

I. Field identification

a) Preparation

Preparation of field identification will be done by mosaic photographs and reference data.

b) Execution

Field identification will be executed as following.

i) Confirmation of preparation

ii) Data gathering

iii) Investigation and supplemental identification of unidentified matters

c) Completion

Completion of field identification will be confirmed on a photo-mosaic for plotting and compilation. At the same time, an over-layer can be used depending on the condition of result.

II. Pricking

First-order bench-marks will be pricked on the 2 times enlargement photographs for aerial triangulation, plotting and compilation. New bench-marks and vertical picture points will be pricked on the contact prints, and the latter will be on every 10Km, in the routes.

III. Photo processing

Before starting the levelling and field identification, photo processing will be done in Japan.

ITEM	QUANTITY
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i) Uncontrolled mosaics	6 sets 34 pcs/1 set
ii) Contact prints	2 sets 1,240 pcs + 1,461 pcs
iii) Diapositives	1 set 1,240 pcs
iv) Diapositives for ortho-photo	1 set 66 pcs
v) 2 times enlargement photographs	1 set 82 pcs

IV. Final products

1. Levelling

i) Field notes 1 set

ii) Computation sheets 1 set

- iii) Data list of B.M. 1 set
 - iv) Description of B.M. 1 set
 - v) Net of levelling (Scale 1:250,000) 1 set
 - vi) Records and source materials 1 set
2. Field identification
- i) Photo-mosaic 1 set
 - ii) Records and source materials 1 set
3. Photo-processing
- i) Diapositives 1 set
 - ii) Records and source materials 1 set

4. Brief plan of work:

I. Levelling

a) Levelling net:

Most of levelling routes will be located along the primary road in the project area.

i) Direct levelling (Duplicate line)

Duplicate level lines will be closed with the 1st order B.M. and another.

Duplicate levelling will be performed also on open level line.

ii) Direct levelling (Single line)

Single level lines will be closed with the 1st order B.M. and new B.M.

iii) Indirect levelling

Indirect levelling will be executed on a wide open area where is difficult to proceed the direct levelling.

b) Monumentation

30 by 30cm Square and 50cm length concrete monument will be used as standard, and be established on junction of routes. Mark is the top center of the metal rod which is flushed to the concrete surface with the inscription of square, point number and B.C.G.S. (as per attached figure)

c) Observation

i) Direct levelling

Direct levelling observation will be done by automatic level. Standard distance of temporal station in duplicate levelling is 2Km. Tolerance is $10\text{mm} \sqrt{S}$.

ii) Indirect levelling

Vertical angle observation will be done by simultaneous observation with 4 sets. Tolerance of altitude constance is 10 seconds. Distance is measured by Hewlett Packard 3808A with 1 set, 4 readings. Tolerance of each reading is 35 mm.

iii) Oversea levelling

Vertical observation will be done by WILD T2 with 2 sets. Tolerance of an altitude constance is 10 seconds. Distance is measured by Hewlett Packard with 2 sets.

d) Description of bench-mark

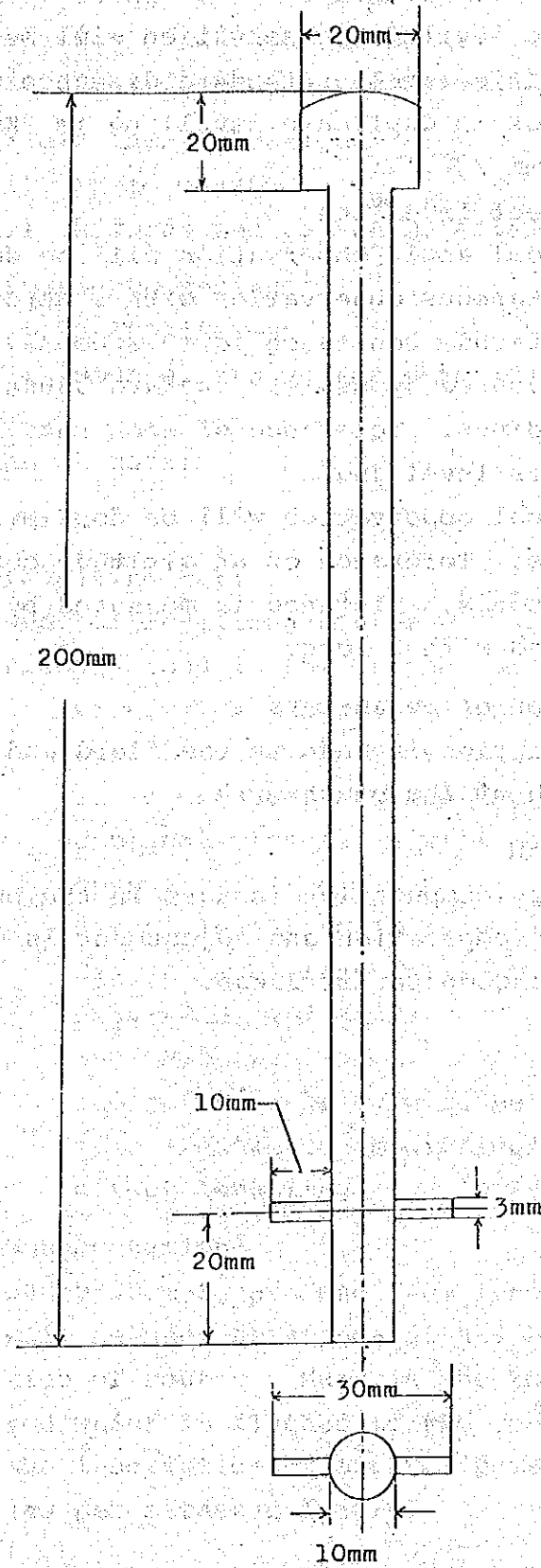
The description is made in the field and append a photograph of the bench-mark.

e) Computation

Preliminary computation is done in the philippines and final computation and adjustment is done by Electronic Computer in Japan.

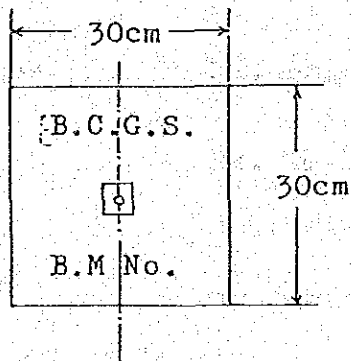
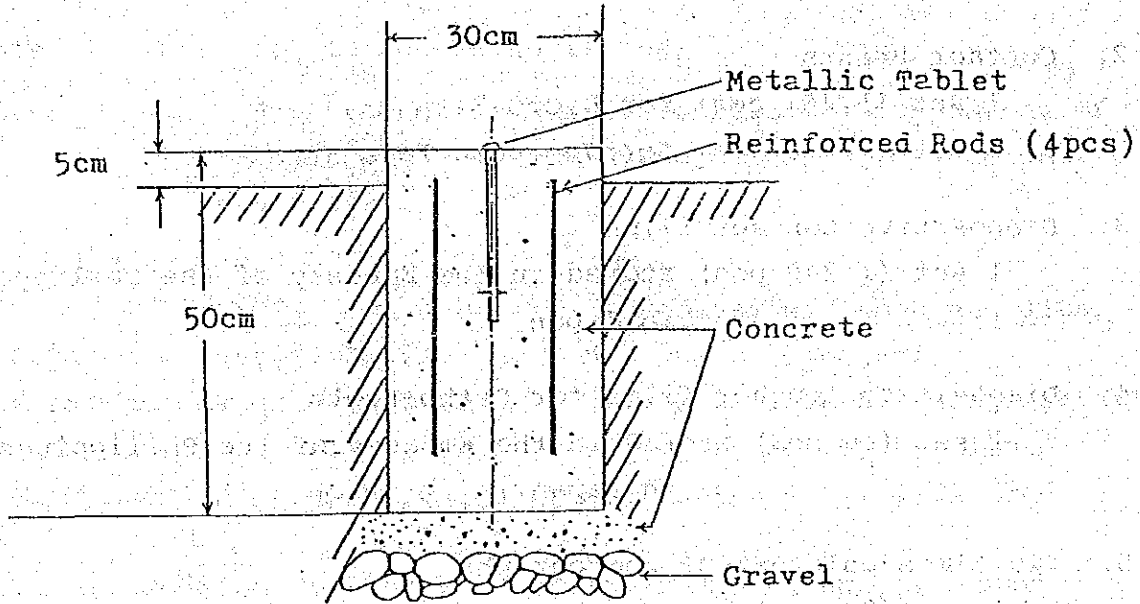
METALLIC TABLET

Scale 1/1



BENCH MARK

Scale 1/10



APPENDIX II

ITEMS, DELIVERED TO B.C.G.S.

1. Uncontrolled Photo-Mosaics
 - 3 sets for Japanese Survey Team
 - 2 sets for Field Party of B.C.G.S.
 - 1 set for B.C.G.S.
2. Contact Prints
 - 1 set (1,461 pcs) for B.C.G.S.
 - 1 set (1,240 pcs) for Japanese Team
3. Diapositive contact films
 - 1 set (1,240 pcs) stored in the Embassy of the Philippines
in Japan
4. Diapositive contact films for Ortho-Photo
 - 1 set (66 pcs) stored in the Embassy of the Philippines
in Japan
5. Two times enlargement photographs
 - 1 set (88 pcs) for Japanese Survey Team

Republic of the Philippines
MINISTRY OF NATIONAL DEFENSE
BUREAU OF COAST AND GEODETIC SURVEY
421 Barraca St., San Nicolas, Manila

MINUTES OF THE MEETING OF THE
CAGAYAN VALLEY TOPOGRAPHIC MAPPING PROJECT

Date : 14, 15 and 20 April 1981

Place : Map Production Center Conference Room Bureau of
Coast and Geodetic Survey Ministry of National
Defense

Attended By :

BCGS

Embassy of Japan and JICA

Captain Oliver F. Castro

Mr. Tamio Shimogami

Commander Mamerto S. Gler

Mr. Akira Yaguchi, Geographical
Survey Institute

Commander Ceferino R. Pascual

Mr. Manabu Aiba, JICA Head
Office

Lieut. Rodrigo R. Pascua

Mr. Mikio Nakamura, Deputy
Resident Representa-
tive, JICA Manila
Office

Mr. Robert G. Matheson

Mr. Shigehiho, Shino, JICA
Survey Team Leader

Mr. Byrne Goodrick

Mr. Toshimasa Nagashima, JICA
Deputy Survey Team
Leader

Mr. Lzet M. Serdar

Mr. Chuji Misawa, JICA Chief
Surveyor

The following matters were discussed and confirmed by both parties :

I. The Third Year Work (Phase III)

1. Work done by JICA Survey Team with the help of the five counterparts from BCGS

The third year work done by JICA Survey Team consisted

of levelling, field identification, pricking, and photo processing. Concerning the first three items, the work has been carried out in the project area during the period December 1980 to April 1981. The photo processing was carried out in Japan in November 1980. Detailed description of the work is as follows:

a) Levelling

In order to supply sufficient number of vertical control points for the whole mapping project, some 800 kilometers of level lines was run along the primary routes in the project area. These comprised some 460 kilometers direct levelling by duplicate line (F & B running), some 340 km. direct levelling by single running, and some 80 km. trigonometric levelling. River crossing levelling was done at six sites. Twenty (20) Bench marks were monumented, those mainly on junctions of levelling routes.

The closure of each level net was calculated, and all were within the tolerance according to the previously agreed standards. The elevations of some horizontal control points included in the levelling nets, calculated in the third year work will be adopted instead of the elevations calculated by trigonometric levelling during the second year work.

b) Field Identification

Field identification has been carried out according to the "Manual of Guidelines for Field Identification" for the whole project area of some 11,200 square kilometers. (Appendix III of the minutes dated December 26, 1980).

There were some critical and/or inaccessible areas during the field operation. It was agreed that under such conditions, the information to be incorporated on the maps affected shall depend on the information that could be derived from the

corresponding aerial photographs of the area by photo interpretation.

c) Pricking

Some one hundred vertical control points and all the first order bench marks along some 460 kilometers length route have been pricked on the aerial photographs for use during the aerial triangulation and plotting stages.

d) Photo Processing

Photo processing to produce the following photographic materials necessary for the later stages of the project and in accordance with the minutes of the meeting between BCGS & JICA dated 26 December 1980, was done.

- | | |
|--|--------|
| i) Uncontrolled mosaics | 6 sets |
| ii) Contact prints | 2 sets |
| iii) Diapositive films | 1 set |
| iv) Diapositive films for orthophotography | 1 set |
| v) Two times enlargement photographs | 1 set |

2. Work done by BCGS Field Party :

During the period from February through April 1981, BCGS Field Party has carried out the following field work over the whole project area according to the "Manual of Guidelines for Field Identification".

- a) Delineation of administrative boundaries.
- b) Gathering of geographic names.
- c) Road classification.

Due to lack of reliable information on the administrative boundaries in some areas, it was agreed that in the maps affected, the boundary as delineated by the field party shall contain the annotation "Approximate Boundary".

BCGS acknowledged and thanked JICA Survey Team for the logistical support extended to BCGS Field Party, particularly in providing additional transport just so

the fieldwork could be completed in accordance with the time table.

II. The Fourth Year Work (Phase IV)

1. Outline of the Work :

a. During the calendar year 1981, the following items of work will be carried out in Japan.

- i) Aerial Triangulation
- ii) Map compilation
- iii) Orthophoto production

b. During the period from January through March 1982 supplementary field verification will be carried out in the project area.

2. Aerial Triangulation :

Aerial Triangulation will be carried out in the mapping area. The total mapping area will be divided into six blocks and each block will be adjusted separately. The number of flight lines of one block is approximately 2 to 12 while that of models of one block is approximately 30 to 300.

Procedure and accuracy specifications will be according to the "Technical Manual of Overseas Surveying of JICA".

Measurements will be done using stereo-comparators, and further processing will be done analytically with electronic computers. Main specifications are as follows :

i) Inner orientation (transformation from comparator system to photo system) the residuals at the fiducial marks ≤ 0.03 mm.

ii) Relative orientation :
The residual y-parallax ≤ 0.03 mm (in photo scale)

iii) Model connection :
The discrepancy at the pass points in adjacent models $\leq 0.5\%$ of flying height in both plan and

- height.
- iv) Adjustment :
- Method for :
- 1) Plan - The polynomial adjustment using a second order conformal transformation.
 - 2) Height - The polynomial adjustment using a second order polynomial.
- v) Accuracy :
- The residuals at ground control points $\leq 0.8\%$ of flying heights/the discrepancy at tie points $\leq 0.8\%$ of flying height.

Accuracy - the residuals at ground control points $\leq 0.8\%$ of flying height/the discrepancy at tie points $\leq 0.8\%$ of flying height both plan and height.

3. Map Compilation

The plotting shall be carried out using stereo-plotting instruments at the scale of 1/25,000 with 10 meter contour interval. The detailed compilation will be done with help of the field identification results.

Bathimetric contour will be compiled using the data which will be provided by BCGS.

The number of sheets will be 71 or 72, the size of each sheet is 7'.5 x 7'.5.

Procedure and accuracy specifications will be according to the "Technical Manual of Overseas Surveying of JICA".

Main specifications are as follows :

- i) plotting instruments : autograph A-8, Topocart B, or equivalent.
- ii) relative orientation : residual y-parallax at six standard orientation points ≤ 0.02 mm in photo scale.

iii) absolute orientation : residual error at control points

Plan - ≤ 0.5 mm

Height - $\leq 1/4 \times 10$ m

iv) plotting accuracy

Plan 1 mm on the map

spot heights $\frac{10\text{m}}{3}$

Contour $\frac{10\text{m}}{2}$

In connection with the work in map compilation, BCGS commented that it appears that the original specification for maps at scale 1:25,000 has some minor deficiencies which may not warrant a satisfactory depiction of topographic features in the produced line maps. And considering the printing and cartographic capabilities of BCGS as well as the large number of topographic maps it has to produce to comply with its responsibilities, the amendments of the present specification should be aimed to simplify the cartographic and printing work.

JICA Survey Team presented the recommended map symbols list which came from the cartographic consideration, and also presented samples of GSI symbol sheets as a reference. And the team pointed out the necessity of additional symbols. Such as weirs, land use boundaries etc. as a result of field identification surveys.

Finally it was agreed that BCGS would complete new map specifications considering the above mentioned situation. JICA recommendations and the "Manual of Guidelines for Field Identification". The new specifications must be completed and delivered to Japan by July 1981. (Refer to IV).

4. Orthophoto map Production

Orthophotomaps of the following areas will be produced using orthophoto instruments at the scale of 1:10,000, with annotation of geographical names as well as public

facilities, the selection of which will be the same as that of the 1:25,000 topographic maps, and with 5m contour.

- | | |
|-----------------------------------|----------|
| i) Tuguegarao, Cagayan | 6 sheets |
| ii) Port Irene, Sta. Ana, Cagayan | 1 sheet |
| iii) Gonzaga, Cagayan | 1 sheet |
| iv) Ilagan, Isabela | 4 sheets |

The sheet size will be 5 km x 5 km based on the Philippine Plane Coordinate System. The instrument to be used will be TOPOCART-ORTHO.

In line with the recent policy by BCGS in adopting the UTM on her topographic maps at Scale 1:10,000 and smaller and the adoption of a coordinated numbering system of topographic map coverage of the entire country from Scale 1:1,000,000 to scale 1:10,000, the following amendments in the production of orthophotomaps in the project area was requested :

- a) Using the UTM system instead of the PTM system (Philippine Transverse Mercator).
- b) Map coverage of three minutes by three minutes or approximately 5.3 km. by 5.4 km. rather than the original proposal of 5 km. by 5 km.

JICA Survey Team stated that the alteration of the coordinate system to be based on and the change of the map coverage will be difficult and uncommendable at this stage of the project because of the following reasons :

- a) The number of necessary models for one orthophotomap sheet will be increased, so the quality of the map will deteriorate considerably and the necessary work quantity will increase.
- b) Additional computation work to convert PTM coordinate data to UTM coordinate data.
- c) The orthophotomaps planned to be produced in this project are only 12 sheets and they are rather isolated from other project areas of orthophotomaps

productions planned in the near future. However grid ticks indication of longitude and latitude will be added on the sheet line.

JICA Survey Team promised that the request of BCGS will be transmitted to the Technical Advisory Committee of JICA.

5. Training in Japan

On-the-job training of Philippine counterparts in Japan will be in three shifts, of three months duration for each shift as follows :

- a) Aerial Triangulation May - July 1981
- b) Map Compilation (plotting) Aug. - Oct. 1981
- c) Map compilation (editing) Nov. 1981 - Jan. 1982

Two trainees (Security Officers) will be accomodated for each shift of the above-mentioned program and they will come from the following agencies :

- a) One Officer - J-2, AFP
- b) One Officer - BCGS

The list of trainees for the first shift was handed over to JICA Survey Team.

The training will be done in accordance with the normal procedure under the Colombo Plan Technical Cooperation Scheme.

6. Supplementary Field Verification

Supplementary Field Verification will be conducted by JICA Survey Team with BCGS counterparts and BCGS field party. The map manuscript derived from the maps compilation will be used in undertaking the fieldwork.

Main items of verification will be as follows:

- a) Sample checking of the planimetry and the elevation.
- c) Verification of details which have been identified in the third year of the project.

- c) Updating the planimetric details: Special attention will be made on the on-going infrastructure projects, such as high tension transmission lines and NIA (National Irrigation Administration), irrigation projects.

III. The Fifth Year Work

Tentative work scheme during the fifth year of the project will be discussed when the Fourth Year work will be terminated.

IV. Necessary material for later stages

BCGS will provide JICA Survey Team the following materials necessary in later stages of the project. They should arrive in Japan not later than July 1981 (except h & i).

- a) Map Symbol Specifications for scale 1:25,000 topographic map.
- b) Sample printed map sheet.
- c) Master reproduction material of the marginal information format for scale 1:25,000 topographic map.
- d) BCGS Seal (This will be incorporated in c).
- e) Stick Up's Sample.
- f) Photo setting type (Japanese photo setting type should be used).
- g) Bathimetric data.
- h) Master reproduction material of the marginal information format for Scale 1:10,000 orthophoto maps (to be brought along by the first shift of trainees).
- i) Printing Press to be used by BCGS.

The specifications of the Roland Offset Printing Press (RZP 1-2 C, printing plate size 740 mm (circumference) x 925 mm (axis) which BCGS is intending to use in printing the Scale 1:25,000 topographic map series of

the country.

V. Final Delivery of orthophotomaps to BCGS

JICA will delivery the following final results of ortho-photomaps production to BCGS by March, 1982.

- a) Original orthophoto negatives
- b) Contour overlays
- c) Final orthophoto positive prints of Scale 1:10,000 (two sets)
- d) Offset printing plates (film)

BCGS requested additional twenty positive diazo copies of each sheet, with which it will compliment various organizations related to this project such as the Governors of the Provinces of Cagayan and Isabela, the Mayors of Tuguegarao, Gonzaga, Santa Ana, and Ilagan, Ministry of Public Works, Ministry of Local and Community Development and etc.

VI. Others

1. The photographic materials which have been used in the field, such as mosaic photographs, contact prints, and etc. have been delivered to the Embassy of Philippines in Tokyo through the diplomatic channel, and they will be eventually handed over to JICA Survey Team in Japan.

2. Concerning JICA Land Cruiser station wagons :

a. Availability of JICA Vehicles

Relating to the 4th year work, BCGS requested JICA Manila Office to make some kind of arrangement in the availability of JICA's Survey Team vehicles.

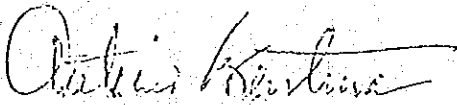
In connection with the request, discussions were made and BCGS proposed the following conditions :

- 1) The Vehicles shall solely be used for the Project,
- 2) All the expenses related to maintenance and operation shall be borne by BCGS,
- 3) In case of accident, BCGS shall promptly inform all the details to the JICA Manila Office

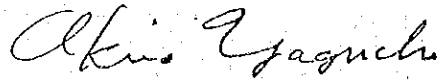
- and follow its directions,
- 4) BCGS shall, when necessary, bear the Minimum Charge for repairs, as the JICA Vehicles are all insured,
 - 5) BCGS shall prepare Log Book for maintenance and operation of each vehicle.

Availability of the vehicles will be realized as soon as JICA Headquarter's approval.

APPROVED :



ANTONIO P. VENTURA, Commodore,
BCGS Director



MR. AKIRA YAGUCHI
Geographical Survey Institute

Date : 20 Apr 81

JICA