

0 20 40 60 80 100 Meter

**LEGEND**

▲ Existing Triangulation Point	— Electric Power Line
○ GPS Point	— Jalur Tegangan Tinggi
○ Closing Bench Mark	— Cultiva and Embankment
○ Spot Height	— Kerkahan air Timbunan
□ House / Building	— Swampr
□ Factory	— Rice
□ Public Hall	— Maclin graves
□ Police Station	— Kuburan Muslim
□ Fire Station	— Christian cemetery
□ Post Office	— Kuburan Kristen
□ Mosque	— Chinese graves
□ Church	— Chinese Cem
□ Hospital	— Paddy field
□ Market	— Boundary of Vegetation
□ Telephone Office	— Field
□ Government Office	— Labang
□ Hotel	— Forest
□ Gasoline Pump	— Grass
□ Road	— Rubber
□ Path	— Tree
□ Bridge	— Water hole
□ Station	— Lubang air
□ Subdistrict Boundary	— Saluka
□ Village Boundary	— Pagarip
	— Pipe Culvert
	— Gorong - gorong
	— Monuments
	— Tugu
	— Contour Line
	— Garis Kontur
	— Pond, lake
	— Tandan, danau
	— Sand
	— Pantai
	— Land slide
	— Tumbang
	— a. River / Sungai
	— b. Rivulet / Arak Sungai
	— c. Direction / Arak Sungai

**INDEX MAP**

- Aerial Photography ( 1/10,000 ) : August 2001  
 - Topographic map ( 1/1,000 ) : October 2001  
 - Horizontal System : UTM ( 51 Zone )  
 - Elevation System : MSL  
 - Contour Interval : 1 m

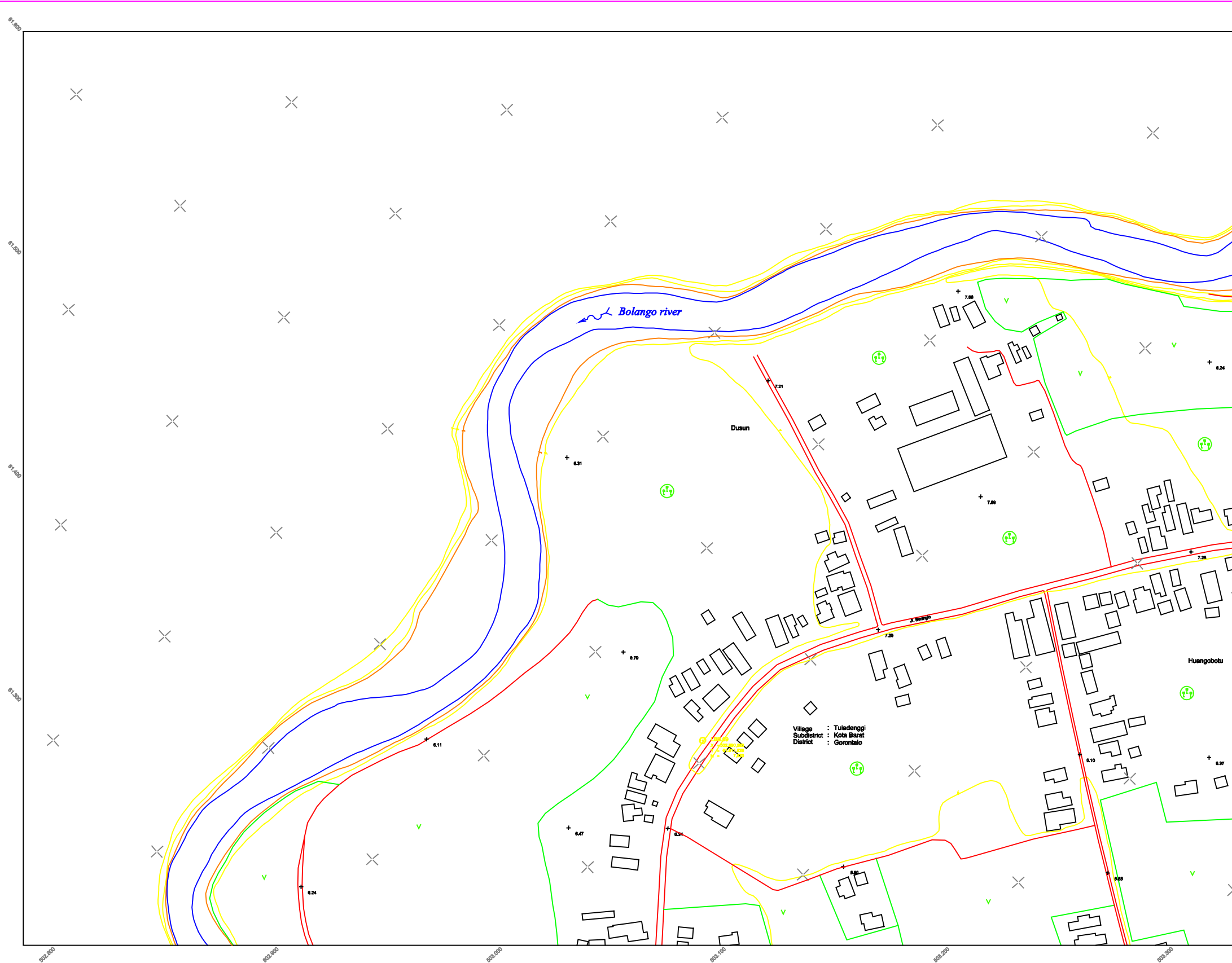
**DIRECTORATE GENERAL OF WATER RESOURCES,  
 MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE**

**THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT  
 IN LIMBOTO - BOLANGO - BONE BASIN**

**TOPOGRAPHIC MAP : LOW-LYING AREA / GORONTALO**

Checked by	Approved by
Name PT. ATLAS DELTABATYA	Isoo Basrihime
Signature	
Date October 9, 2001	October 10, 2001

<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY	<b>PT. ATLAS DELTABATYA</b> A. ATLAS DELTABATYA JICA PROJECT NO. 2001-01	SHEET No. <b>12/22</b>
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**LEGEND**

<ul style="list-style-type: none"> <li>▲ Existing Triangulation Point</li> <li>● GPS Point</li> <li>⊠ Existing Bench Mark</li> <li>⊠ Spot Height</li> <li>⊠ House / Building</li> <li>⊠ Factory</li> <li>⊠ Public Hall</li> <li>⊠ Police Station</li> <li>⊠ Fire Station</li> <li>⊠ Post Office</li> <li>⊠ Mosque</li> <li>⊠ Church</li> <li>⊠ Hospital</li> <li>⊠ School</li> <li>⊠ Market</li> <li>⊠ Telephone Office</li> <li>⊠ Government Office</li> <li>⊠ Hotel</li> <li>⊠ Gasoline Pump</li> <li>⊠ Road</li> <li>⊠ Path</li> <li>⊠ Bridge</li> <li>⊠ Station</li> <li>⊠ Subdistrict Boundary</li> <li>⊠ Village Boundary</li> </ul>	<ul style="list-style-type: none"> <li>⊠ Electric Power Line</li> <li>⊠ Cutting and Embankment</li> <li>⊠ Swamp</li> <li>⊠ Muslim graves</li> <li>⊠ Christian cemetery</li> <li>⊠ Chinese graves</li> <li>⊠ Paddy field</li> <li>⊠ Boundary of Vegetation</li> <li>⊠ Field</li> <li>⊠ Forest</li> <li>⊠ Grass</li> <li>⊠ Tree</li> <li>⊠ Water hole</li> <li>⊠ Pipe Culvert</li> <li>⊠ Monuments</li> <li>⊠ Tugu</li> <li>⊠ Contour Line</li> <li>⊠ Pond</li> <li>⊠ Sand</li> <li>⊠ Land Slide</li> <li>⊠ a. River / Sungai</li> <li>⊠ b. Rivulet / Arak Sungai</li> <li>⊠ c. Direction / Arak Sungai</li> </ul>
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**INDEX MAP**

- Aerial Photography ( 1 / 10,000 ) : August 2001  
 - Topographic map ( 1 / 1,000 ) : October 2001  
 - Horizontal System : UTM ( 91 Zone )  
 - Elevation System : MSL  
 - Contour Interval : 1 m

DIRECTORATE GENERAL OF WATER RESOURCES,  
 MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE

THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT  
 IN LIMBOTO - BOLANGO - BONE BASIN

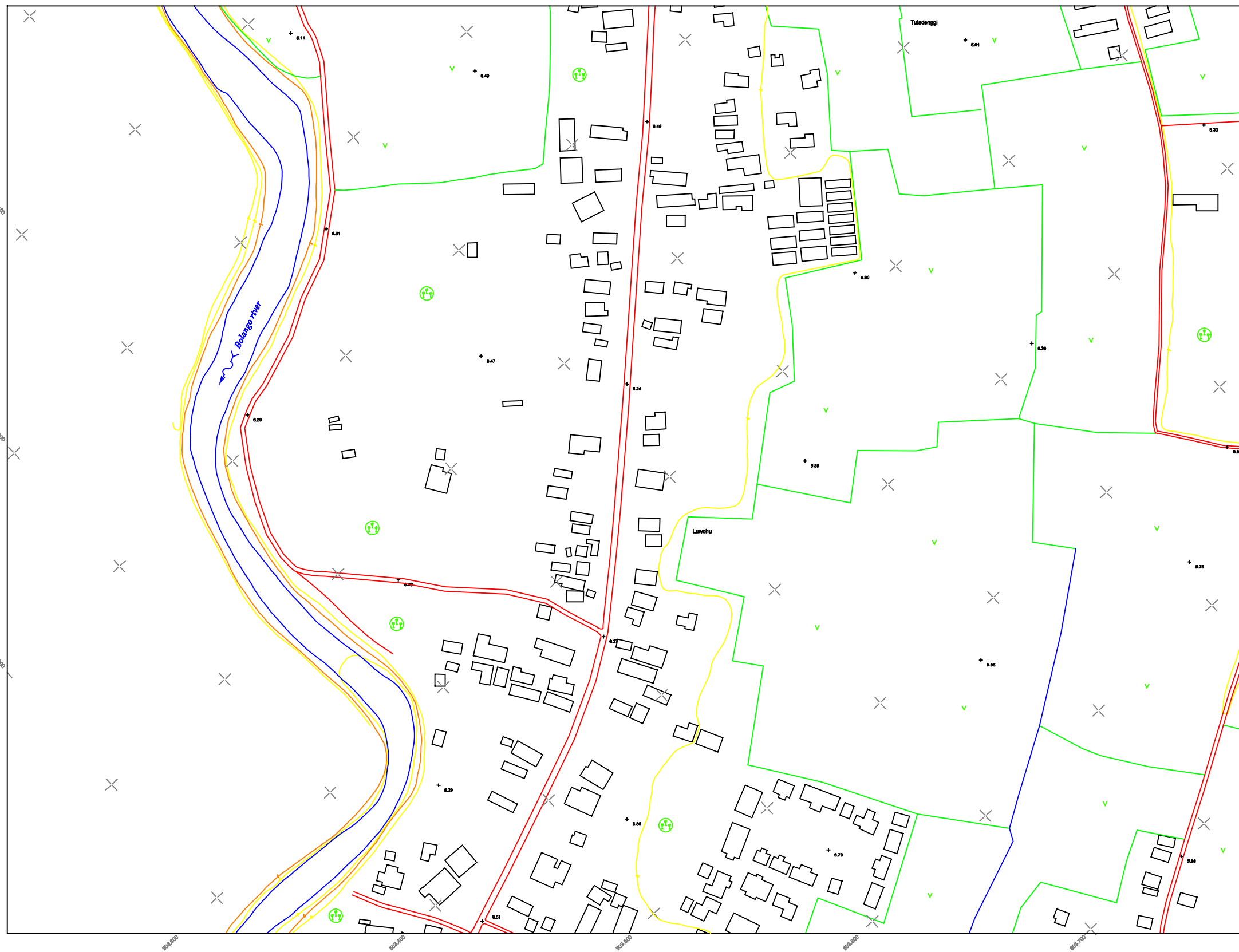
TOPOGRAPHIC MAP : LOW-LYING AREA / GORONTALO

Checked by	Approved by
Name PT. ATLAS DELTAMATYA	Isao Isehima
Signature	[Signature]
Date October 8, 2001	Date October 18, 2001

**JICA**  
JAPAN INTERNATIONAL  
COOPERATION AGENCY

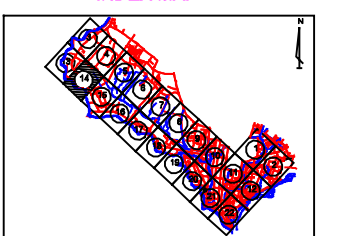
**PT. ATLAS DELTAMATYA**  
JICA MEMBER COMPANY

SHEET NO.  
**13/22**



LEGEND

Existing Triangulation Point TITIK TEGANGAN TINGGI	Electric Power Line JALUR TEGANGAN TINGGI
GPM Point	Cutting and Embankment
Survey Bench Mark BENCANA TINGGI	Kebun dan Timbunan
Spot Height TITIK TINGGI	Swamp
House / Building	Muslim graves KUBURAN MUSLIM
Factory	Christian cemetery KUBURAN KRISTEN
Public Hall RUANG KOS	Chinese graves KUBURAN CINA
Police Station KANTOR POLISI	Paddy field SARUWAT
Fire Station STASIUN PEMADAM KABARAHAT	Boundary of Vegetation BATAS TUMBUK
Post Office KANTOR POS	Field LADANG
Mosque MASJID	Forest KAWU
Church GEREJA	Grass RUMPUT
Hospital RUMAH SAKIT	Tree PUNCAK
School SEKOLAH	Water hole LUBANG AIR
Market PASAR	Sluice PENGALIRAN
Telephone Office KANTOR TELEFON	Pipe Culvert GROUING - GROUING
Government Office KANTOR PEMERINTAH	Monuments TUGA
Hotel HOTEL	Contour Line GARIS KONTUR
Gasoline Pump POMPA BAHAN	Pond, lake KAWAN, DANAU
Road JALAN	Sand PASIR
Path JALAN SEPAT	Land Slide TALING
Bridge JERENDAN	a. River / Sungai b. Rivulet / Anak Sungai c. Direction / Arak Sungai
Station STASIUN	
Subdistrict Boundary BATAS KABUPATEN	
Village Boundary BATAS KELURAHAN	



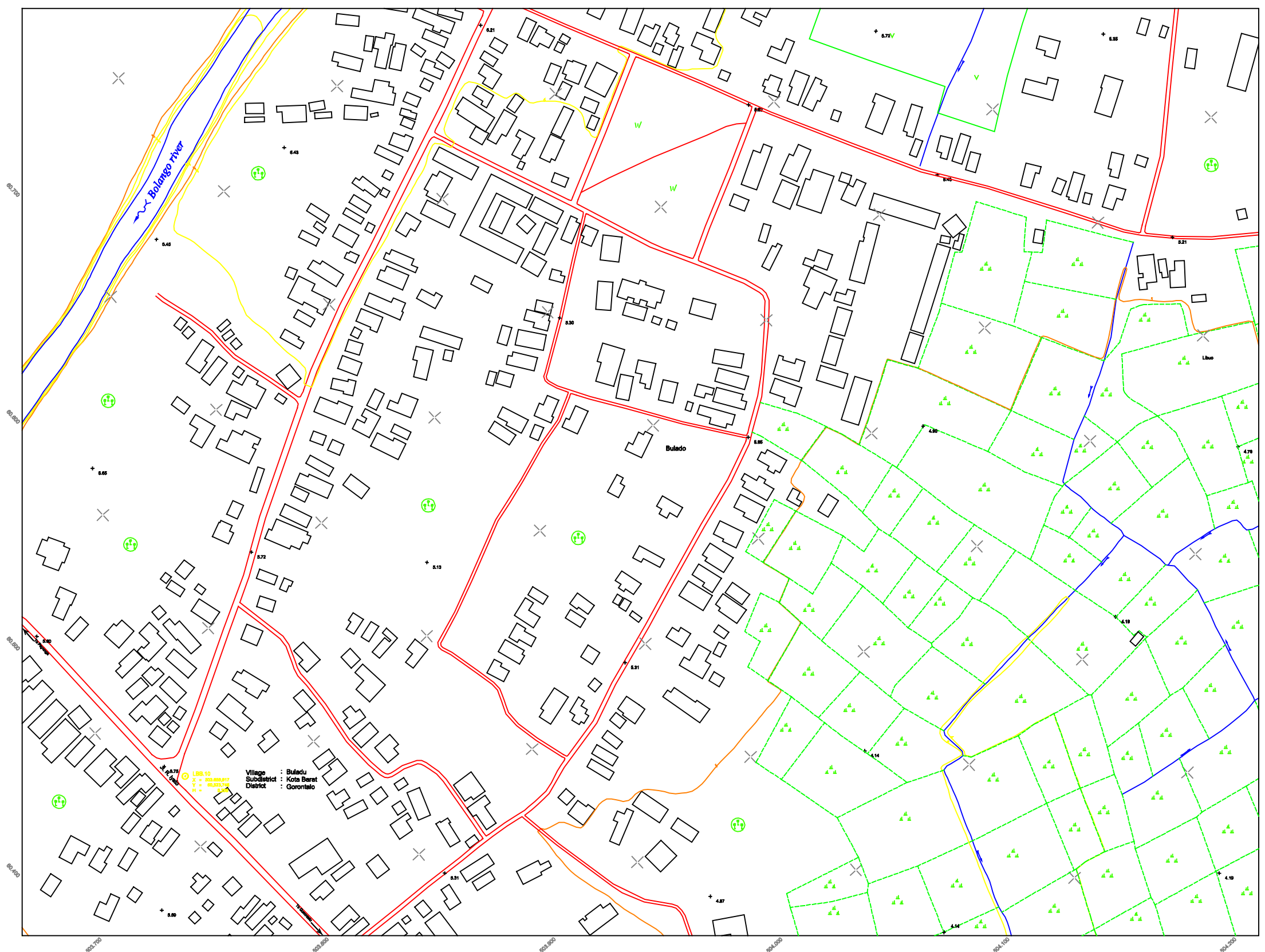
- Aerial Photography (1/10,000) : August 2001  
 - Topographic map (1/1,000) : October 2001  
 - Horizontal System : UTM (51 Zone)  
 - Elevation System : MSL  
 - Contour Interval : 1 m

DIRECTORATE GENERAL OF WATER RESOURCES,  
 MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE  
 THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT  
 IN LIMBOTO - BOLANGO - BONE BASIN

TOPOGRAPHIC MAP : LOW-LYING AREA / GORONTALO

Checked by	Approved by
Name PT. ATLAS DELTASATYA	Isoo Ikeshima
Signature	
Date October 9, 2001	October 19, 2001

JICA JAPAN INTERNATIONAL COOPERATION AGENCY  
 PT. ATLAS DELTASATYA  
 SHEET No. 14/22



LEGEND

▲ Existing Triangulation Point	— Electric Power Line
⊕ TBM (Tinggi Benang)	— JBRP Tegangan Tinggi
⊙ GPS Point	— Cutting and Embankment
⊕ TBM (Tinggi)	— Konsolidasi GBT Terasukan
⊕ Existing Bench Mark	— Swamp
⊕ Bench Mark	— Ponds
⊕ Spot Height	— Muslim graves
⊕ TBM (Tinggi)	— KUBUR MUSLIM
⊕ House / Building	— Christian cemetery
⊕ Bangunan	— KUBUR KRISTEN
⊕ Factory	— Chinese graves
⊕ Pabrik	— KUBUR CINA
⊕ Public Hall	— Paddy field
⊕ Balai Kota	— Sawah
⊕ Police Station	— Boundary of Vegetation
⊕ Kantor Polisi	— Batas Tanaman
⊕ Fire Station	— Field
⊕ Stasiun Pemadam Kebakaran	— Ladang
⊕ Post Office	— Casing
⊕ Kantor Pos	— Forest
⊕ Mosque	— Forest
⊕ Masjid	— Forest
⊕ Church	— Grass
⊕ Gereja	— Rumput
⊕ Hospital	— Tree
⊕ Rumah Sakit	— Pohon
⊕ School	— Water hole
⊕ Sekolah	— Lubang Air
⊕ Market	— Stake
⊕ Pasar	— PANGKAP
⊕ Telephone Office	— Pipe Culvert
⊕ Kantor Telekomunikasi	— Gorong-gorong
⊕ Government Office	— Monuments
⊕ Kantor Pemerintahan	— Tugu
⊕ Hotel	— Contour Line
⊕ Hotel	— Garis Kontur
⊕ Gasoline Pump	— Pond, lake
⊕ Pompa Bensin	— Kolam, Danau
⊕ Road	— Sand
⊕ Jalan	— Pasir
⊕ Path	— Land Slide
⊕ Jalan Sepeda	— Longsor
⊕ Bridge	— a. River / Sungai
⊕ Jembatan	— b. Rivulet / Anak Sungai
⊕ Station	— c. Direction / Arah Sungai
⊕ Stasiun	
⊕ Subdistrict Boundary	
⊕ Batas Kecamatan	
⊕ Village Boundary	
⊕ Batas Kelurahan	

**INDEX MAP**

- Aerial Photography (1/10,000)	: August, 2001
- Topographic map (1/10,000)	: October, 2001
- Horizontal System	: UTM (91 Zone)
- Elevation System	: MSL
- Contour Interval	: 1 m

**DIRECTORATE GENERAL OF WATER RESOURCES,  
MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE**

**THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT  
IN LIMBOTO - BOLANGO - BONE BASIN**

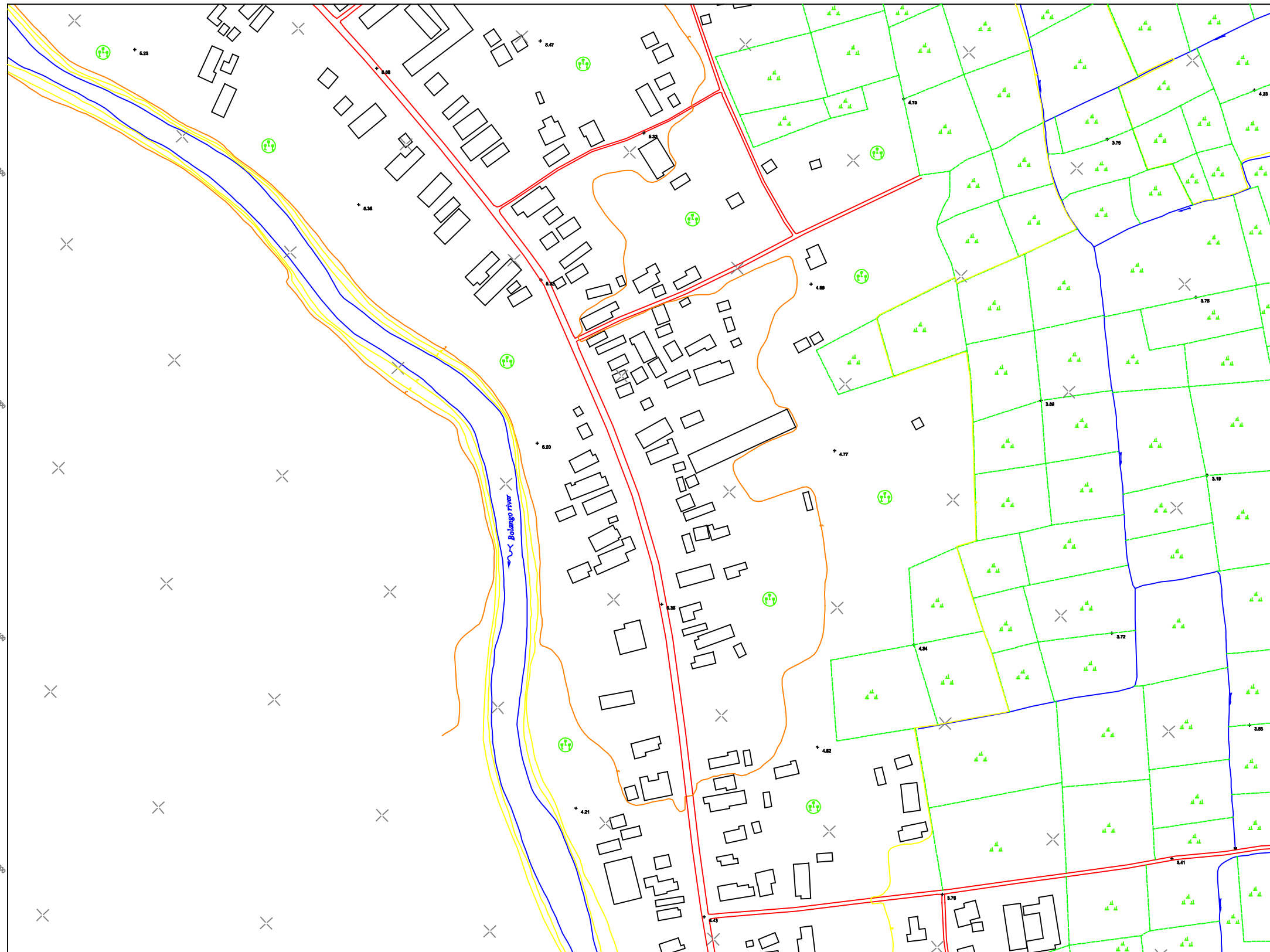
**TOPOGRAPHIC MAP : LOW-LYING AREA / GORONTALO**

Checked by		Approved by	
Name	PT. ATLAS DELTASATYA	Name	Isao Beahima
Signature		Signature	
Date	October 8, 2001	Date	October 19, 2001

**JICA** JAPAN INTERNATIONAL COOPERATION AGENCY

**PT. ATLAS DELTASATYA**

SHEET NO. 15/22



**LEGEND**

<ul style="list-style-type: none"> <li>▲ Existing Triangulation Point</li> <li>⊙ TBM Triangulation</li> <li>⊙ GPS Point</li> <li>⊙ TBM GPS</li> <li>⊙ Existing Bench Mark</li> <li>⊙ Spot Height</li> <li>⊙ House / Building</li> <li>⊙ Factory</li> <li>⊙ Public Hall</li> <li>⊙ Police Station</li> <li>⊙ Fire Station</li> <li>⊙ Post Office</li> <li>⊙ Mosque</li> <li>⊙ Church</li> <li>⊙ Hospital</li> <li>⊙ School</li> <li>⊙ Market</li> <li>⊙ Telephone Office</li> <li>⊙ Government Office</li> <li>⊙ Hotel</li> <li>⊙ Gasoline Pump</li> <li>⊙ Road</li> <li>⊙ Path</li> <li>⊙ Bridge</li> <li>⊙ Station</li> <li>⊙ Subdistrict Boundary</li> <li>⊙ Village Boundary</li> </ul>	<ul style="list-style-type: none"> <li>⊙ TBM Triangulation</li> <li>⊙ GPS Point</li> <li>⊙ TBM GPS</li> <li>⊙ Existing Bench Mark</li> <li>⊙ Spot Height</li> <li>⊙ House / Building</li> <li>⊙ Factory</li> <li>⊙ Public Hall</li> <li>⊙ Police Station</li> <li>⊙ Fire Station</li> <li>⊙ Post Office</li> <li>⊙ Mosque</li> <li>⊙ Church</li> <li>⊙ Hospital</li> <li>⊙ School</li> <li>⊙ Market</li> <li>⊙ Telephone Office</li> <li>⊙ Government Office</li> <li>⊙ Hotel</li> <li>⊙ Gasoline Pump</li> <li>⊙ Road</li> <li>⊙ Path</li> <li>⊙ Bridge</li> <li>⊙ Station</li> <li>⊙ Subdistrict Boundary</li> <li>⊙ Village Boundary</li> </ul>	<ul style="list-style-type: none"> <li>⊙ Existing Triangulation Point</li> <li>⊙ TBM Triangulation</li> <li>⊙ GPS Point</li> <li>⊙ TBM GPS</li> <li>⊙ Existing Bench Mark</li> <li>⊙ Spot Height</li> <li>⊙ House / Building</li> <li>⊙ Factory</li> <li>⊙ Public Hall</li> <li>⊙ Police Station</li> <li>⊙ Fire Station</li> <li>⊙ Post Office</li> <li>⊙ Mosque</li> <li>⊙ Church</li> <li>⊙ Hospital</li> <li>⊙ School</li> <li>⊙ Market</li> <li>⊙ Telephone Office</li> <li>⊙ Government Office</li> <li>⊙ Hotel</li> <li>⊙ Gasoline Pump</li> <li>⊙ Road</li> <li>⊙ Path</li> <li>⊙ Bridge</li> <li>⊙ Station</li> <li>⊙ Subdistrict Boundary</li> <li>⊙ Village Boundary</li> </ul>	<ul style="list-style-type: none"> <li>⊙ Existing Triangulation Point</li> <li>⊙ TBM Triangulation</li> <li>⊙ GPS Point</li> <li>⊙ TBM GPS</li> <li>⊙ Existing Bench Mark</li> <li>⊙ Spot Height</li> <li>⊙ House / Building</li> <li>⊙ Factory</li> <li>⊙ Public Hall</li> <li>⊙ Police Station</li> <li>⊙ Fire Station</li> <li>⊙ Post Office</li> <li>⊙ Mosque</li> <li>⊙ Church</li> <li>⊙ Hospital</li> <li>⊙ School</li> <li>⊙ Market</li> <li>⊙ Telephone Office</li> <li>⊙ Government Office</li> <li>⊙ Hotel</li> <li>⊙ Gasoline Pump</li> <li>⊙ Road</li> <li>⊙ Path</li> <li>⊙ Bridge</li> <li>⊙ Station</li> <li>⊙ Subdistrict Boundary</li> <li>⊙ Village Boundary</li> </ul>
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**INDEX MAP**

- Aerial Photography ( 1 / 10.000 )	: August 2001
- Topographic map ( 1 / 1.000 )	: October 2001
- Horizontal System	: UTM ( 81 Zone )
- Elevation System	: MSL
- Contour Interval	: 1 m

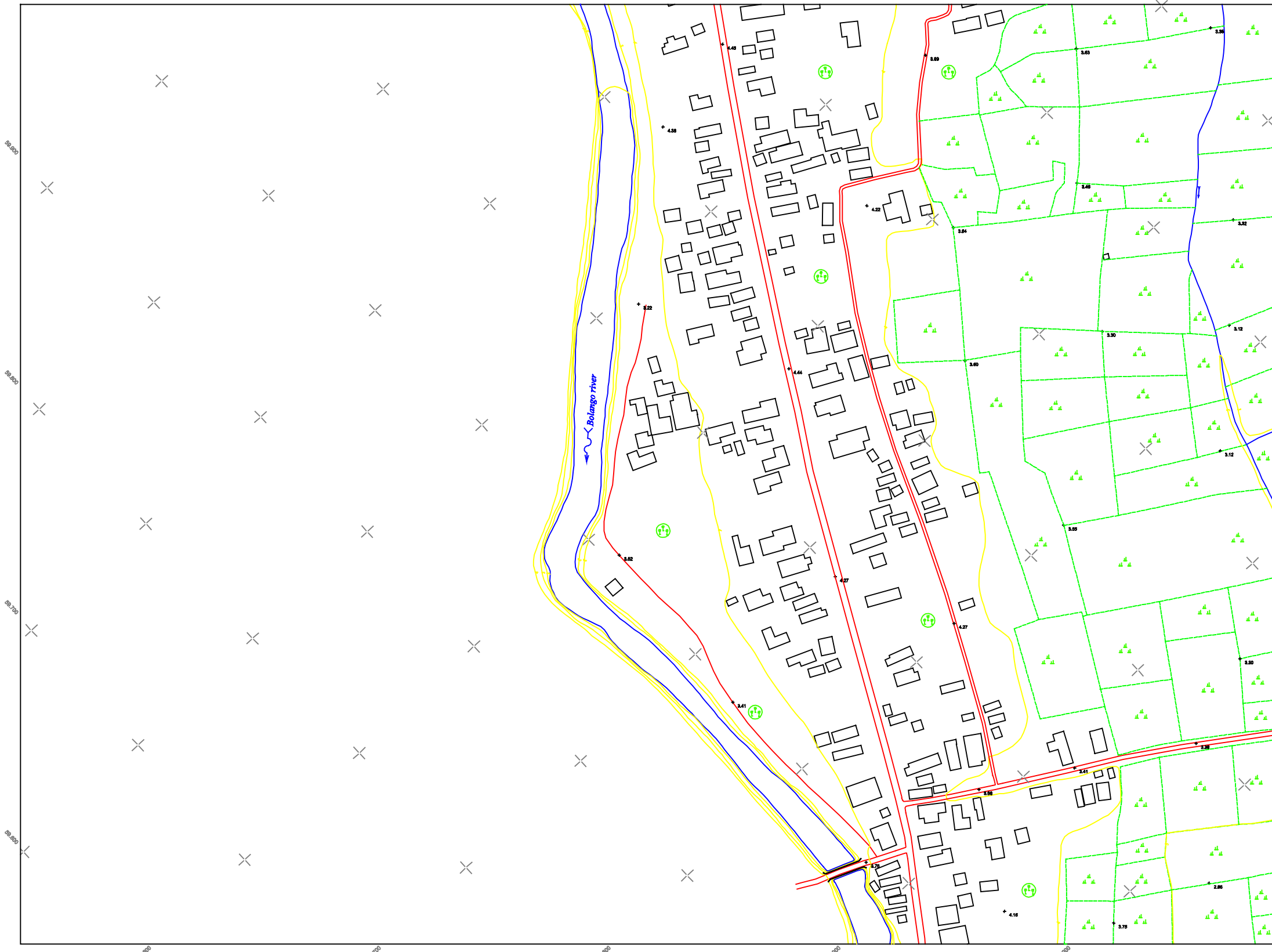
**DIRECTORATE GENERAL OF WATER RESOURCES,  
MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE**

**THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT  
IN LIMBOTO - BOLANGO - BONE BASIN, NORTH SULAWESI**

**TOPOGRAPHIC MAP : LOW-LYING AREA / GORONTALO**

Checked by	Approved by
Name PT. ATLAS DELTASATYA	Name Isco Iseahma
Signature	Signature
Date October 8, 2001	Date October 16, 2001

SHEET NO.  
**16/22**



**LEGEND**

▲ Existing Triangulation Point	— Electric Power Line
▲ TIK Triangulasi	— Salur Tegangan Tinggi
⊙ GPS Point	— Cutting and Embankment
⊙ TIK OPK	— Kamban dan Timbunan
⊠ Existing Bench Mark	— Swamp
⊠ BSMK	— Kawa
× 4.74 Spot Height	— Muslim graves
× TIK TINGGI	— KUBURAN MUSLIM
⊠ House / Building	— Christian cemetery
⊠ Rumah	— KUBURAN KRISTEN
⊠ Factory	— Chinese graves
⊠ Pabrik	— KUBURAN CHINA
⊠ Public Hall	— Paddy field
⊠ Balai Desa	— Sawah
⊠ Police Station	— Boundary of Vegetation
⊠ Kantor Polisi	— Batas Vegetasi
⊠ Fire Station	— Field
⊠ Stasiun Pemadam Kebakaran	— Ladang
⊠ Post Office	— Forest
⊠ Kantor Pos	— Hutan
⊠ Mosque	— Grass
⊠ Masjid	— Rumput
⊠ Church	— Tree
⊠ Gereja	— Pohon
⊠ Hospital	— Water hole
⊠ Rumah Sakit	— Lubang Air
⊠ School	— Sluice
⊠ Sekolah	— Pagar Jir
⊠ Market	— Pipe Culvert
⊠ Pasar	— Saluran "gonggong"
⊠ Telephone Office	— Monuments
⊠ Kantor Telekomunikasi	— Tugu
⊠ Government Office	— Contour Line
⊠ Kantor Pemerintahan	— Garis Kontur
⊠ Hotel	—
⊠ Hotel	—
⊠ Gasoline Pump	— Pond, lake
⊠ Pompa Bensin	— Kolam, danau
— Road	— Sand
— Jalan	— Pasir
— Path	— Land Slide
— Jalur Sepak	— TROG
— Bridge	— a. River / Sungai
— Jembatan	— b. Ruket / Anak Sungai
— Station	— c. Direction / Arah Sungai
— Subdistrict Boundary	—
— Batas Kecamatan	—
— Village Boundary	—
— Batas Kelurahan	—

**INDEX MAP**

- Aerial Photography ( 1 / 10,000 ) : August 2001  
 - Topographic map ( 1 / 1,000 ) : October 2001  
 - Horizontal System : UTM ( 51 Zone )  
 - Elevation System : MSL  
 - Contour Interval : 1 m

**DIRECTORATE GENERAL OF WATER RESOURCES,**  
**MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE**  
**THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT**  
**IN LIMBOTO - BOLANGO - BONE BASIN**  
**TOPOGRAPHIC MAP : LOW-LYING AREA / GOLONTARO**

Checked by		Approved by	
Nama	PT. ATLAS DELTASATYA	Isao Ikehama	
Signature			
Date	October 9, 2001	October 19, 2001	

**JICA** JAPAN INTERNATIONAL COOPERATION AGENCY

PT. ATLAS DELTASATYA  
 SHEET NO. 17/22