilla flava lutea	Yellow Wagtail	x	x	x	x
Motacilla c. citreola	Yellowheaded Wagtail	x	x	x	x
Motacilla c. werae	Yellowheaded Wagtail	x	x	x	x
Motacilla c. calcarata	Yellowheaded Wagtail	x	x	x	x
Motacilla c. caspica	Grey Wagtail	x	x	x	x
Motacilla alba dukhensis	Pied or White Wagtail	x	x	x	x
Motacilla a. personata	Masked Wagtail	x	x	x	x
Motacilla a. alboides	Pied or White Wagtail	x	x	x	x
Motacilla a. leucopsis	White-faced Wagtail	x	x	x	x
Motacilla a. ocularis	Streak-eyed Wagtail	x	x	x	x
Motacilla a. baicalensis	Pied or White Wagtail	x	x	x	x
Motacilla maderaspatensis	Large Pied Wagtail	x		x	
Family Dicaeidae	Flowerpeckers	x	x	x	x
Dicaeum a. agile	Thickbilled Flowerpecker	x	x	x	x
Dicaeum a. deignani	Thickbilled Flowerpecker				x
Dicaeum chrysorrheum chrysochlore	Yellow-vented Flowerpecker				x
Dicaeum trignostigma rubropygium	Orange-bellied Flowerpecker		x		x
Dicaeum e. erythrohynchos	Tickell's Flowerpecker	x	x	x	x
Dicaeum concolor olivaceum	Plaincolored Flowerpecker	x	x	x	x
Dicaeum c. cruentatum	Scarletbacked Flowerpecker	x	x	x	x
Family Nectariniidae	Sunbirds	x	x	x	x
Anthreptes singalensis assamensis	Rubycheck				x
Anthreptes m. malaccensis	Brownthroated Sunbird		x		
Nectarinia h. hypogrammica	Blue-naped Sunbird		x		
Nectarinia zeylonica sola	Purplerumped Sunbird	x	x	x	x
Nectarinia sperata brasiliana	Van Hasselt's Sunbird				x
Nectarinia a. asiatica	Purple Sunbird	x	x	x	
Nectarinia a. intermedia	Purple Sunbird	x	x	x	x
Aethopyga s. saturata	Black breasted Sunbird			x	
Aethopyga s. assamensis	Black breasted Sunbird				x
Aethopyga siparaja scheriae	Yellowbacked Sunbird	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Aethopyga siparaja labecula	Yellowbacked Sunbird			x	x
Aethopyga i. ignicauda	Firetailed Sunbird				x
Arachnothera l. lorgirostris	Little Spiderhunter			x	x
Arachnothera m. magna	Steaked Spiderhunter			x	x
Family Zosteropidae	White-eyes	x	x	x	x
Zosterops p. palpebrosa	White-eye	x	x	x	x
Family Ploceidae	Weaver Birds	x	x	x	x
Passer domesticus indicus	House Sparrow	x	x	x	x
Passer domesticus parkini	House Sparrow	x		x	
Passer montanus malacensis	Tree Sparrow			x	x
Passer rutilans cinnamomeus	Cinnamon Tree Sparrow			x	
Passer rutilans intensior	Cinnamon Tree Sparrow				x
Ploceus p. philippinus	Baya	x	x	x	
Ploceus p. burmanicus	Baya	x	x	x	x
Ploceus megarhynchus	Finn's Baya	x		x	x
Ploceus bengalensis	Blackthroated Baya	x	x	x	x
Ploceus manyar peguensis	Steaked Baya	x	x	x	x
Estrilda a. amandava	Red Munia	x	x	x	x
Lonchura m. malabarica	White-throated Munia	x	x	x	
Lonchura striata acuticauda	White-backed Munia	x	x	x	x
Lonchura p. punctulata	Spotted Munia	x	x	x	
Lonchura p. subundulata	Spotted Munia	x	x	x	x
Lonchura malacca rubroniger	Chestnut Munia	x	x	x	
Lonchura malacca atricapilla	Chestnut Munia	x	x	x	x
Family Fringillidae	Finches	x	x	x	x
Carpodacus erythrinus roseatus	Common Rosefinch	x	x	x	x
Carpodacus erythrinus kubanensis	Common Rosefinch	x	x	x	x
Carpodacus e. erythrinus	Common Rosefinch	x	x	x	x
Family Emberizidae	Buntings	x	x	x	x
Emberiza bruniceps	Redheaded Bunting	x	x	x	x
Emberiza rutila	Chestnut Bunting	x	x	x	x

Scientific Name	Common Name	PRESENT IN: F	P	R	S
Emberiza s. aureola	Yellow-breasted Bunting	x	x	x	x
Emberiza citrinella erythrogenys	Yellow Bunting				x
Emberiza spodocephala sordida	Black-faced Bunting	x	x	x	x
Embariza fucata arcuata	Greyheaded Bunting	x	x	x	x
Emberiza f. fucata	Greyheaded Bunting			x	x
Emberiza pusilla	Little Bunting	x	x	x	x
Melophus lathami subscritatus	Deccan Crested Bunting	x	x	x	x

REPTILES AND AMPHIBIANS LIST

Frogs and Toads

Bufo melanostictus (Common Indian Toad)
Rana tigrina (Indian Bullfrog)
Rana limnocharis (Indian Cricket Frog)
Rana cyanophlyctis (Skipper Frog)
Rana tytleri
Rana temporalis
Rhacophorus maculatus
Rhacophorus leucomystax
Microhyla ornata
Microhyla rubra
Kaloula pulchra

Snakes

Family Typhlopidae (Blind Snakes)

Typhlops braminus
Typhlops porractus

Family Colubridae (Keelback)

Natrix piscator (Checkered Keelback)
Natrix stolata (Striped Keelback)
Atretium schistosum (Olivaceous Keelback)
Xenocrophis cerasogaster
Boiga cyana (Green Cat Snake)
Dryophus nasutus (Green Whip Snake)
Enhydris enhydris
Elape radiata (Copperhead)
Lycodon aulicus (Common Wolf-snake)

Family Colubridae (Keelback) (cont'd)

Lycodon jara
Pareas macularius (Rat Snake)
Pytas mucosus (Indochinese Rat Snake)
Zaocys nigromarginatus
Oligodon cyclurus
Oligodon albocinctus
Oligodon cinuris
Oligodon arnensis

Family Boidae (Pythons)

Python molurus (Rock Python)
Python reticulatus (Reticulated Python)

Family Elapidae (Crait,Coral Snake, Cobra)

Naja naja (Indian Coral Snake)
Naja hannah (King Cobra)
Bungarus fasciatus (Banded Crait)
Bungarus multicinctus (Manybanded Crait)
Bungarus lividuss (Lesser Black Crait)

Family Viperidae (Vipers)

Vipera russelli (Russell's Viper)
Trimeresurus monticola
Trimeresurus popeorum
Trimeresurus erythurus

Family Hydrophiidae (Marine Snakes)

Hydrophis cyanocinatus
Hydrophis fasciatus
Hydrophis nigrocinctus
Hydrophis cyanocinctus
Hydrophis obscurus
Hydrophis fasciatus
Lepimus curtus
Microcephalophus gracilis
Microcephalophus cantoris
Laticaudata laticaudata

Lizards

Hemidactylus brooki
Hemidactylus flaviviridis
Hemidactylus frenatus
Hemidactylus bowringii
Calotes versicolor
Varanus monitor
Varanus nebulosus
Varanus flavescens
Varanus salvator
Mabuya carinata
Mabuya macularia
Mabuya dissimilis
Mabuya elegans
Leiolopisma sikkimense
Gekko gekko

Crocodiles

Crocodilus porosus
Crocodilus holastrus
Gavialis gangeticus

MAMMAL LIST

(Includes those common mammals likely to be found in or near one of the four districts of Faridpur, Patuakhali, Rangpur or Sylhet)

Primates

Nycticebus coucang (Slow Loris)
Macaca mullata (Rhesus Macaque)
Presbytis entellus (Langoor, Hanuman)
Presbytis pileatus (Capped Monkey)
Presbytis phayrii (Leaf Monkey)
Hylobates hoolok (White-browed or Hoolok Gibbon)

Carnivores

Cats

Panthera tigris (Royal Bengal Tiger)
Panthera pardus (Leopard)
Felis chaus (Ban Biral or Jungle Cat)
Felis bengalensis (Ban Biral or Leopard Cat)
Felis viverrina (Fishing Cat or Mach Biral)
Felis marmorata (Marbled Cat)
Felis temmincki (Golden Cat)
Neofelis nebulosa (Clouded Leopard)

Canines

Canis aureus (Jackal)
Cuon alipnus (Wild Dog)
Vulpes bengalensis (Bengal Fox)
Lutra macrodus (Otter)
Lutra cinera (Otter)

Bears

Selenarctos thibetanus (Asiatic or Himalayan Black Bear)
Helarctos malayanus (Malayan Sun Bear)
Melursus Ursinus (Sloth Bear)

Civets and Mongooses

Viverra zibetha (Large Civet)
Viverra indica (Small Civet)
Paradoxurus hermaphroditus (Common Civet)
Arcogalida trivirgata (Small Toothed Civet)
Herpestes auropunctatus (Small Indian Mongoose)
Herpestes edwardsi (Common Mongoose)

Elephant

Elephasus maximus (Asiatic Elephant)

Scaly Anteater

Manus crassicaudata (Indian Pangolin)
Manus javanica (Malay Pangolin)

D e e r s

Cervus unicolor (Sambar)
Cervus duvauceli (Barasingha)
Axis axis (Spotted Deer or Cheetal)
Axis porcinus (Hog Deer)
Muntiacus muntjak (Barking Deer)

Wild Boar

Sus scrofa (Wild Boar)

Rodents

Atherurus macrourus (Asiatic Brush-tailed Porcupine)
Hystrix hodgsoni (Crestless Himalayan Porcupine)
Rattus rattus (House Rat)
Rattus norvegicus (Brown Rat)
Rattus fulvescens (Chestnut Rat)
Rattus blanfordi (White-tailed Rat)
Rattus rattus rufesents(Common Indian Rat)
Rattus rattus alexandrinus (House Rat)
Rattus norvegicus norvegicus
Mus musculus (House Mouse)
Mus cervicolor (Fawn-colored Mouse)
Mus booduga
Nesokia indica (Short-tail Mole Rat)
Callosciurs erythracus(Pallas Squirrel)
Callosciurs sladini (Pallas Squirrel)
Funambulus palmarum (Common Striped Squirrel)
Callosciurs pygerthrus lockrodes(Irrawaddy Squirrel)
Callosciurs pygerthrus pygerthrus(Irrawaddy Squirrel)
Callosciurs flavimanus griscimanus(Yellow-handed Squirrel)
Bandicota bengalensis (Lesser Bandicoot Rat)
Bandicota indica (Bandicoot Rat)
Caprolagus hispidus (Hispid Hare)

Moles and Shrews

Talpa micrura (Eastern Mole)
Suncus murinus (House Shrew)
Suncus etruscus(Pygmy Shrew)

Bats

Rousettus leschenaulti (Fulvous Fruit Bat)
Pteropus giganteus (Fruit Bat, Indian Flying Fox)
Megaderma lyra (Indian False Vampire)
Cynopterus sphinx (Short-nosed Bat)
Taphozous sacculaimus (Pouch-bearing Sheath-Tailed Bat)
Taphozous longimanus (Long-armed Sheath-Tailed Bat)
Taphozous melanophogon (Black-beard Sheath-Tailed Bat)
Scotophilus temmincki (Lesser Yellow Bat)
Rhinolophus affinis (Allied Horseshoe Bat)
Rhinolophus lepidus (Little Indian Horseshoe Bat)
Rhinolophus trifoliatus (Trifoil Horseshoe Bat)
Hipposideros larvatus (Hosfield's Leaf-nosed Bat)
Hipposideros bicolor (Bicolored Leaf-nosed Bat)
Hipposideros galeritus (Cantor's Leaf-nosed Bat)
Tylonycteris pachypus (Clubfooted Bat)
Tylonycteris longimanus
Tadarida tragata (Dobson's Wrinkle-lipped Bat)
Tadarida plicata (Wrinkle-lipped Bat)
Myotis farrnosus (Hodgson's Bat)
Hesperoptenus tickelli (Tickell's Bat)
Scotomanus ornatus (Harlequin Bat)
Coelops frithii (Tail-less Leaf-nosed Bat)
Kerivoula picta (Painted Bat)
Kerivoula hardwicki (Hardwick's Bat)
Pipistrellis coromanda (Indian Pipistrell)
Pipistrellis kuhli (White-bordered Bat)
Pipistrellis ceylonicus (Kelaart's Pipistrell)
Pipistrellis mordax (Grizzled Bat)
Pipistrellis dormeri (Dormer's Bat)