5-1 Minutes of meeting at the time of the field identification for the land condition map (Mar. '87)

MINUTES OF DISCUSSIONS

ON

THE ESTABLISHMENT OF GRAPHIC INFORMATION BASE PROJECT FOR THE NATIONAL CAPITAL REGION

BETWEEN

THE JAPAN INTERNATIONAL COOPERATION AGENCY

AND

THE BUREAU OF COAST AND GEODETIC SURVEY

Dated: March 13th 1987

in Manila, Philippines

FOR THE BUREAU OF COAST AND GEODETIC SURVEY

Commo. ANANIAS A. BATILARAN, Jr.

Director of BCGS

FOR THE JAPAN INTERNATIONAL COOPERATION AGENCY

M. Takasaki

Mr. MASAYOSHI TAKASAKI

Leader of JICA Survey Team

At the end of the 2nd year, JICA survey team had completed the scheduled work including field identification and minor order leveling. Discussions on categorization, definition and application for landform classification on the survey area were made from mid-January to mid-March 1987 between JICA and BCGS.

Likewise, BCGS had on February 23 '87 completed checking all proof prints of the contoured and planimetric maps. Approval for the printing in Japan was given by BCGS.

Both JICA and BCGS teams have confirmed results of the 2nd year work, and have outlined the tentative 3rd year work as follows:

I Field Identification

1. Preparatory work

Prior to the implementation of field identification work, photo-interpretation and analysis for preliminary landform classification were conducted in Japan.

2. Field Work

The following field work had been completed in cooperation with BCGS:

By JICA team

(1) Field identification 429 km^2, 16 sheets
(2) Minor order leveling 150 km
(3) Outcrop survey and sampling with soil auger
(4) Collection of existing technical data
(5) Data analysis for land condition maps
(6) Preparation of draft specifications for land condition mapping

By BCGS

(1) Assignment of 6 field counterparts
(2) Assisted in data collection

(see Appendix-1: Plan of Operation &
Appendix-5: List of Data)

II Technical Discussions

General features of landform on the survey area (north-west and east of Manila) were firstly explained by JICA team using source maps (1/25,000). Preliminary classification was shown on the above source maps based on results of the photo-interpretation and analysis made in Japan.

Then, detailed discussions have been made mainly on the specifications for landform classification of land condition map of the survey area and both sides have agreed as follows: (Appendix-2: Specifications(Draft))

1. Succeeding work (compilation) to be carried out in Japan before field completion of the 3rd year, shall be made based upon the specifications (Draft).

However, some more details related to definition & application of landform classification, color scheme and other items including ground elevation for land condition maps, shall be further studied. These shall be finalized at the time of field completion of the 3rd year. Sample maps will be prepared and presented by the Japanese side to depict land condition and land use information.

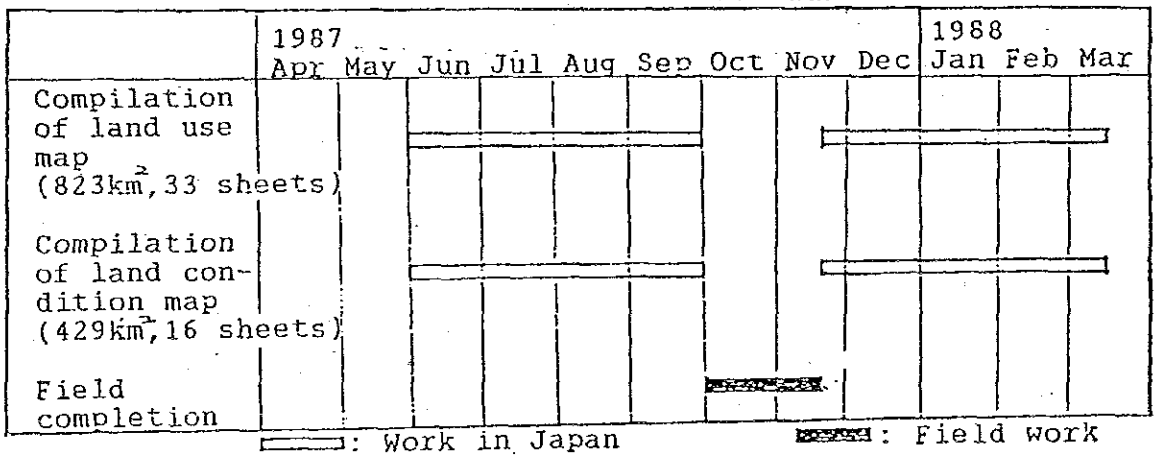
2. For future consideration, location of organization and public facilities related to disaster prevention and land development shall be plotted on the maps provided. BCGS shall give needed data at the beginning of field completion work.(see Appendix-6: Organization, Public Facilities, etc.)

3. BCGS proposed that the landform data of shallow sea area should be shown because of its valuable information. JICA team accepted it on the condition that the related data would be provided by BCGS.

III Outline of the 3rd Year Work (Tentative)

Both sides have agreed that the 3rd year work shall be carried out according to the following schedule. BCGS has also agreed to assign counterparts and to provide data and other information necessary for the work:

Tentative 3rd Year Work Schedule



IV Others

1. JICA and BCGS have further agreed on some matters regarding contoured and planimetric maps.
(see Appendix-3: Memorandum)

2. With regard to the printing of contoured and planimetric maps, BCGS has completely checked all the proof prints and approved the printing in Japan of the following map sheets:

Contoured map 57 sheets x 1,000 copies

Planimetric map 57 sheets x 1,000 copies

Printing is expected to be completed at the end of March 1987 in Japan. (see Appendix-4: Letter of Approval)

3. Training in Japan
With regard to the BCGS counterparts for the 3rd year in-door work to be carried out in Japan, BCGS in accordance with I/A has strongly proposed the following training schedule of 4 counterparts for attaining the most effective technological transfer:

Training course	No. of counterpart	Tentative schedule
Land use map (Compilation)	1	end of May - end of September '87
Land condition map (Compilation)	1	" "
Land use map (Classification/Symbolization)	1	mid-November '87 - mid-March '88
Land condition map (Classification/Symbolization)	1	" "

JICA team, in response to BCGS's proposal, agreed to convey the above requirements and schedule to JICA, Tokyo.

List of Attendants

BUREAU OF COAST AND GEODETIC SURVEY

1. Captain Renato B. Feir
   Chief Counterpart, BCGS-JICA NCR Project/Staff Officer for Planning
2. Mr. Ponciano C. Ciceron
   Chief, Coastal Mapping and Special Projects Division
3. Mr. Gavino C. Angeles, Jr.
   Chief, Chart & Map Production Division
4. Engr. Felisa M. Nepomuceno
   Chief, Planning Division

JICA SURVEY COMMITTEE

1. Mr. Masatoshi Nagaoka
   Technical Adviser
2. Mr. Yoshikazu Yamada
   Adviser

JICA SURVEY TEAM

1. Mr. Masayoshi Takasaki
   Leader
2. Mr. Kenzo Motojima
   Deputy Leader
3. Mr. Hiroshi Kimura
   Coodinator
4. Mr. Keikichi Yoshida
   Chief Surveyor
5. Mr. Tomotaka Kamakura
   Surveyor

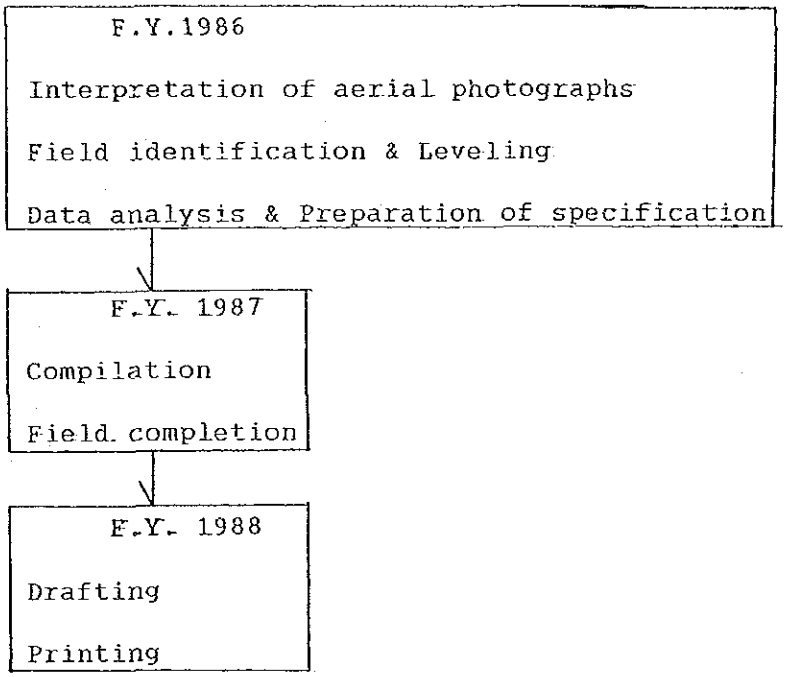
(1) Plan of Operation of the Land Condition Mapping

Appendix-1

Plan of Operation
of the Land Condition Mapping for
the Establishment of Graphic Information
Base Project of NCR, the Philippines

1. Purpose of the Land Condition Mapping

Principal purpose of this work is to prepare necessary informations for the land use planning, regional development planning and countermeasure planning for natural disasters (particularly flood damages) in accordance with the following work flow:



2. Outline of the Work in F.Y. 1986

Purpose of the work is to identify all necessary features for land condition mapping by geomorphologic method and to classify such features on the existing aerial photographs. Entire work is divided into the following two steps:

The first step consists of interpretation of aerial photos and analysis of existing technical reports for preliminary classification of the landforms.

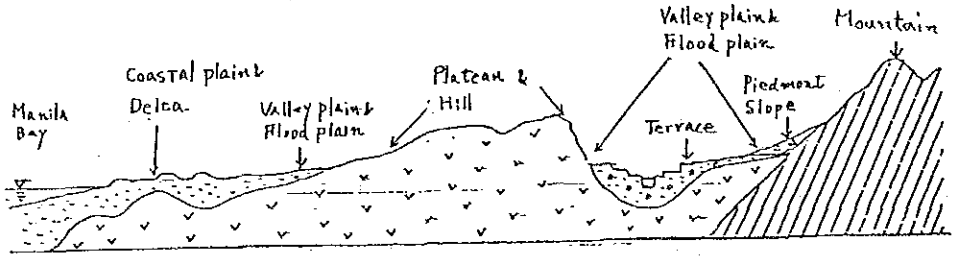
The second step consists of field identification, leveling and data collection to verify results of the preliminary classification.

Physical and social characters of these areas shall be fully taken into consideration for analyzing all the collected data & informations to prepare land condition map. Leveling shall also be carried out to help clarify the condition of flood plain.

The first step had been started in November and completed in December '86. The second step shall be carried out from January 11 till March 14 '87.

3. Concept of Landform Features in the Project Area

As the results of preliminary photo interpretation, the major landforms in the project area are considered to be composed of mountain, hills, plateau, terrace, piedmont slope, valley and flood plain as well as coastal plain and delta. (see Fig. 1)



Profile of the Project Area (Fig.1)

In the eastern part of the lowland along the Marikina River, the mountain, hills and piedmont slope are located.
In the central part between coastal area of Manila Bay and Marikina River, the hills and plateau exist.
Terrace, valley plain and flood plain are situated in the Marikina River Basin and coastal area of Manila Bay.
Coastal plain and delta are observed in the coastal area of Manila Bay.

4. Field Work

Outline of the field work in this F.Y. 1986 is as follows:

(1) Field identification to confirm results of the photo interpretation.
(2) Outcrop survey and sampling with soil auger.
(3) Local investigation of past flood damages.
(4) Collection of existing technical reports and related data.
(5) Leveling
(6) Data analysis and preparation of specification for Land Condition Map.

4-1 Survey Volume

(1) Field identification: 429 km 16 sheets
(2) Leveling: 150 km

4-2 Work Schedule

Item of work	1987 Jan.	Feb.	March
Technical discussion			
Field identification			
Data collection			
Leveling			
Preparation of specification			
Office work in Japan			

4-3 Formation of JICA Survey Team

Name	1987 Jan.	Feb.	March
Masayoshi Takasaki, Leader			
Kenzo Motojima, Deputy Leader			
Hiroshi Kimura, Coordinator			
Keikichi Yoshida, Chief Surveyor			
Tomotaka Kamakura, Surveyor			
Tsutomu Moriiwa, "			
Mitsuo Saito, "			
Yasuo Furukawa, "			
Masanobu Ishii, "			
Tatsujiro Kubo, "			
Takeshi Toyooka, "			
Naoya Yunohara, "			

4-4 Undertakings by BCGS

(1) To assign six(6) counterparts
    Four(4) counterparts for the Field I.D.
    Two(2) counterparts for security
(2) To provide identification cards to JICA team members.
(3) To prepare available data for this survey.
(4) To secure permission for JICA survey team to enter government/private properties.
(5) To assist JICA team members in conducting interviews of people living in flood plains.

(2) Specifications for Landform Classification (Draft)

Appendix-2

Specifications for Landform Classification of Land Condition Map (Draft)

Classification		Definition	Application	Minimum area
Mountain & Slope	Top & ridge flat	Relatively flat surface at the top of mountains, where the erosional processes of weathering and soil creep are prevailing.	Flat surfaces on the top of mountains whose width is more than 1.0mm on the map.	4mm²
	Gentle slope	Slope surface at mountain-side where the erosional processes of weathering and soil creep are prevailing,	Surface gradient is less than about 20°.	"
	Steep slope	Slope surface at mountain-side, where rain wash and landslide are prevailing.	Surface gradient is more than about 20°.	"
	Nick line	The line passing points on the slope of mountain-side, which divide upper gentle slope and lower steep slope. Landslide are often to occur around this line.	Delineation shall be made by photo-interpretation and by analysis of contour line.	5mm
Piedmont landform	Colluvial slope	Depositional landform with relatively gentle slopes, formed by debris and weathered material transported and sedimented by effects of rain wash and soil creep. This landform is observed at the foot of mountains or hills, edge of plateus and valleys.	Surface gradient is less than about 10°	10mm²
	Small alluvial fan	Small depositional landform with relatively gentle slopes, expanding from all points before exit of valley to lowland and being formed by aggradation of sand and gravel transported by river flood from mountains.	Surface gradient is less than about 15° and the area is limited only around the exit of valley.	"
	Talus	Depositional surface formed at lower part of mountain-slope by rain wash or land slide and consisted of bigger grains of debris.	Surface gradient is more than about 10°.	"

(80)

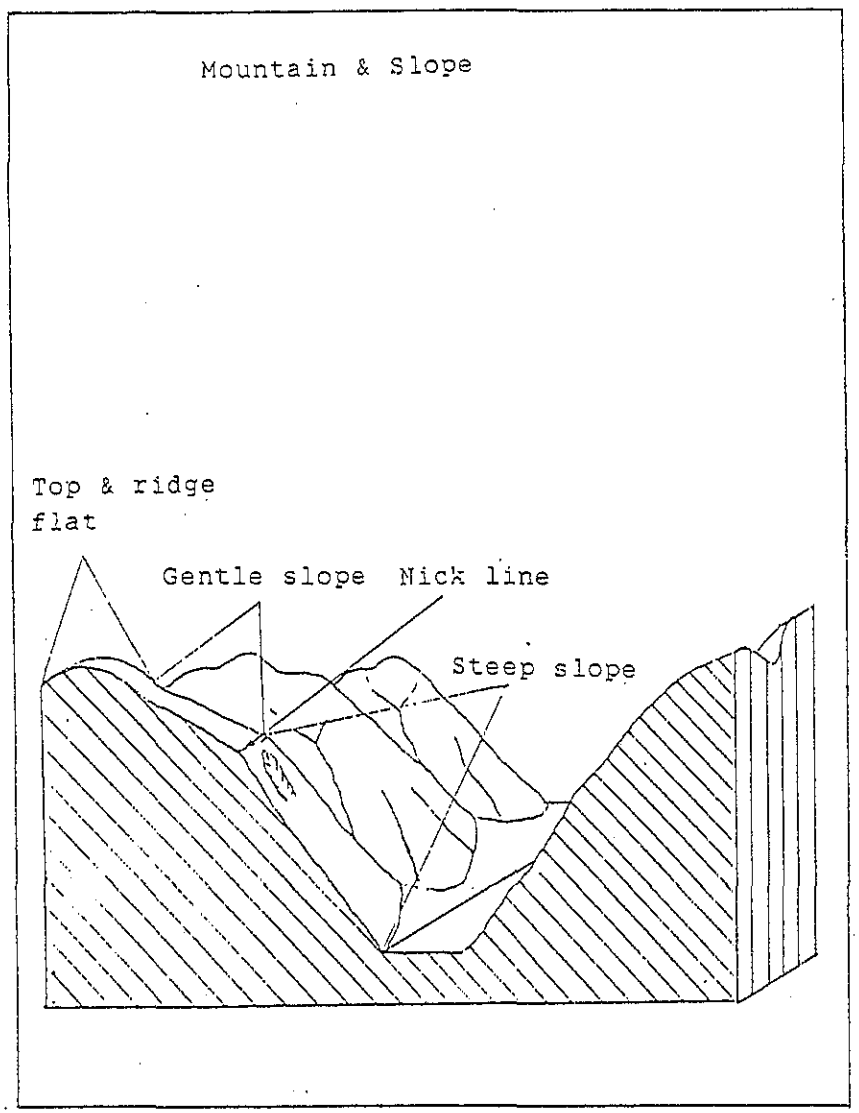
Classification		Definition	Application	Minimum area
				10mm²
Hills & Plateau	Top flat	Relatively flat surface at the top of little undulated hills and plateaus, where erosional processes of weathering and soil creep are prevailing,	Flat surface with width of more than 2.0mm on the map.	"
	Gentle slope	Surface at the slope of little undulated hills and plateaus, where rain wash and soil creep are prevailing.	Surface gradient is less than about 5°.	"
	Slope	General slope not classified in the afore-mentioned top flat or gentle slope, where rain wash and soil creep are prevailing.	Surface gradient is between about 5° and 20°.	"
	Steep slope	Slope surface at hills & plateaus, where rain wash and landslide are prevailing.	Surface gradient is more than about 20°.	"
	Valley flat	Flat surface formed immediately along river tributaries, where bed rock is partially covered by shallow fluvial stratum.	Width is more than 1.0mm on the map.	"
Terrace	Low terrace	A group of terraces lying at the second level from the flood plain, that consists of wide and flat original surface. Those were formed in the oldest period in the area.	Group lying second level from flood plain of the survey area.	"
	Lower terrace	A group of terraces lying lower than the above, that was formed by effect of river erosion of the above terrace.	Group lying first level from flood plain of the survey area.	"

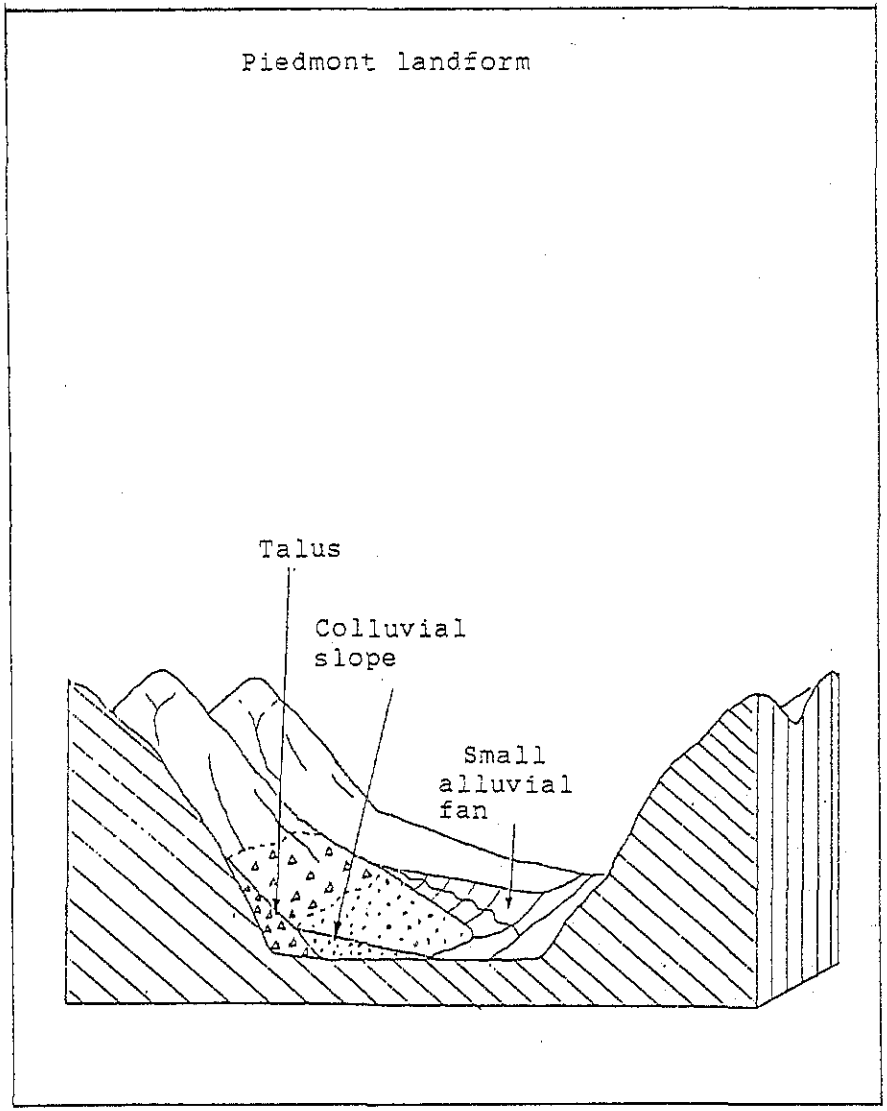
Classification		Definition	Application	Minimum area
Alluvial fan	General surface of alluvial fan	Relatively gentle and flat surface, covering wide area at the section before or on the exit of valley expanding to lowland or mouth of river. This was formed by aggradation of sand and gravel transported by river flood from mountains.	Surface gradient is less than 15° at the exit of valley.	10㎟
	Former river bed	Abandoned stream/river channel, where surface is degraded 0.5 to 1.0 m below the general surface and flood water can still come in.	Width is more than 1.0mm on the map.	"
	Natural levee	Microrelief observed along or around the river, which is relatively higher than the general surface and composed of sand and silt deposited by sedimentation during floods.	Width is more than 1.0mm on the map.	"
Valley plain & Flood plain	General surface of Valley plain & flood plain	Widely extended general surfaces resulting with dissecting mountain, hills and plateaus, and that of flood plain formed by alluviation of rivers.	Widely opened general surface of alluvial valley floor and flood plain, both of which are mainly composed of sand, silt, clay, etc.	"
	Former river bed	Abandoned stream/river channel, where surface is degraded 0.5 - 1.0m below the general surface and flood water can still come in.	Width is more than 1.0mm on the map.	"
	Natural levee	Microrelief observed along or around the river which is relatively higher than the general surface and composed of sand and silt deposited by sedimentation during floods.	Width is more than 1.0mm on the map.	"
	Backmarsh	Low land relatively free from alluviation of rivers and poorly drained, being located behind natural levee or sandwiched by them.	Low lying swampy area being composed of clay and clayey soil.	"

Classification		Definition	Application	Minimum area
Coastal plain & Delta	General surface of coastal plain & delta	Former depositional surface in the shallow water, composed of fine materials, where present flat plain was formed after regression of sea water. Delta is very low and flat land formed in the mouth of river and consists of unconsolidated silt and clay transported by river.	General surface being formed at the mouth of river and mainly composed of silt and clay, and the same formed between or behind sand bars with main composition of fine sand and silt.	10mm²
	Former river bed	Abandoned stream/river channel, where surface is degraded 0.5 - 1.0m below the general surface and flood water can still come in.	Width is more than 1.0mm on the map.	"
	Natural levee	Microrelief observed along or around the river which is relatively higher than the general surface and composed of sand and silt deposited by sedimentation during floods.	Width is more than 1.0mm on the map.	"
	Upper sand bar	Microrelief observed around the former and present coast, being composed of sand and gravel, and formed by sedimentation and transportation of ocean wave and coastal current.	Those which run in the inland area almost in parallel with coastal line and is 0.5 - 1.0m higher than the general surface.	"
	Lower sand bar	----------do---------- (Microrelief slightly lower than the above-mentioned)	"	"
	Backmarsh	Low land relatively free from alluviation of rivers and poorly drained, being located behind sand bar or sandwiched by them.	Low lying swampy area being composed of clay and clayey soil.	"
Unstable slope	Cliff	Unstable slope with perpendicular or very steep gradient, formed by errosion of sea or river and faulting, where there is danger of landslide and rockfall.	More than 4m in height. However, cut slope and banked up slope shall be omitted.	5mm
	Landslide	Vestiges of radical falling of large mass of earth down a slop or cliff, where shrub and grass usually cover the ground but weathered soil and rocks are sparsely exposed on the surface, where there is danger of rockfall.	Area shall be shown from photo-interpretation as related to the contoured map.	4mm

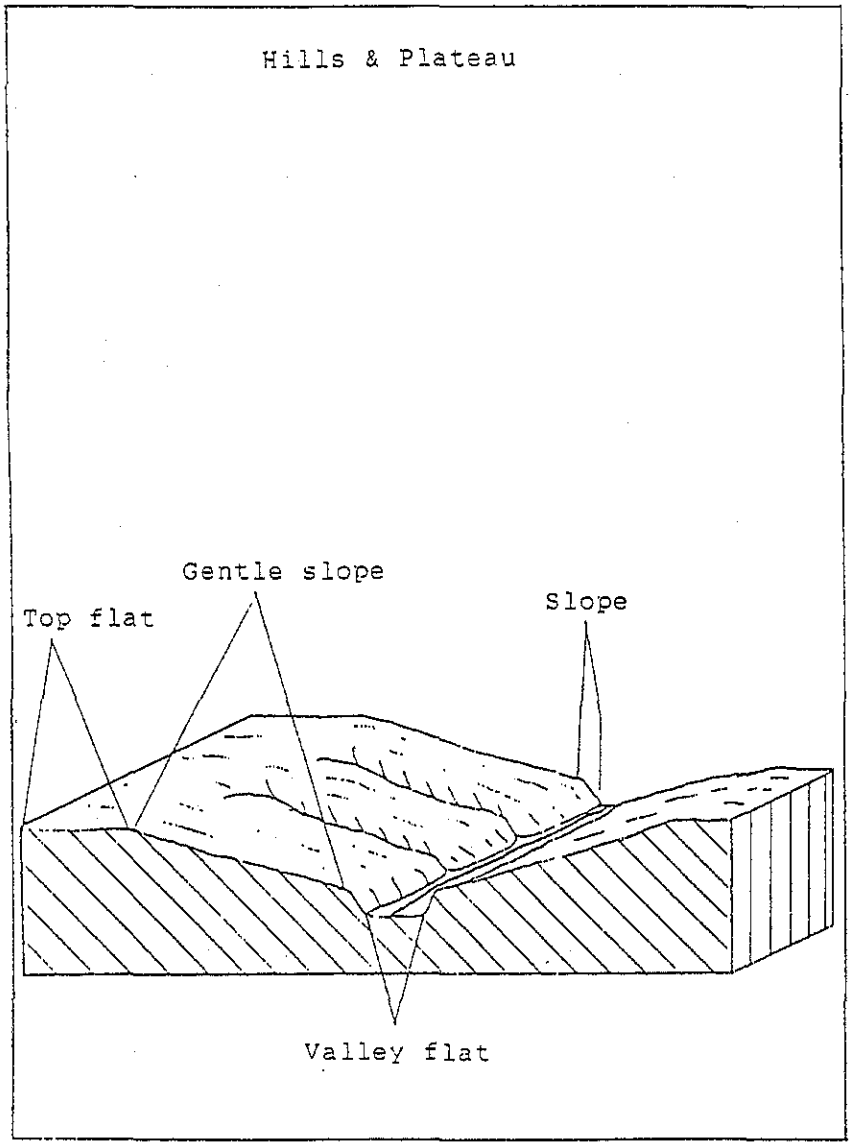
Classification		Definition	Application	Minimum area
Artificially deformed land	Cut and rolled surface	Flat or gentle surface artificially made on mountain slopes, hills or plateaus.	Area with more than 2m in height, of cut of slopes on the mountains/ hills/ plateaus.	4mm
	Banked up surface	Build-up land mainly in low lying area or coastal area up to a level higher than the surrounding.	Area with elevation more than 1m higher than general surface.	"
	Cut slope	Artificially deformed slopes mainly in mountains, hills, terraces, etc.	Cut slope with more than 2m high and more than 1.0mm width on the map.	5mm
	Banked up slope	Artificially build up slopes.	Slope with more than 2m high and more than 1.0mm width on the map.	"
	Filled up surface	Artificial lands leveled by filling marshes, lakes or river beds up to the surrounding surface.	Area shall be shown from photo-interpretation as compared to old photographs or old maps.	4mm
	Under Construction area	Area under reclamation of the sea coast or under deformation in mountains, hills and terraces by cutting and rolling the ground for development of business, industrial, commercial, residential areas, quarries, etc.	Area shall be shown from photo-interpretation if possible.	"
Others	Main watershed	Main ridges of mountains and hills including several drainage basins which collect to a common basin.	Main river basin with an area of more than about 5cm x 5cm on the map.	5cm
	Drainage	Stream lines on the surface of slope of mountains, hills and plateaus, made by rainwater.	Drainage line with length of more than about 2 cm on the map.	2cm
	Water surface	Boundary between water sphere and land is regarded as shore line. The surface of river, lake, sea, pond, etc. are regarded as water surface.	1:10,000 Contoured Map shall be applied.	4mm²

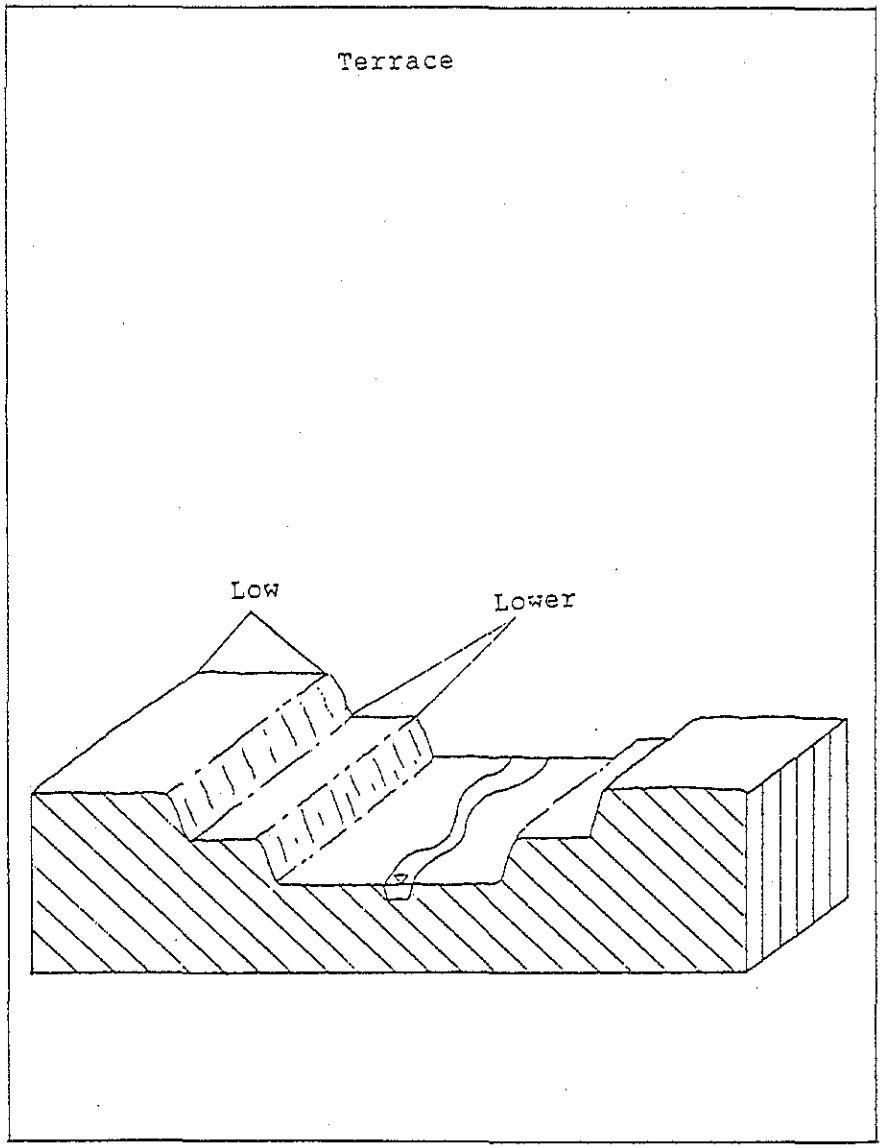
(84)


Mountain & Slope
Top & ridge flat
Gentle slope
Nick line
Steep slope


Piedmont landform
Talus
Colluvial slope
Small alluvial fan

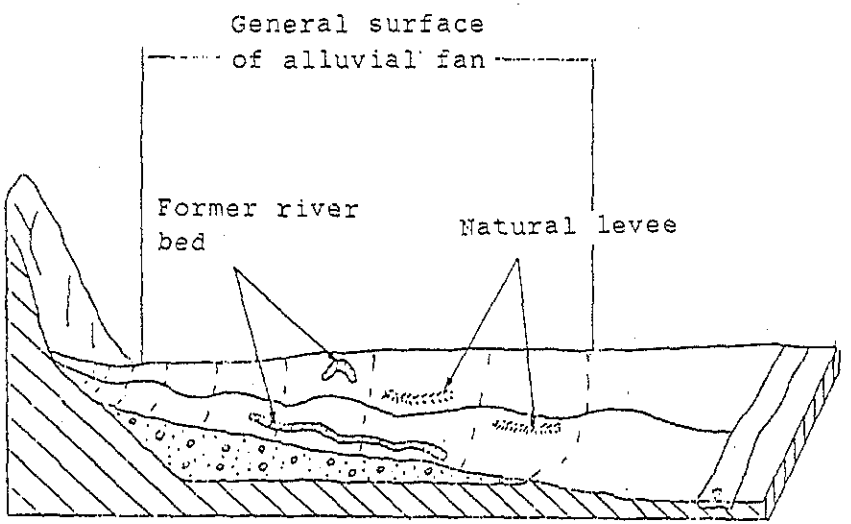
(98)


Hills & Plateau
Gentle slope
Top flat
Slope
Valley flat

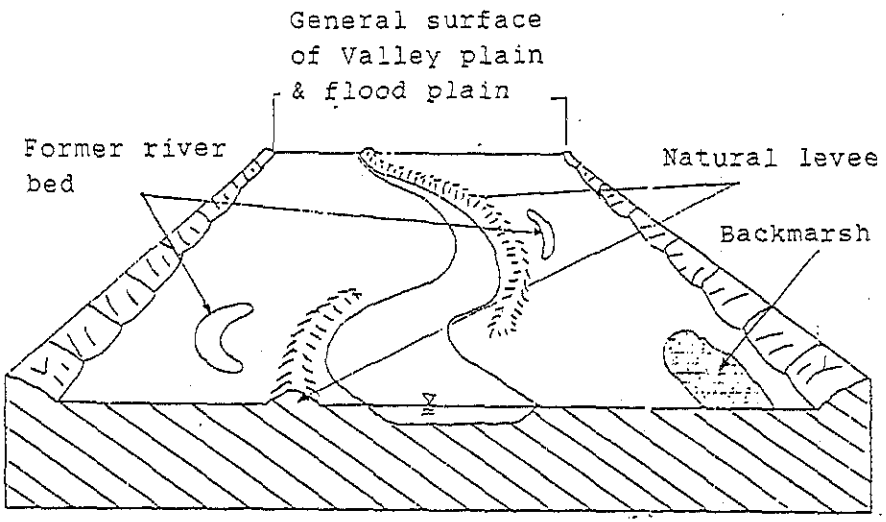

Terrace
Low
Lower

(18)

Alluvial fan

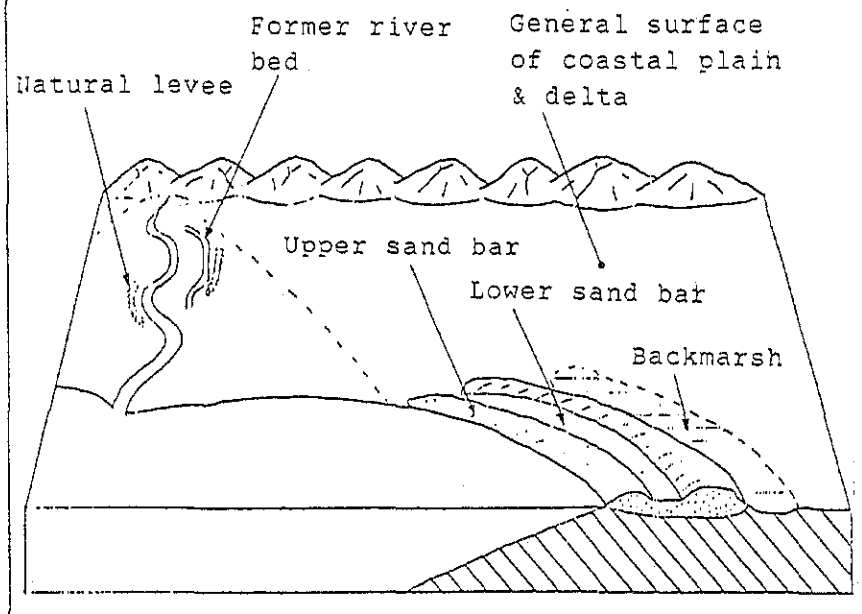


Valley plain & Flood plain

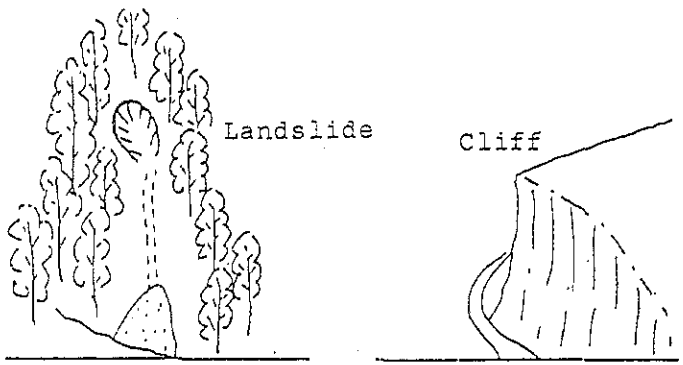


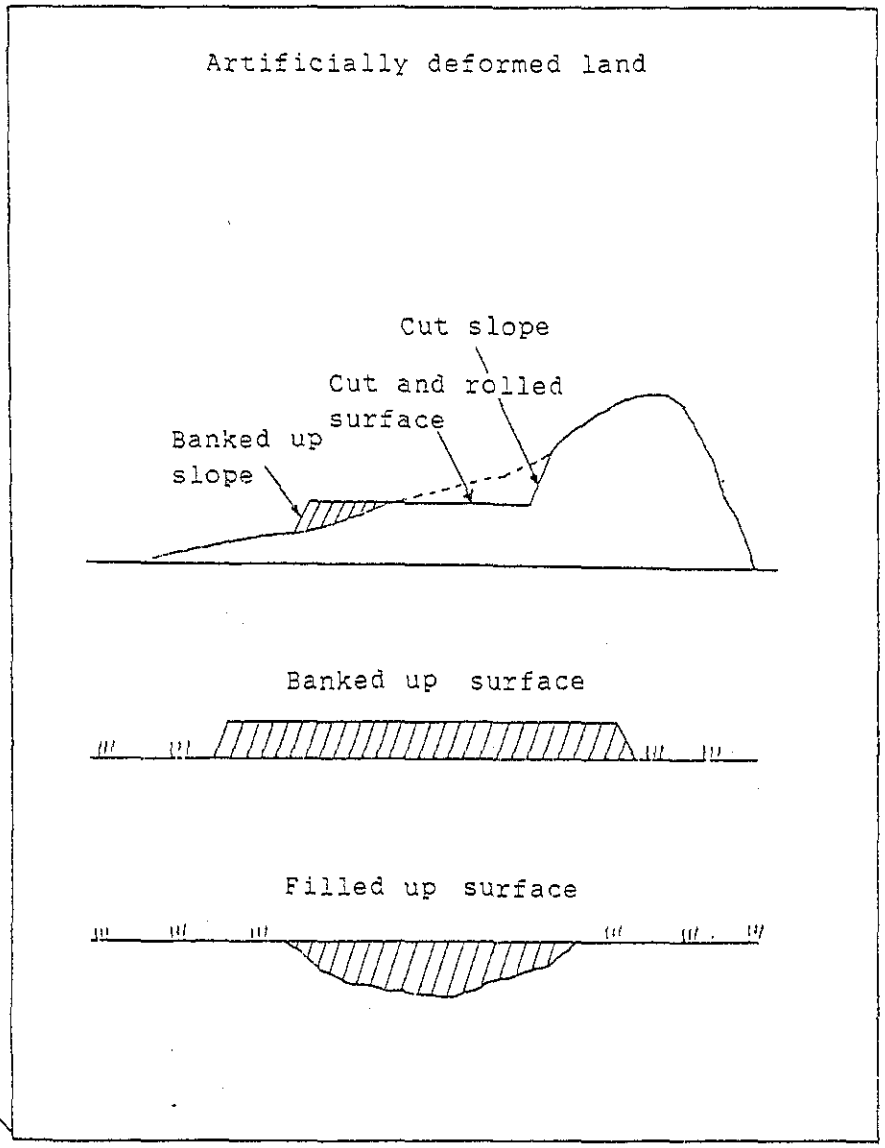
(8)

Coastal plain & Delta



Unstable slope




Artificially deformed land
Cut slope
Cut and rolled surface
Banked up slope
Banked up surface
Filled up surface

(68)

(10)

Memorandum
on
"Establishment of Graphic Information Project
of the National Capital Region"
Republic of the Philippines

As a result of discussions made on January 15, 1987, JICA and BCGS jointly agreed on the following matters with regard to contoured and planimetric maps:

1. Names of sheets No. 11, 36, 46 and 56 shall be changed as follows:

Sheet No. 11	LOMA DE GATO	to	CONGRESSIONAL
Sheet No. 36	ANTIPOLO (South)	to	ANTIPOLO
Sheet No. 46	SUCAT	to	BAGUMBAYAN
Sheet No. 56	MABUHAY	to	M. ALVAREZ

2. Annotation of administrative names shall be as follows:

(1) City name: Annotation shall be made at the center of the area with 2 spaces between letters.

Town name: If the town proper is shown on the sheet, annotation shall be made adjacent to it with no letter space.

If only part of the town is shown on the sheet, annotation shall be made in the center of the area with 1 space between letters.

District name: Annotation shall be made at the center of the area with 1 space between letters and E08-24C-3.5mm letter style.

On limited space, annotation parallel to the neatline shall be accepted but shall be placed approximately at the center of the area.

(2) For Village and Subdivision, annotation shall be made as follows:

		(if space permit)
Village:	OOOOO VIL	OOOOO VILLAGE
Subdivision:	OOOOO SUBD	OOOOO SUBDIVISION

3. At least 1 spot height on peaks shall be shown every 5cm x 5cm area on the map.

4. Contour value shall not, in principle, be shown on the slope descending to north on the map. Average distribution shall be 1 or 2 sets of contour values per 20cm x 20cm on the map. As much as possible all index contour shall be drawn with values.

Capt. Renato B. Feir
Chief Counterpart,
BCGS-JICA NCR Project

Mr. Kenzo Motojima
Deputy Leader
JICA Survey Team

(4) Approval for Printing by BCGS

Appendix-4

REPUBLIC OF THE PHILIPPINES
MINISTRY OF NATIONAL DEFENSE
Bureau of Coast and Geodetic Survey
421 BARRACA ST., SAN NICOLAS MANILA

28 February 1987

Mr. Masayoshi Takasaki
Team Leader
JICA Survey Team

Subject: Approval for printing of the contoured and planimetric maps of the Project "Establishment of Graphic Information Base Project for the NCR" for the Philippines

Sir,

Last December 1986 during the checking and approval of map surprints and color proofs, forty (40) sheets of the contoured maps, were not checked. The preliminary checking of these surprints was done in Manila from January 16 to 26, 1987. Minimal corrections were then made by JICA Survey Team and final checking and approval was made by BCGS this date. Together with the forty (40) contoured maps, all sheets (54) of the planimetric maps were also checked and approved for printing.

BCGS noted that the work on the contoured and planimetric maps were beyond its expectations. It closely followed the agreed set of specifications. Also the maps can be considered updated to 1986 as regards to major planimetric details.

The surveying, mapping and planning sectors of both the government and private agencies are eagerly waiting for the presentation of these maps to the Republic of the Philippines from the Government of Japan, for much of the socio-economic thrust of the country depends on an accurate and updated maps.

Again, for and in behalf of the Bureau of Coast and Geodetic Survey, I would like to extend our deepest appreciations for this invaluable gift from the Government of Japan through the Japan International Cooperation Agency. May this Technical Cooperation bind our countries to an everlasting friendship.

Respectfully yours,

Captain RENATO B. FEIR
Chief Counterparts for Establishment of Graphic Information Base Project for the NCR, BCGS

TEL. NO. 47-96-11 to 14 TELEX NO. RCA 722-7373 CGS PH

List of Data provided for the Land Condition Mapping

1. Ground Water:	Metropolitan Waterworks and Sewerage System, Interim Report and Plates, Aug. 31 1981
	Ground Water Situation in Pasig and Marikina
2. Geology:	Philippine Geochronology (Report)
	Geologic Mapping of Active Faults for Land Use Policy Generation (Report)
	Annual Report 1984 (Philippine Institute of Volcanology and Seismology)
	Geology and Facies of Part of Laguna Formation (Report)
3. Boring Data:	Boring Data of Low Land (North Metro Manila)
4. Aerial Photos:	Old Aerial Photos of Metro Manila Region in 1965

(6) Classfication and Application of Organigation & Facilities and Others (Draft)

Classification and Application of Organization & Public Facilities and Other Features for Land Condition Map (Draft)

Appendix-6

Classification		Application	Remarks
Boundaries	Regional Boundary	Regional boundary shall be shown within the neatline without annotation. Annotation shall be indicated below the boundary diagram.	Based on the 1/10,000 Contoured map
	Provincial Boundary	Provincial boundary shall be shown within the neatline without annotation. Annotation shall be indicated below the boundary diagram. Where the provincial boundary coincides with regional boundary, symbol shall be that of the latter.	- do -
	City or Municipal Boundary	City or Municipal boundary shall be shown within the neatline without annotation.	- do -
Transportation	Main Road	Expressways, National and Provincial roads shall be shown. Main arteries which are important for disaster prevention/relief/rehabilitation and land development having about 10m in width and more than 1km in length shall be shown.	- do -
	Railway	All railways including the LRT shall be shown.	- do -
	Bus Terminal	Terminal of buses connecting city and provinces shall be shown including large motor pool.	Based on the 1/10,000 Contoured Map and field survey
Organization related to Disaster & Land Development	Government Building	National/Regional/Provincial main offices and City/Municipal halls and organizations related to disaster prevention & land development shall be shown.	Based on the 1/10,000 Contoured Map and BCGS data
	Police Station	Main and branch offices shall be shown.	Based on the 1/10,000 Contoured Map
	Fire Station	Main and branch stations shall be shown.	- do -

Classification		Application	Remarks
Facilities for Rescue & Relief	Hospital	Hospital, health center, large clinic and medical center shall be shown.	Based on the 1/10,000 Contoured Map
	Church/Mission	Church, Mission and chapel shall be shown.	- do -
	School	All schools shall be shown.	- do -
	Rescue Center	All rescue centers shall be shown.	Based on BCGS data
Facilities for Dangerous Materials	Manufacturing, storage or handling facilities of dangerous materials	Factories and facilities producing or handling dangerous materials (ammunition/petroleum/gas/explosives chemicals) shall be shown.	Based on BCGS data and field confirmation
	Storage Tank	Oil/gas tanks that can not be drawn to scale shall be symbolized and annotated. In case diameter is more than 1mm on the map they shall be drawn to scale and annotated.	Based on the 1/10,000 Contoured Map
Observatories	Tidal Station	Observation stations for measuring sea water level and tidal movement shall be shown.	Based on BCGS data and field confirmation
	Water Level Gauge Station	Observation stations for measuring river/reservoir water level shall be shown.	- do -
	Rain Gauge Station	Observation stations for measuring rainfall shall be shown.	- do -
	Earthquake Observatory	Observation stations of earthquake activities shall be shown.	- do -

(96)

Classification		Application	Remarks
Facilities for Supply & Processing	Power Plant & Sub-station	Power generating and sub-station facilities shall be shown.	Based on the 1/10,000 Contoured Map
	Water Treatment Plant	Water treatment and supply facilities shall be shown.	Based on BCGS data and field confirmation
	River Pumping Station	Fixed pumping stations used on rivers shall be shown.	- do -
	Well	Large deep wells for commercial and industrial use shall be shown.	- do -
River & Coast Structures	Embankment	Dikes constructed along rivers of more than 7.5m in width used for preventing flood, high tide, etc.. Such dikes shall be more than 50m in length or 1.5m in height.	Based on the 1/10,000 Contoured Map and field survey
	Dam	Structures constructed on rivers of more than 7.5m in width used for impounding water and/or flood control shall be shown.	- do -
	Weir	Structures constructed on rivers of more than 7.5m in width used for irrigation shall be shown.	- do -
	Revetment	Structures constructed along rivers and shoreline used for preventing erosion with length more than 50m shall be shown.	- do -
	Bridges	Structures crossing rivers of more than 7.5m in width shall be shown with their clearances.	- do -
	Breakwater/Jetty/Causeway	Structures constructed out into the water for protecting ports & harbors and coastal areas shall be shown.	- do -

Classification		Application	Remarks
River & Coast Structures	Flood Gate	Structures constructed on the rivers for controlling water level and flow shall be shown.	Based on the 1/10,000 Contoured Map and field survey
	Drainage Station	Fixed pumping stations used to drain inland-water shall be shown.	Based on field investigation
	Wharf and Pier	Landing structures for ships constructed along the river banks and harbors shall be shown.	Based on the 1/10,000 Contoured Map and field survey
	Lighthouse	Marine lighthouses built for safe navigation shall be shown.	- do -
Facilities & Other Features in Coastal Area	Port & Harbor	Port and harbor shall be shown and annotated.	Based on BCGS data
	Fishing Port	Fishing port shall be shown and annotated.	- do -
	Pipe Line/Cable on Sea Bottom	Pipe lines and cables laid down on sea bottom for water and oil or communication shall be shown.	- do -
	Fishpen	Drift-net used for fishpen which is located at sea, lake or river shall be drawn.	Based on the 1/10,000 Contoured Map
	Rock Awash or Reef	Rock awash or reef which is dangerous to surface navigation shall be shown.	- do -
	Wreck	Wrecks showing any portion of hull or always partially submerged shall be shown.	- do -
	Marine Pond/Salt Bed	Pond for raising marine species/salt making shall be drawn to scale.	- do -

(97)

Classification		Application	Remarks
Others	Restricted Area for Urban Development	Area covered by zoning laws and regulations shall be shown.	Based on BCGS data
	Dumping Area	Dumping area shall be shown.	- do -

(86)

N.C.R. PROJECT (SBNS 17 6mm C)

1:10,000 (SBNS 17 4.5mm)

12mm

5mm

14° 03' 00"

(SA 302 9mm C)

MANILA (NOR

7mm

14° 02' 00"

(SA 302 9mm C)

MANILA (NORTH)

(SBNS 17 6mm C/L) Contoured Map No. 3

(SBNS 17 4mm C

MARGINAL INFORMATION

(SBNS 17 6mm C/L) Contoured Map No.3130-II-15

12mm (SBNS 17 4mm C.L) Edition 1 1987

5mm

(SB 6021 3mm C)

LEGEND

	Divided Highway Expressway	16 5	Route Marker National / Provincial
	National Provincial Road		City Municipal Road
	Alley		Concrete
	Trail		Asphalt
Under Const.	Road Under Construction		Gravel
	Sidewalk		Grade Separation
	Crossing	CL = 4.27	Pedestrian Overpass
	Pedestrian Underpass		Toll Gate
	Rope Way		Trees Lined Road
	Ditch		Power Transmission Line
Siphon	Siphon	Pipeline	Pipeline / Water Pipeline
Ferry Ford	Ferry Ford	Sewerage Outfall	Sewerage Outfall
Single Track Double Track	National Railway		Private Railway
Under Const.	Under Construction		Level Crossing
	Light Rail Crossing Transit		Underpass
	Railway Station		Turnplate
	Regional Boundary		Provincial Boundary
	City or Municipal Boundary		Wall / Fence
	Fort		Antiquity
	Prominent Building		Independent Building House
	Congested Housing Area		Temporary Housing Area
	Ruins		Building Minimum

	Government Building	P	Police Station	G	Gas Station
PO	Post Office	MWSS Name	Water Supply Sewerage Embassy	F	Fire Station
	Hospital		Church / Mission		School
	Spring / Hot Spring		Health Center		Mosque
	Power Plant Sub-Station	B	Bank		Temple
	Market Prominent Store		Factory	H	Hotel / Motel
T	Theater, Cinema (Prominent)	S	Sports Center		Helipad
Radio	Radio Tower, TV Tower Stack, Flagpole, Telephone		Lighthouse	Oil	Storage Tank
	Mine	WT	Water Tank		Cave
	Windpump	SP	Stand Pipe		Monument
	Aero Beacon	Well	Well		Bus Terminal
	Airport / Airfield	Park	Park		

(SB 6021 1.6mm C/L)

14°01'.00

SBF 6066 1mm

TO SAN JOSE 1.5mm

14°02'.00

Spring · Hot Spring		Health Center		Mosque	
Power Plant Sub-Station		Bank		Temple	
Market Prominent Store		Factory		Hotel / Motel	
Theater, Cinema (Prominent)		Sports Center		Heliped	
Radio	Radio Tower, TV Tower Stack, Flagpole, Telephone	Lighthouse	Oil	Storage Tank	
Mine	WT	Water Tank		Cave	
Windpump	SP	Stand Pipe		Mounment	
Aero Beacon	Well	Well		Bus Terminal	

(SB 6021 1.6mm C/L)

20mm

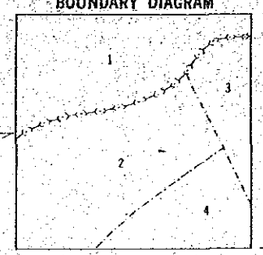
	Airport / Airfield	Park	Park
	Slipway	Cemetery	Memorial Park / Cemetery
	Military		Fishpen
	Rock Awash		Wreck
	Pier-Jetty		Breakwater
	Wharf, Revetment		River / Stream Single Line
	River / Stream Double Line		Intermittent
	Indefinite		Flow Arrow
	Falls (Double Line)		Falls (Single Line)
	Channel, Causeway		Flood Gate
	Dam		Weir
	Lake Pond, Shoreline		Reef / Coral
	Tidal Flat		Sand, Sand Dunes
	Mud		
M.P.	Salt Bed, Marine Pond		
	Broadleaf		Bushes / Scrub
	Mixed Scrub & Broadleaf		Rice Field
	Tropical Grass		Nipa
	Other Plantation		Bamboo
	Swamp / Marsh		Mangrove
Man	Mango		Crop Land / Agricultural Land
Ba Su	Banana, Sugarcane	Pi Co	Pineapple, Coconut
	Cutting		Embankment
	Slope		Quarry
	Depression		Cliff, Rock Outcrop Area
20	Index Contour	20	Depth Curve
18	Supplementary Contour		
16	Intermediate Contour	20	Contour Value
△123.4	Horizontal Control Station	⊙567.89	Vertical Control Station (Identifiable)
456	Spot Height	917.45	Direct Leveling Point

1.5mm

21mm

(SB 6021 2 mm C)

BOUNDARY DIAGRAM



45mm

40mm

REGION III

(SB 6023 1.8mm C)

14°00'00"
120°57'00"

9mm (SB 6021 1.5mm C/L)

45mm

120°58'00"
1.2mm

4mm (SBNS 17 2.5mm C)

SCALE 1:10,000

500 400 300 200 100 0 500

8mm (SB 6023 2.3mm)

UNIVERSAL TRANSVERSE MERCATOR PROJ.

ZONE 51 CLARKE SPHEROID 1866 LUZON

VERTICAL DATUM: MSL FOR HEIGHTS MLLW

CONTOUR INTERVAL 4 METERS

This map was produced under a cooperative undertaking between the Government of the Republic of the Philippines and the Government of Japan.

Aerial photography: April 1982.

Field surveys by Bureau of Coast and Geodetic Survey and Japan International Cooperation Agency.

Other sources of information: Bureau of Lands, Bureau of Soils, Metro Manila Commission, BPWB, NEDA, City/Municipal Governments, NCCS and AMS maps.

Information reliable to 1982 with major changes to 1985 incorporated.

Boundaries are approximate.

Distributed by: Bureau of Coast and Geodetic Survey 421 Barraca St., San Nicolas, Manila.

1.5mm C/L)

ernment of the Republic of

ational Cooperation Agency,
Manila Commission,

an Nicolas, Manila.

45mm

120°58'00"

1.2 mm

4mm (SBNS 17 2.5mm C)

SCALE 1:10,000

500 400 300 200 100 0 500 1000 meters

8mm (SB 6023 2.3mm C)

UNIVERSAL TRANSVERSE MERCATOR PROJECTION

ZONE 51 CLARKE SPHEROID 1866 LUZON DATUM

VERTICAL DATUM: MSL FOR HEIGHTS MLLW FOR DEPTHS

CONTOUR INTERVAL 4 METERS

120°59'00"

34mm

MN GN TN

2°33' 1°30'

(SB 6021 1.5mm C/L)

53mm

True North, Magnetic North and Grid North are shown in their true relative positions.
Magnetic North is correct for 1988 and moves west annually by about 0°3'

45mm 35mm

(SA 6007

MA

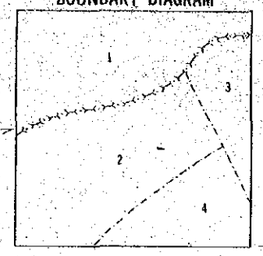
She

(SA 6007

10mm

21mm

(SB 6021 2 mm C)
BOUNDARY DIAGRAM



45mm

40mm

REGION III
1. Bulacan Province

REGION IV
2. Cavite Province
3. Rizal province
4. Laguna province

(SB 6023 1.8mm C)
(SB 6023 1.8mm C/L)

(SB 6021 2 mm C)
INDEX TO ADJOINING SHEETS

3130-II-9	SB 45 1.8mm 3130-II-10	3230-III-6
	3130-II-15 MANILA (NORTH) SBC 1091 1.8C	3230-III-11
	3130-II-20	3230-III-16

35mm

60mm

(SBNS 17 1.5mm)

120°59'00"

1.5mm 121°00'00"

1000 meters

34mm

MN GN TN

2°33' 1°30'

(SB 6021 1.5mm C/L)

True North, Magnetic North and Grid North are shown in their true relative positions.
Magnetic North is correct for 1988 and moves west annually by about 0°3'

53mm

45mm 35mm

(SA 6007 6mm C) (C/L)

MANILA (North)

Sheet No. 3130-II-15

(SA 6007 4mm C/L)

14mm

MINISTRY OF NATIONAL DEFENSE • BUREAU OF COAST & GEODETIC SURVEY • PHILIPPINES •

15mm

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JAPAN INTERNATIONAL
COOPERATION AGENCY