

REPORT ON TOPOGRAPHIC MAPPING
PROJECT OF THE BARITO RIVER BASIN
REPUBLIC OF INDONESIA

MARCH 1974

OVERSEAS TECHNICAL COOPERATION AGENCY

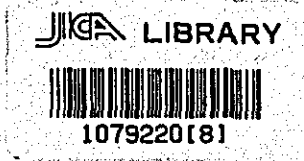
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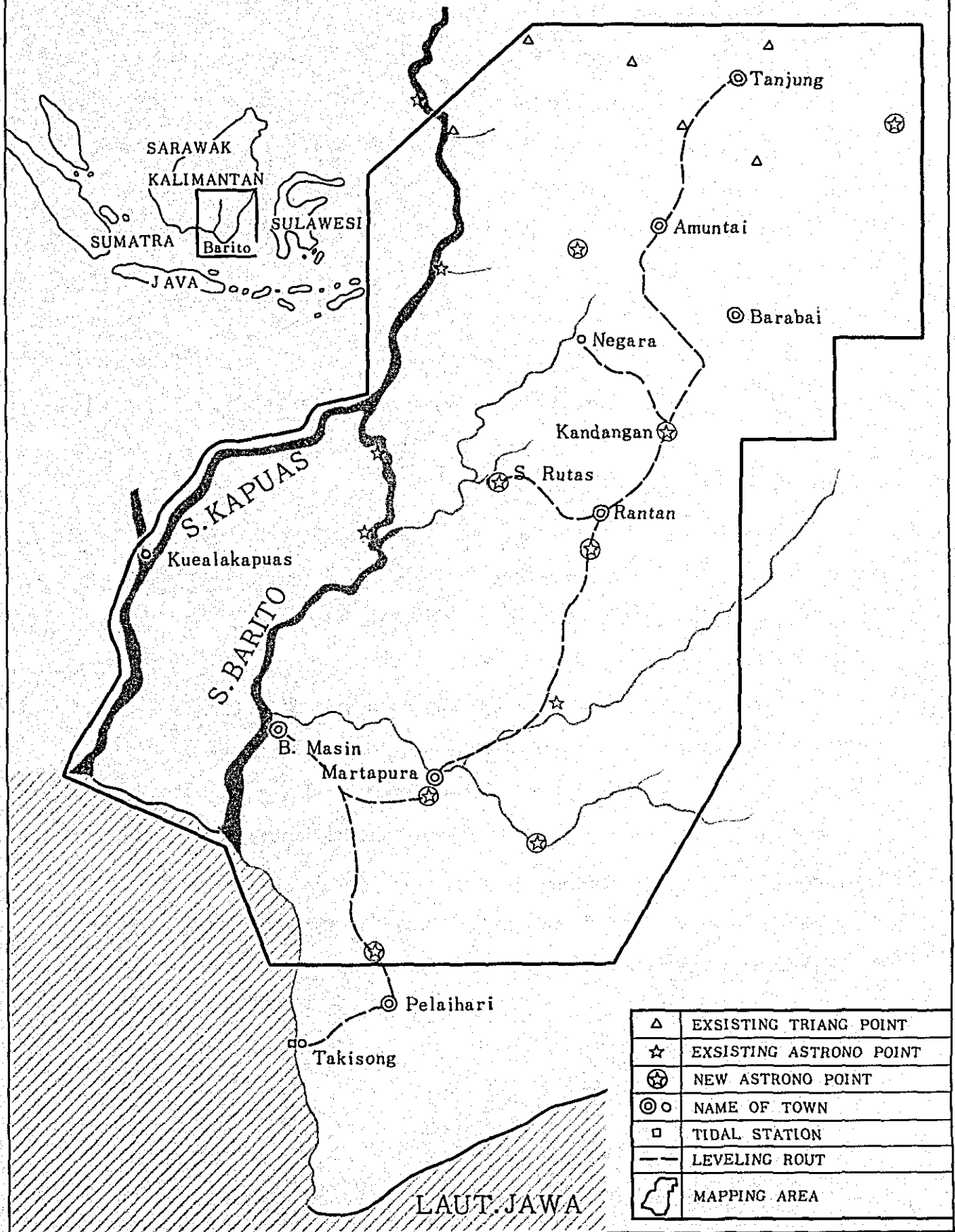
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BARITO RIVER BASIN MAPPING PROJECT LOCATION MAP



FOREWORD

The Barito River Basin Mapping Project, Kalimantan, started at the request of the Government of the Republic of Indonesia, called for three years of successive work involving aerial photography, ground surveying, aerial triangulation, compilation and printing for its completion.

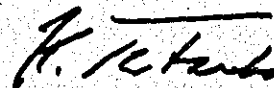
In 1973 which was the third year of the project, aerial triangulation, stereoscopic plotting, supplementary survey, compilation and scribing, and proofreading were performed.

As in 1972, the greater part of these works were commissioned by the Overseas Technical Cooperation Agency to International Engineering Consultants Association which was given the same kind guidance and instructions from Japanese Technical Advisory group.

The supplementary survey, which required a period of 45 days from late August to early October 1973, was conducted by a team headed by Professor, Dr. Takakazu Maruyasu of Tokyo University, with the participation of Mr. Shiro Imai, of Geological Survey Institute, Ministry of Construction, who served as the superintendent of field work. Proofreading was performed by a 4-man team consisting of Mr. Masaru Toshioka, Advisor to International Engineering Consultants Association, and three other members who stayed in Indonesia for about a month from late December to late February, 1974.

After three years of continued effort exerted by many experts and engineers who directly participated in the above-mentioned works and thanks to the valuable and very effectual assistance offered by all quarters concerned, the project is about to be successfully brought to completion with the exception of the printing work.

On this occasion, I should like to express my deep gratitude to the Government of the Republic of Indonesia, provincial government of Kalimantan, Japanese Embassy in Jakarta and other competent Japanese government offices including Geological Survey Institute for their unlimited cooperation as well as to the surveying companies belonging to International Engineering Consultants Association for their elaborate effort and endeavours.



Kelichi Tatsuke
Director General
Overseas Technical Cooperation Agency

March 1974

Mr. Keiichi Tatsuke
Director General
Overseas Technical Co-operation Agency

Dear Sir:

We have the pleasure to submit herewith the Report on Topographic Mapping Project of the Barito River Basin, South Kalimantan, Indonesia.

The above project which includes aerial photography, ground survey, aerial triangulation and stereoscopic mapping of the Barito River Basin, has been entrusted us by your agency in 1972. The work was started in May the same year.

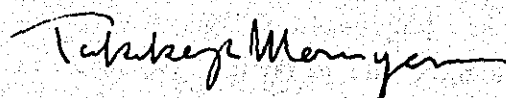
The report is the result of the work hitherto executed and contains a part of the result of aerial survey, ground survey and stereoscopic plotting.

It is to be noted that the performance of our work has been tremendously facilitated by thoughtful assistance of the Working Group of the Ministry of Public Works and Electric Power of the Government of Indonesia and provincial Government of South Kalimantan.

We believe firmly that the well co-ordinated co-operation between Indonesian and our engineers for the execution of wide range survey activities throughout the work period has contributed much towards the exchange of knowledges, technological advancement of surveying in Indonesia and further promotion of mutual friendship between two countries.

In concluding this short note we should not fail to express our heartfelt thanks to the Ministry of Public Works and Electric Power, the Army Topographic Service and other concerned governmental agencies and institutions, and the Japanese Embassy in Jakarta and Japanese officials stationed in Indonesia for their warm and kind assistance rendered us during the whole work period.

Last but not least we hope sincerely that the present report together with maps be fully utilized for the future comprehensive development projects of the Barito River Basin.



Prof. Dr. Takakazu Maruyasu
Leader of the Japanese Survey
Team for Mapping of the
Barito River Basin.

March 1974
Tokyo, Japan

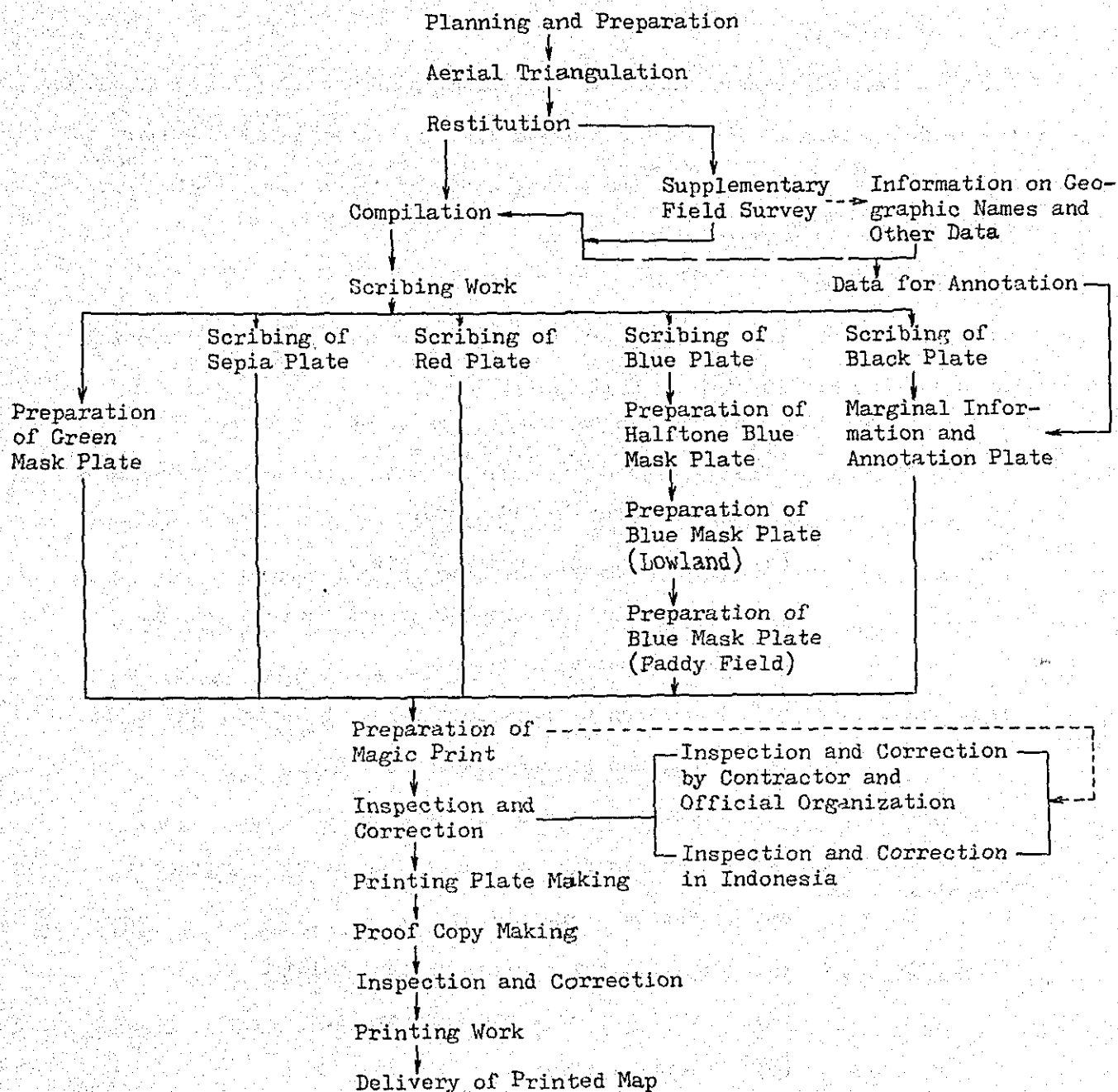
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1. Work Schedule for 1973/1974

The mapping work in 1973/1974 was performed according to the following flow chart with the exception of the printing work.

Flow Chart of Mapping Work



2. Aerial Triangulation

This report contains a detailed account of the analytical aerial triangulation work conducted for the purpose of preparing a 1/50,000 topographic map which is required as basic data for implementing the Barito River Basin Development Project.

The analytical triangulation was performed in August 1973 in continuation of the aerial triangulation work conducted during the period from January to March of the same year. The entire survey area was taken as a single block for simultaneous adjustment computation.

A. Outline of Work

Purpose : Establishment of additional control points for mapping.

Amount of Work: 10 strips, 115 models.

Source Materials : (1) Positives, 1/50,000, $f = 152$.

(2) Contact prints of above.

(3) Data of ground control points.

(4) Contact prints showing ground control points.

(5) Reference maps.

Instrument : (1) Precision stereoscopic pricking device, KRP & PUG.

(2) Precision stereo-comparator, STKI.

(3) Electronic computer, DEMOS & NOVA.

Formation of Operation Team : 7-man team comprising 1 chief engineer, 2 engineers and 4 assistant engineers.

Final Result : (1) Diapositives showing pricked points.

(2) Result table of control points.

(3) Orientation map.

B. Operation Procedure

(1) Preliminary Work

Contact prints, positives, control point data and other materials directly relating to the triangulation as well as reference maps and existing survey records and data were collected and put in order. The operation procedure was formulated after a detailed examination of the data thus arranged.

(2) Selection of Control Points, Pass Points and Tie Points

Control points, pass points and tie points are selected with their approximate positions marked on the contact prints. In the present work, six pass points and one tie point were selected for each model.

(3) Pricking

The positions of selected pass points and tie points which are marked on contact prints are determined and pricked by perforating small holes of 30μ diameter in the right and left positives by stereoscopic measurement using precision stereoscopic pricking devices, KRP and PUG, which provide 16 magnifications. In the present work, pass points, tie points and control points were pricked.

(4) Measurement

The coordinates of aerial photographs showing pricked pass points and tie points are measured in the unit of 1μ by means of precision stereo-comparator, STKI.

(5) Calculation and Adjustment

In the present work, calculations were worked out by NOVA and DEMOS systems.

Correction of film shrinkage, relative orientation and absolute orientation were effected by the on-line system in which STKI was directly connected with NOVA. In the absolute orientation, all strips were taken as a single block for simultaneous adjustment computation on the basis of the points obtained by the first-phase aerial triangulation and eight control points in the survey area. The calculations were worked out with an accuracy of 10.88 mm of standard deviation for tie point discrepancy and 49.13 mm of standard deviation for residual of control point.

Equations employed for calculation are shown below.

- i) Correction of Film Shrinkage
- ii) Relative Orientation
- iii) Successive Relative Orientation
- iv) Absolute Orientation

3. Restitution

By restitution is meant the process in which the stereomodel produced in the plotting machine is measured for preparation of the draft of topographic map.

Each pair of positives set in the plotting machine is controlled by the data obtained from aerial triangulation, so that it is possible to obtain a stereomodel which represents the actual topography and whose scale factor is clearly known.

In the mapping work, the restitution work should be completed before entering the stage of digital processing and drafting.

In the present work, restitution was carried out according to the following criteria.

A. Main Specification

- 1) Scale of Plotting : 1 : 50,000.
- 2) Contour Interval : 25 m for intermediate contour,
125 m for index contour, and 12.5 m
for supplementary 1/2 interval contour.
- 3) Instrument : Zeiss Planimat (West German made) or
other instrument with the same or superior
performance.

Notes: Since an 8.8 cm super wide angle camera was used for aerial photography, an instrument capable of using super wide angle photographs was selected.

- 4) Area of Plotting : 19,800 km².
- 5) Number of Sheets : 34 (square sheet measuring 15' × 15').

Notes: The sheet size conforms to the standard adopted for the national large scale map of the Indonesian Government (See Fig. 1).

- 6) Grid Line Interval : 1 km (2 cm on the drawing paper).
- 7) Coordinates : U.T.M. coordinates.

B. Data and Materials

- 1) Plotting Paper : 0.075 mm thick transparent polyester
sheet free from shrinkage.
- 2) Source Material : (a) Result table of levelling.
(b) Contact prints showing survey data.
(c) Result table of aerial triangulation.
(d) Computation book of corner coordinates.
(e) Index map with neatlines.

C. Operation Procedure

- 1) Control Plot : The drawing paper was plotted in advance with-
- (a) triangulation and astronomic control points,
 - (b) pass points, and
 - (c) tie points.

- 2) Orientation : (a) The scale was determined on the basis of pass points.
- (b) The height readings were corrected for each model according to the correction graph.

- 3) Plotting of Details: (a) Indication of control points and elevation points.

Triangulation points in 10 cm. Bench marks in cm. Spot height was plotted in m on the drawing paper at a density of 4 to 5 points per each 20 x 20 cm.

- (b) Selection of spot height.

Major mountain summits and passes; major road intersections; major river confluences; extensive dry river beds or shoals; and deepest points of depressions.

- (c) Measurement of spot height.

The height of elevation points was read twice and the mean value obtained was plotted in pencil on the polyester sheet.

(d) Indication of planimetric features.

Roads wider than 2.5 m Double line

" " 1.5 ~ 2.5 m Single line

" narrower than 1.5 m Trail line

Rivers wider than 2.5 m Double line

" narrower than 2.5 m Single line

Rivers whose width was unknown were plotted in broken lines.

(e) Buildings and clusters.

The boundary line between clusters was plotted in solid line if it is clear, and in broken line if not clear.

The minimum size of clusters plotted was 4 mm^2 on the drawing and clusters smaller than that were expressed in solid black building symbols.

Prominent buildings selected during the field survey were indicated on the drawing in symbols designated separately.

(f) Structures serving as land mark objects.

Structures to be indicated in the basic map were plotted in symbols specially designated.

(g) Vegetation.

Vegetation extending for more than 4 mm on the drawing was plotted in covers indicating their boundary.

(h) For those portions of roads, rivers, buildings, etc. which could not be photographed due to clouds and other obstructions, the enlarged 1/25,000 topographic map was used.

Reproduction from the enlarged topographic map was conducted with care in order that the plotting of these portions may be done with ease at a later date.

(i) Joining.

Sheets were joined in such a way that the bottom of each sheet will be connected with the top of the following lower sheet and the righthand side of each sheet with the lefthand side of the adjoining righthand side sheet.

D. Target Accuracy

Planimetric accuracy Accurate to within ± 0.5 mm (on the drawing).

Spot height accuracy Accurate to within 1.5 m.

E. Interim Result

One draft map.

F. Period Required for Restitution

35 days from July 15 to August 20, 1973.

4. Supplementary Survey Work

Supplementary survey work is conducted to throw light on the questions presented in the stage of restitution and compilation and thereby to confirm photographic interpretations or check the measurements by the plotting

machine. It is also conducted, as occasion demands, to supplement geographic names and other survey items.

In the present work, the supplementary survey work was performed with stress placed on annotations.

A. Preliminary Work

- 1) Determination of Preliminary Work and Operation Procedure :
- (a) Confirmation of collected data (map symbols and details of geographic names) and survey items.
 - (b) Confirmation of the scope of supplementary survey work.

The supplementary work was conducted within about 500 km² extending on either side of arterial roads in which automobile traffic was possible.

- (c) Selection of portions covered by clouds or shadows which reject satisfactory interpretation on aerial photographs.
- (d) Selection of important points whose height need to be checked.
- (e) The supplementary survey work was conducted on contact prints of aerial photographs and blue prints of base map.

- 2) Confirmation of Survey Items :
- (a) Buildings.
Schools, public office buildings, markets, mosques, churches, Chinese temples, Hindu temples, radio stations, railway stations, etc. which are to be indicated in symbols; universities to be indicated in lettering;

and structural classification of buildings (i.e., distinction between stone, wooden, steel and bamboo structures).

(b) Spot features and encircling features.

Cemeteries (Islamic, Christian and Confucian cemeteries), wells, reservoirs, monuments, oil and gas tanks, piers and jetties, lighthouses, oil pipes, dams, bridges (stone, steel and wooden) having a length of more than 200 m; fences (stone, steel and wooden fences and hedges) having a length of more than 200 m; and canals, weirs and small bridges, all of which to be indicated in map symbols adopted in Indonesia.

(c) Roads.

Names, width, kilometer posts, pavement, etc. of roads as well as road structures all to be indicated in symbols adopted in Indonesia).

(d) Area features.

Airports, mines (including quarries), golf links, hot springs, oil wells, etc. (all to be indicated in symbols adopted in Indonesia).

(e) Rivers.

Names and flow directions of rivers, lakes and canals, etc. (all to be indicated in symbols adopted in Indonesia).

(f) Vegetation.

a) Cultivated land.

Paddy fields, dry fields, plantations (including those of rubber, coffee, tea, pepper, quinine, and bananas) and their vegetation zones occupying an area of 5 mm² or larger on the drawing.

b) Uncultivated land.

Virgin forests, coppice forest waste land, reed, savannah, resin, mangrove, palm, bamboo, teak, etc. (all to be indicated in symbols adopted in Indonesia, but no indication of their vegetation zone required).

(g) Topography.

Artificial hachures, crumbling earth cliffs, dunes, sandy areas, reefs, caves, etc. (all to be indicated in symbols adopted in Indonesia).

(h) Boundary line of clusters.

Confirmation of both clear and unclear boundary lines of clusters by field survey with the aid of photographic interpretation,

and indication of clear boundary lines in solid lines and unclear ones in broken lines.

(i) Geographic names and boundaries.

Collection of information on geographic names from the Indonesian Government and confirmation of each geographic name at pertinent public offices and by field survey (geographic names to be checked were limited to those which represent areas larger than villages).

Confirmation of boundaries on the basis of collected information and in accordance with the symbols adopted in Indonesia.

3) Method of Supplementary Survey

- (a) Symbols and signs were entered in waterproof ink on the aerial photograph according to the Standard of Map Symbols adopted by the Indonesian Government with care taken against erroneous entry and omission.
- (b) For districts which could not be covered by the field survey, the items were checked and confirmed by photographic interpretation.
- (c) The true shape and true position were clearly represented for all survey items.

(d) In case the true position could not be represented due to the complexity of survey items, it was pricked and enclosed in a small circle with an arrow mark drawn therefrom to a suitable position at which it was indicated in the pertinent symbol.

(e) Colour of ink.

a) Water area Blue

b) Vegetation Green

c) Others Red

Items a), b) and c) were plotted on contact prints and photo mozaics.

d) Geographical names and boundaries..Red

Item d) was plotted on 1/50,000 blue prints, contact prints and photo mozaics.

(Polyester base sheet #200 was used for preparation of the annotation data sheet)

(f) Inspection

a) Checking of gaps in the survey area.

b) Checking for omission of any survey items and inspection of map arrangement.

c) Checking for discrepancies between data.

d) Checking of joining of sheets.

Field Check:

On the basis of the photo copy of the draft map produced by the plotting machine, field check was carried out in order to correct the discrepancies in important features represented on the draft map (Field checking was conducted only in those parts of the survey area which permit plane table survey).

The check was performed with stress placed on the height obtained by levelling and covered chiefly irrigation planning districts.

For the purpose of field check, fixed bench marks and tide measurements analysis were employed for comparison of the mean sea level with the selected elevation points each representing an extensive area.

4) Work Schedule

For smooth progress of the entire mapping work, it was planned that the supplementary survey would be completed in about 45 days, starting from mid-August and ending in early October.

For this reason, the 45-day survey period was distributed as follows.

- o 4 days for the trip to and from Banjarmasin via Jakarta.
- o 15 days for arrangements and consultation (5 days before starting the field survey and 6 days after completion of the survey)
- o 30 days for field survey.

Notes: For details of the work schedule, see the separate itinerary.

5) Formation of Operation Team

The area to be covered by the supplementary survey was about 5,000 km². It was assumed that if the operation team was divided into three parties for each party to cover an area of about 60 km² per day, a onemonth period would suffice for completion of the survey. In making this assumption, consideration was given to the time required for transportation

and the time loss incurred by unfavourable weather. The operation team was therefore composed of six members who were divided into three parties each comprising two members.

6) Instrument and Data

(a) Level	2 units
(b) Plane table	2 units
(c) Contact print	2 copies
(d) Photo mozaic	2 copies
(e) Blue print	5 copies

B. Operation of Supplementary Survey Work

1) Period

45 days from August 20 to October 3, 1973.

2) Formation of Operation Team

Leader	Takakazu MARUYASU	
Assistant Leader	Masaru TOSHIOKA	
Member	Shin IKEDA	Supplementary survey
"	Meiji UETSUJI	"
"	Sadao WATANABE	"
"	Shohei HATTORI	"
"	Junya FURUSE	Coordination and general affair
"	Akira NISHIMURA	Supplementary survey
"	Shigemitsu KAI	"

3) Arrangements and Consultation at Jakarta

A series of discussions were held on each of the aforementioned survey items between the team and the officials from the Indonesian Ministry of Public Works.

While the Indonesian side accepted the operation procedure proposed by the team, Director of Planning and Programming Mr. Ir. Boesone Boedidarmo explained that a reservoir dam for irrigation was planned to be constructed with the financial backup of the Asian Development Bank at a point downstream of the Riam Kanan dam which was included in the survey area and requested that the team determine the elevation of the proposed dam site as part of its supplementary survey work.

The team acceded to this request after consultation with the staff of the Japanese Embassy in Jakarta.

4) Allocation of Members and Operation Schedule

(a) Headquarters at Banjarmasin

Japanese side : Masaru TOSHIOKA
Junya FURUSE
Indonesian counterpart : Mr. Slamet B.A
members Mr. Harisusanto

(b) Supplementary Survey in Banjarmasin District

Japanese side : Sadao WATANABE
Shohei HATTORI
Indonesian counterpart : Mr. Drs. Anton Sudjadi
member

(c) Supplementary Survey in Barabai District

Japanese side : Shin IKEDA
Shigemitsu KAI
Indonesian counterpart : Mr. Subli BIE
member

(d) Supplementary Survey in Tanjung District

Japanese side : Meiji UETSUJI
: Akira NISHIMURA
Indonesian counterpart : Mr. Soetopo B.A
member

All the Indonesian counterpart members were from the Ministry of Public Works.

Operation Schedule

	August	September	October
Pre-survey Arrangements and Consultation (All 3 Parties)	(Planning)		Jakarta
	(Discussion)		
Preliminary Work (All 3 Parties)	(Planning)		Banjarmasin
	(Implementation)		
Supplementary Survey by A Party	(Planning)		Banjarmasin District
	(Implementation)		
Supplementary Survey by B Party	(Planning)		Barabai District
	(Implementation)		
Supplementary Survey by C Party	(Planning)		Tanjung District
Data Consolidation (All 3 Parties)	(Planning)		Jakarta
	(Implementation)		
Post-survey Arrangements and Consultation (All 3 Parties)	(Planning)		Jakarta
	(Discussion)		
Inspection of Elevation	(Implementation)		

Notes: A gap of nine days was created between the operation schedule and the actual survey period. This was due to the delayed delivery of survey equipment caused by the suspension of Indonesian domestic flight service.

5) Outline of Operation

(a) Preliminary Work

Since the team had to be divided into three parties to cover the survey area, the preliminary work was conducted by all the members so that all the three parties would perform their survey activity according to the unified standard.

The preliminary work was intended to make the supplementary survey work effective by comparing various ground objects with those identified by photographic interpretation through the use of aerial photographs.

Another purpose of this work was to enable each member to confirm and acquaint himself with the operation standard for smooth progress of supplementary survey.

(b) Inspection of Elevation

b-1 In Riam Kanan district, inspection of elevation was carried out together with simple levelling (23 km).

b-2 Height of elevation points each representing an extensive area in the flat land (proposed irrigation project district) was checked against the existing bench marks along the arterial roads. The inspection disclosed that the selected elevation points were about 2 m higher than the bench marks on the average, and some were about 7 m higher. The result of inspection is shown in the table on page 25.

b-3 For those parts of the survey area which were swampy and prevented the passage of the team, observation stations were established at suitable intervals along three rivers using the water level records of at Banjarmasin, Marabahan and Negara. At all these stations, simultaneous observation was conducted for 16 hours to estimate the water level and the elevations in the neighbourhood of the stations were inspected on the basis of the estimated water level.

<u>Station</u>	<u>Tidal Range</u>	<u>Mean Water Level</u>	<u>Ground Height Estimated from Water Level</u>
1. Takisung Tide Station	2.4 ^m	0 ^m	-
2. Banjarmasin (The Martapura)	1.3	+0.65	+1.1 ^m ~ +1.6 ^m
3. Marabahan (The Barito)	0.65	+1.00	+1.5 ~ +2.0
4. Negara (The Negara)	0.04	+1.62	+2.1 ~ +2.6

From the above inspection, it was estimated that the ground height in the vicinity of the said three rivers was less than 3 m on the average. Accordingly, the elevation points rising to a height of more than 3 m in the swampy parts as well as the excessively high elevation points detected in Item b-2 were subjected to reinspection by means of the plotting machine.

b-4 Supplementary field survey

The entire survey area was divided into three parts which were covered according to the established operation procedure.

Although the survey entailed no difficulty with respect to buildings for public use, the team found it difficult to determine the degree of representation of some schools and religious installations on the map. It was noted that indication of schools on the map was just impracticable if primary schools were included because

their number was too large. This problem was also encountered with respect to mosques.

It was therefore determined to carry out the survey as originally planned and to set this problem aside for discussion at Jakarta after completion of the survey.

6) Data for Supplementary Survey

- (a) Information on geographic names.
- (b) Data on boundaries.
- (c) Road network map.
- (d) Statistical data of South Kalimantan Province.

Notes: Since boundaries were not delineated during the survey period, it was agreed that the Ministry of Public Works would send an authenticated boundary map to Japan within 1973.

7) Final Arrangements and Consultation with the Ministry of Public Works at Jakarta

(a) Inspection of Elevation

It was agreed that the elevations found inadequate as a result of the survey would be subjected to inspection by means of the plotting machine for correction.

(b) Field Supplementary Survey

It was agreed that educational institutions above and including senior high schools as well as large mosques would be represented on the map.

Numbers of mosques determined to be indicated on the map are shown below for major municipalities.

Banjarmasin	3 ~ 4 mosques
Martapura	2 ~ 3 "
Banjar Baru	1 ~ 2 "
Rantau	1 ~ 2 "
Kandangan	1 ~ 2 "
Barabai	1 ~ 2 "
Amuntai	1 ~ 2 "
Tanjung	1 ~ 2 "

(d) Symbols

It was agreed that schools, post offices, hospitals, factories and oil fields would be indicated in symbols established under the international rule of representation.

(e) Boundaries

While it was noted that the boundaries of the nine Ketjamatans embraced in the survey area were not determined during the survey period, an agreement was reached that they would be represented on the map and that the team would be informed of them through the diplomatic channel as soon as determined within 1973.

(f) Rules for Annotation

It was agreed that the geographical names would be indicated according to the Information on Geographical Names and the road names according to the road classification map.

As regards the names of rivers, it was agreed that the names of large rivers alone would be represented with consideration given to the arrangement of map.

(g) Marginal Information

The following agreement was reached with regard to the marginal information.

g-1 The bearing azimuth would be indicated according to the data of Map Division, Indonesian Army.

g-2 Districts covered by the supplementary survey would be clearly distinguished by marginal information from those not covered.

g-3 Other necessary annotations, lettering, additional symbols, etc. would be entered in positions agreed upon after mutual consultation.

g-4 Districts which could not be plotted would be covered by enlarging the existing 1/100,000 map and would be clearly delineated on the map.

(h) Proofreading

h-1 The team requested the cooperation of the Ministry of Public Works in the proofreading of printing plates, with explanations given on how the proofreading should proceed.

h-2 Proofreading was originally planned to be conducted in Jakarta. However, both parties agreed that proofreading of geographical names, river names, road names, boundaries, buildings, etc. could be best performed by the eligible local staff in South Kalimantan province. As regards the resultant need for revising the original proofreading schedule, the team informed the Ministry of Public Works that a definite reply would be sent with the approval of OTCA after the team's return to Japan.

h-3 Proposed Revised Schedule for Proofreading

Daily proofreading and correction capacity per person 0.5 sheet

Total number of sheets 34 sheets

Considering the time limit set on the printing process, the proofreading, inspection and correction need to be completed in a period of about one month which is to be distributed as follows.

- o 4 days for the trip to and from Tokyo and Banjarmasin via Jakarta.
- o 9 days for arrangements and consultation at Jakarta.
- o 17 days for actual proofreading work.

Hence, 4 persons are required to complete the proofreading of all 34 sheets in 17 days.

In order to ensure smooth progress of this work, it is desirable that engineers who participated in the survey from the beginning be dispatched again for proofreading. The team wishes to point out that this desire was also expressed by Director Ir. Boesono Boedidarmo of the Ministry of Public Works.

(i) Comments

i-1 Arrangement of Map

As for planimetric features, it was noted that portions of villages, roads and small rivers covered by trees were omitted.

It was further noted that natural vegetation in uncultivated land and afforestation zone were not clearly distinguished from each other or erroneously indicated (this was conspicuous in districts embracing rubber plantations).

Elevations of flat cultivated land and grassland were represented with fair accuracy, but those of flat land covered by trees involved errors assignable to misreading at time of plotting.

i-2 Preparations required before supplementary survey work

The field supplementary survey was commenced behind schedule because the survey equipment were held at Jakarta Airport for nearly seven days. This was caused by the unexpected suspension of flight service from Jakarta to Banjarmasin.

Since there is no guarantee that there will occur no sudden flight suspension in future, it is desirable that the operation team leave Japan after a preparatory team organized and sent in advance has arranged for survey activities including the transportation of survey equipment.

(j) Result of Inspection of Elevations

The following table shown the elevations obtained directly by checking against the existing bench marks.

District	Elevation Read by Plotting	Actual Measured Elevation	Difference
Vicinity of Amuntai			
(East Side) 1	8.0 m	2.6 m	+5.4 m
" 2	7.0 m	2.5 m	+4.5 m
" 3	6.0 m	2.7 m	+3.3 m
" 4	7.0 m	2.5 m	+4.5 m
" 5	10.0 m	3.0 m	+7.0 m
(South Side) 1	6.0 m	4.1 m	+1.9 m
" 2	5.0 m	3.0 m	+2.0 m
" 3	5.0 m	3.2 m	+1.8 m
" 4	6.0 m	2.7 m	+3.3 m
(West Side) 1	5.0 m	2.3 m	+2.7 m
" 2	5.0 m	2.3 m	+2.7 m
" 3	4.0 m	2.1 m	+1.9 m
Vicinity of Negara			
(North Side) 1	2.0 m	1.8 m	+0.2 m
" 2	3.0 m	2.0 m	+1.0 m
(East Side) 1	3.1 m	2.0 m	+1.1 m
" 2	3.0 m	1.5 m	+1.5 m
" 3	3.2 m	2.0 m	+1.2 m
(South Side) 1	2.9 m	2.0 m	+0.9 m
" 2	2.0 m	1.6 m	+0.4 m
Vicinity of Rantau			
(North Side) 1	16.0 m	13.0 m	+3.0 m
" 2	15.0 m	13.0 m	+2.0 m
" 3	15.0 m	12.3 m	+2.7 m
" 4	13.0 m	12.5 m	+0.5 m
" 5	14.0 m	12.7 m	+1.3 m

5. Compilation (Scribing)

Since the scribing method was employed in the present work, compilation was performed for each separate plate.

The scribing method has the advantage of stabilizing the line weight and ensuring an excellent printing finish of the map. In addition, it dispenses with one of the stages of printing process and therefore cuts down the cost and time.

A. Specification of Scribing Work

1) Symbols

Map symbols adopted in the national large scale map of Indonesia were adopted for representation.

Items not covered by the Indonesian map symbols were represented in A.M.S. symbols.

See Fig. 3 for map symbols.

2) Colour Separation

Since the map was printed in five colours, compilation was conducted on each of the following separation plates.

Red plate, blue plate and blue mask plate, sepia plate, green mask plate, black plate, and marginal information plate.

Symbols and annotations scribed on these plates were as follows.

(a) Red Plate

Roads, buildings (specified ones), cemeteries, monuments, wells, dams, etc.

(b) Blue Plate

Rivers, lakes, swamps, paddy fields, water sources, etc.

(c) Sepia Plate

Contour lines, contour values, steep slopes, etc.

(d) Green Plate
Clusters.

(e) Black Plate
Control points, elevation numbers, annotations, boundaries,
neatlines, grid lines, title, legend, etc.

3) Data for Scribing Work

(a) Information on geographical names, style sheet, legend, result
table of field survey, etc.

4) Interim Results

(a) Marginal information plate (positive and negative) 1 set

(b) Scribed sheet 1 set

(c) Mask plate 1 set

5) Period for Scribing Work

126 days from August 5, 1973 to January 15, 1974.

6. Survey for Proofreading

A. Period

30 days from January 28 to February 27, 1974.

B. Formation of Operation Team

The operation team was organized by the following four members.

Masaru TOSHIOKA

Shin IKEDA

Meiji UETSUJI

Sadao WATANABE

C. Purpose of Survey

- 1) Confirmation of administrative boundaries.
- 2) Confirmation of geographical names, road names and river names.
- 3) Confirmation of locations of specific buildings.
- 4) Confirmation of marginal information.

D. Schedule of Survey

- o 2 days for trip to and from Jakarta.
- o 9 days for arrangements and consultation at Jakarta.
- o 4 days for arrangements and consultation at Banjarmasin.
- o 15 days for field survey.

E. Data Used for Survey

- | | |
|---|-----------|
| 1) Magic print in five colours (brought from Japan) | 34 sheets |
| 2) Blue print | 10 copies |
| 3) Information on geographic names (brought from Japan) | 1 set |
| 4) Contact print | 1 set |
| 5) Land use map provided by the Land Use Department. | |

F. Arrangements and Consultation at Jakarta

During the meetings held at Jakarta between the team and Director of Planning and Programming Ir. Boesono and other Indonesian officials including Messrs. Ir. Sofyan Azis, Drs. Tata Sukarta Ir. Yaya Juyana and Ir. Slamet B.A, the schedule and particulars of the survey were discussed on the basis of the colour prints and blue prints. In the course of discussion, views were exchanged on the determination of administrative boundaries and the team requested the Indonesian government's cooperation in the survey.

As a result of the discussion, it was agreed that Messrs. Ir. Slamet and would accompany the team and the arrangements for their departure from Jakarta were made immediately.

Before proceeding to Banjarmasin, the team made an attempt to confirm administrative boundaries of the survey area in Jakarta and collected data for this purpose including the recently revised ones made available by the Ministry of Interior which controls administrative boundaries and holds all the relevant data. However, since the scale of the boundary map offered

by the Ministry of Interior was too small (1 : 500,000), it was determined to make use of the Authenticated Identification of Administrative Boundaries alone.

The team learned that the provincial governor was vested with discretionary powers with respect to the determination of administrative boundaries. It was therefore determined that the final decision on this question would be left to his discretion.

During its stay in Jakarta, the team also visited General Pranoto and General Slamet, Map Division of Indonesian Army, with the view to confirming the Indonesian approach to the preparation of basic map.

As a result of these discussions and visits, it was determined that the survey would be carried out with account taken of the following points.

1. Administrative boundaries would be determined subject to the confirmation by the provincial governor.
2. Geographical names and river names would be confirmed in the survey area.
3. A new print of marginal information plate would be submitted to the Map Division for its final confirmation and approval.

G. Arrangements and Consultation at Banjarmasin

On the strength of the agreement reached in Jakarta, discussions were held on each item between the team and the officials of the central and provincial governments. As a result, it was agreed that the proofreading would be carried out by dividing it as follows.

1. Proofreading of administrative boundaries would be conducted in each Ketjamatan under the supervision of the Secretariat to the provincial government for final confirmation and approval by the governor.

2. Proofreading of geographical names, river names, structures, etc. would be undertaken by the chief of each Ketjamatan and the Land Use Department.

H. Implementation of Survey

The survey for proofreading was conducted with the team divided into two parties each covering nine Ketjamatan boundaries. One of the two parties surveyed the boundaries of Ketjamatans Tanjung, Amuntai, Barabai, and Kandangan, and the other the boundaries of Ketjamatans Banjarmasin, Banjar Baru, Pelaihari, Martapura and Rantau. A period of about two weeks from February 7 to 20 was required for completion of the survey.

As a result of proofreading, it was disclosed that the following corrections and additions were required.

- 1) Administrative Boundaries

- (a) Partial correction of provincial and Ketjamatan boundaries.
- (b) Addition of 84 village boundaries.

- 2) Geographical Names

- (a) Correction of erroneous annotation of geographical names. mountain names, etc. ensued from misreading of their positions.
- (b) Addition of names of small rivers and districts where new projects are being implemented.
- (c) Correction of erroneous indication of elevations in mountainous districts discovered by comparison with the former topographic map.

I. Problems Disclosed by Proofreading and Measures for Their Solution

- 1) As for administrative boundaries, it was discovered that provincial and Ketjamatan boundaries were revised recently and corresponding partial correction was necessary. Village boundaries excluded from the

original plan were represented at the request of the Map Division of Indonesian Army and the provincial government.

2) Geographical names were indicated on the Draft map using the Information of Geographical names which was the only data available. It was noted, however, that the scale of the map attached to the Information was too small and the annotations were slightly off position. This gave rise to the confusion of village names to be included in a cluster.

Correction of these erroneous annotations were effected according to the Land Use Survey Map and to the information obtained through direct interviews with the assistant chief of each Ketjamatan.

3) Annotation of additional small rivers was requested by many quarters on the grounds that the map would be used for implementing various future projects including, in particular, irrigation improvement schemes. Additional annotation was made with the necessary data provided by the Land Use Department and Banjarmasin office of the Ministry of Public Works.

As regards the districts where new construction projects were started after completion of the supplementary survey, it was not possible to collect necessary data because the survey period coincided with the wet season. It was therefore agreed that annotation of these districts would be made in Tokyo on the basis of drawings provided by pertinent offices.

4) As for the elevations of mountainous districts, it was concluded that the errors detected were not altogether assignable to the present survey work which was apparently different from the survey conducted for preparation of the existing 1/500,000 map. It was also noted that

the difference in scale created a difference in tolerance between the two maps. It was determined, however, that districts detected to present large errors (about 80 m) would be selected for inspection by the plotting machine.

All the above-mentioned works were carried out using several copies of blue print, and it was agreed that the corrected original plot would be held by the team and its copy by the Ministry of Public Works.

J. Result of Proofreading Survey

One copy of blue print of original plot approved by the provincial governor after additional annotation and correction of administrative boundaries, geographical names, etc.

K. Comments

1) Administrative boundaries often present problems even in Japan. Problems of this kind, if encountered in the course of survey in a foreign country, should be solved by the pertinent government offices of that country. In the case of the present survey, no problems were entailed in administrative boundaries since the final decision was made on the responsibility of the provincial governor.

2) There are certain differences between Japan and Indonesia in the preparation of national large scale map, particularly in the interpretation of legend. In Japan, hospitals and schools are indicated on the map, but they need not be represented on the map according to the Indonesian practice.

In the present case, however, the Japanese practice was adopted and symbols of hospitals and schools were all indicated on the map.

Hatched section indicates the
area covered by supplementary survey

7. Fig. 1. Neatline

PETA PETA TOP SEKALA 1: 50,000

Index of the proposed maps

DAERAH KAL - SEL

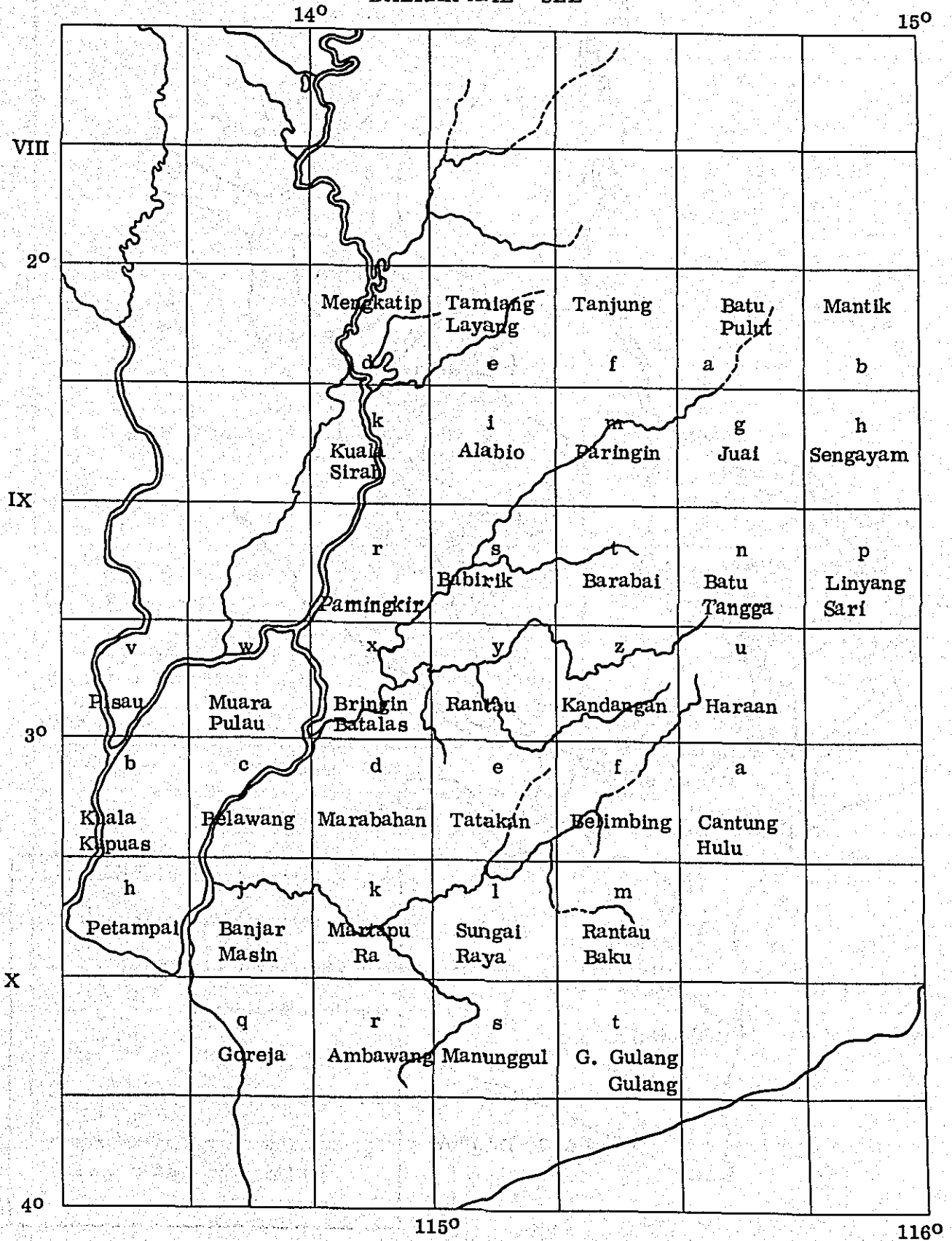


Fig. 2. Area covered by Supplementary Survey

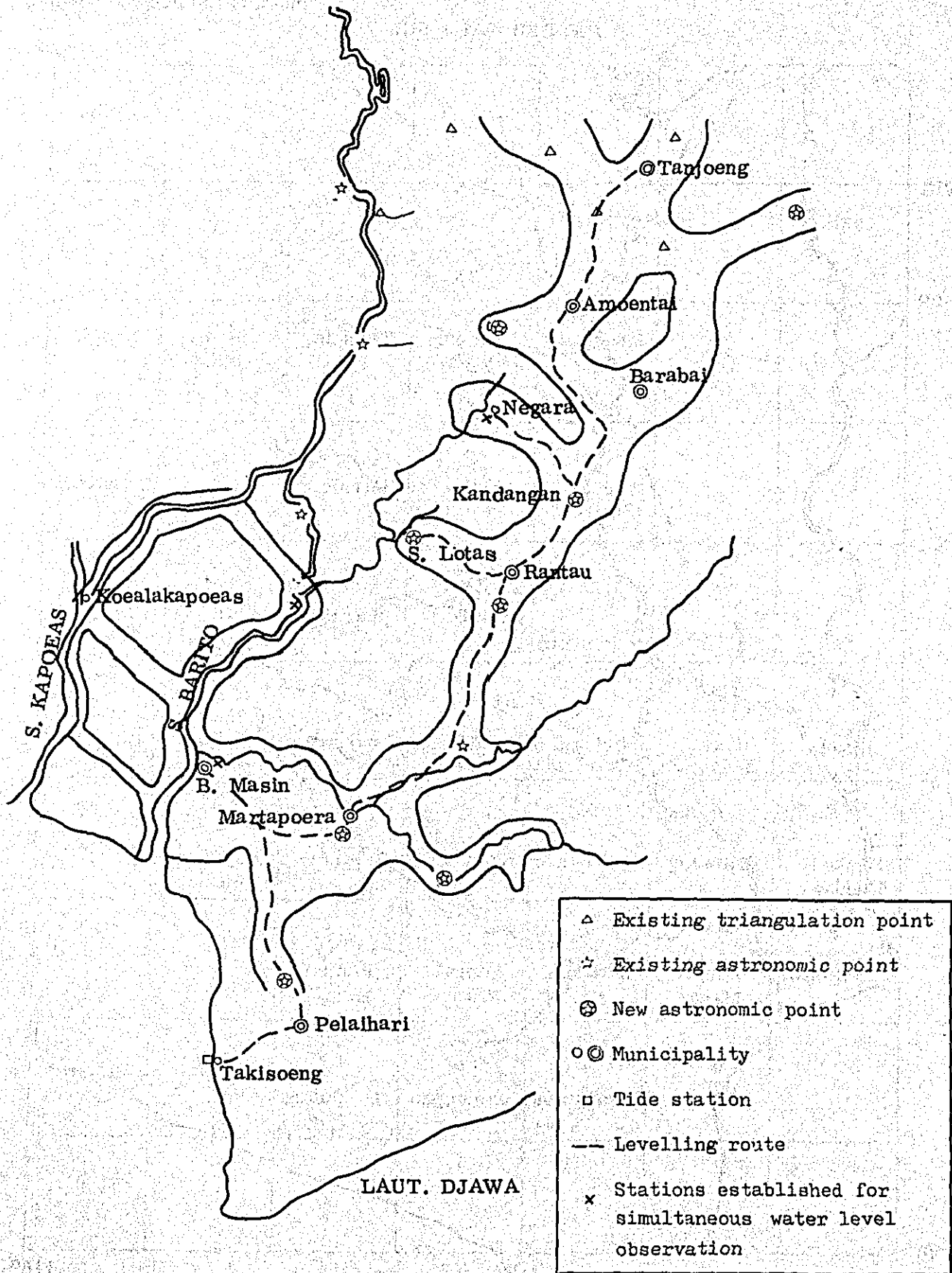



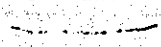
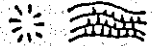


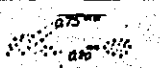
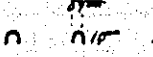
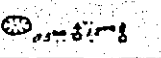
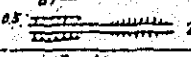
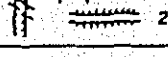
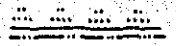

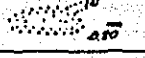



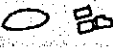
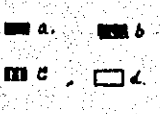

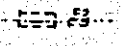


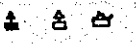



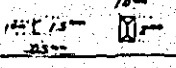








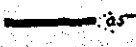
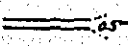
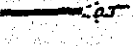





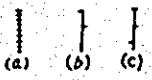




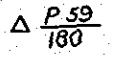





Fig. 3. Legend Adopted for Indonesian National Large Scale Map

Symbol	Description (Classification)	Bahasa Indonesia
A: RELIEF		
	Contour line	Garis ² samatinggi dan titik tinggi. Jarak tegak menurut hitungan M. ialah 1:2000 skala; yang tebal sepuluh kali sebanyak itu.
	Elevation point	Garis-samatinggi bantuan.
	Intermediate contour, index contour	Index contour interval is 10 times the intermediate contour interval.
	Supplementary contour	
	Scattered rock and depression	Batu - budur. Lekuk.
	Steep sloped hill	Susur curam. Guguk.
	Boundary of swamp and dry land	Batas tanah basah dan kering.
	Sand area, sand dune	Pasir dan kerakal. Bukit ² - pasir.
	Cave	Batu ² persarangan - burung. Gua.
	Source of mud, gas and sulphur	Sumber ² -lumpur-gas-belerang.
	Cut, embankment	Timbunan atau galian.
	Ditch, earth embankment	Parit. Tanggul.
(Water area)		B: PERAIRAN
	Castline, low water zone	Garis-pantai. Garis-air-surut.
	Depth contour	Garis ² -samadalam 2,5,10 dan 20m.
	Sandbar	Gosong selalu kelinhatan.
	Sandbar	Gosong timbul pada air-surut.
	Rock	Beting-karang. Pecahan ombak.
	Reef	Terumbu selalu kelihatan.
	Reef	Terumbu timbul pada air-surut.

Symbol	Description (Classification)	Bahasa Indonesia
	Lake, fish culture pond	Danau. Empang
	Forest at time of high tide.	Penggaraman. Hutan pasang.
	Swamp area	Rawa. Tanah-bencah.
	River a) Clear b) Not clear	Sungai dan anak sungai; a. diukur; b. tidak diukur.
	Flowing water	Sungai bawah-tanah.
	Sandbar, fall	Gosong-pasir. Air terjun.
	Rapid	Jeram. Pusaran air.
	Vessel, flow direction	Dapat dilayari. Arah arus.
	Water source, hot spring	Mata air. Sumber panas.
	Canal	Terusan. Saluran air.
	Weir	a. Bendungan; b. dengan pintu air.
	Dam	Pengempang
	(Vegetation)	C: PENUMBUHAN
	Paddy field	Sawah.
	Upland field	Tegatan; a. berbatas tegas b. kurang tegas; c. tidak tetas.
	Virgin forest, thicket of assorted trees	Hutan belantara. Belukar.
	Grassland, waste land	Pohon ciri. Rumput. Alang ² .
	Resin	Gelagah. Sabana. Damar.
	Mangrove, plam	Bakau ² . Palem rawa.
	Bamboo, teak	Bamby.
	Palm	Kelapa.
	Other palms	Jenis palem lain ² .
	Rubber	Karet. Kina. Kopi.
	Pepper	Teh. Agave. Lada.

Symbol	Description (Classification)	Bahasa Indonesia
	(Structures)	D: BANGUNAN ²
	a. Stone structure b. Wooden structure c. Steel structure d. Bamboo structure	Bangunan ² terasing; a. batu; b. kayu; c. besi; d. bambu
	School	Sekolah bangunan.
	Boundary of clusters	Gedung ² hampir runtuh.
	Market, dormitory	Los pasar. Pasanggrahan.
	Mosque, church, Chinese temple	Mesjid. Gereja. Klenteng.
	Chastle, fortress, temple	Pura. Puri. Candi.
	Cemetery	Pekuburan Islam. Kristen.
	Cemetery	Pekuburan Tionghoa. Bali.
	Monument	Tanda peringatan.
	Well	Sumur. Sumur jara.
	Stone reservoir, boundary post	Waduk batu. Tonggak batas.
	Mine	Korok tambang. Tambang mati.
	Raw ore	Tempat cebakan bijih.
	Tower, radio station	Menara jara. Stasiun radio.
	Oil tank	Tangki minyak tanah.
	Civilian air port	Lapangan terbang sipil.
	Road and bridge	E: JALAN DAN JAMBATAN
	Road classified by traffic law as 1st, 2nd or 3rd class	Jalan keras termasuk kelas I, II, dan III, menurut Peraturan Lalu Lintas (P.L.L.)
	Road classified by traffic law as 3rd or 4th class	Jalan keras termasuk kelas III A atau IV. menurut (P.L.L.)
	Other paved road	Jalan keras lain ² .
	Double line road	Jalan tidak keras./Jalan gerobak.
	Single line road	Jalan kuda.

Symbol	Description (Classification)	Bahasa Indonesia
	Trail, shortcut	Jalan setapak. Ukur-rintasan.
	Road under construction	Jalan sedang dibuat.
	Embankment	Bagian jalan timbunan.
	Cut	Bagian jalan galian.
	Steep slope	Bagian jalan yang terjal.
	Kilometer post	Tonggak km.
	Bridge (stone, steel or wooden)	Jambatan batu. Besi. Kayu.
	Intersection	Jambatan kayu beratap.
	Uncertain road	Dangkalan sungai.
	Railway line	F: JALAN KERETA-API D.L.L.
	Double track line	Jalan kereta-api rangkap.
	Single track line	Jalan kereta-api tunggal.
	Streetcar route	Jalan kereta-api trem.
	Goods line, tunnel	Jalan lori. Terowongan.
	Track	Jalan sepur gerigi.
	Station	Stasiun. Perhentian.
	Temporary section	Penyinggahan.
	High tension cable	Kawat telepon, telegrap.
	Oil pipe	Hantaran tegangan-tinggi listrik
	(Boundaries)	Pembuluh minyak. Jalan kawat.
	International boundary, Provincial boundary	G: BATAS ²
	Boundary of official residence of Kabutan chief, municipal boundary (town)	Batas Negara. Propinsi.
	Ketjamatan boundary, village boundary	Batas Karesidenan. Kabupaten.
	Municipal boundary (city)	Batas Kawedanan. Kecamatan.
	Farm boundary	Batas Kotapraja.

Symbol	Description (Classification)	Bahasa Indonesia
	Boundary delineated under the Forest Control Law.	Batas perkebunan dan konsesi.
	Boundary of preservation area	Batas kawasan kehutanan.
	Government office	Batas alam lindungan.
	(Port Facilities)	H: PELABUHAN ²
	Breakwater a. Stone b. Wooden c. Steel	Tumpuan pelabuhan; a. batu; b. kayu c. besi.
	Pier	Cerokan kepil; a. batu; b. kayu; c. besi. a. Stone. b. Wooden.
	Lighthouse (stone, wooden or steel)	Suar-pelabuhan; a. batu; b. kayu; c. besi.
	Buoy, lighthouse buoy	Pelampung. Pelampung suar.
	Pilot boat, anchorage	Kapal-pandu. Tempat berlabuh.
	(Control Points)	I: TITIK ² PASTI
	First order triangulation point	Titik segitiga ke-I (Primair) dengannomor dan tingginva.
	Second order triangulation point	Idem, ke-II (Secundair).
	Third order triangulation point	Idem, ke-III (Tertiair).
	Fourth order triangulation point	Idem, ke-IV (Quartair).
	Astronomic point	Stasiun perbintangan.
	Bench mark	Tiang penyipat-datar tepat.

