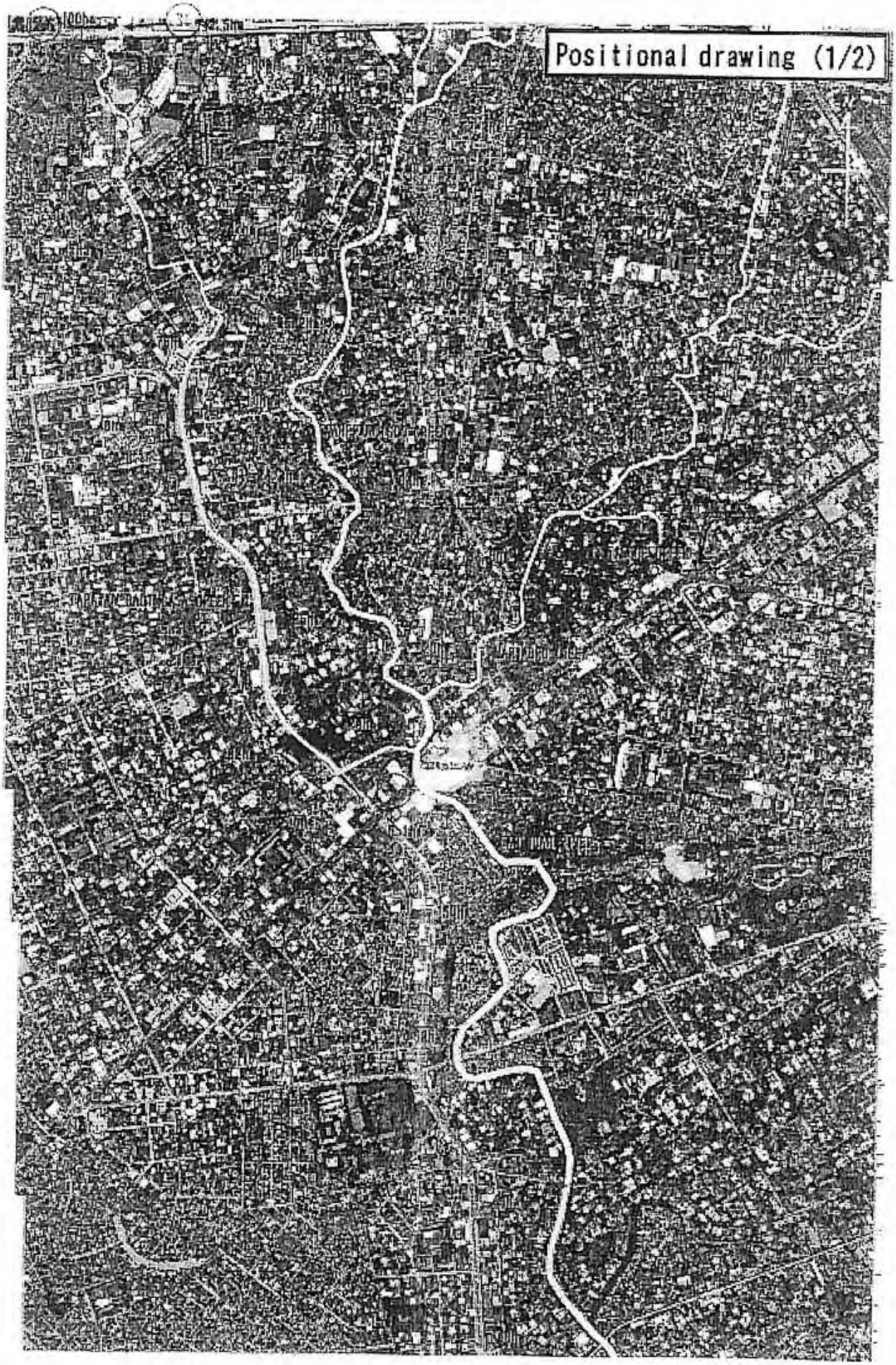
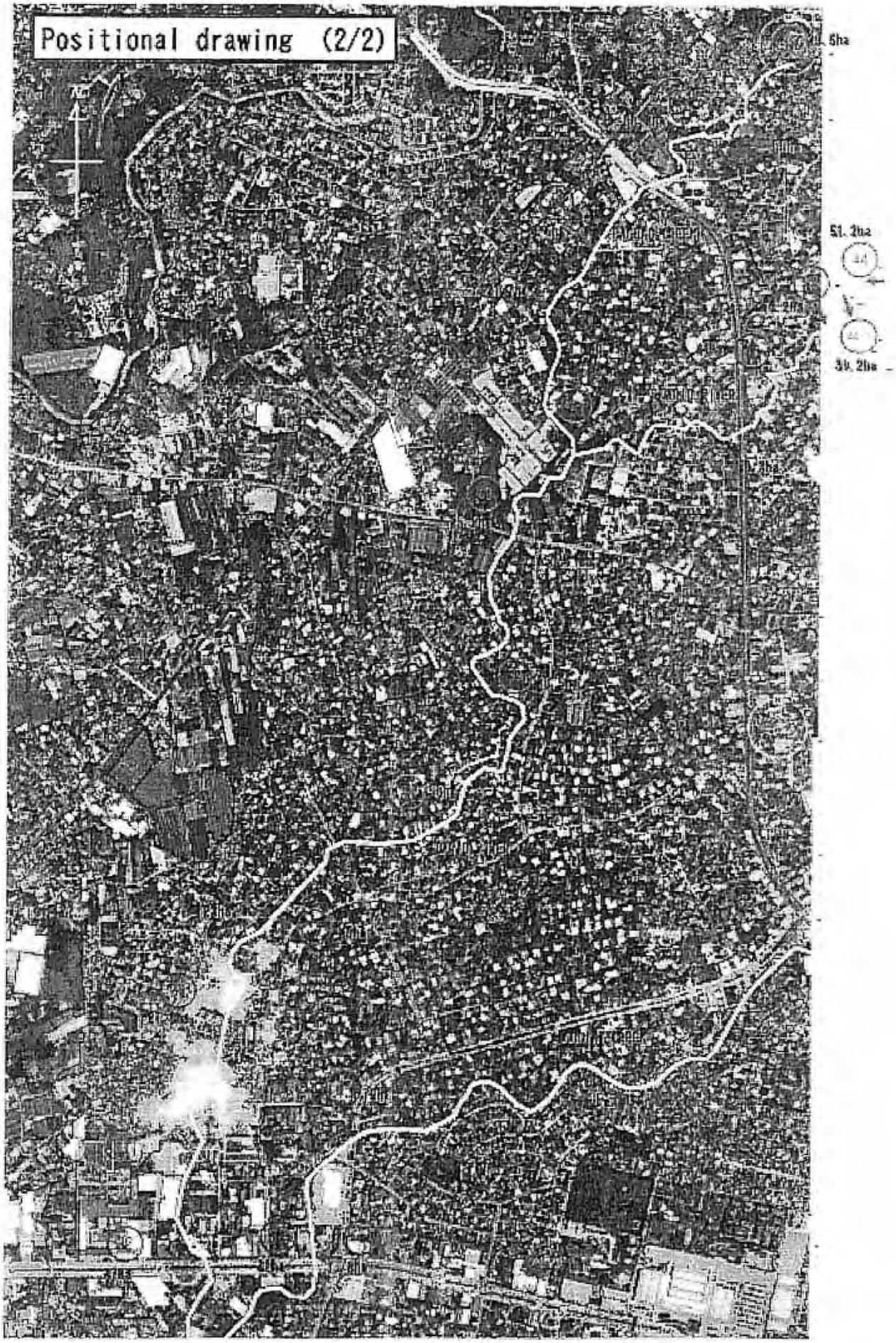
ATTACHMENT 1

PROJECT SITE CANDIDATE FOR SAN JUAN RIVER BASIN


Positional drawing (1/2)


Positional drawing (2/2)
5ha
51.2ha
39.2ha

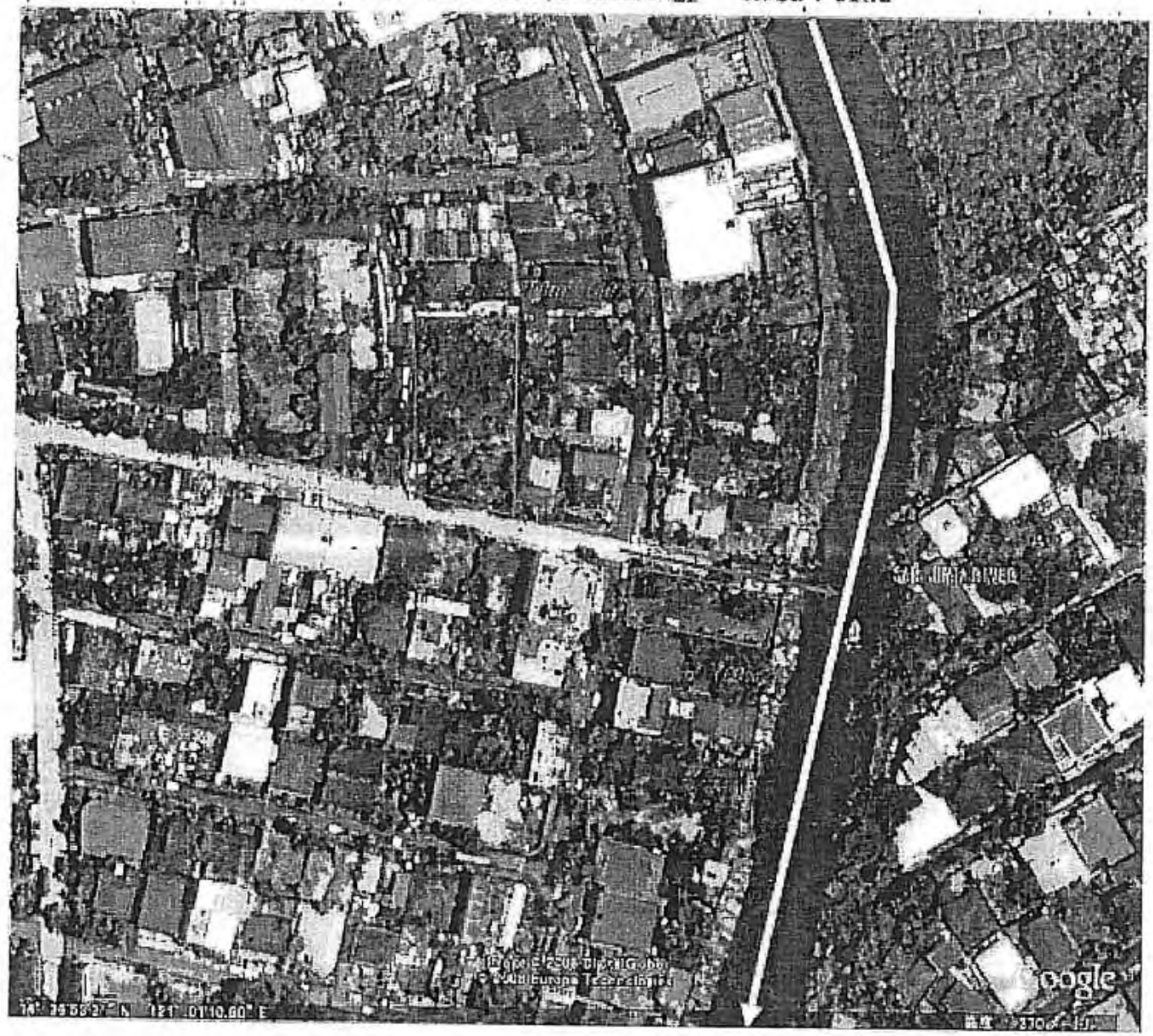
Detailed drawing

LEGEND

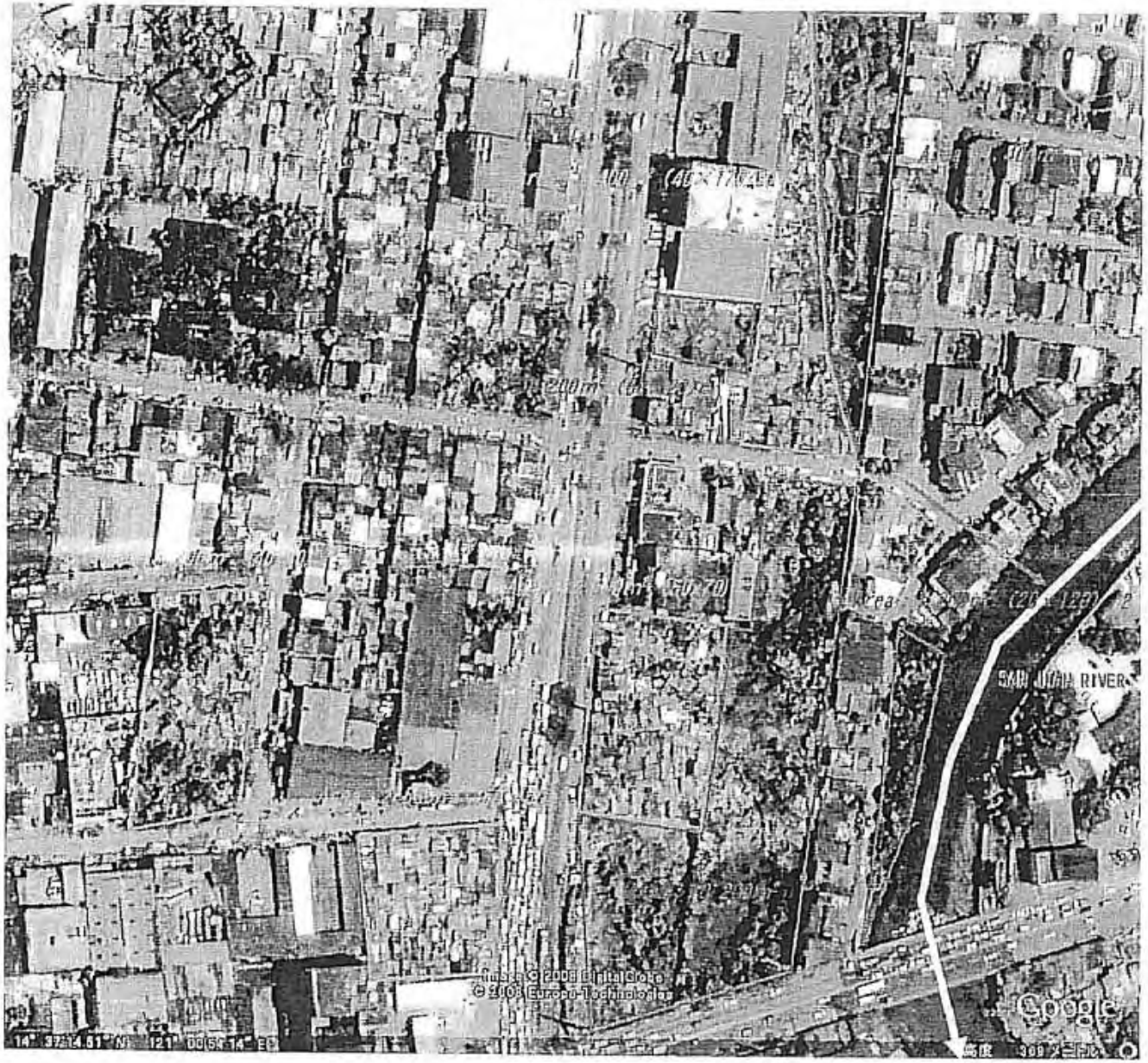
	There is a possibility of the official business ground
	There is a possibility of ground of owning privately
	There is a possibility of the squatter

[No. 1 of a detailed drawing] Area : 48ha

[No. 2 of a detailed drawing] Area : 65ha

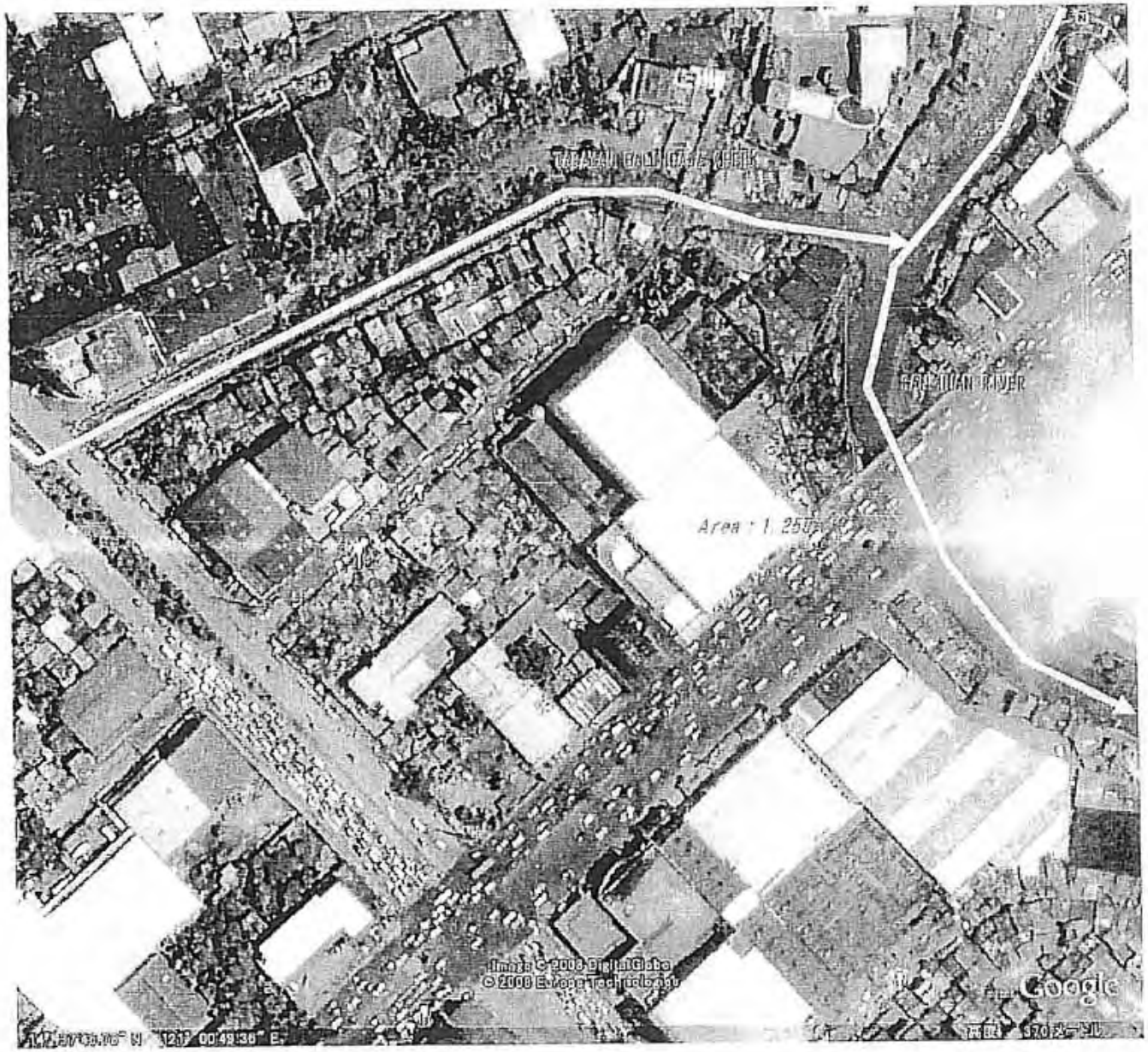


[No. 3 of a detailed drawing] Area : 52ha



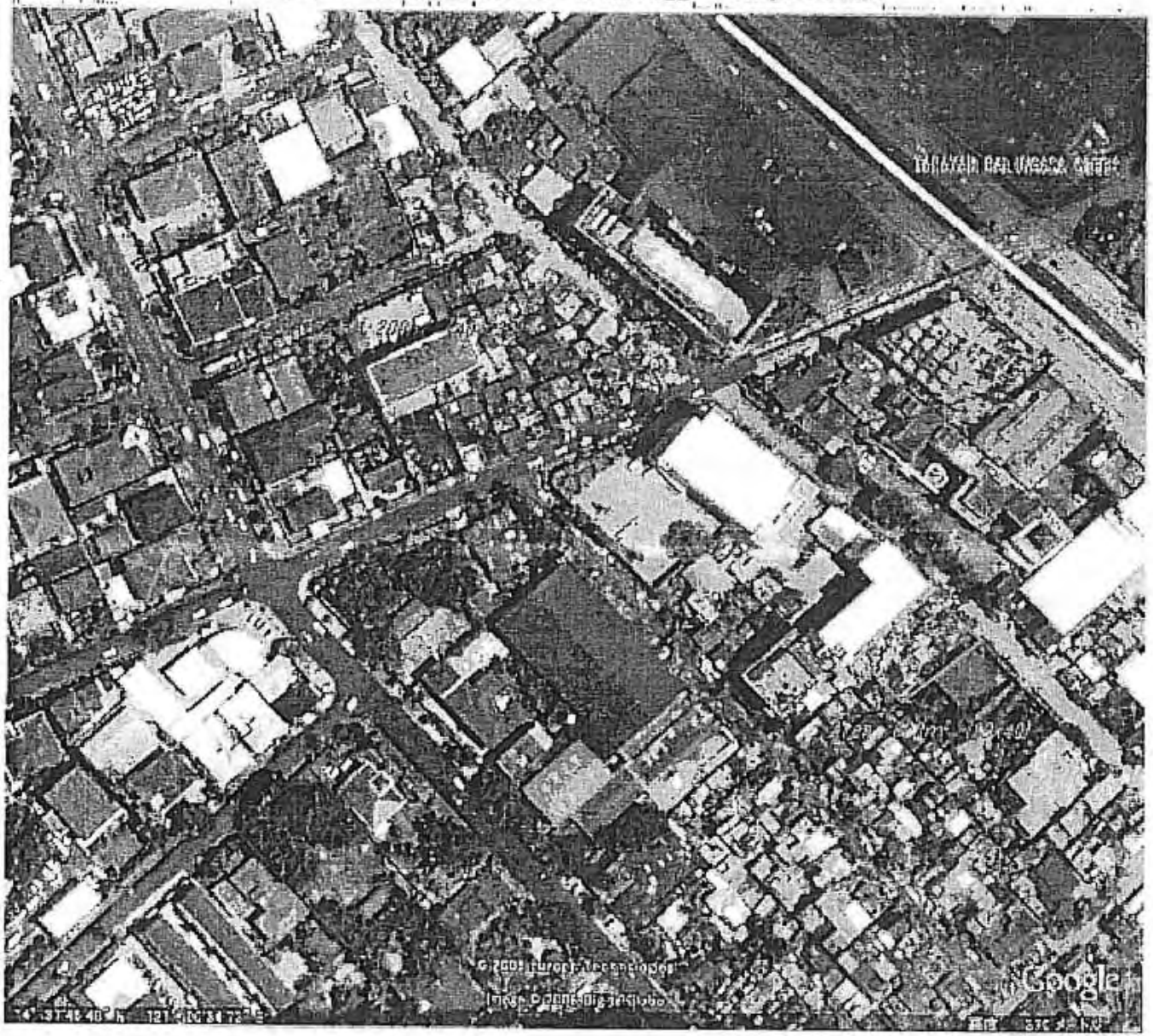
[No. 4 of a detailed drawing] Area : 50ha

[No. 5 of a detailed drawing]　*Area : 5. 1ha*



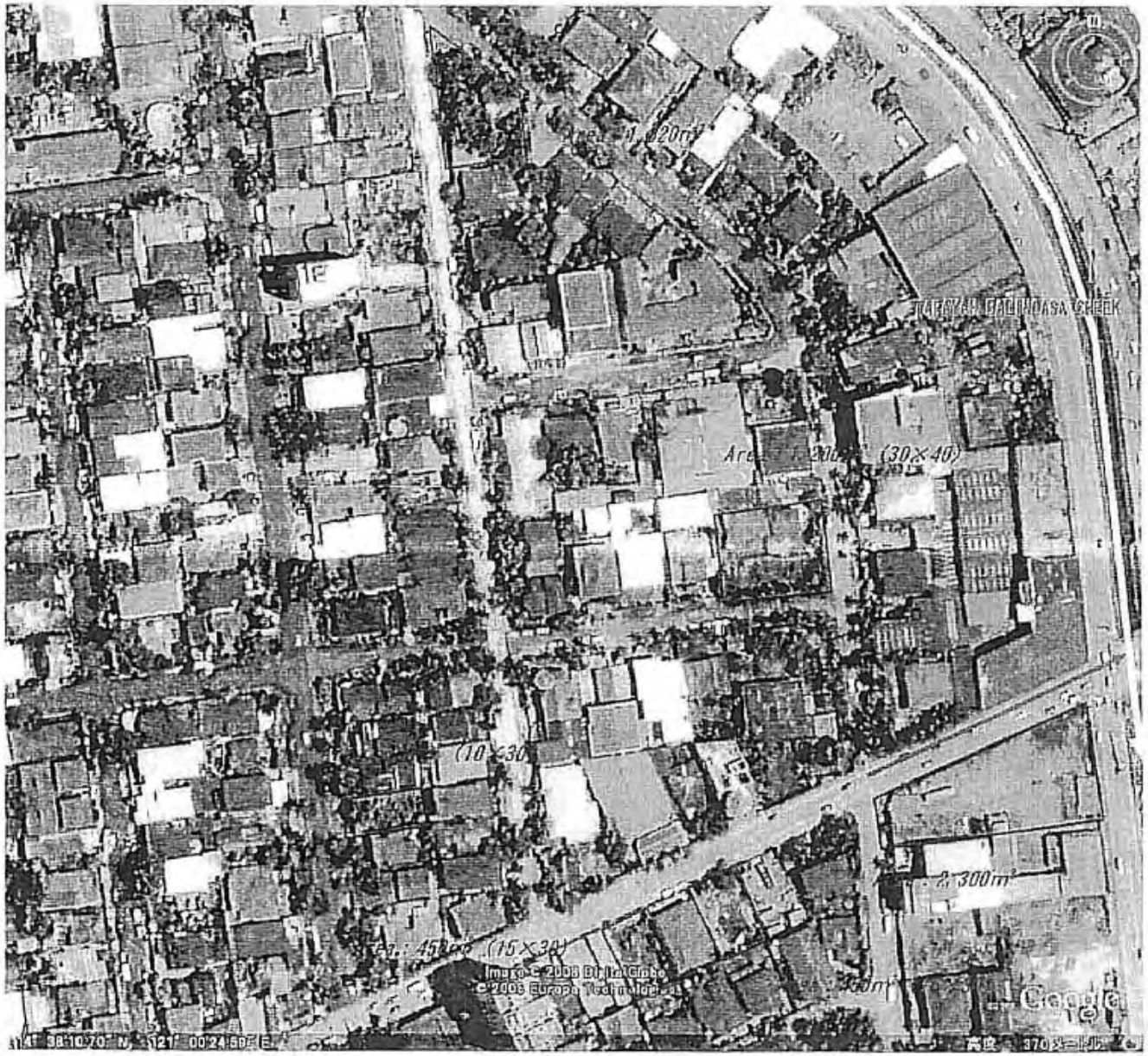
[No. 6 of a detailed drawing] *Area : 24ha*

[No. 7 of a detailed drawing] Area : 56ha

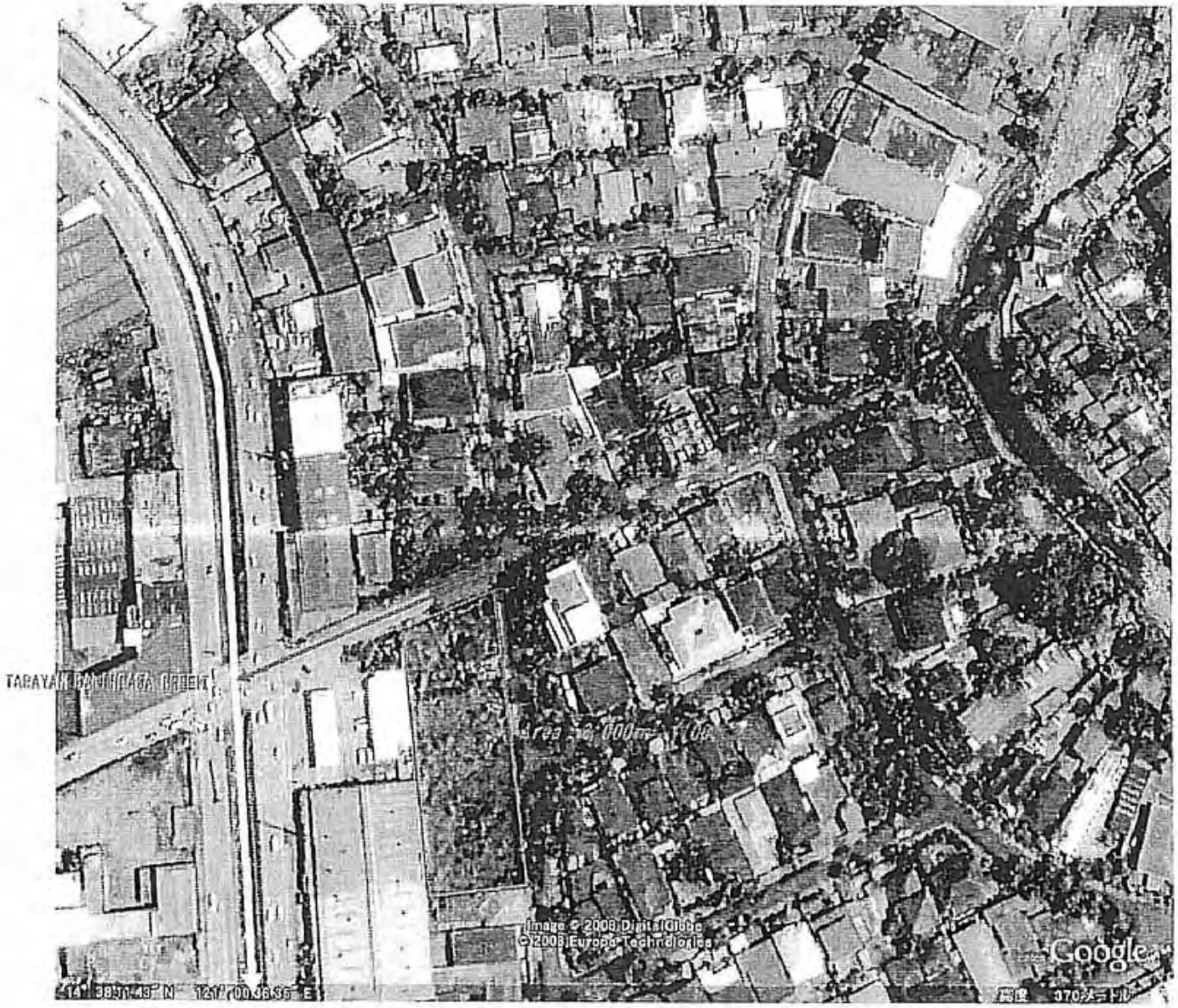


[No. 8 of a detailed drawing] Area : 82ha

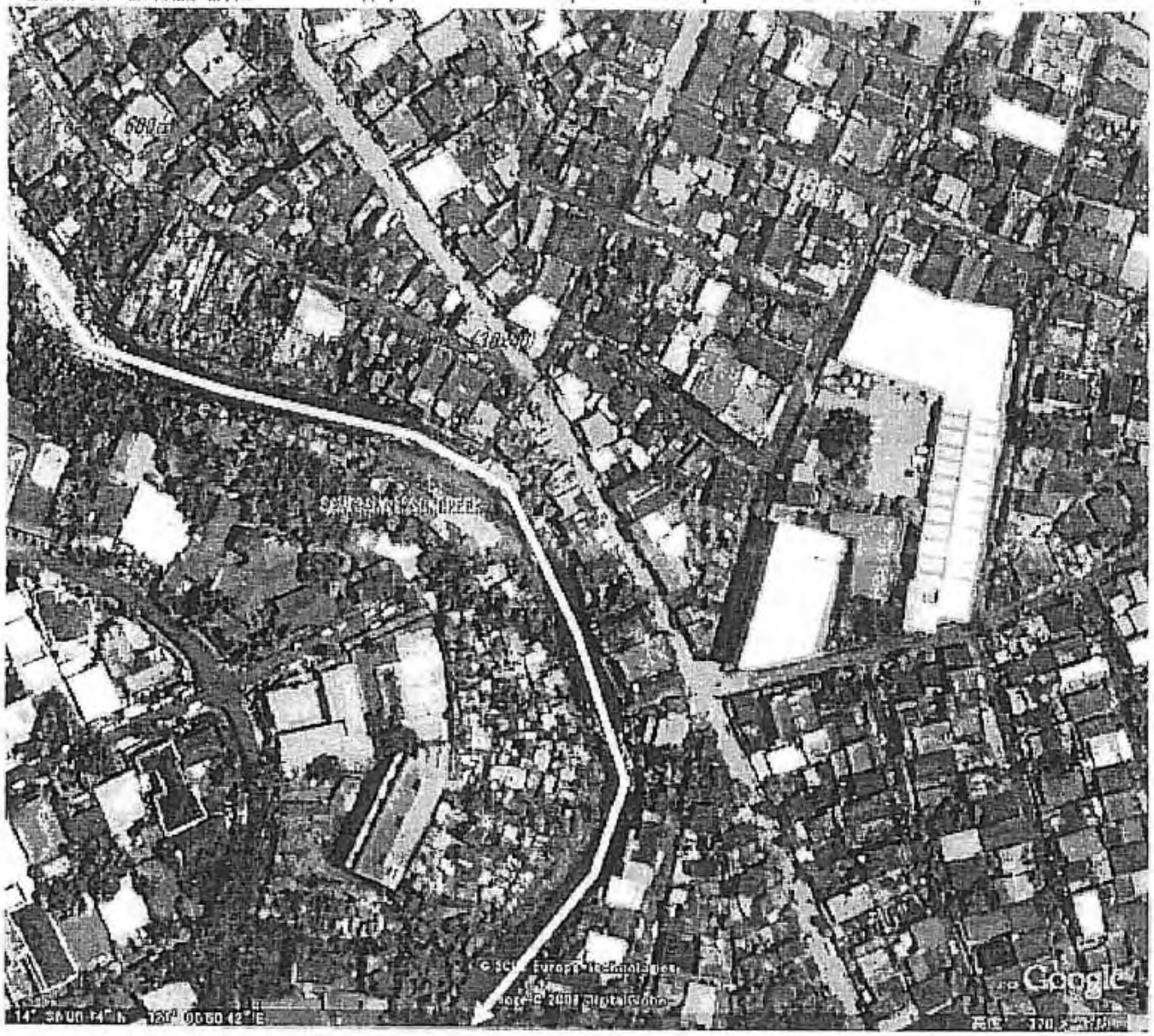
[No. 9 and No. 9-1 of a detailed drawing]　Area : 65ha、21ha



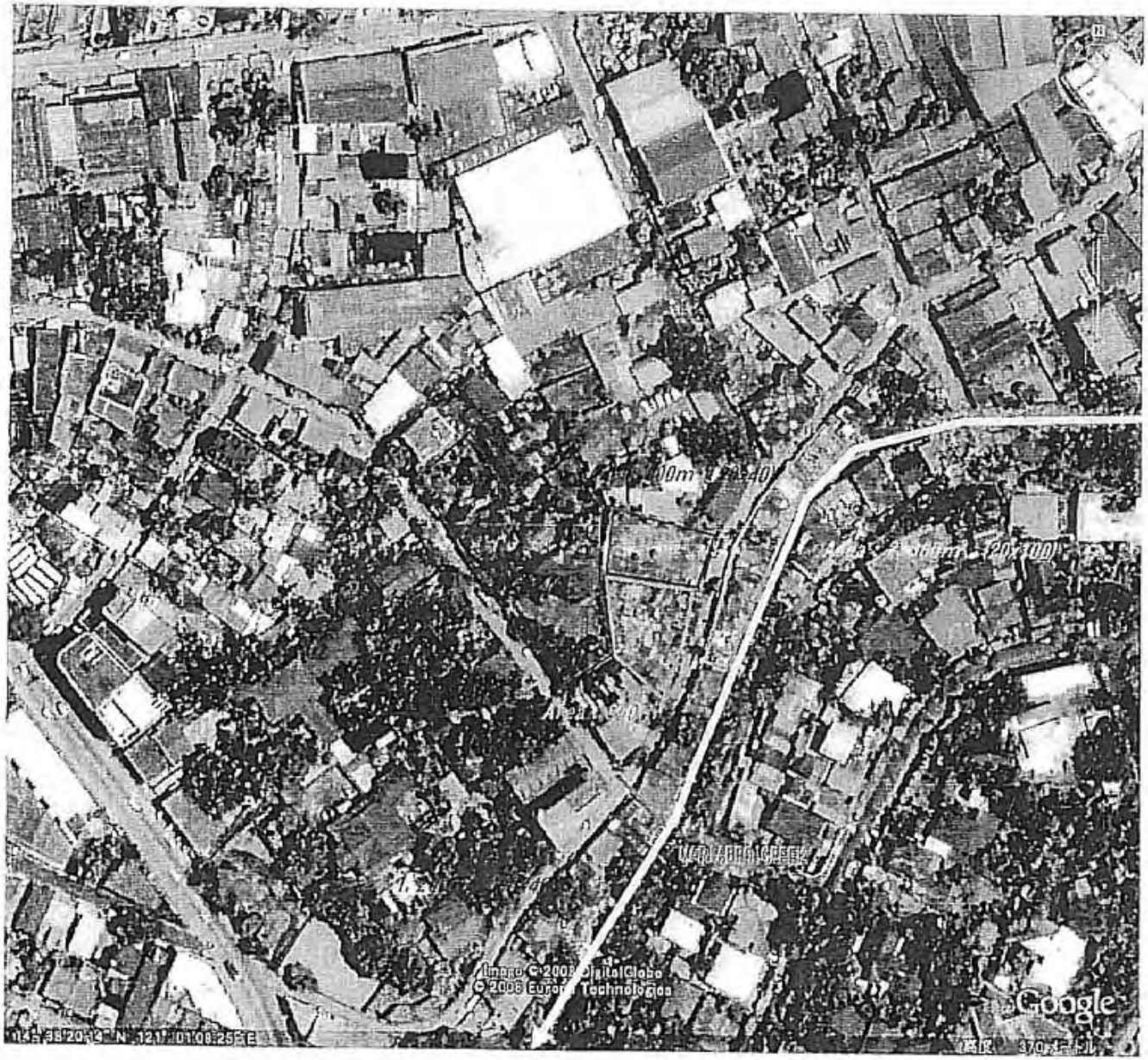
[No. 9-2 of a detailed drawing] Area : 25ha



[No. 10 of a detailed drawing] Area : 20ha

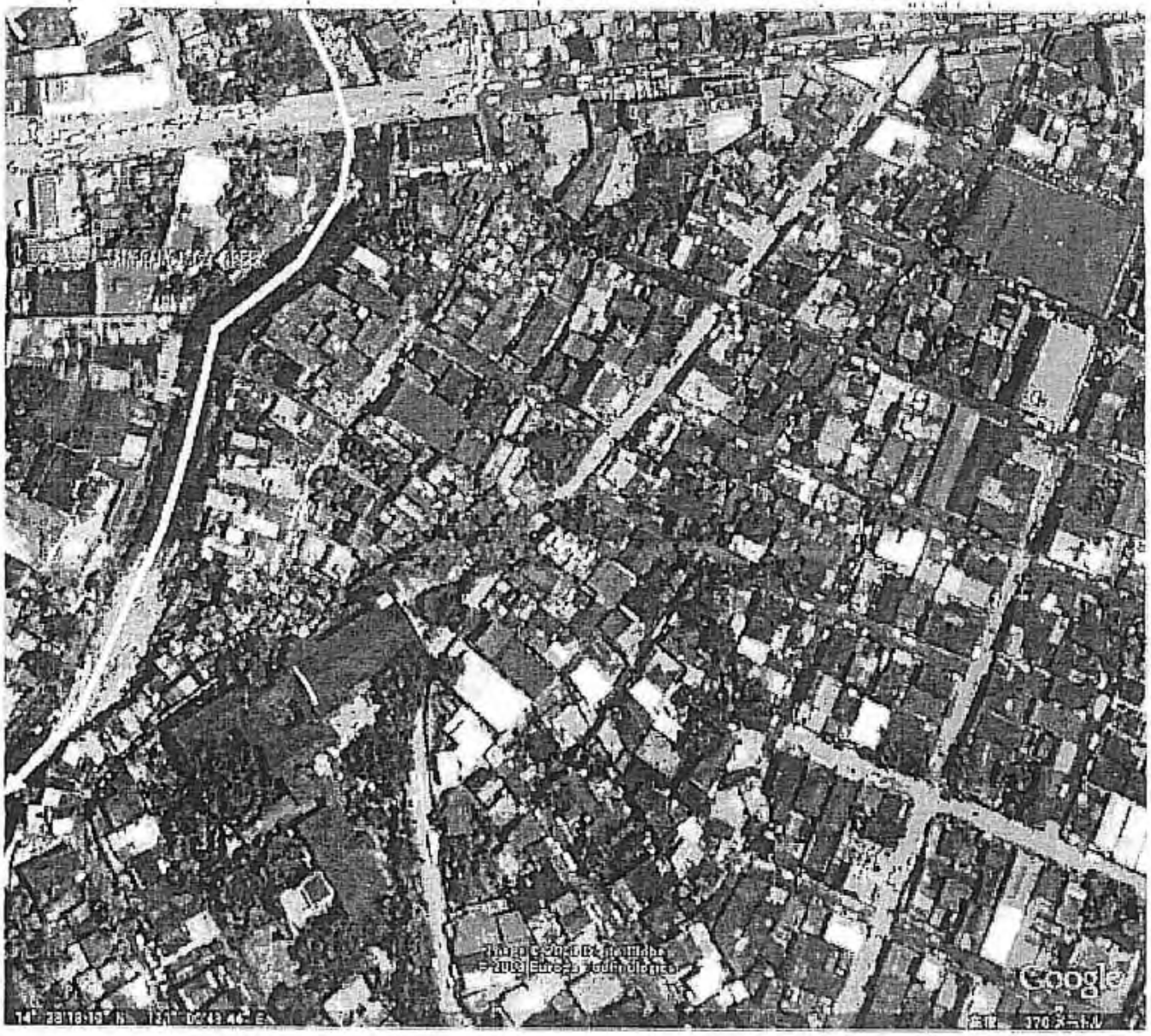


【No. 11 of a detailed drawing】　Area : 33. 5ha

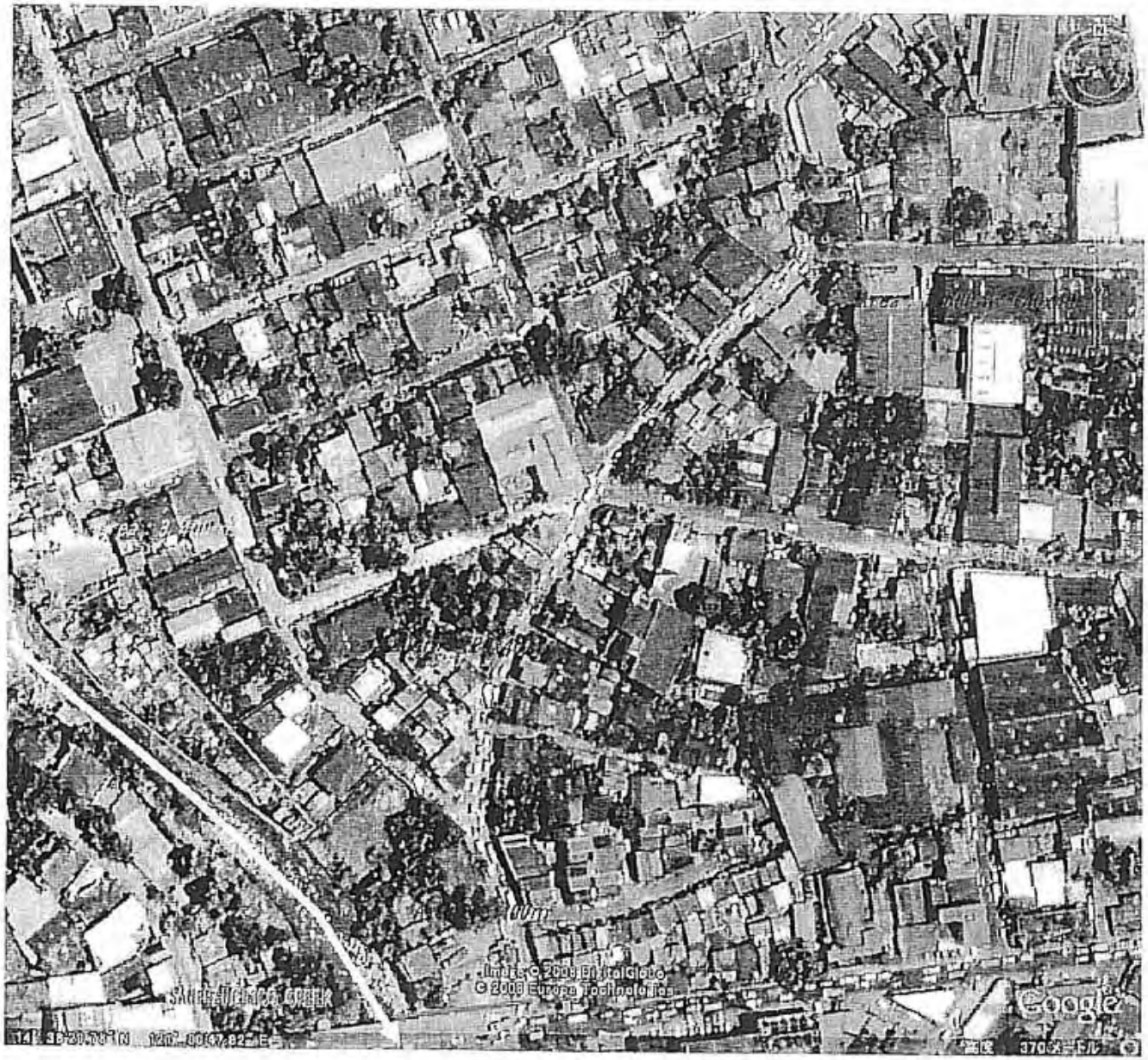


【No. 12 of a detailed drawing】 Area : 28ha

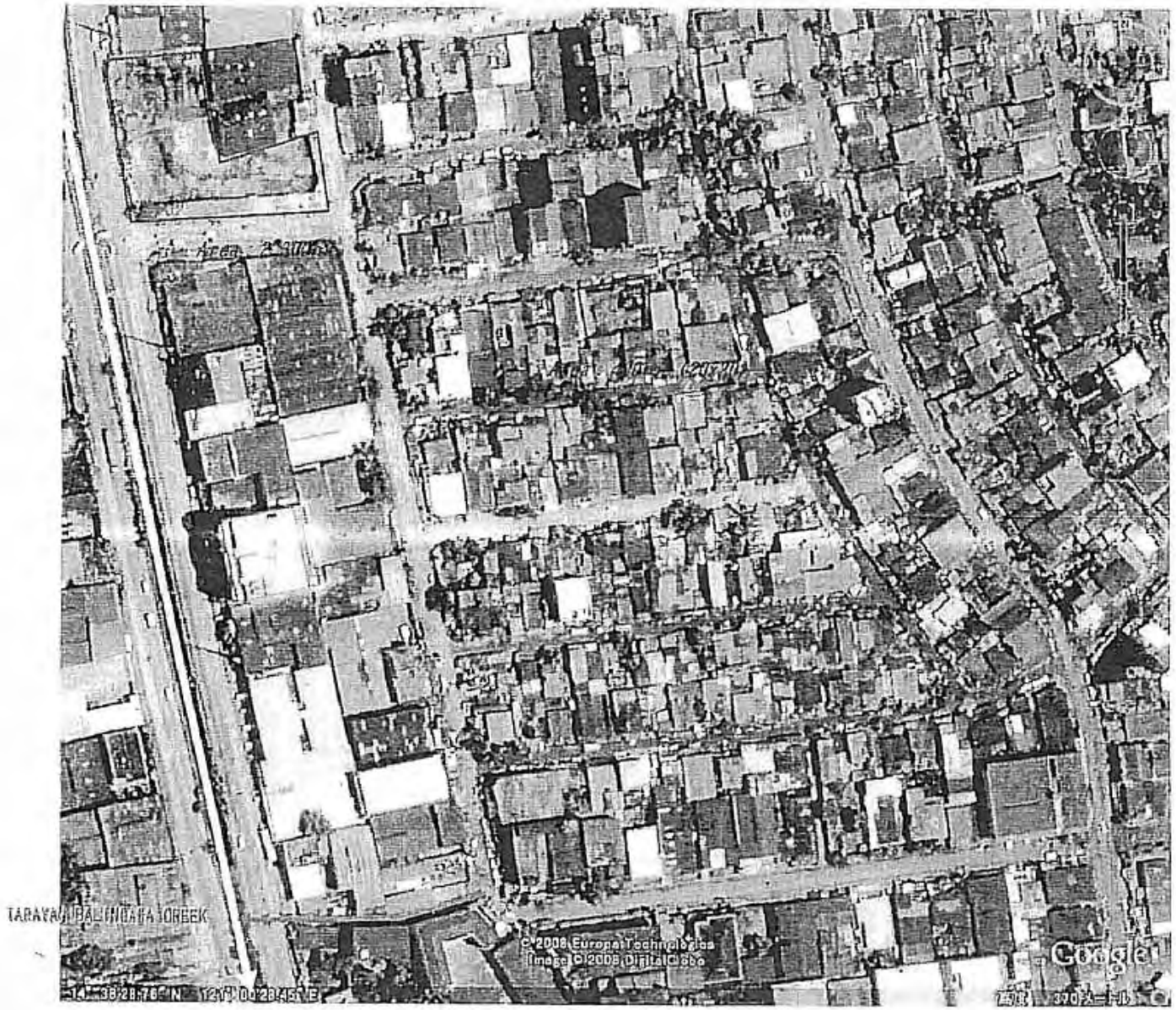
【No. 12-1 of a detailed drawing】 Area : 23ha



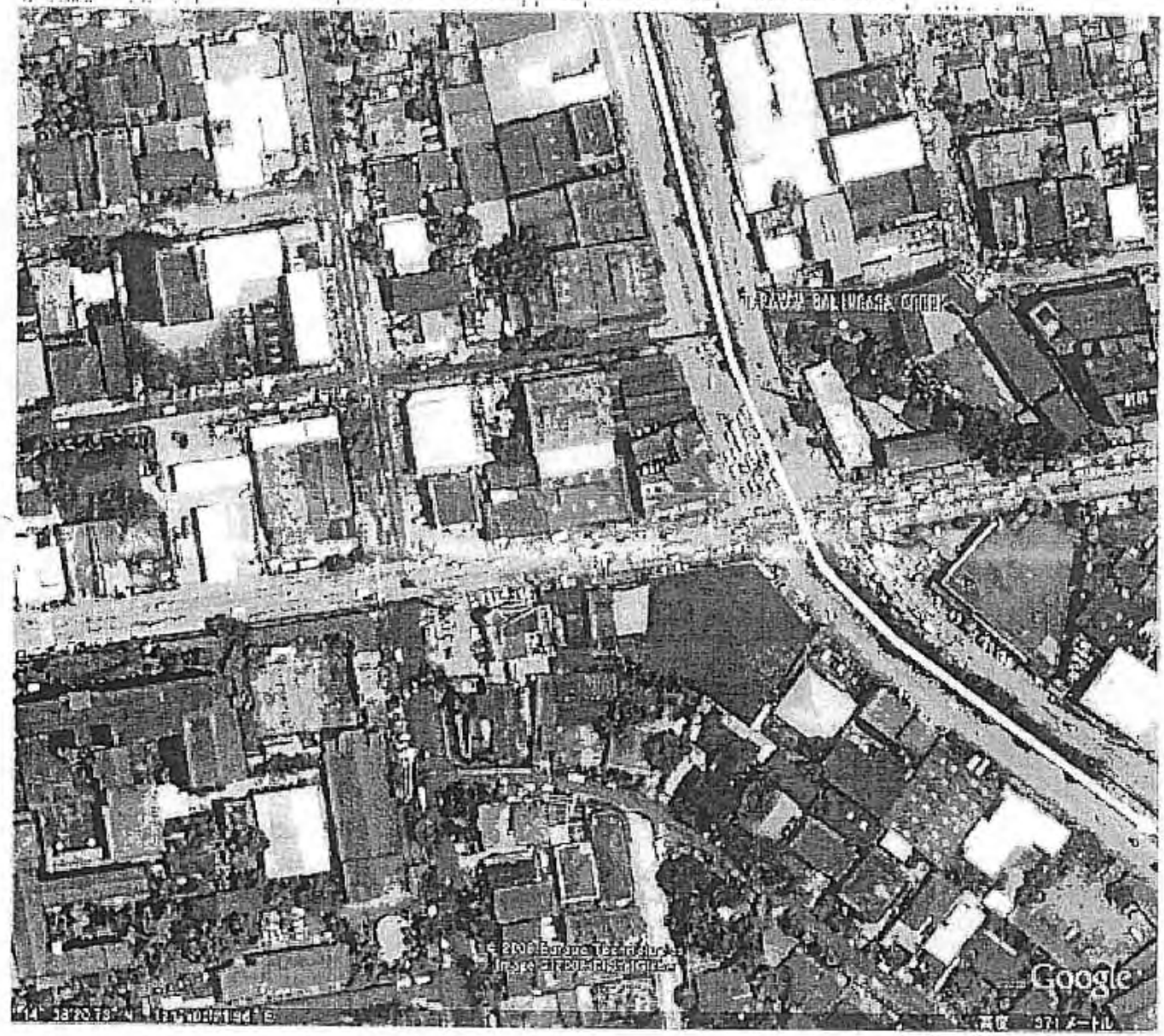
【No. 13 of a detailed drawing】 Area : 54ha



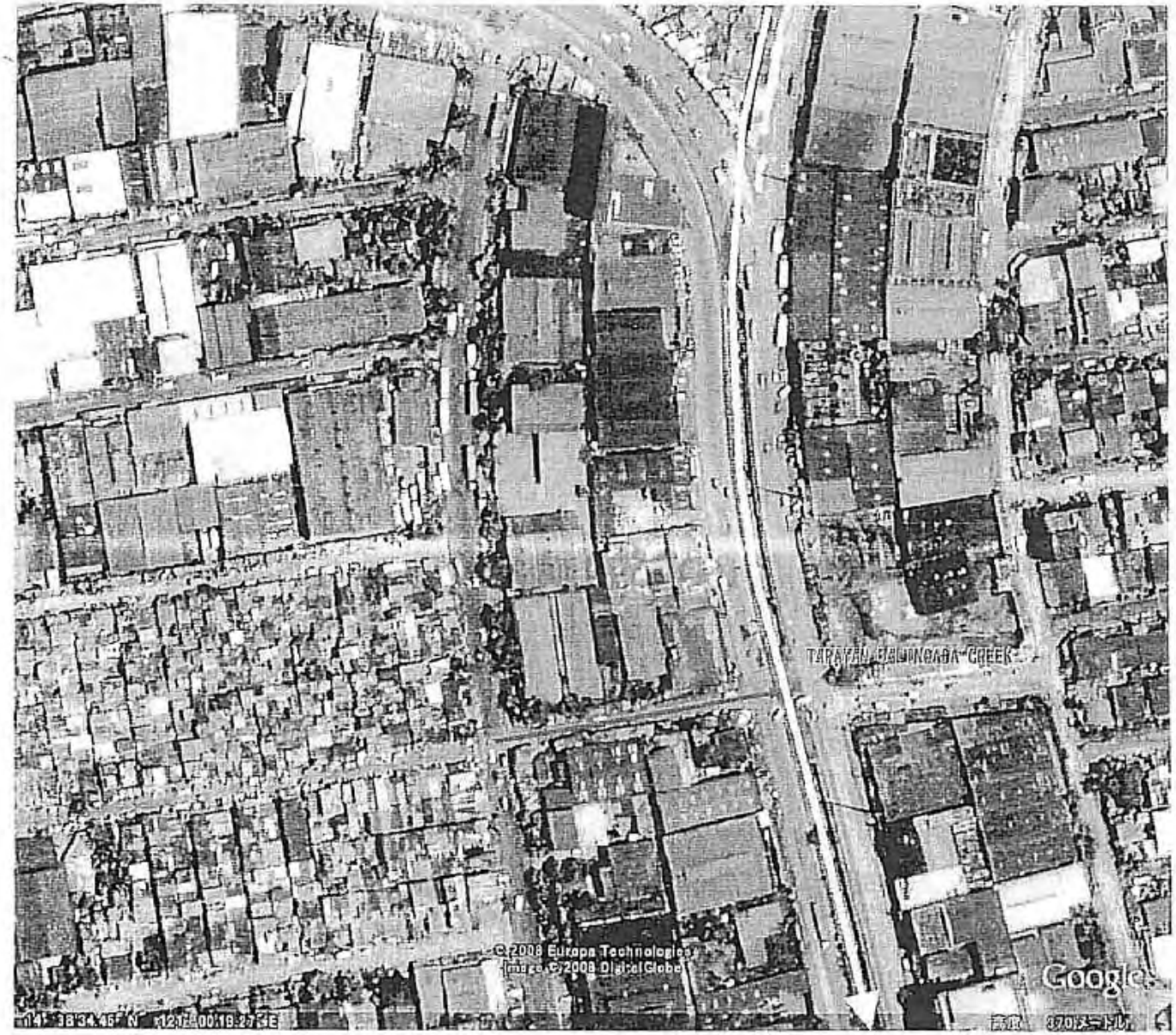
【No. 14 of a detailed drawing】 Area : 24. 3ha



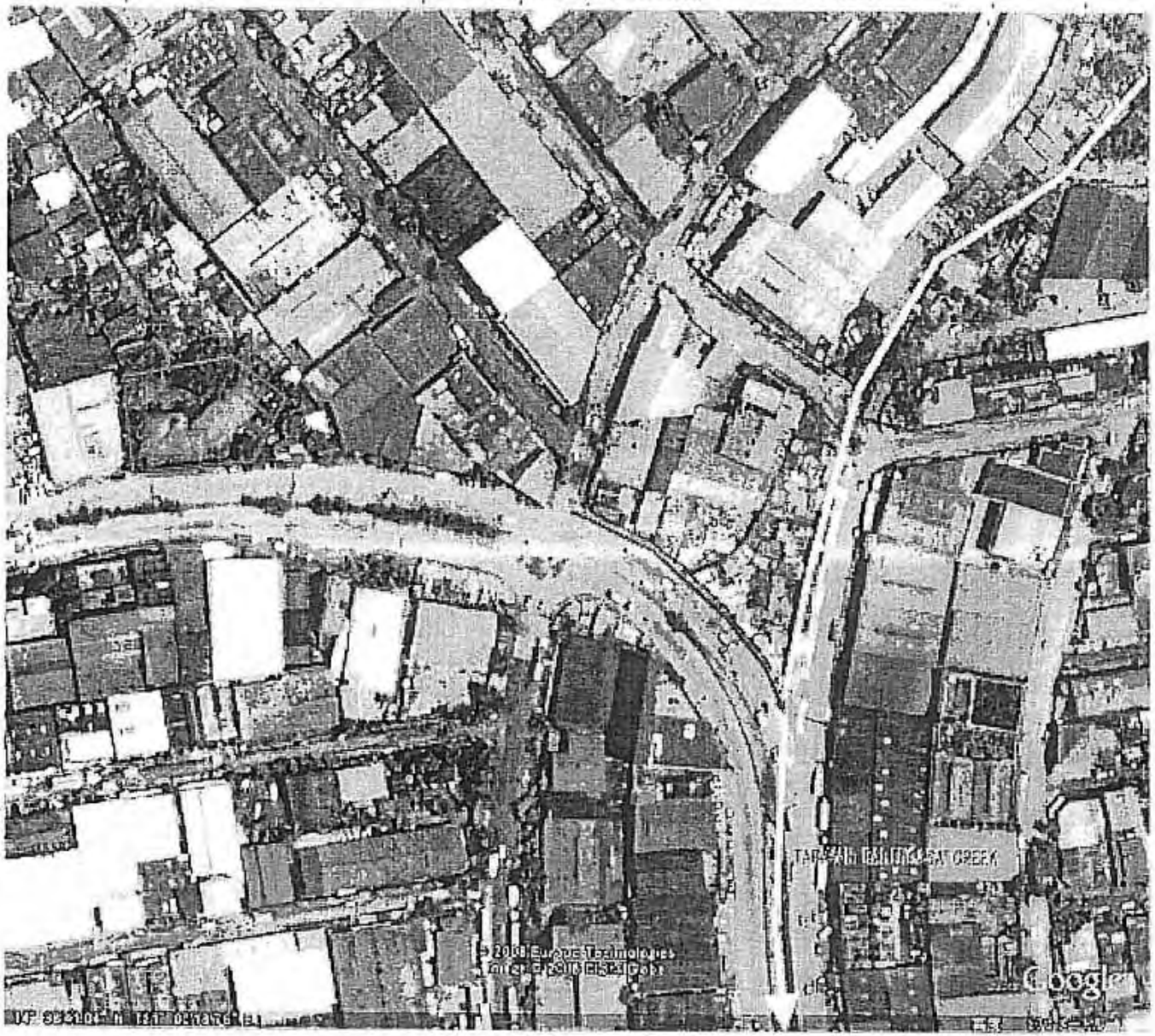
[No. 15 of a detailed drawing] Area : 48ha



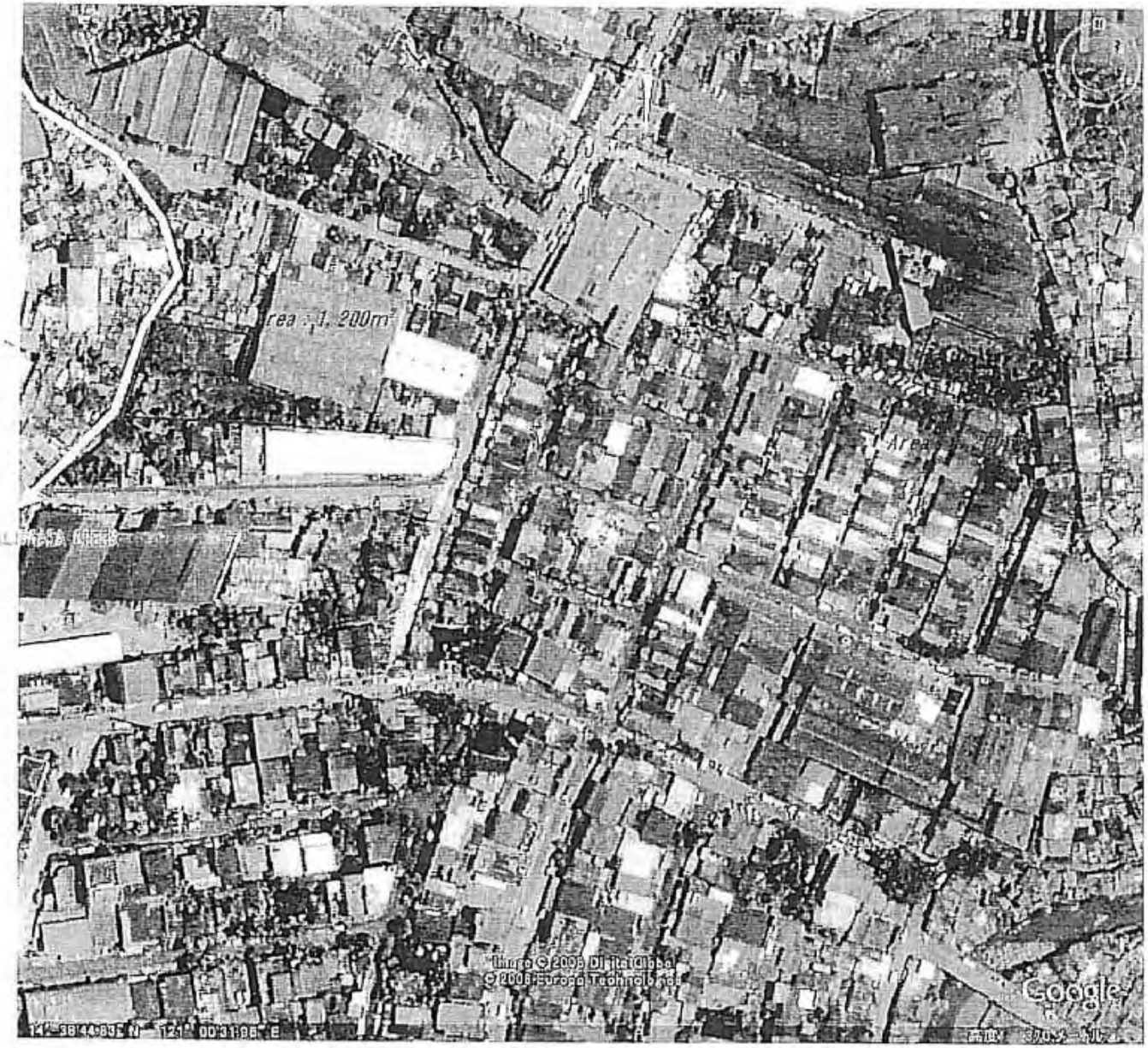
【No. 16 of a detailed drawing】　Area:48ha



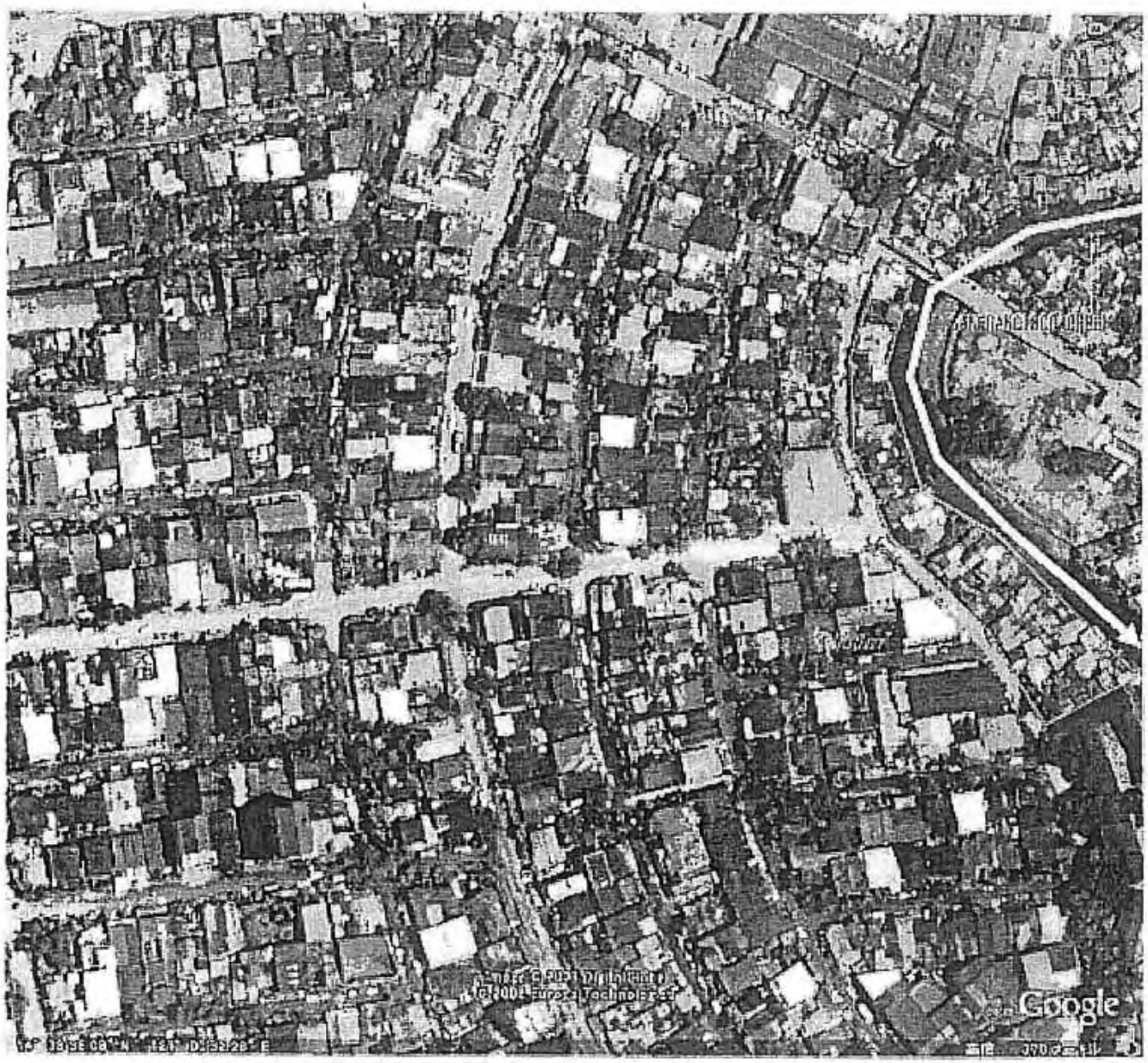
[No. 17 of a detailed drawing] Area:76ha



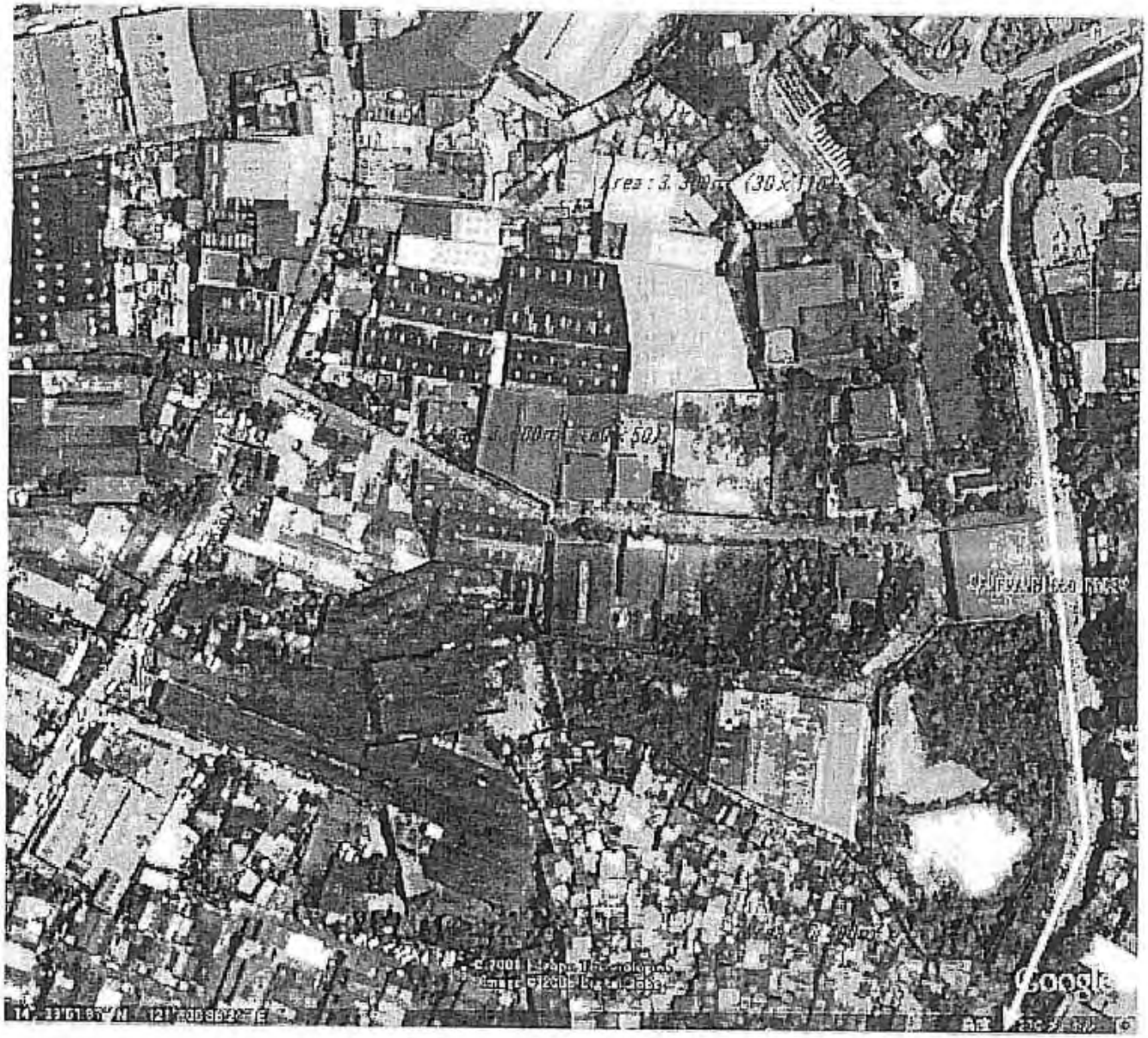
【No. 18 of a detailed drawing】　Area : 15. 2ha



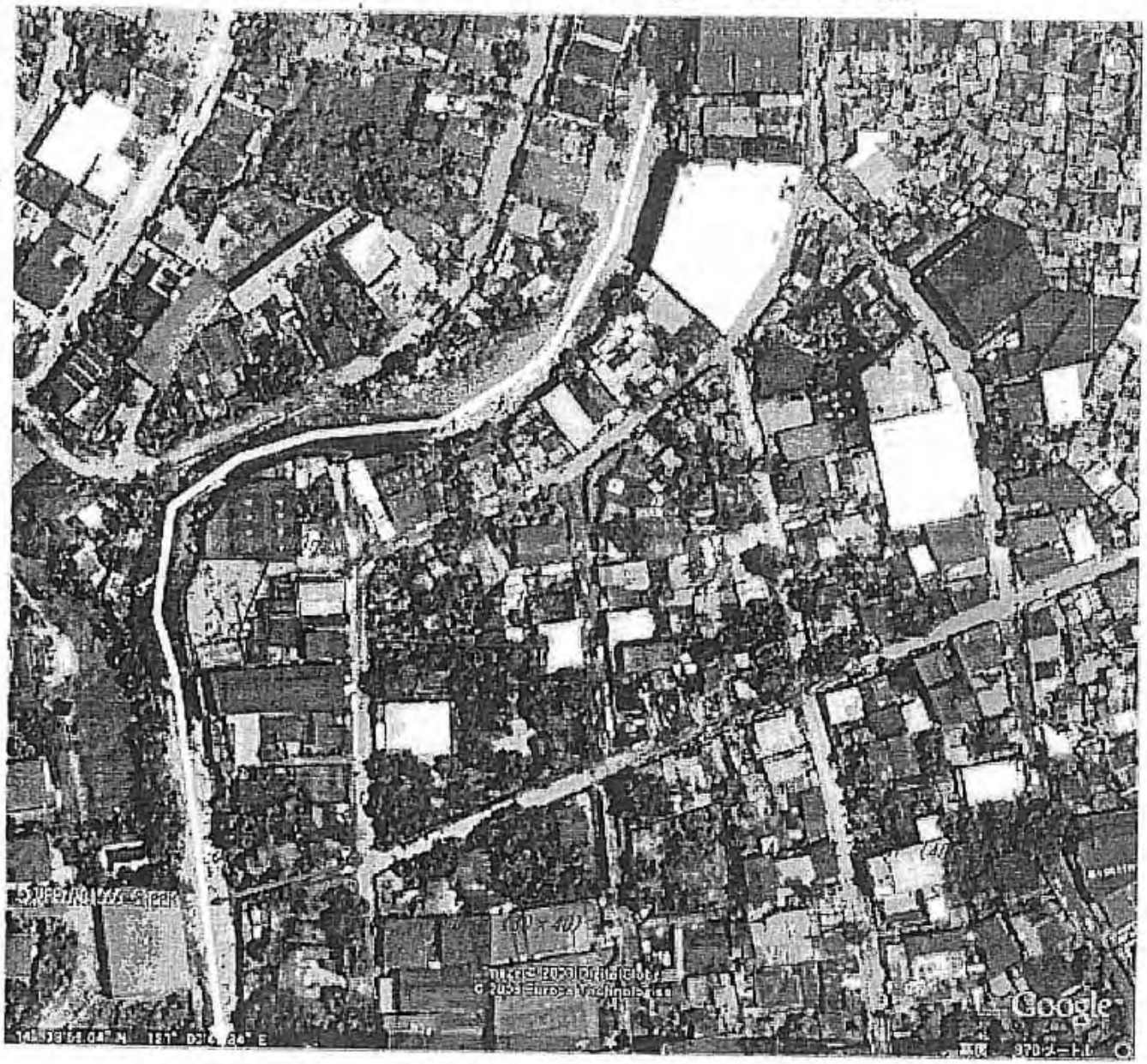
[No. 19 of a detailed drawing] Area : 10ha



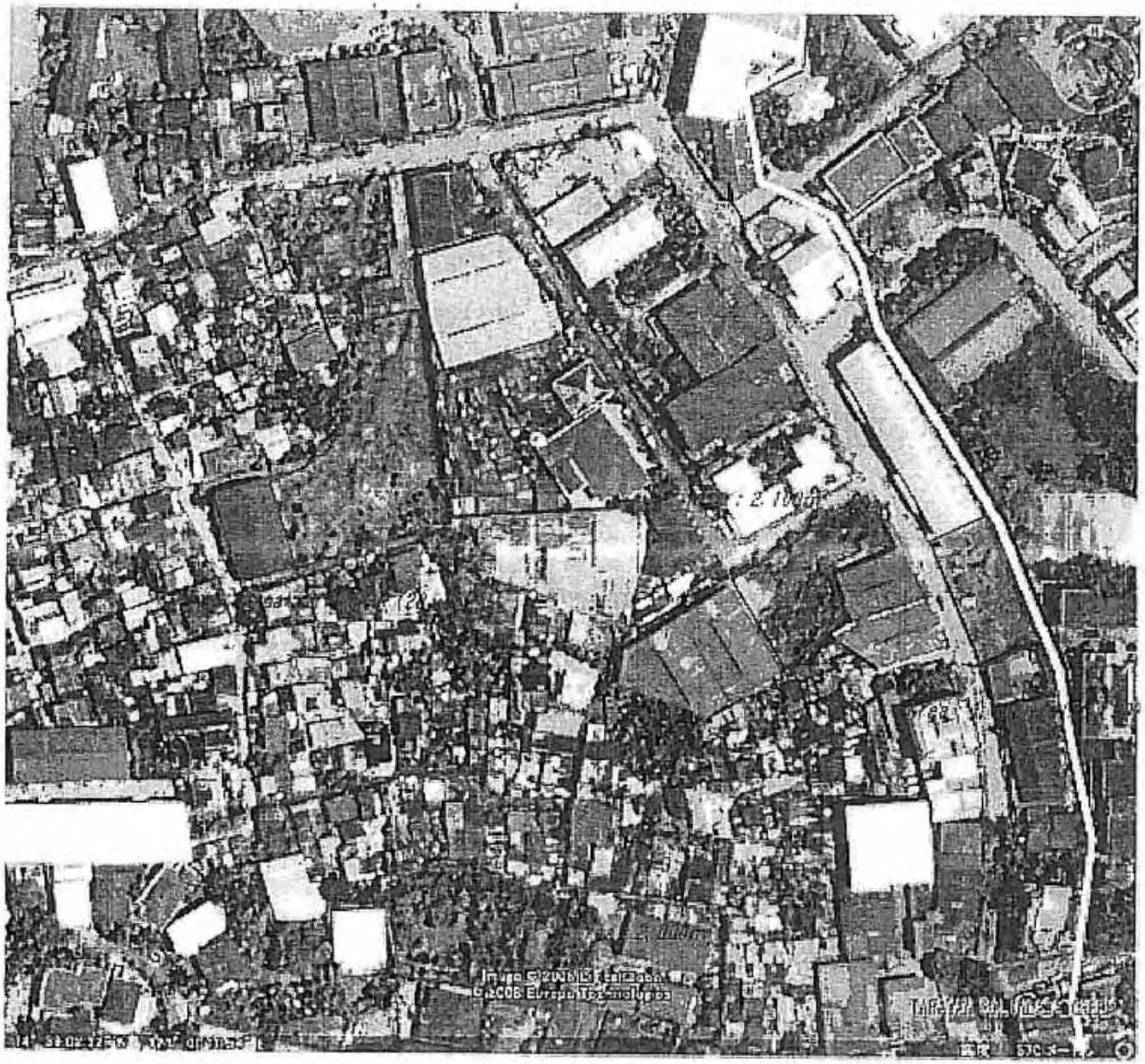
[No. 20 of a detailed drawing]　Area : 30. 3ha



[No. 21 of a detailed drawing] Area : 64.3ha

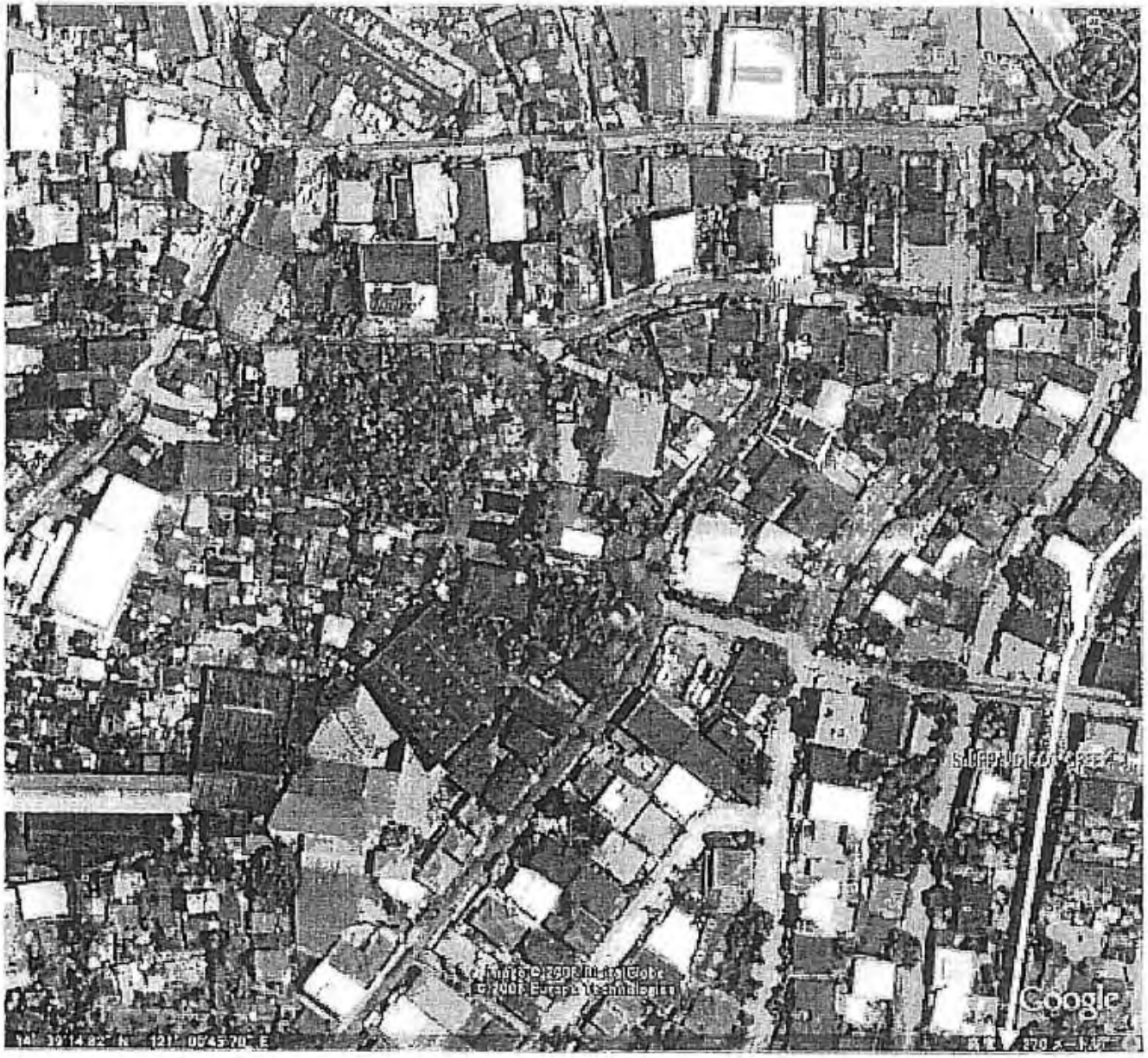


[No. 22 of a detailed drawing] *Area : 43ha*

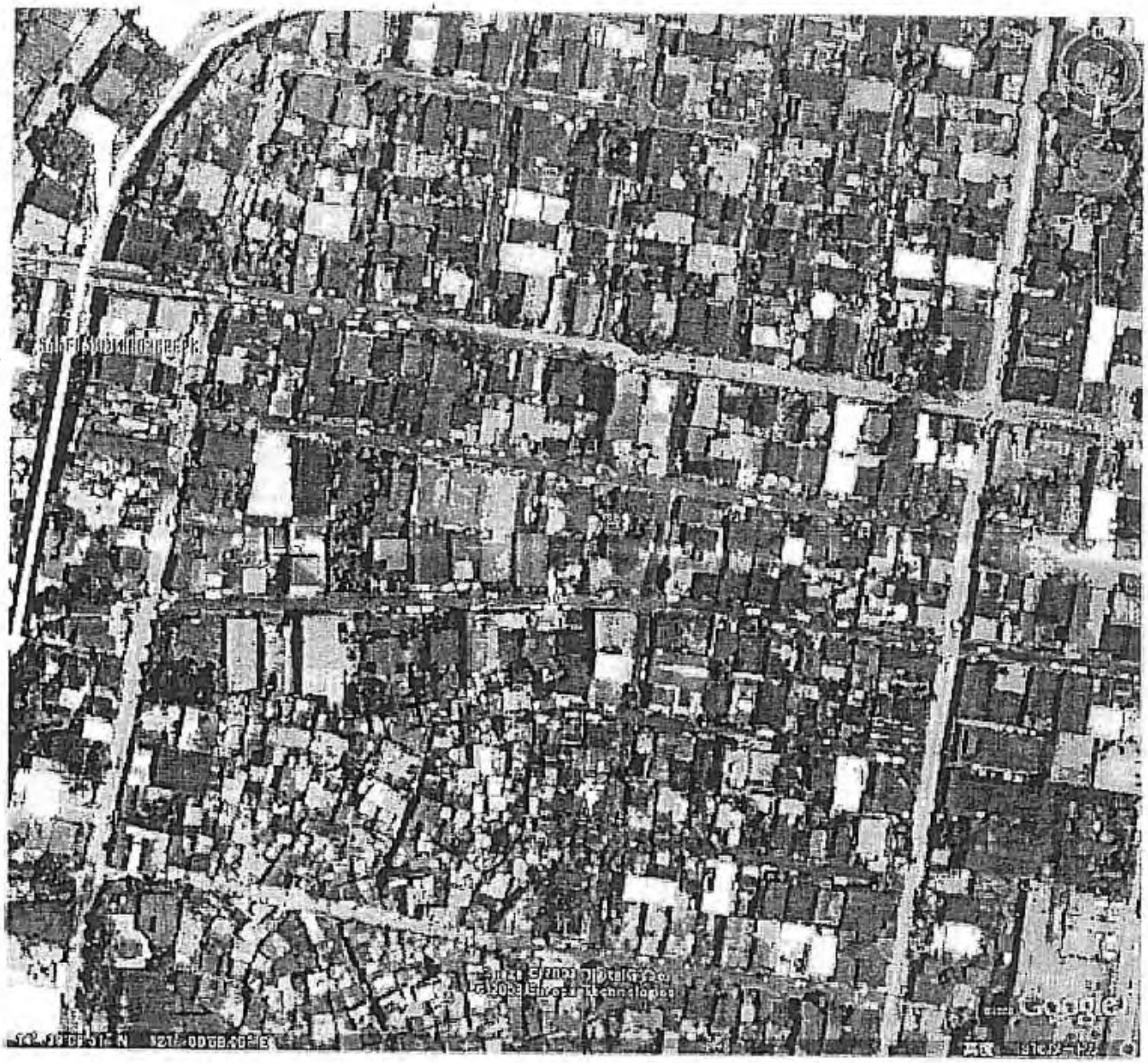


【No. 23 of a detailed drawing】 Area : 47ha

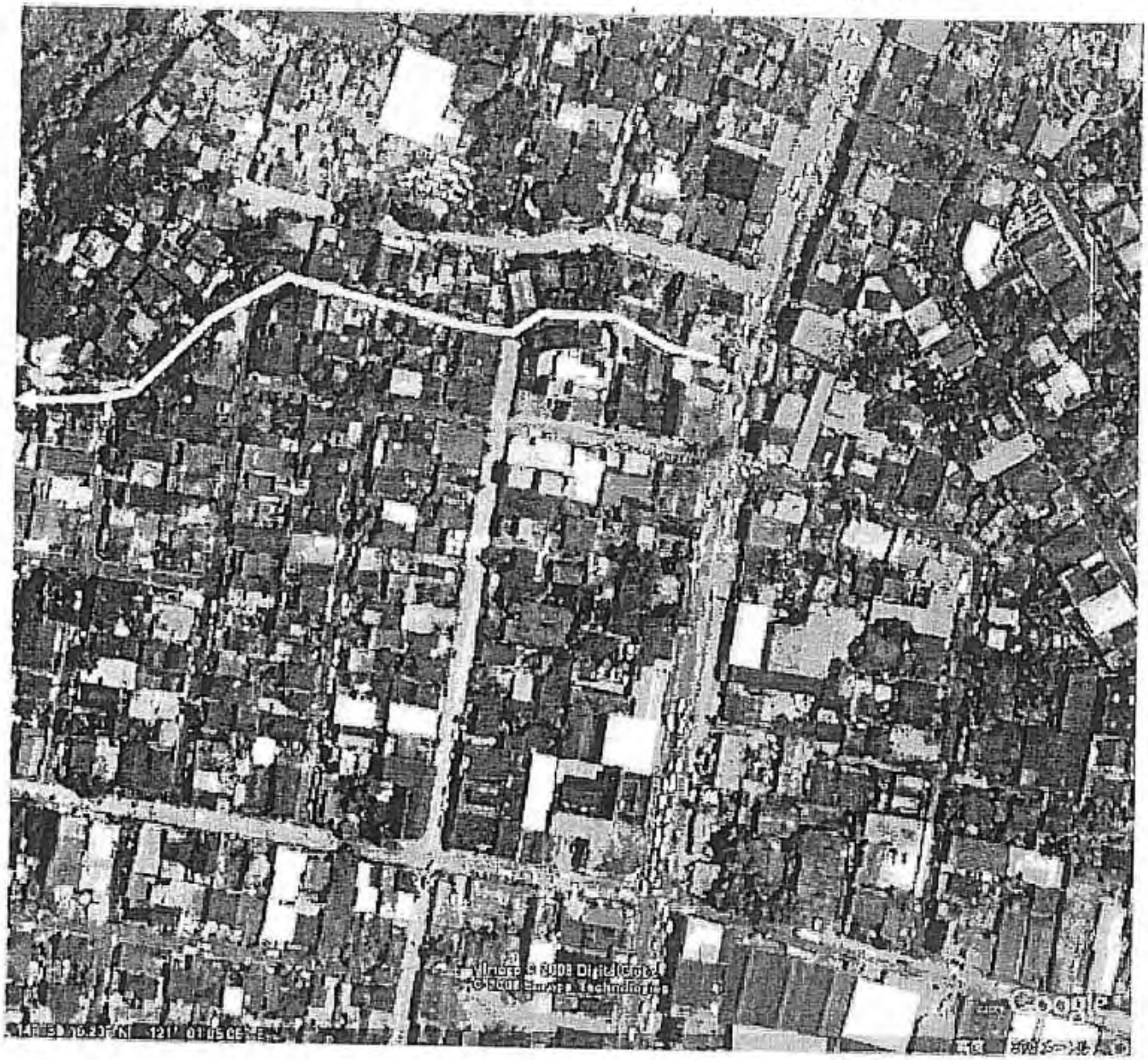
[No. 24 of a detailed drawing] Area : 27.4ha



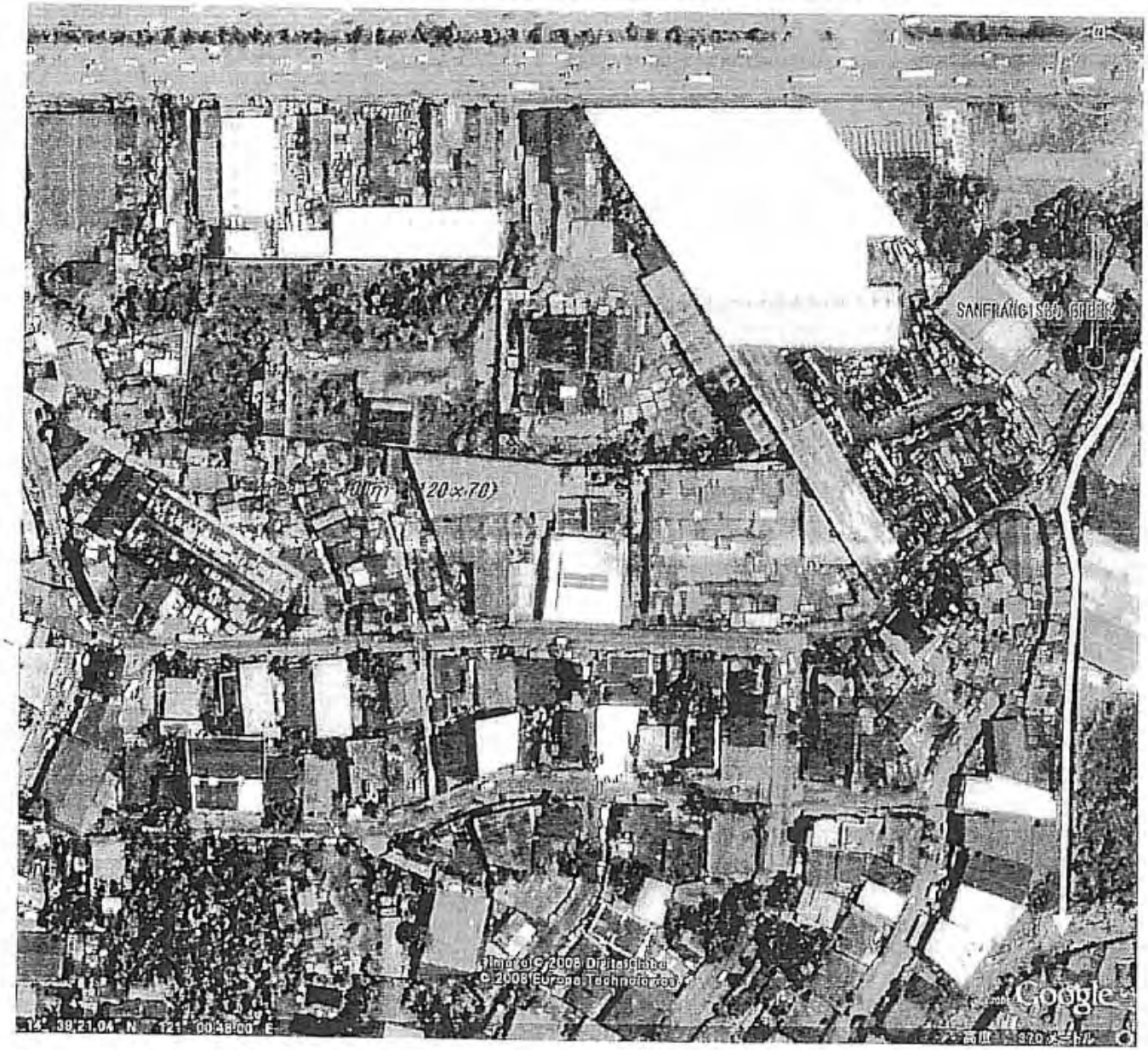
[No. 25 of a detailed drawing]　Area : 52.3ha



[No. 26 of a detailed drawing] Area : 4.5ha

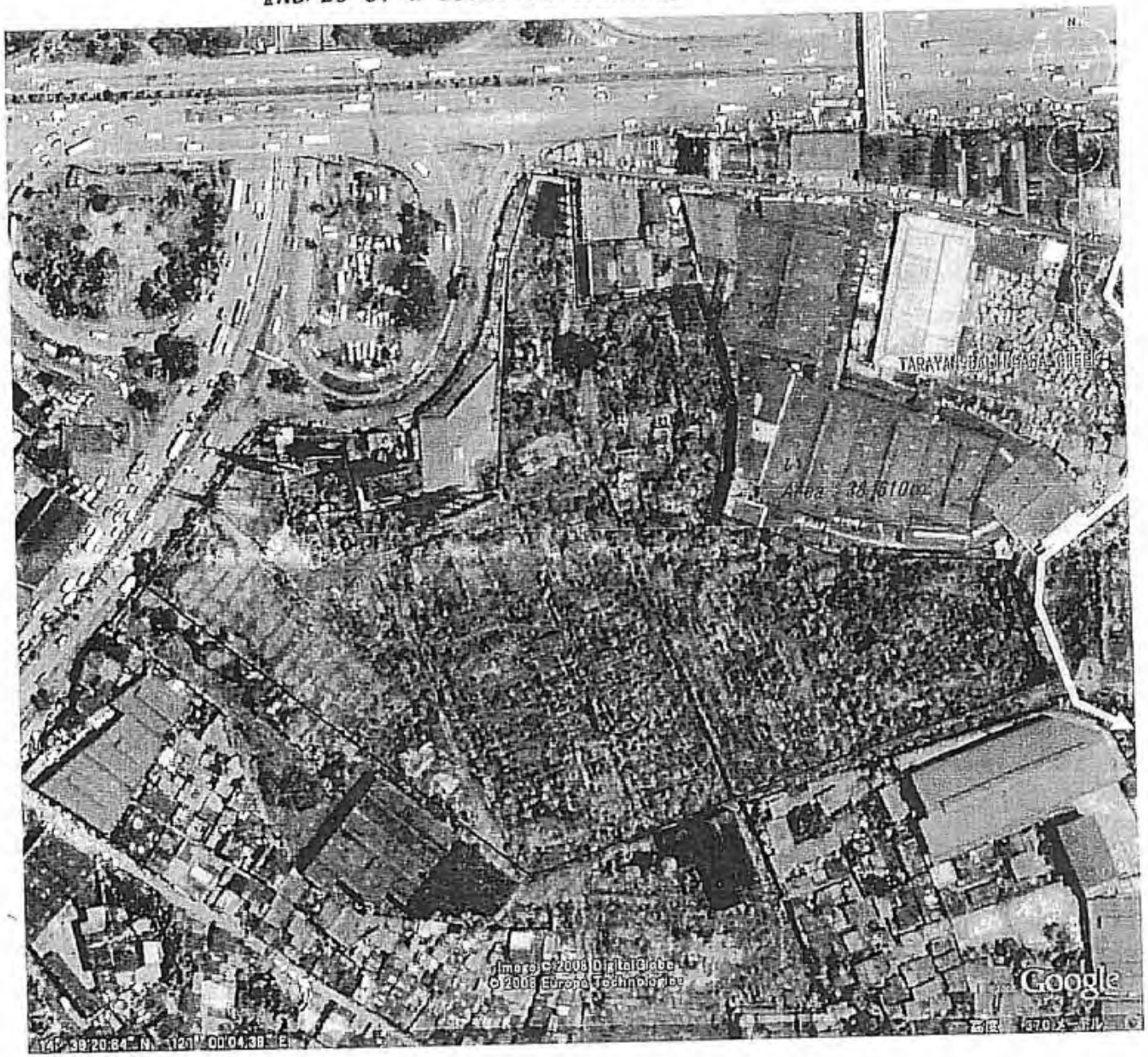


[No. 27 of a detailed drawing]　Area : 5.8ha

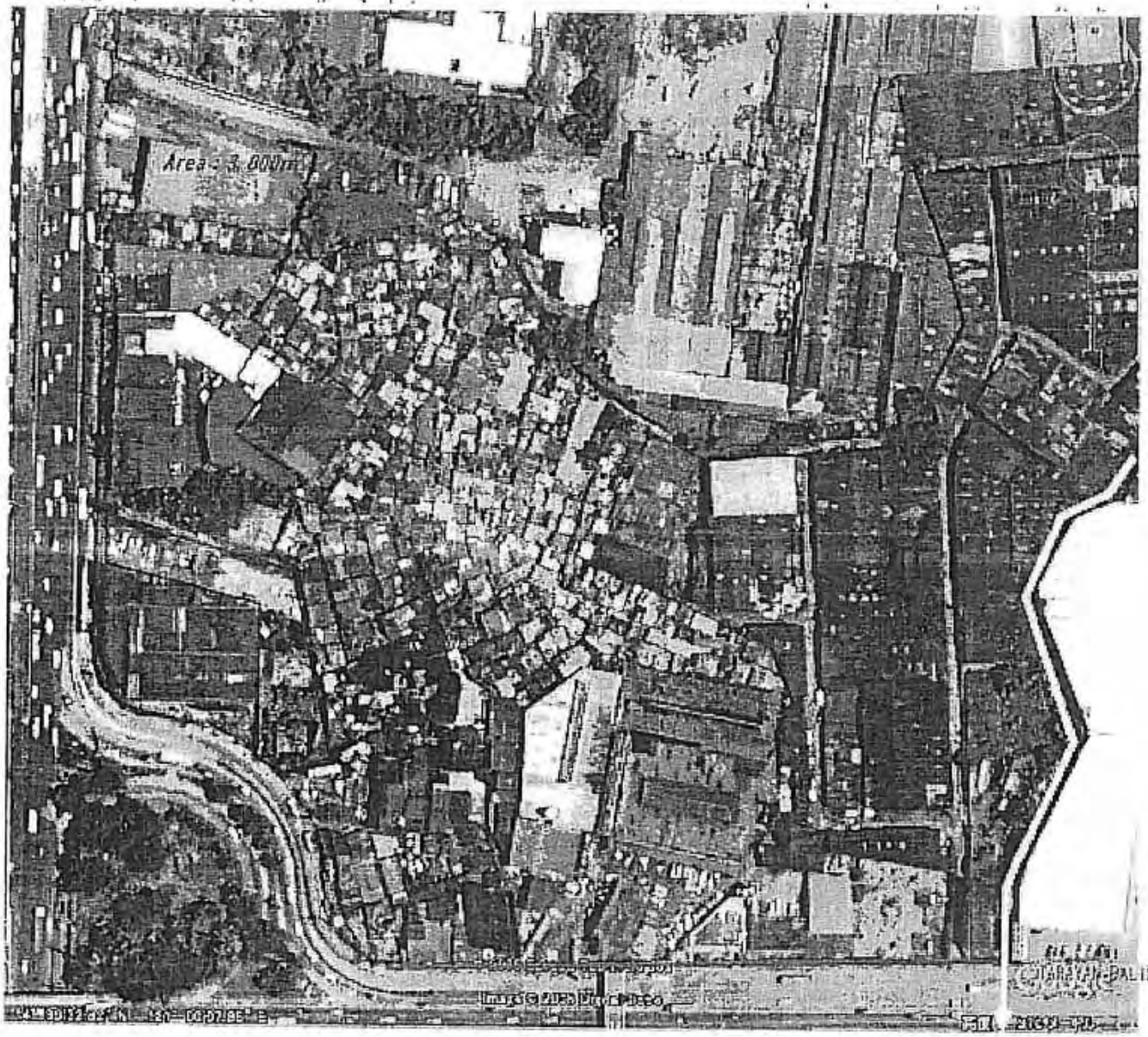


[No. 28 of a detailed drawing]　*Area : 3.6ha*

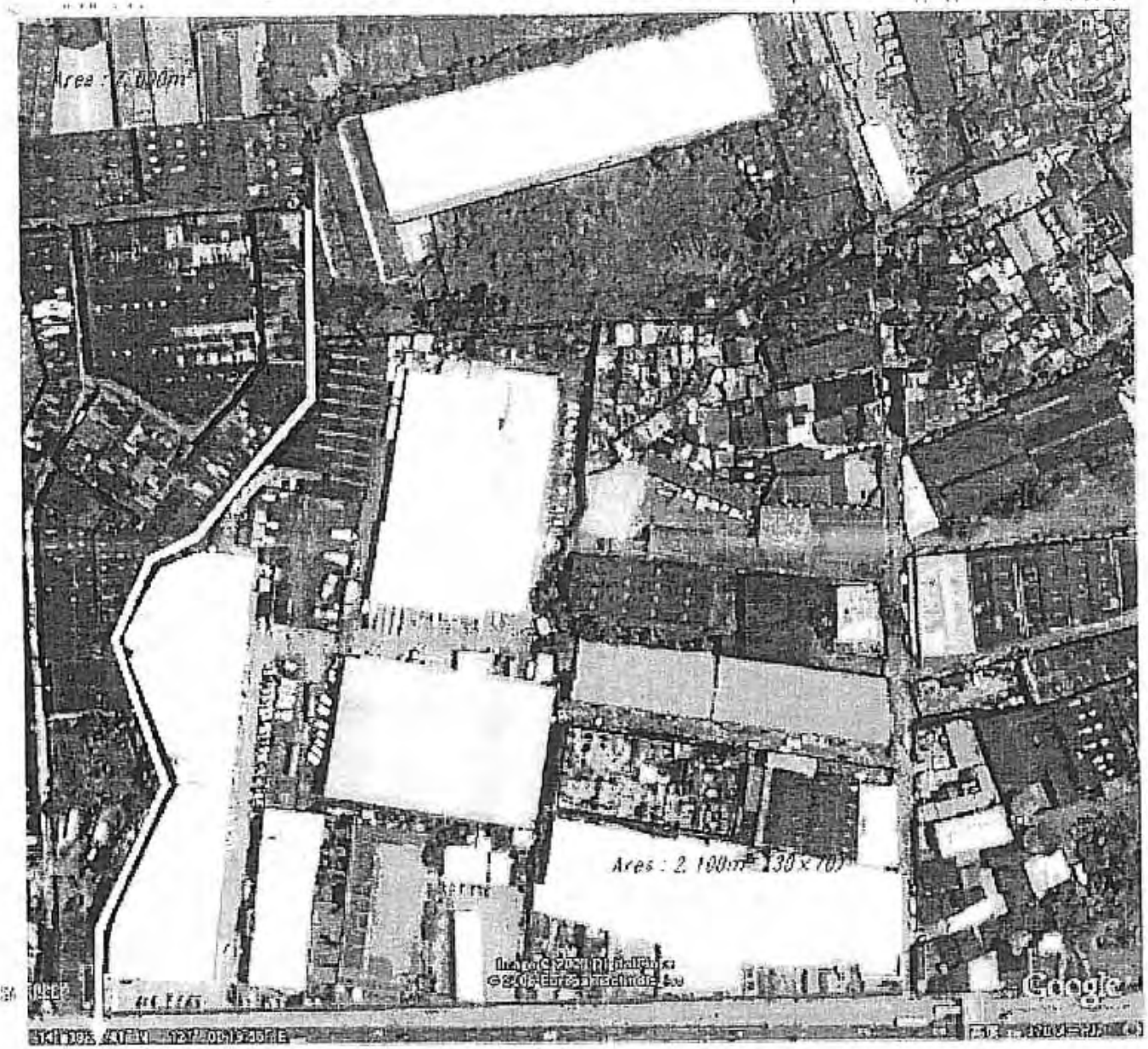
[No. 29 of a detailed drawing]　*Area : 7.3ha*



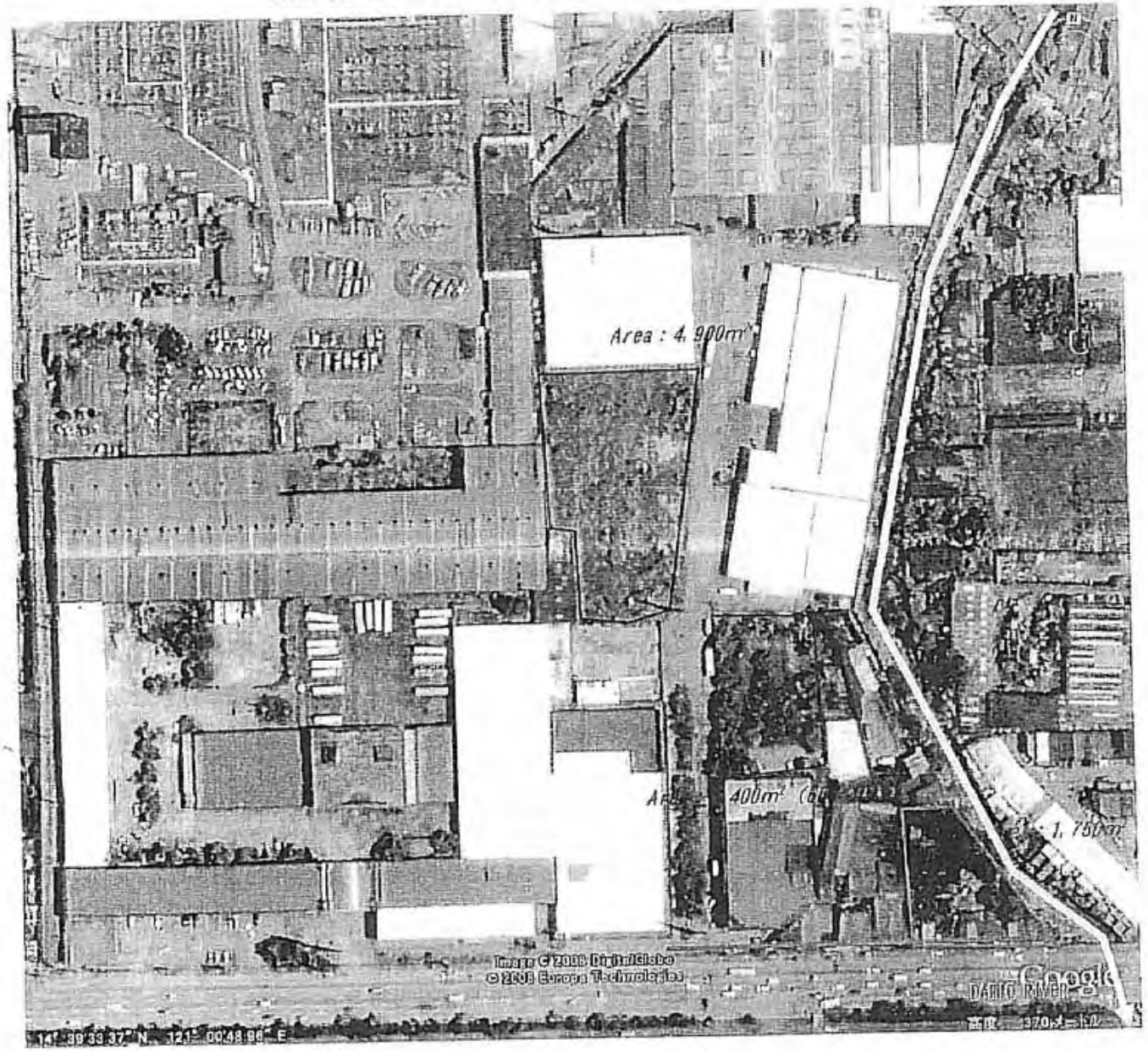
[No. 30 of a detailed drawing] Area : 100ha



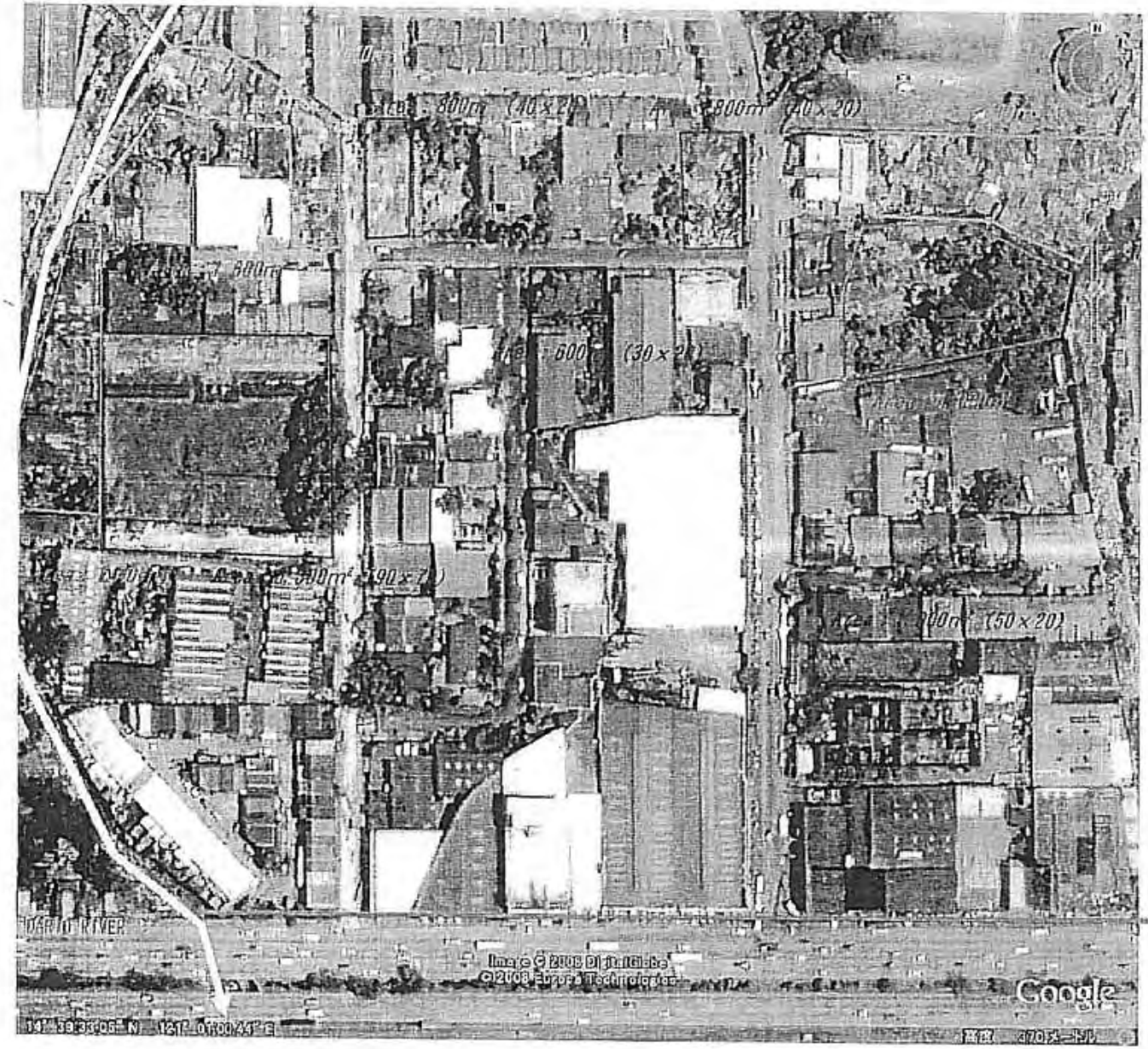
[No. 31 of a detailed drawing] Area : 42.5ha



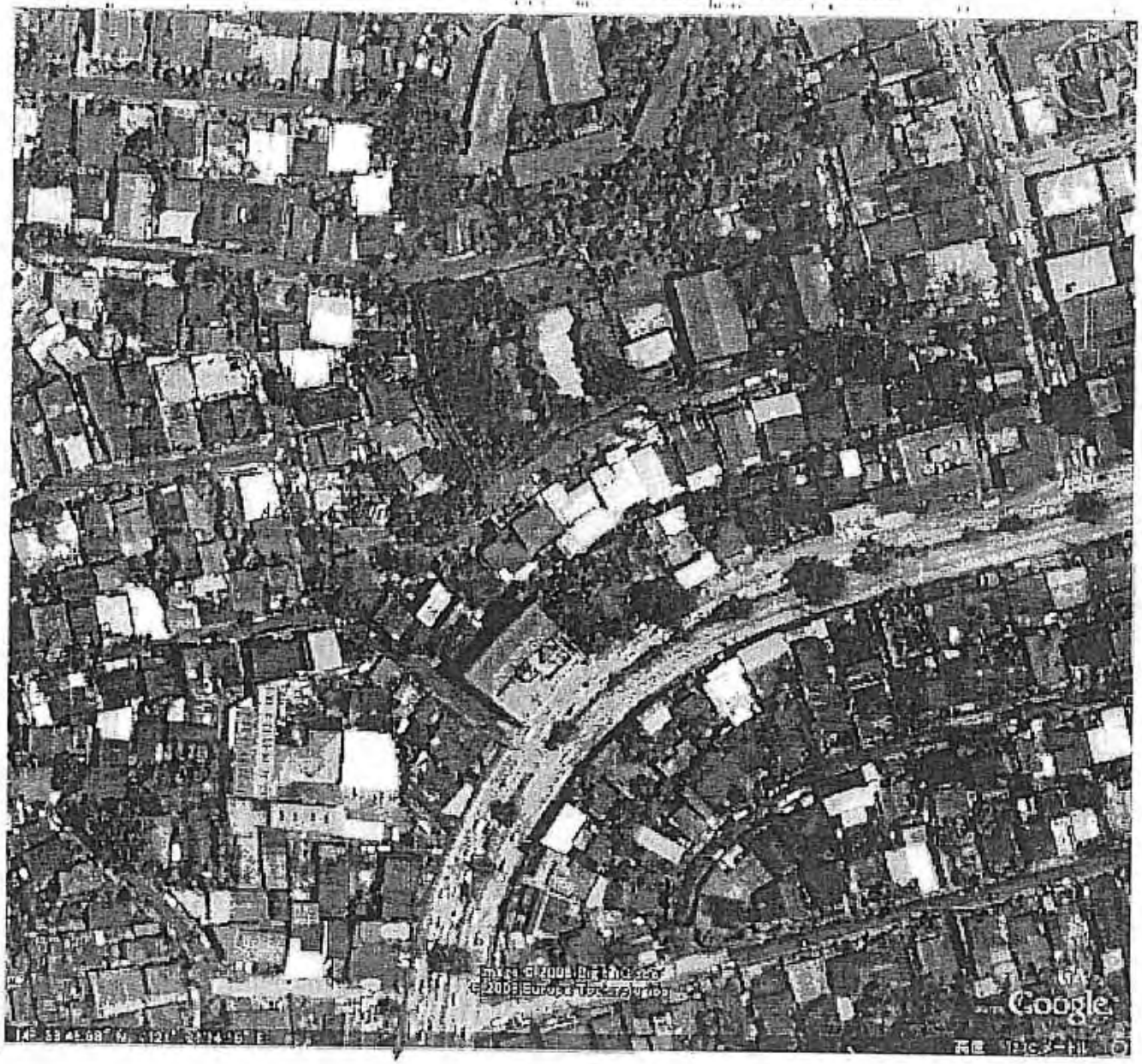
[No. 32 of a detailed drawing] Area : 47ha



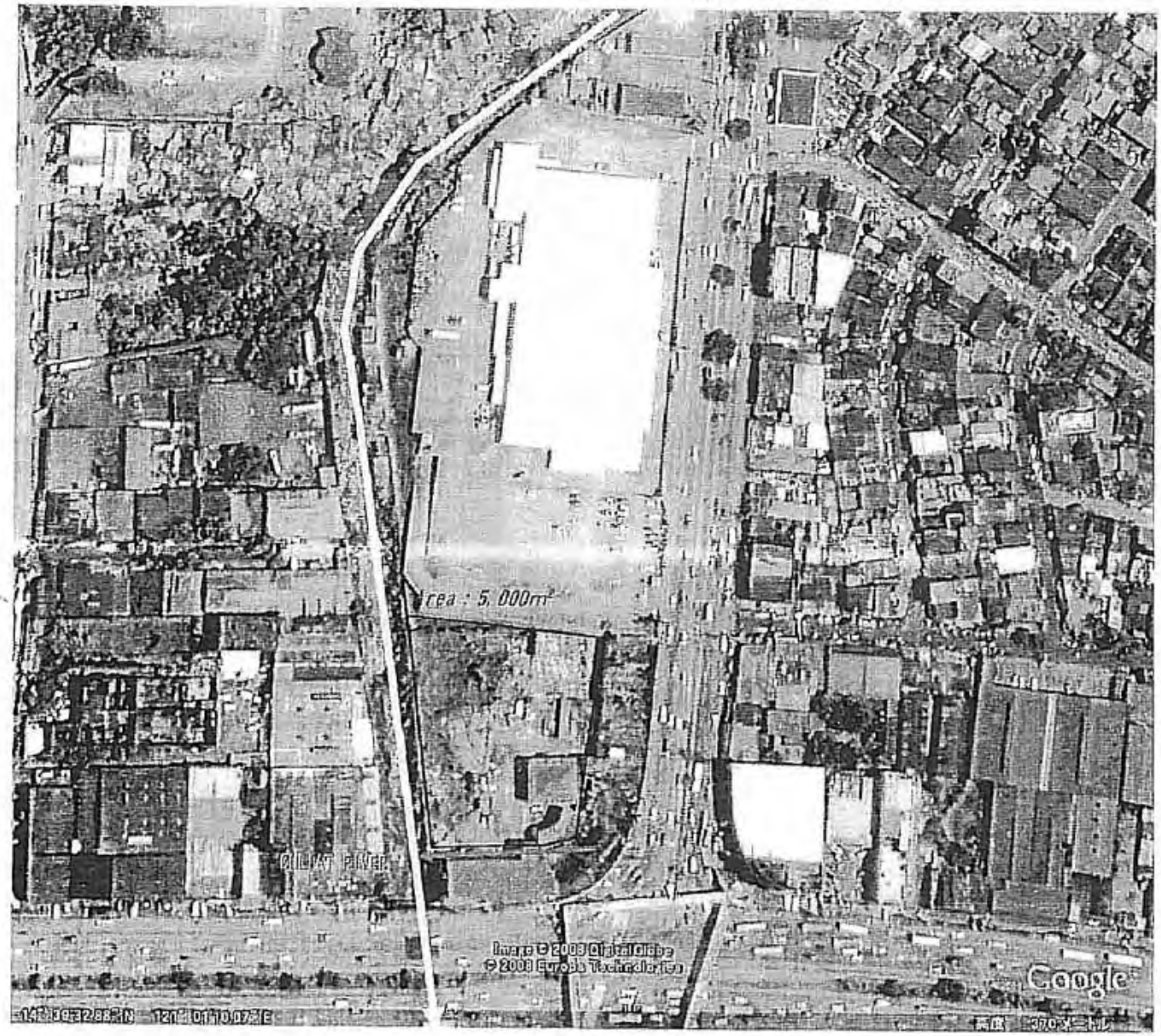
[No. 33 of a detailed drawing]　Area : 32ha



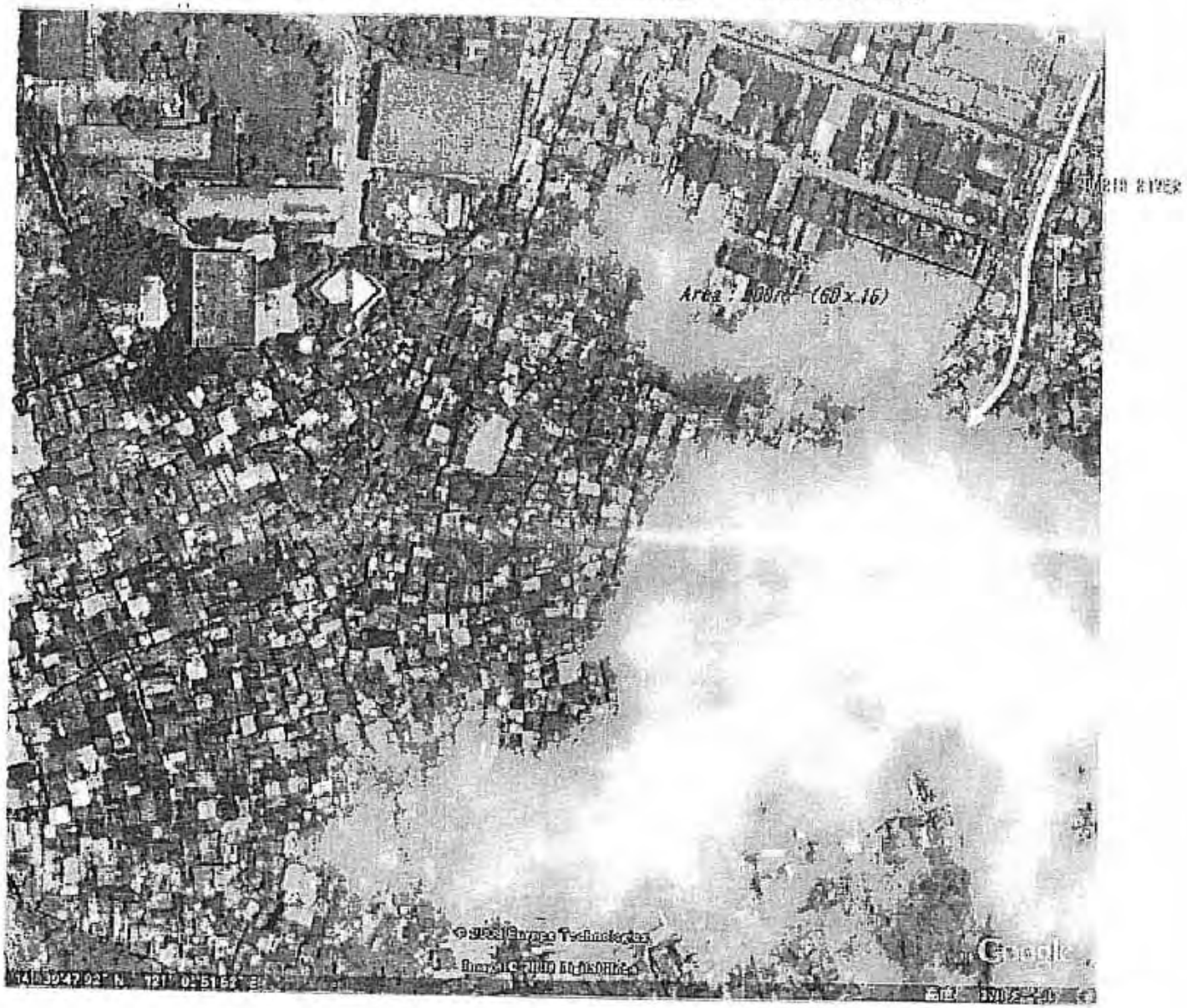
[No. 34 of a detailed drawing] Area : 79ha



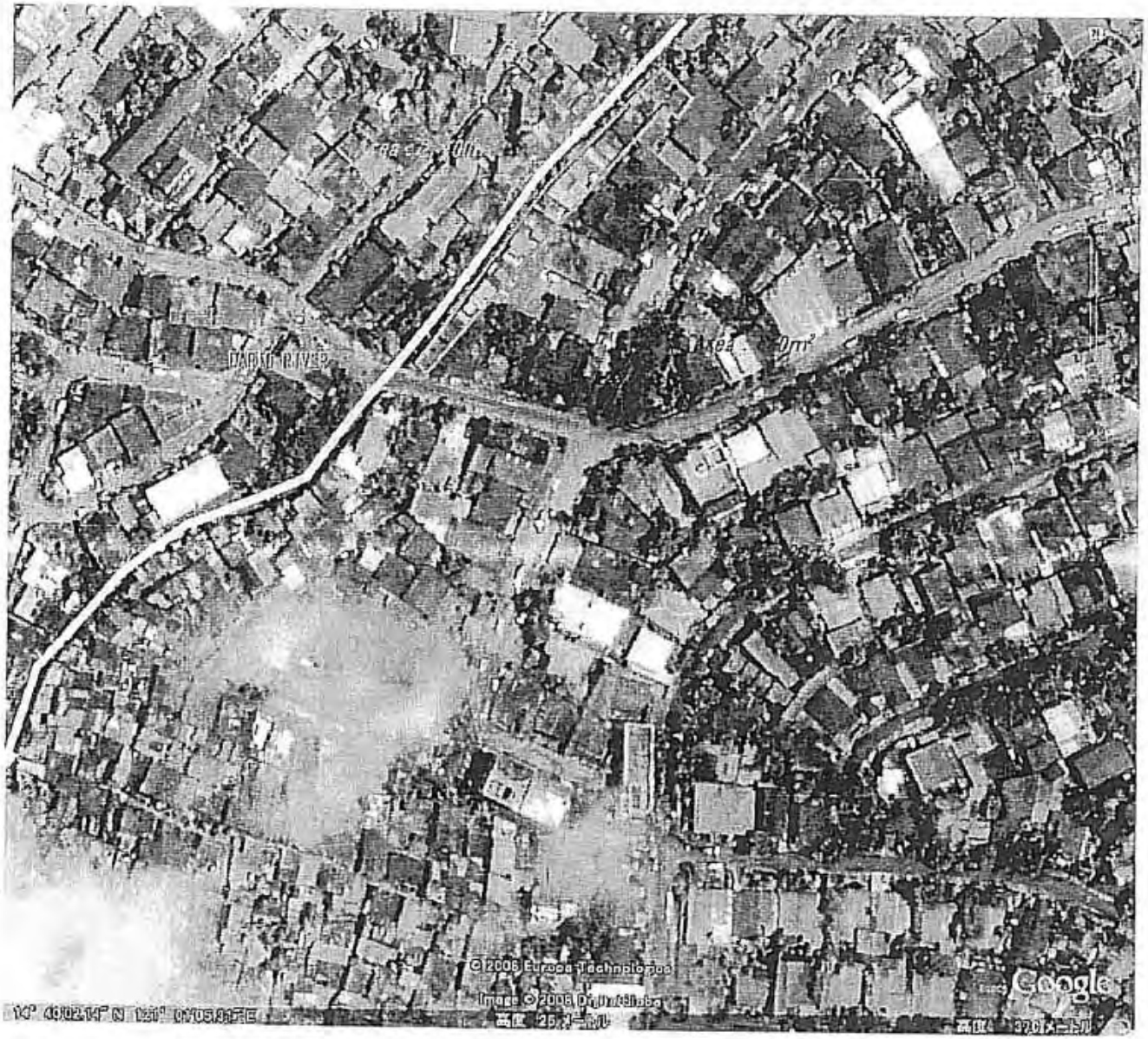
【No. 34-1 of a detailed drawing】 Area : 8ha



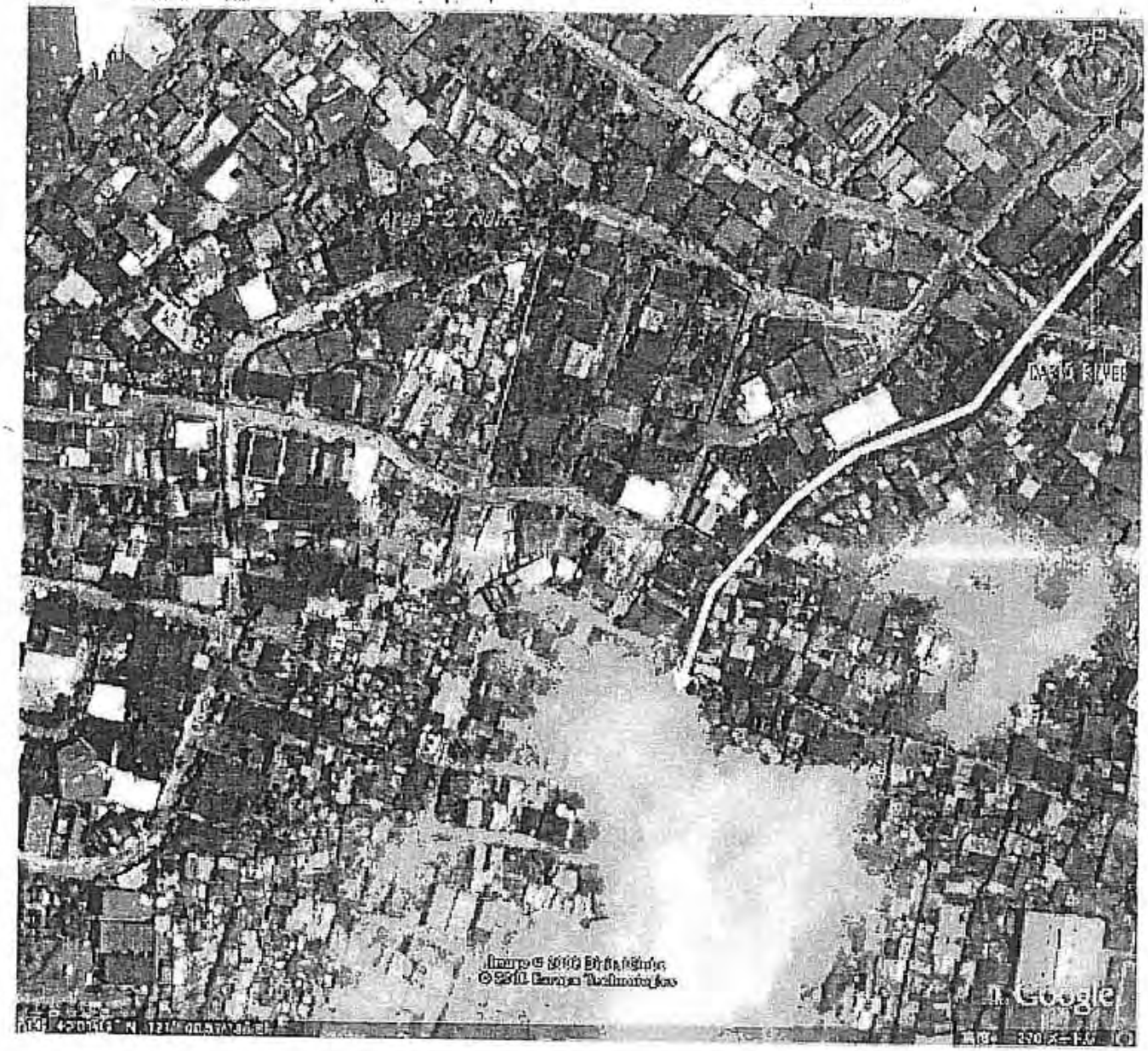
[No. 35 of a detailed drawing] Area : 21.8ha



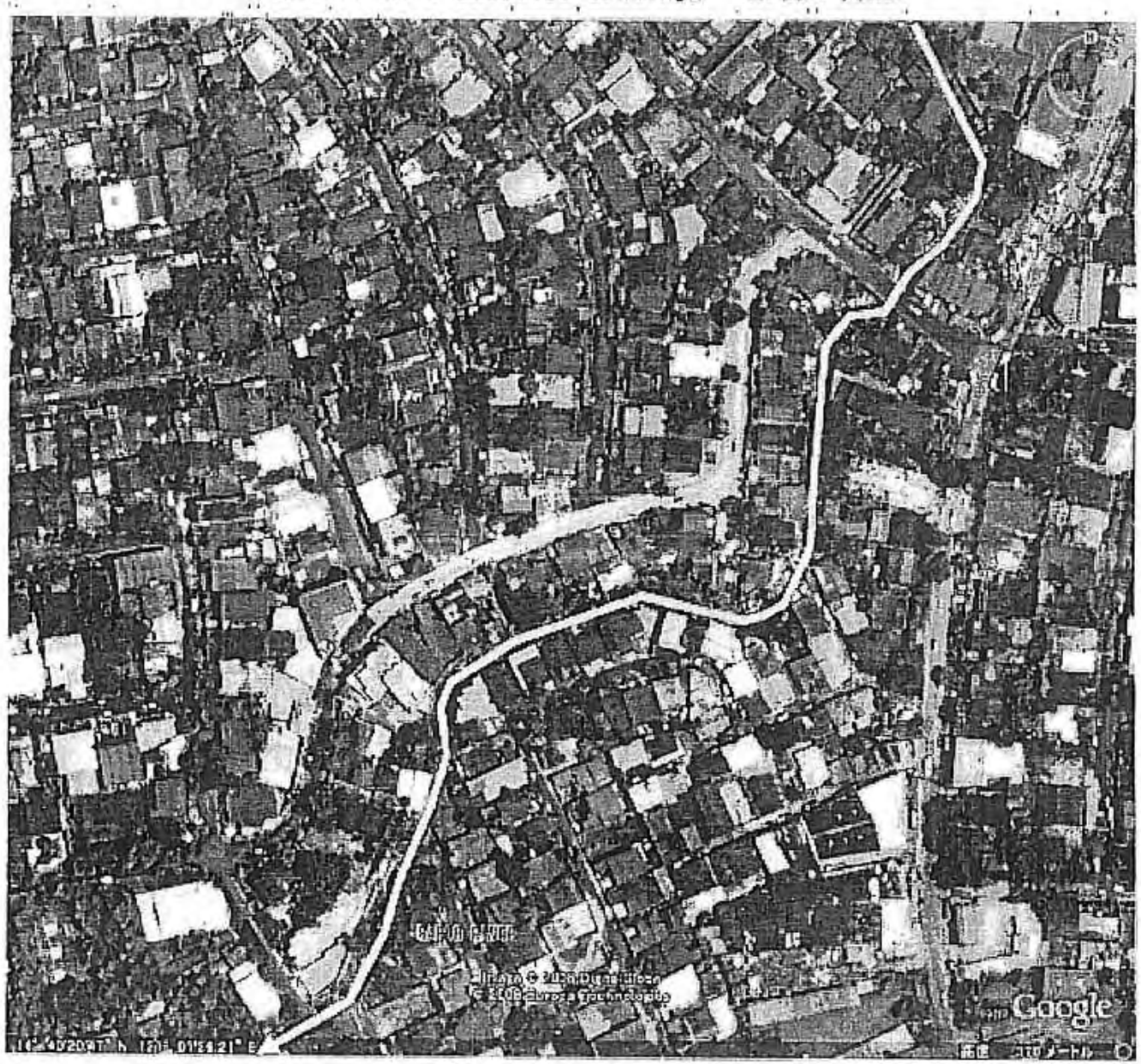
[No. 36 of a detailed drawing] *Area : 45ha*



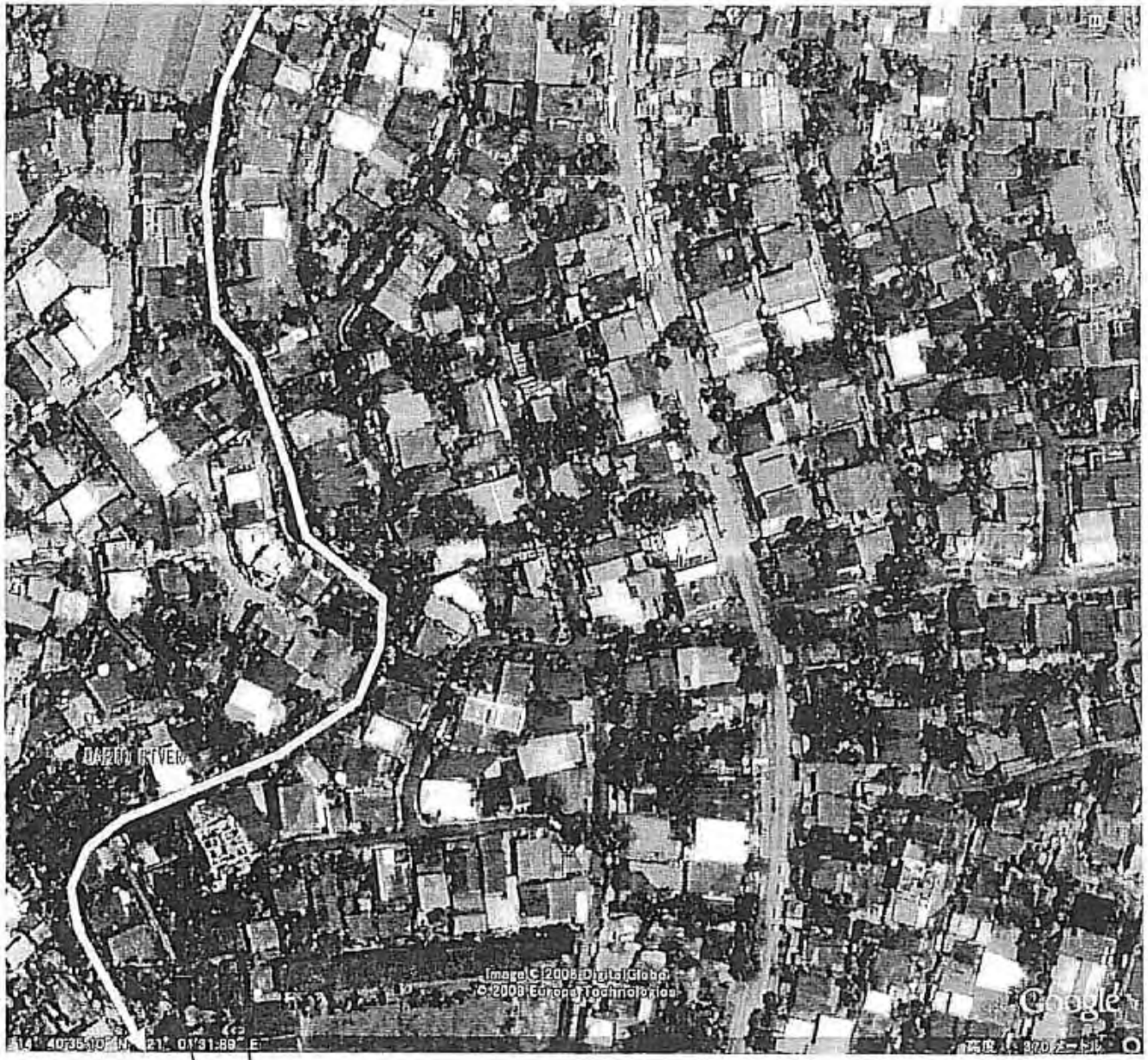
[No. 37 of a detailed drawing] Area : 123ha



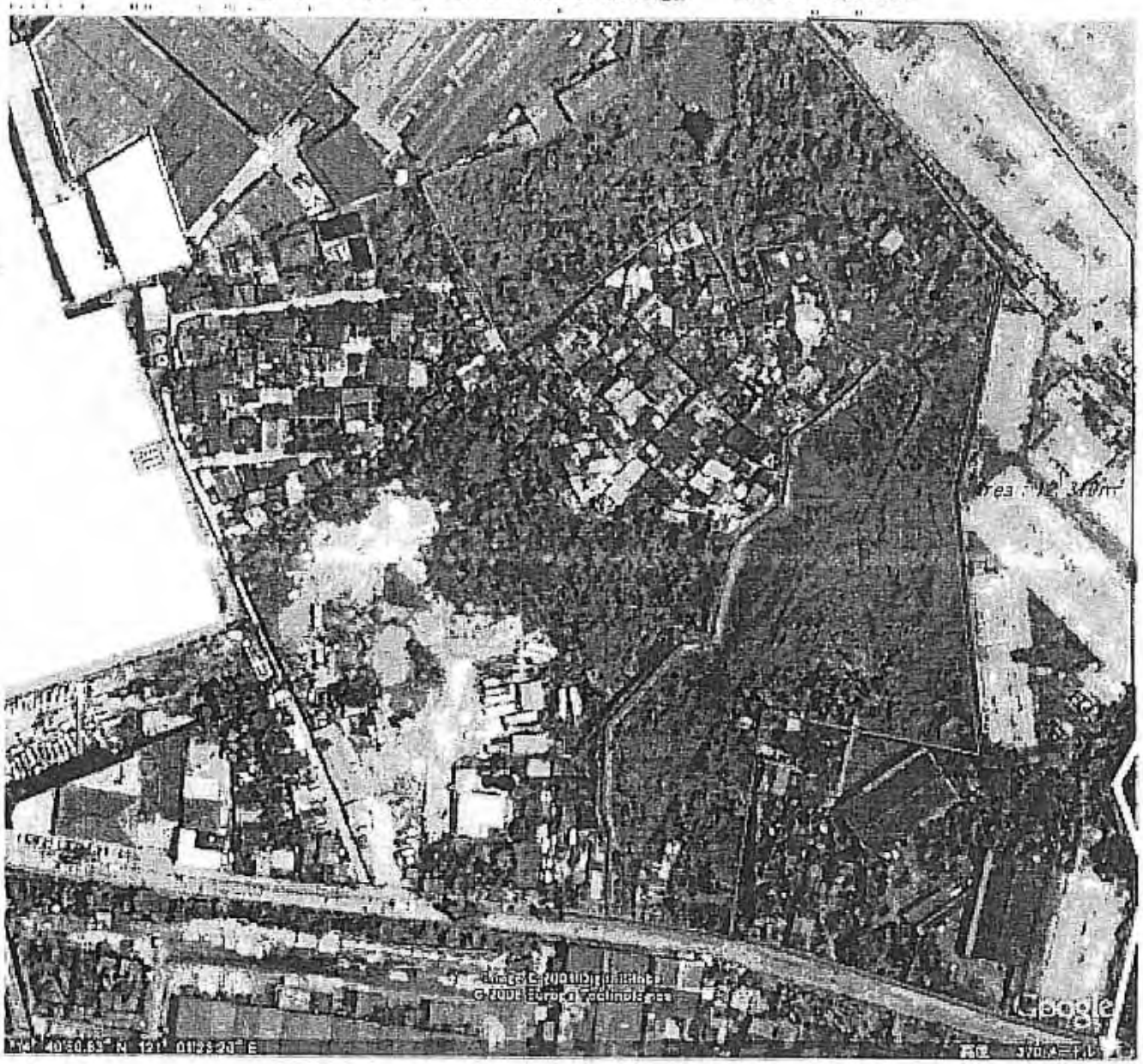
[No. 38 of a detailed drawing] Area : 58ha



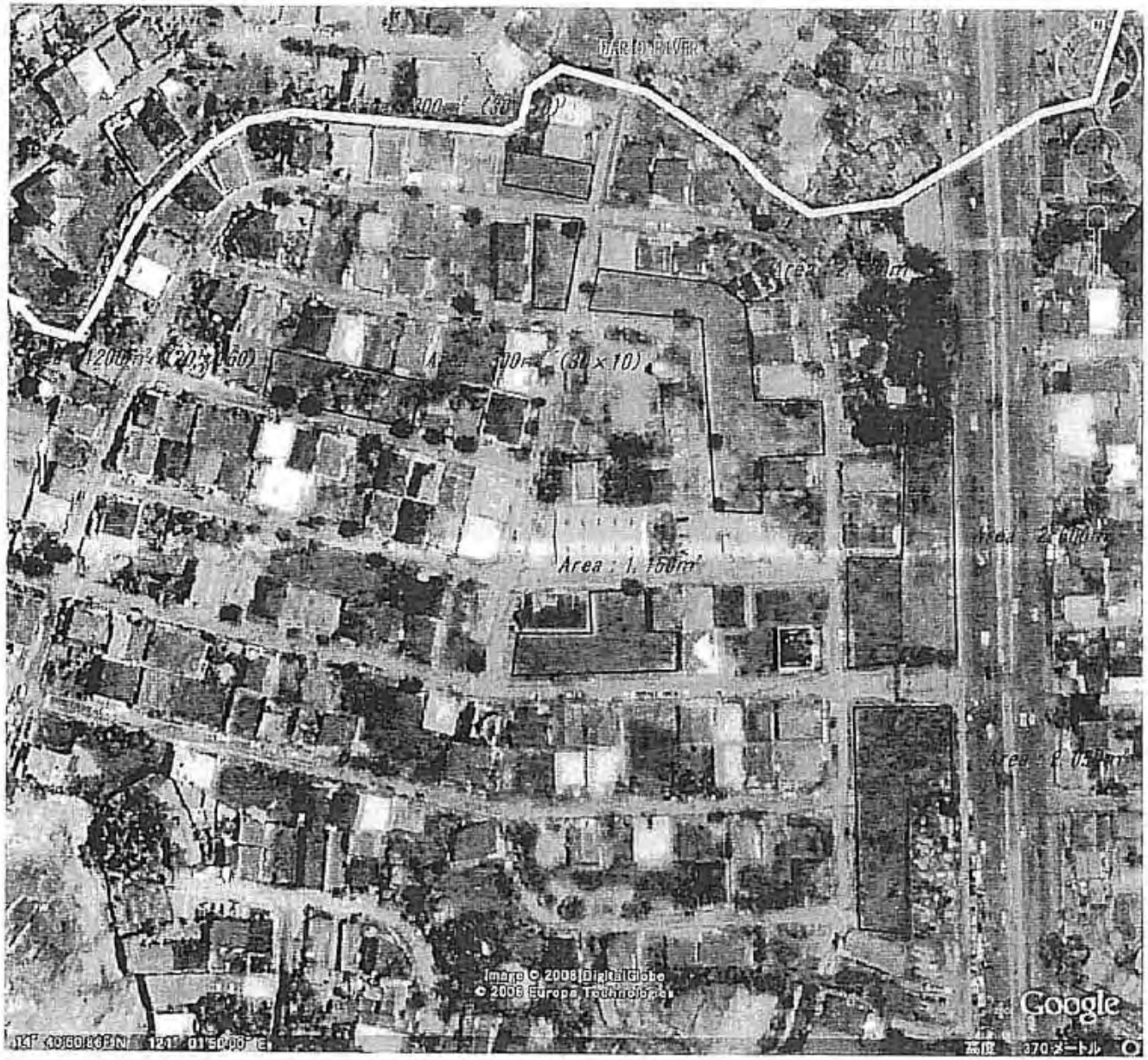
【No. 39 of a detailed drawing】 Area : 38. 5ha



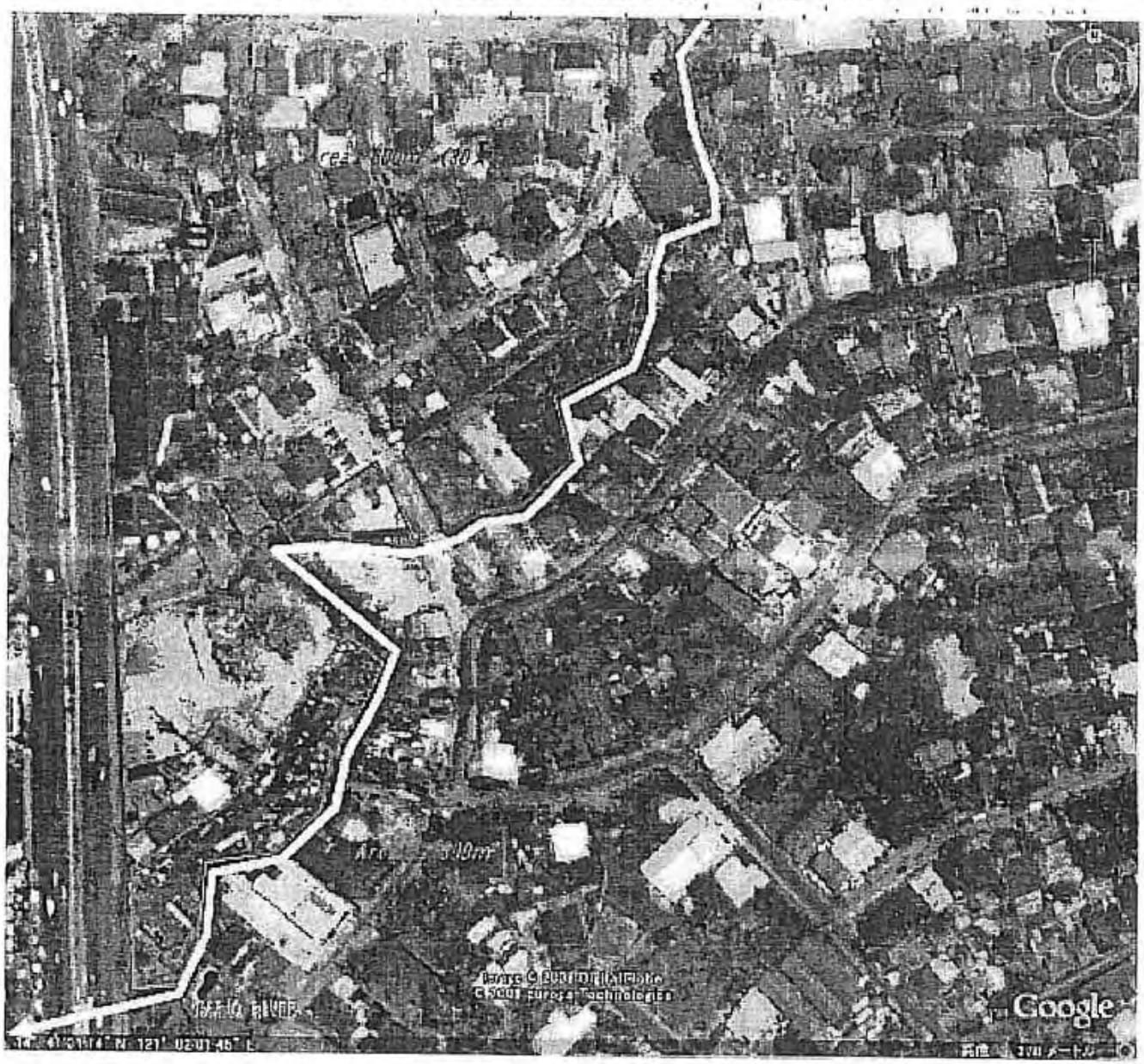
[No. 40 of a detailed drawing] Area : 25.2ha



【No. 41 of a detailed drawing】　Area : 10. 3ha

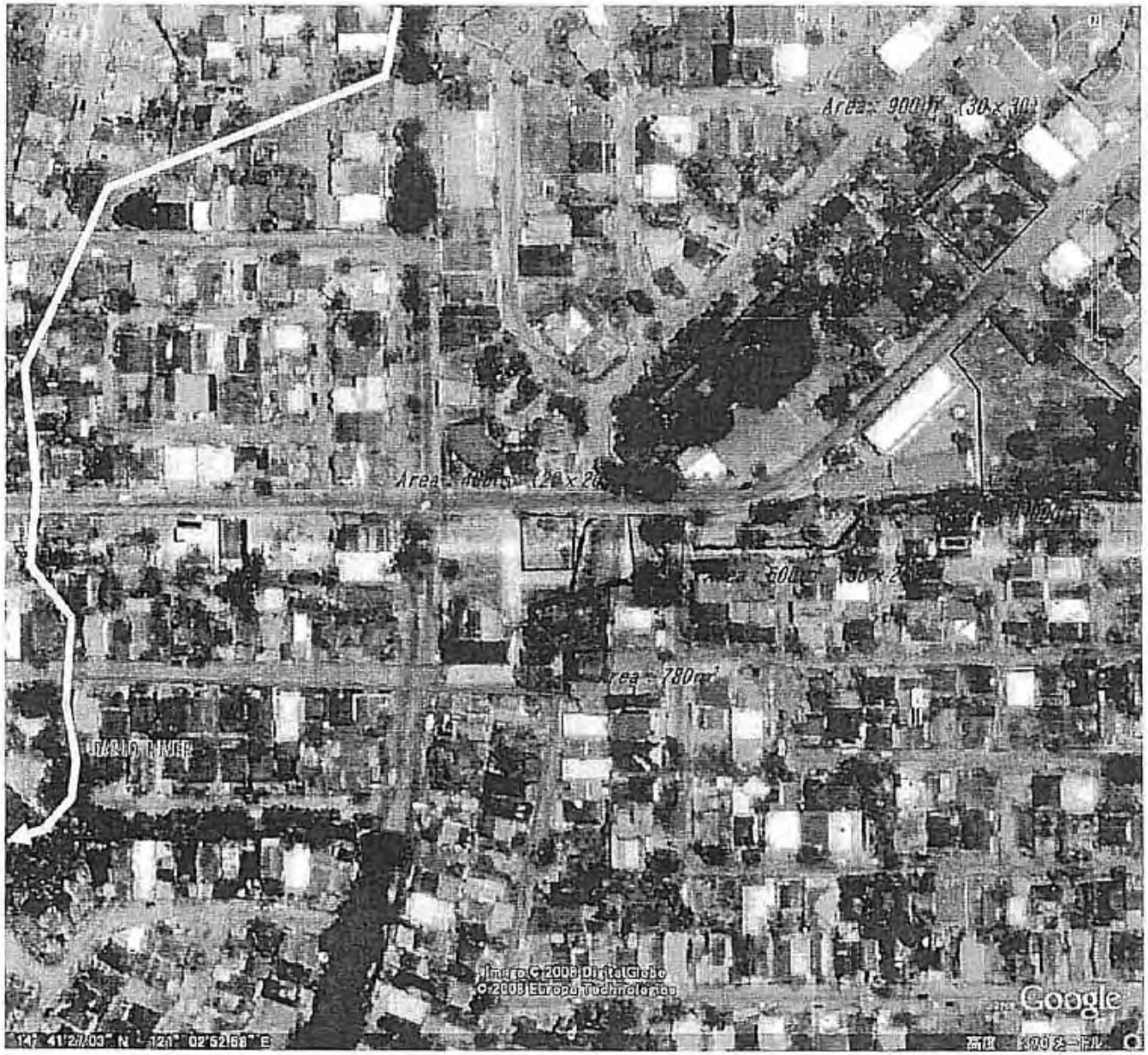


[No. 42 of a detailed drawing] Area : 44ha



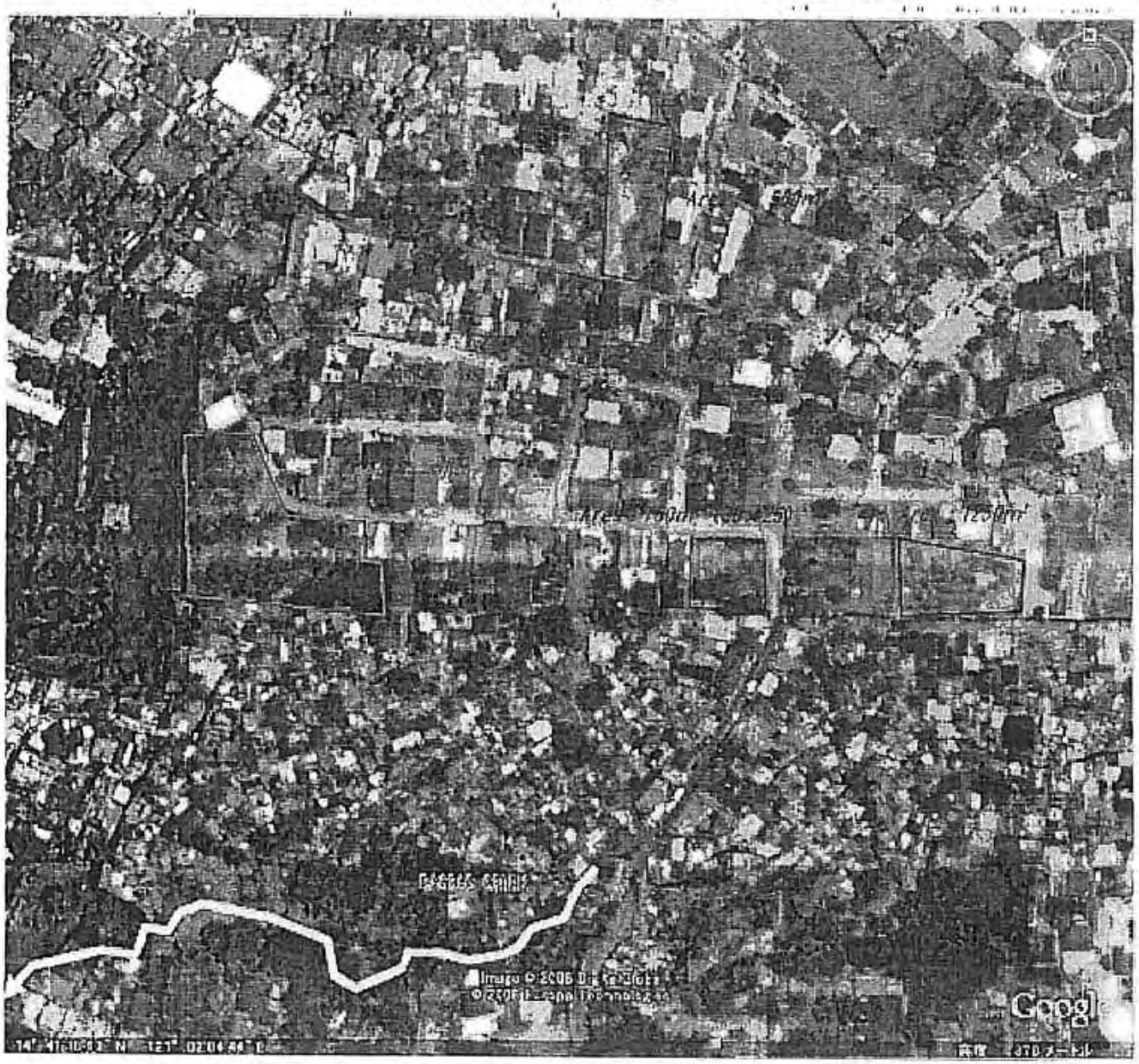
[No. 43 of a detailed drawing]　*Area : 13. 2ha*

【No. 44 of a detailed drawing】　Area : 51. 2ha

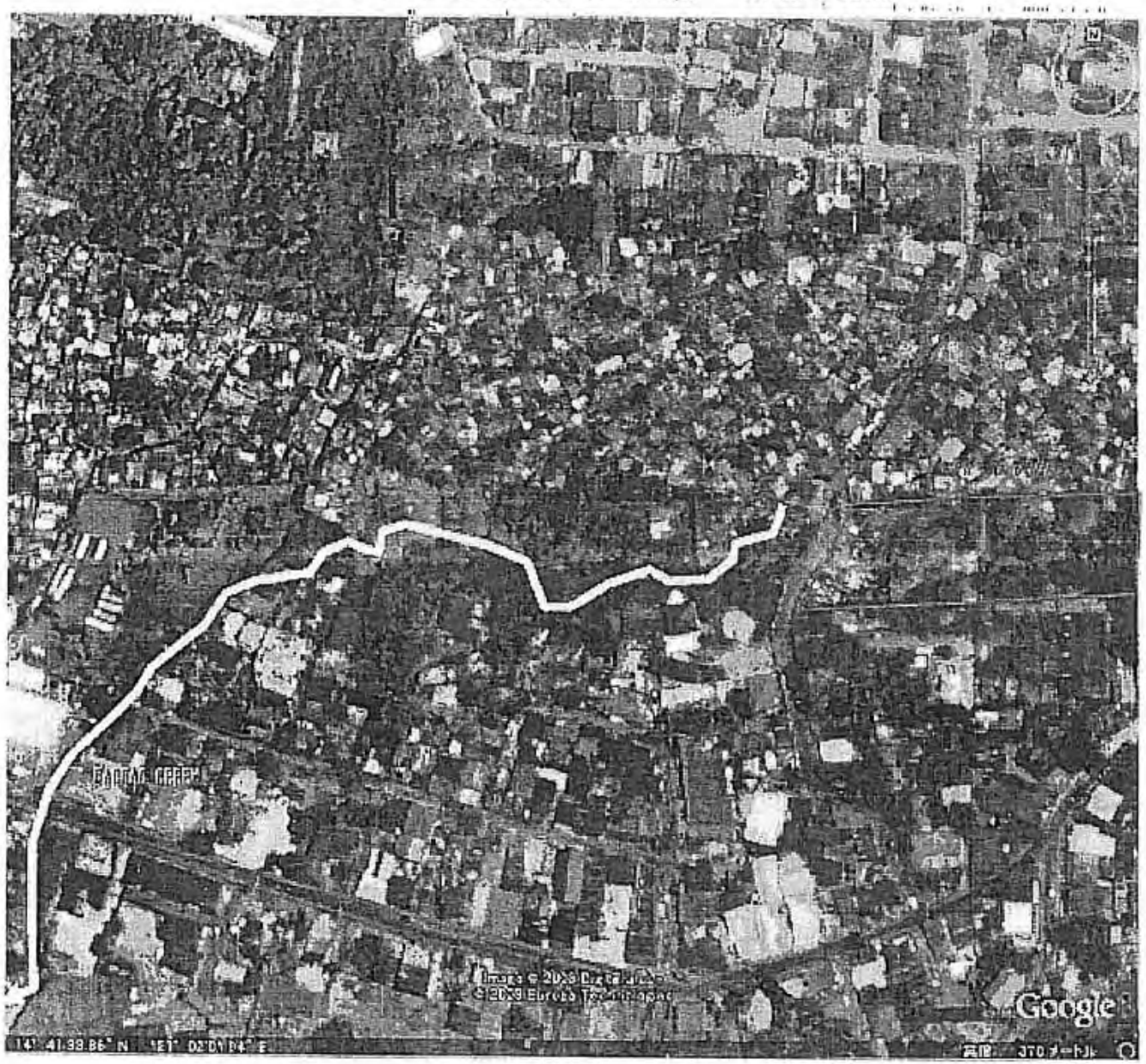


[No. 44-1 of a detailed drawing]　*Area : 31. 2ha*

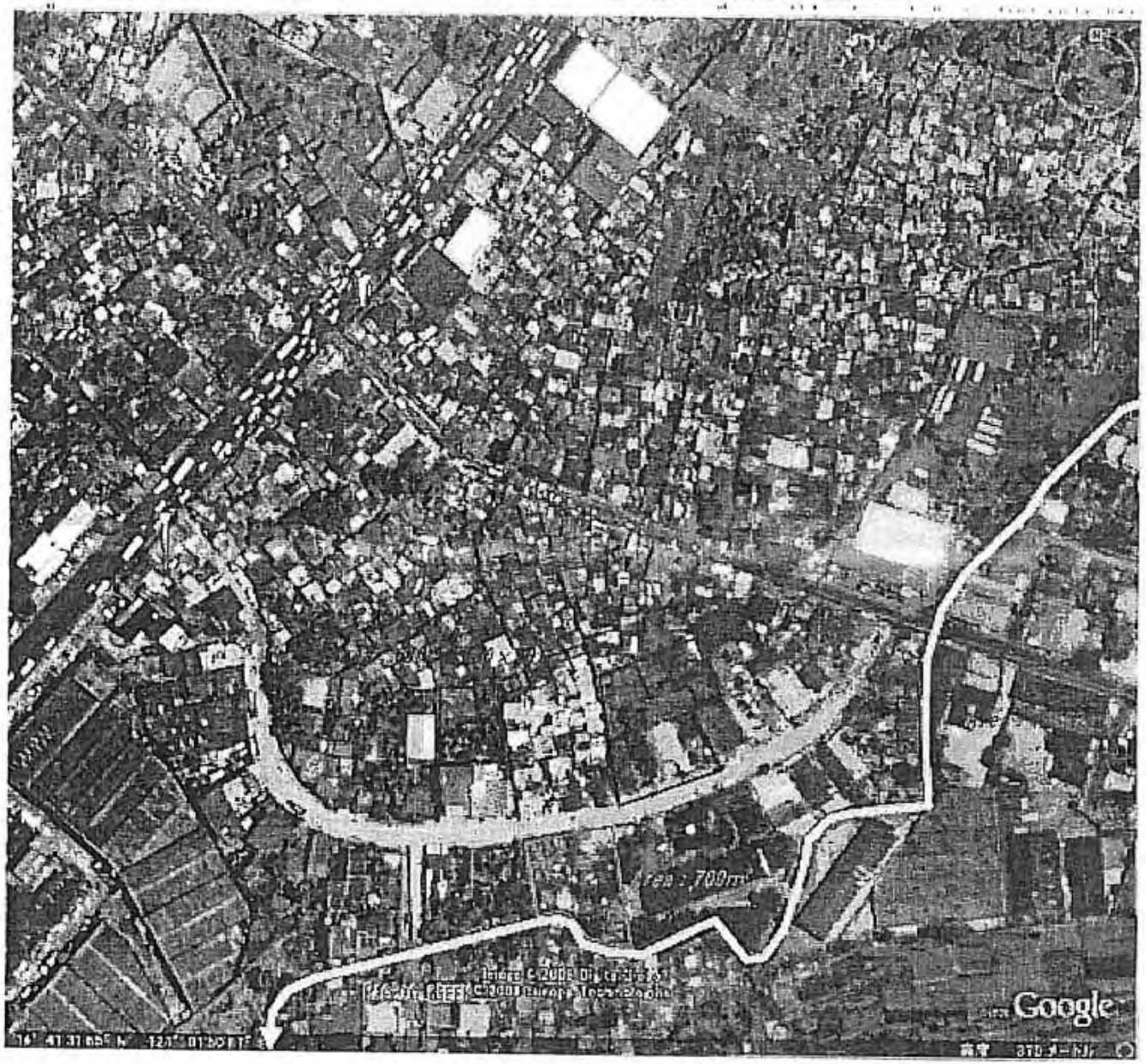
[No. 45 of a detailed drawing] Area : 29. 5ha



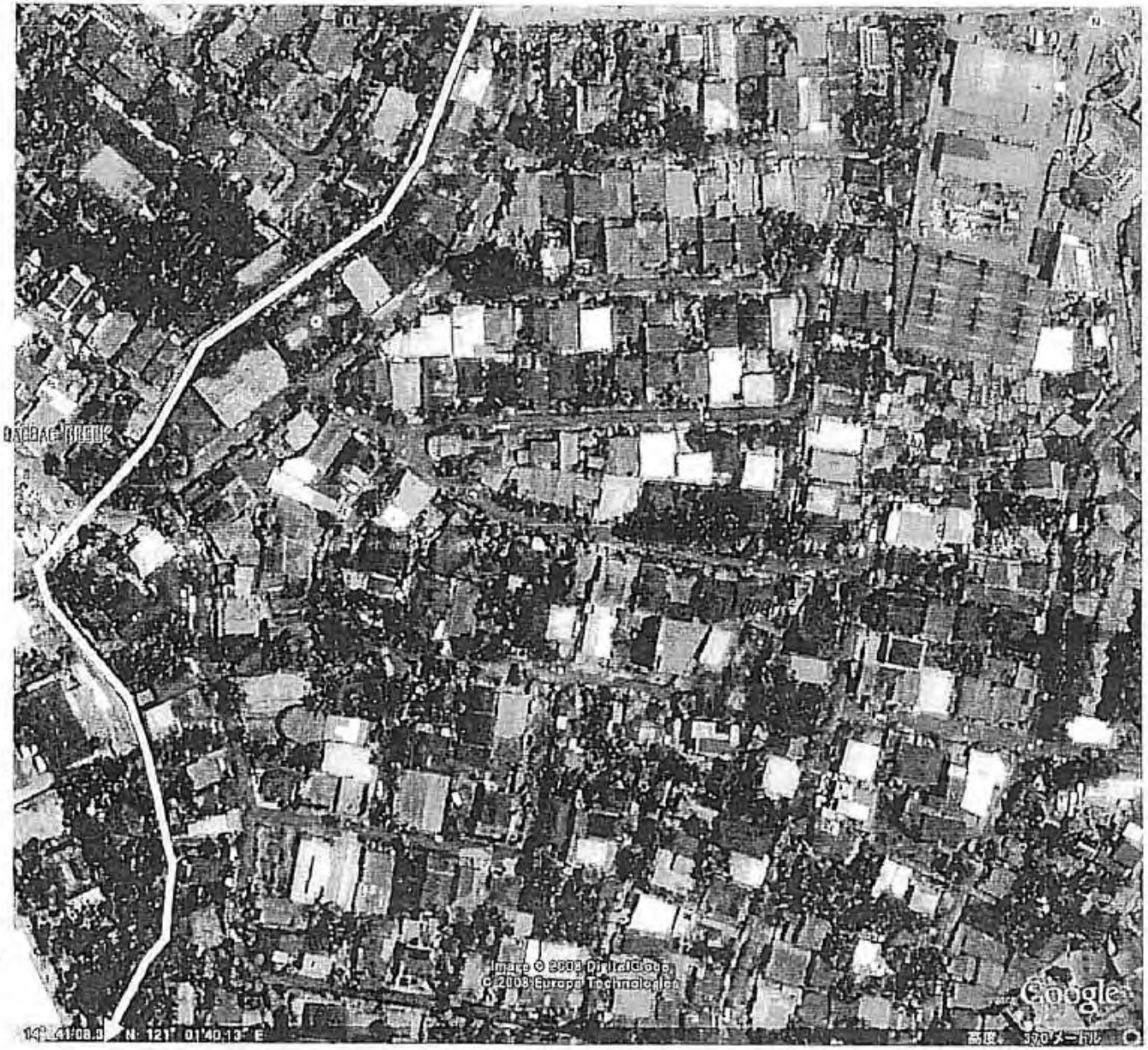
[No. 46 of a detailed drawing] Area : 65ha



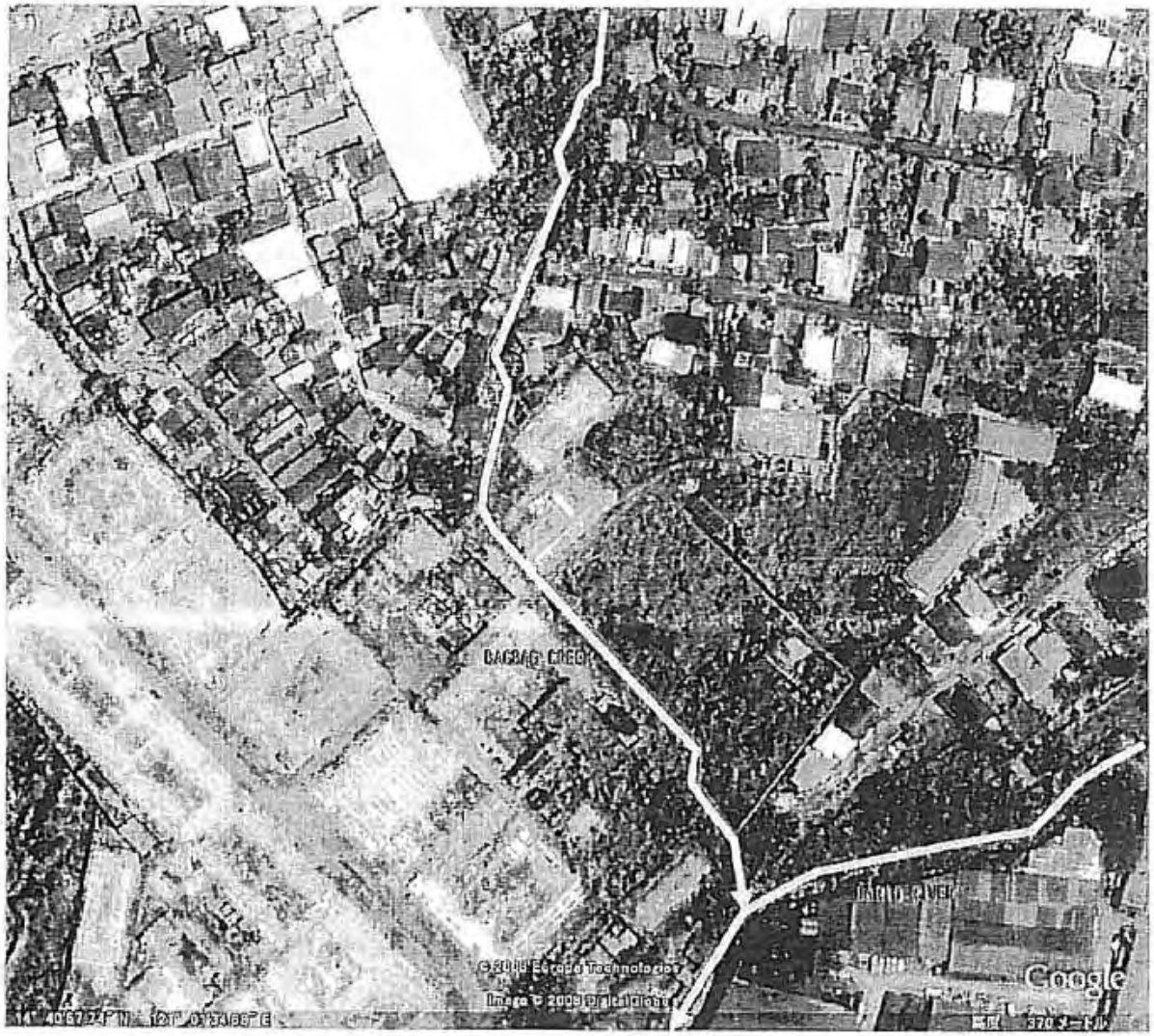
[No. 47 of a detailed drawing] Area : 58. 2ha



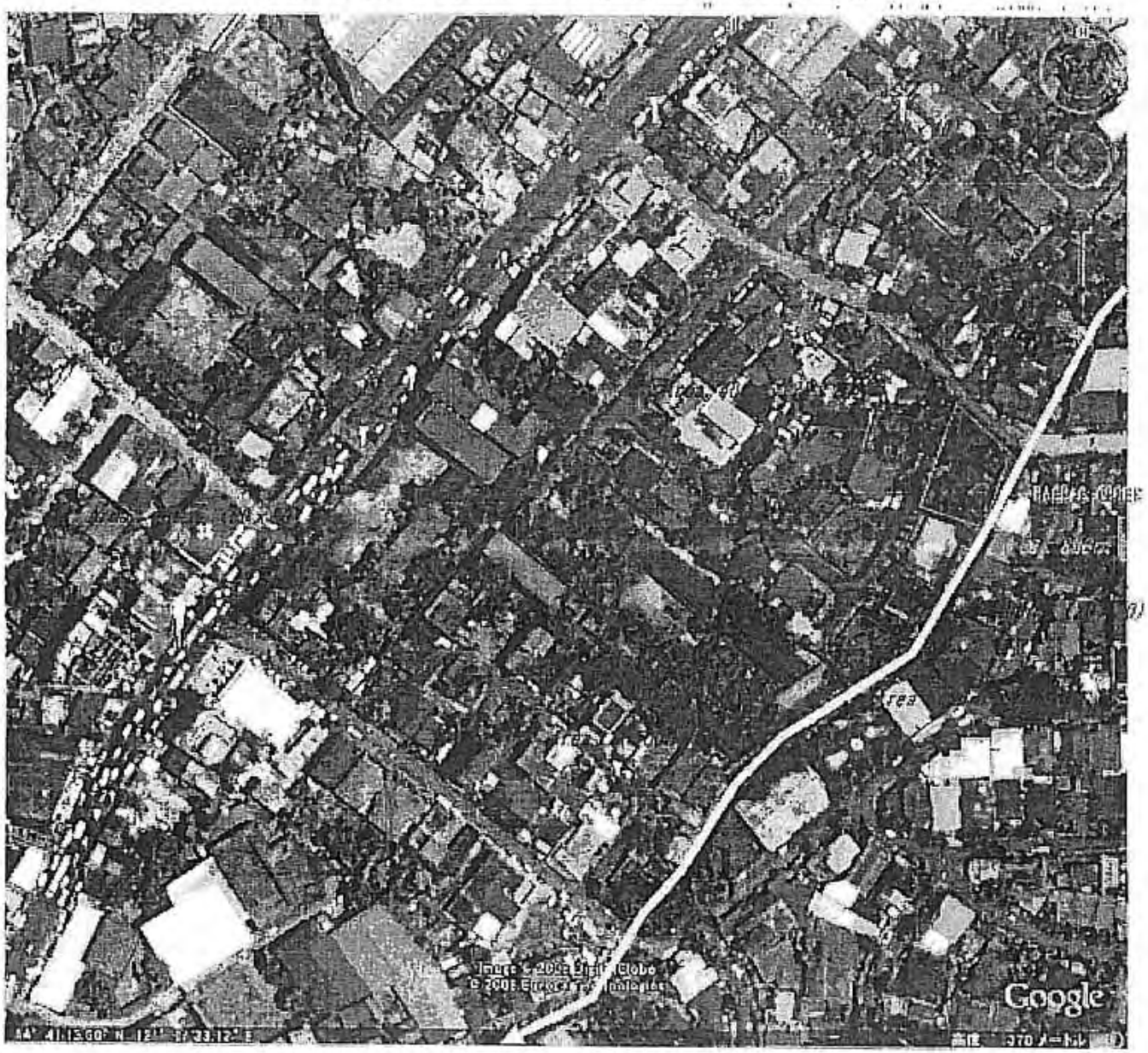
【No. 48 of a detailed drawing】　Area : 40. 7ha



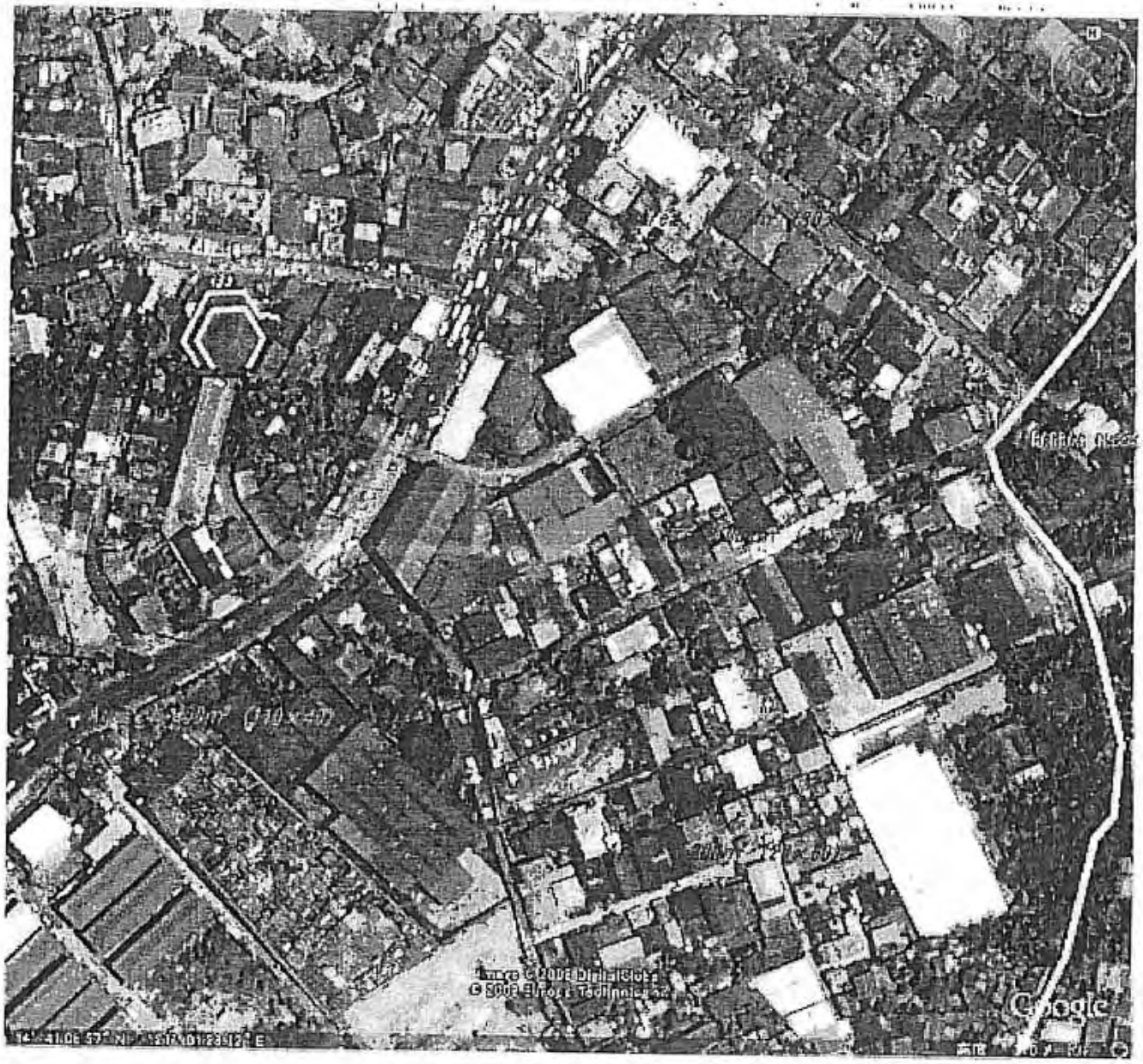
【No. 48-1 of a detailed drawing】 Area : ha



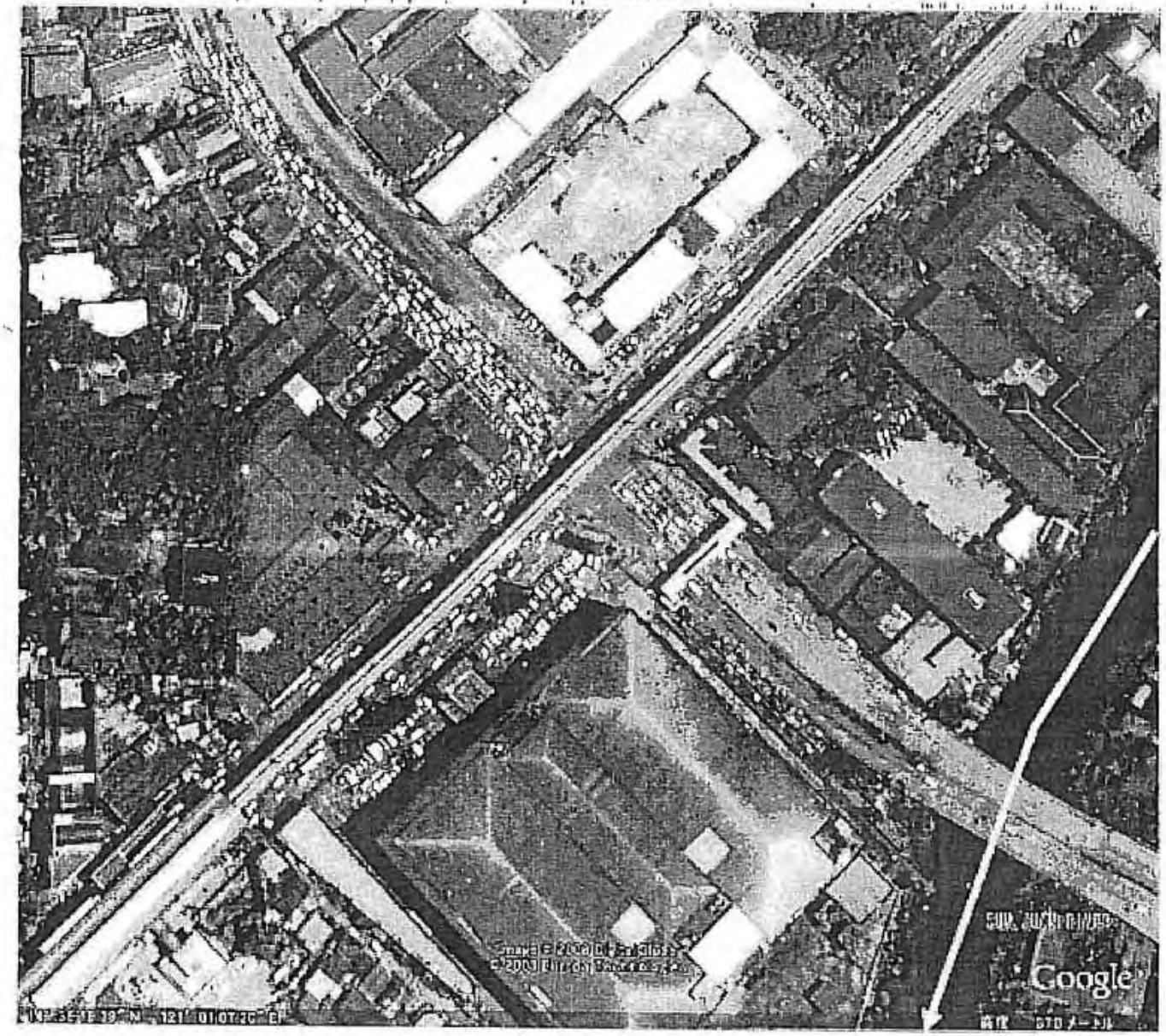
[No. 49 of a detailed drawing] Area : 8.6ha



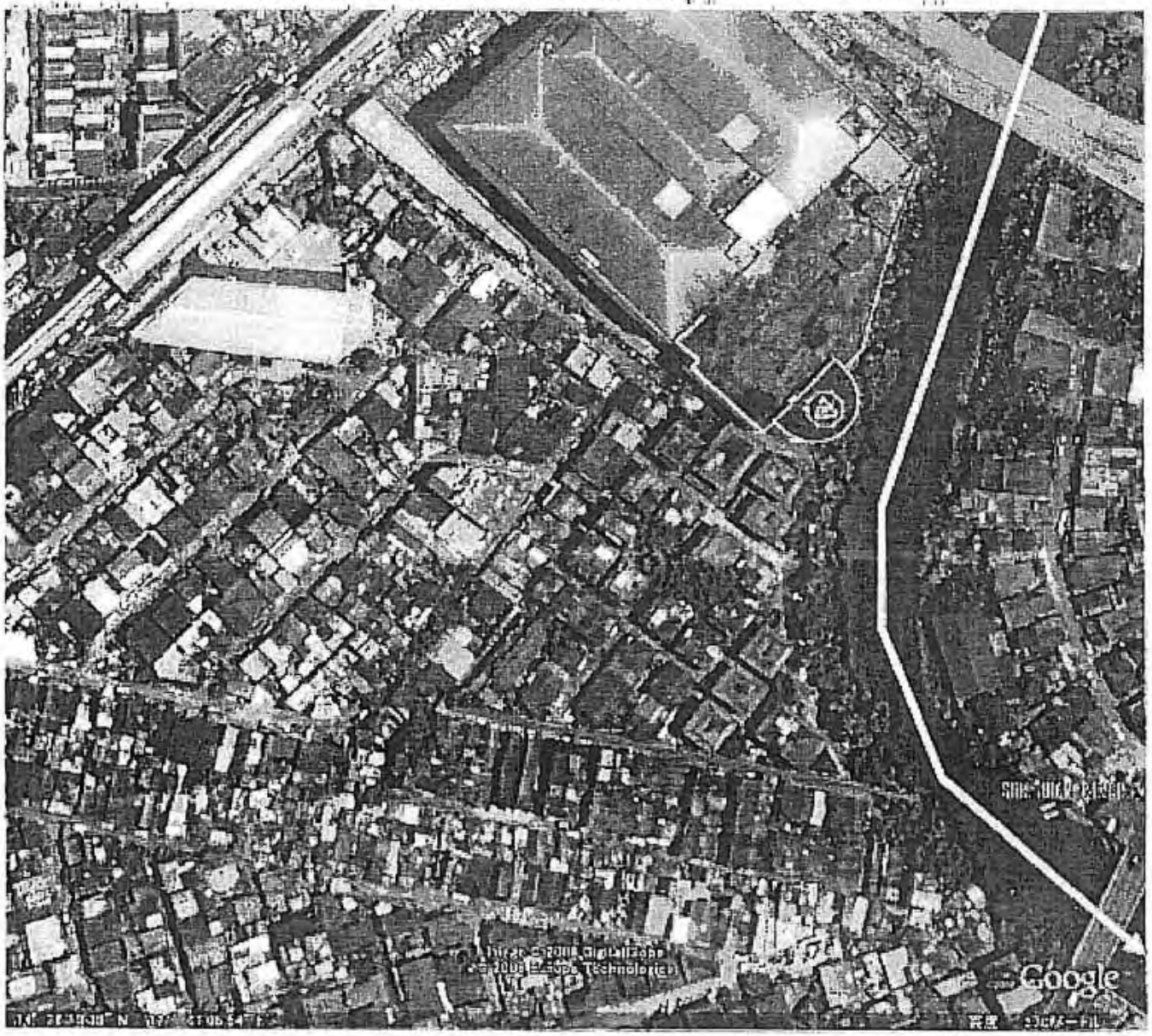
[No. 50 of a detailed drawing] Area : 21. 7ha



[No. 51 of a detailed drawing] Area : 22.0ha



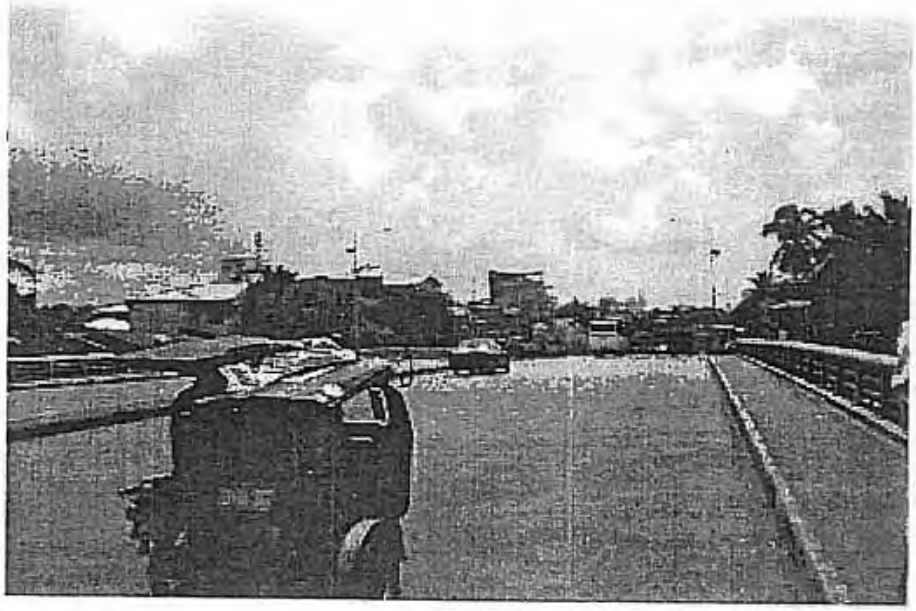
[No. 52 of a detailed drawing] Area : 37. 0ha

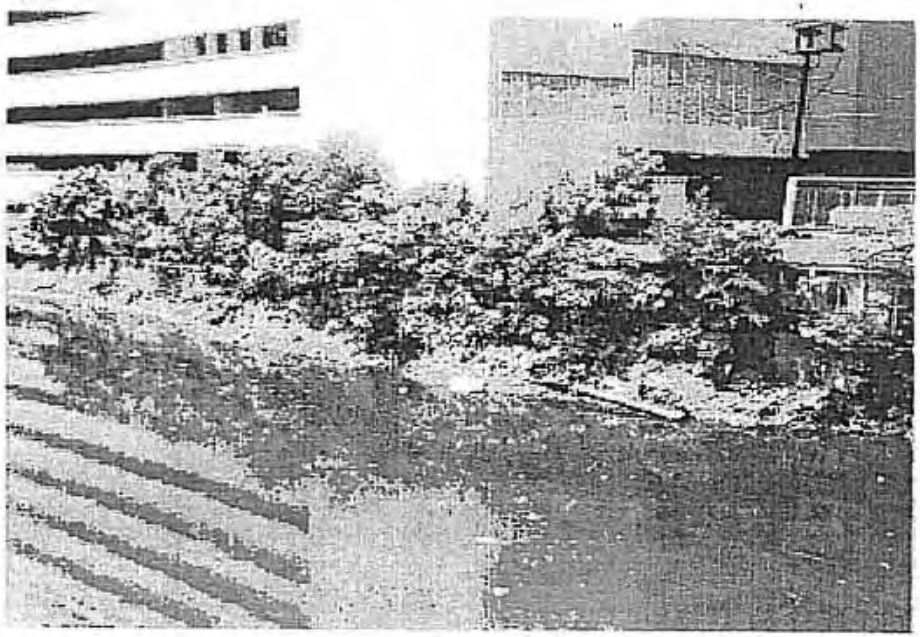


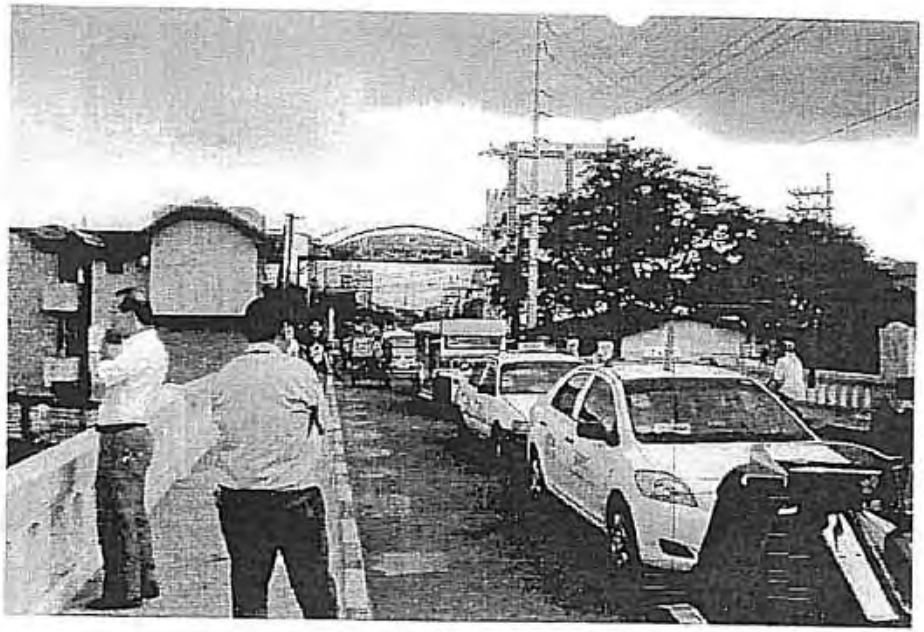
ATTACHMENT 2

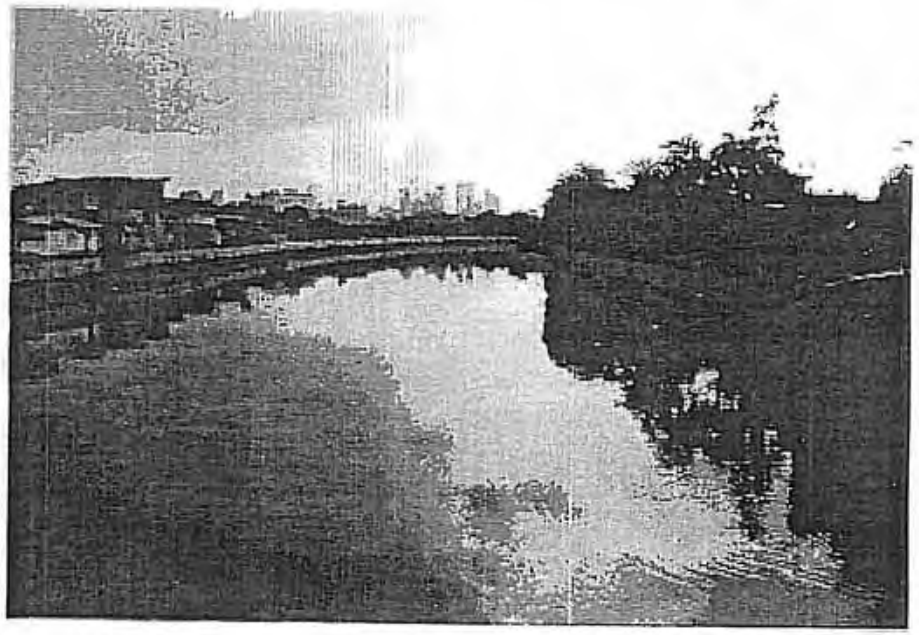
SITE PHOTOS IN SAN JUAN BASIN

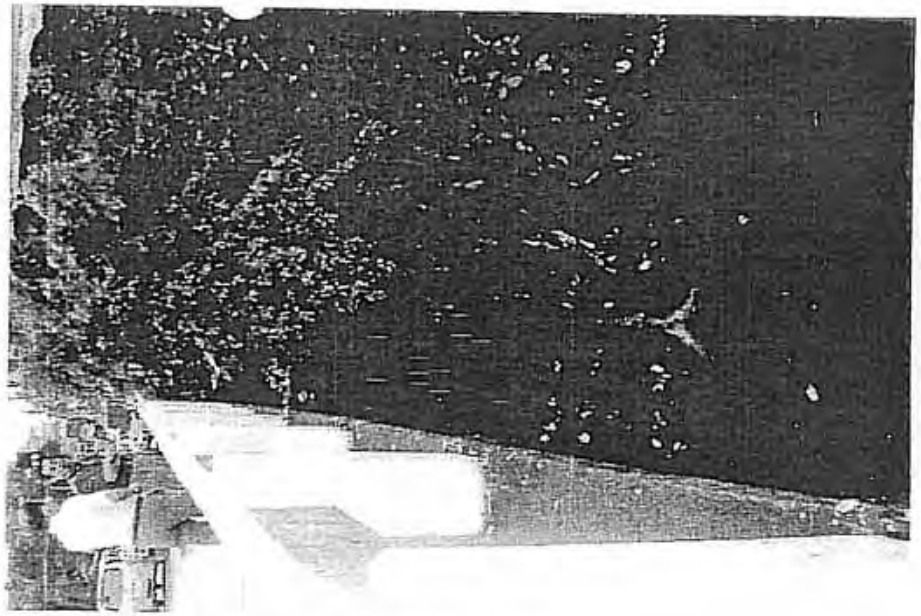
SAN JUAN RIVER

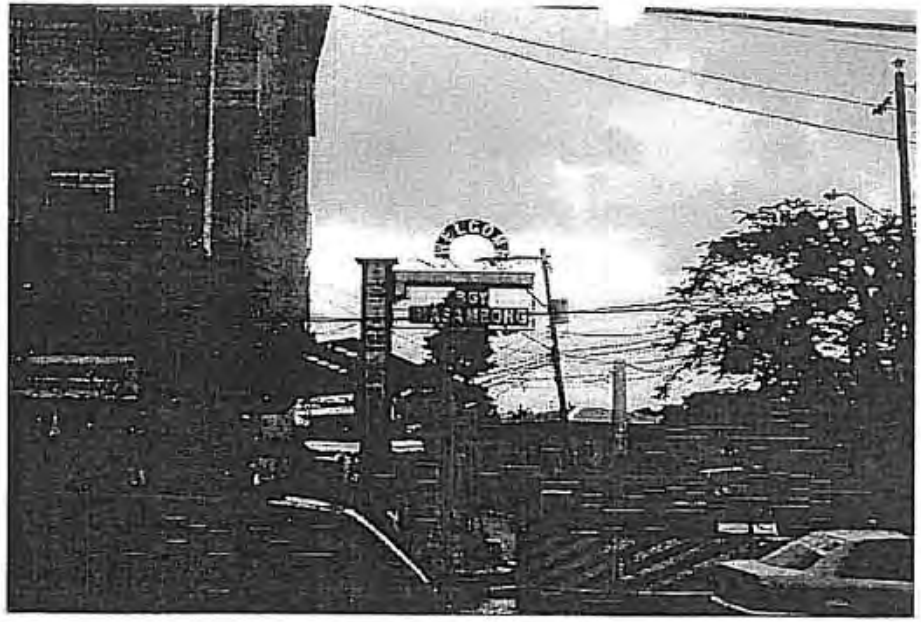








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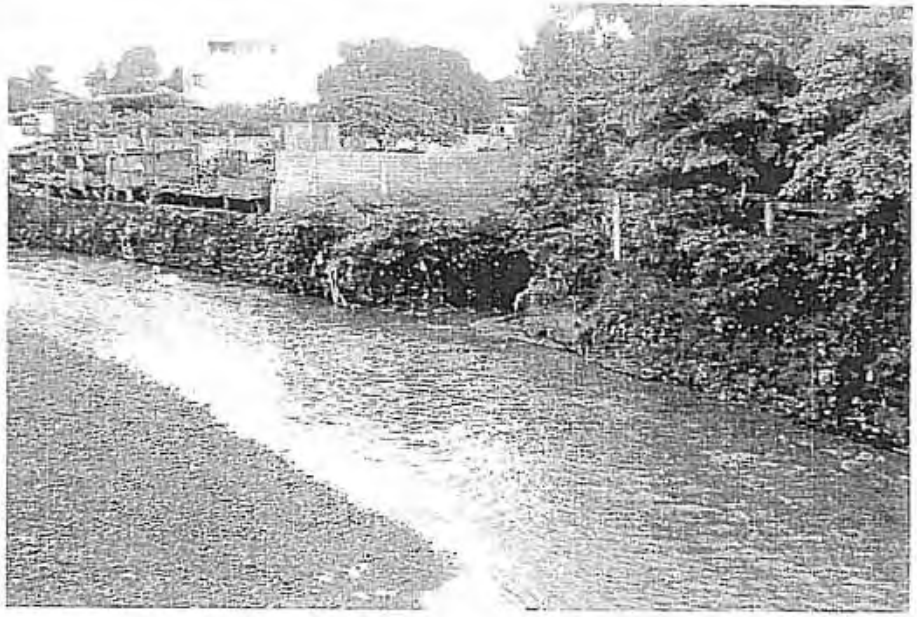
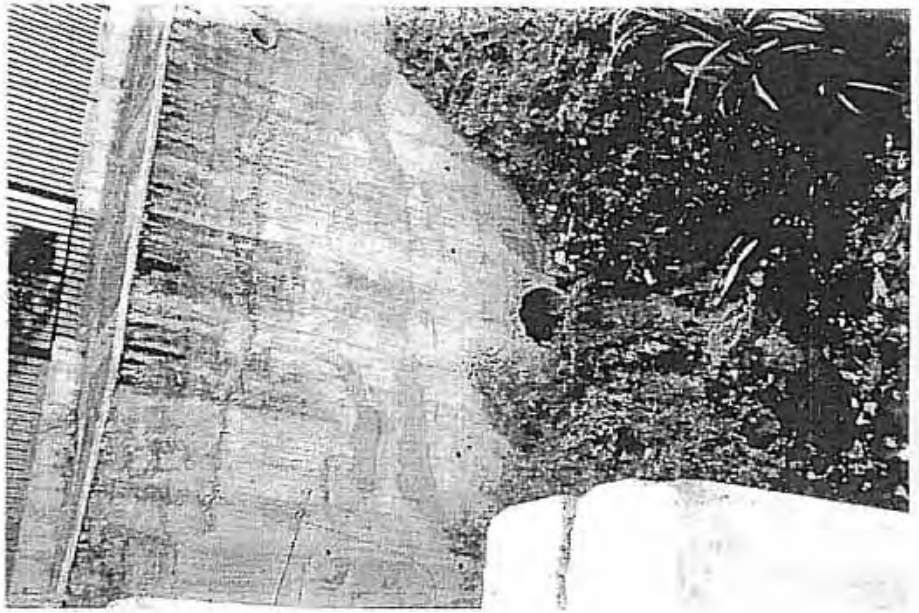
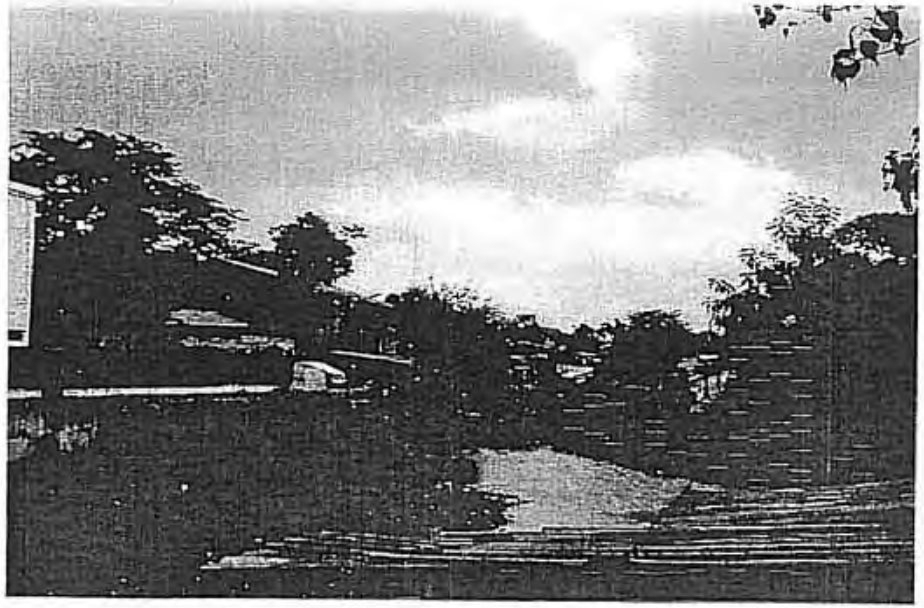
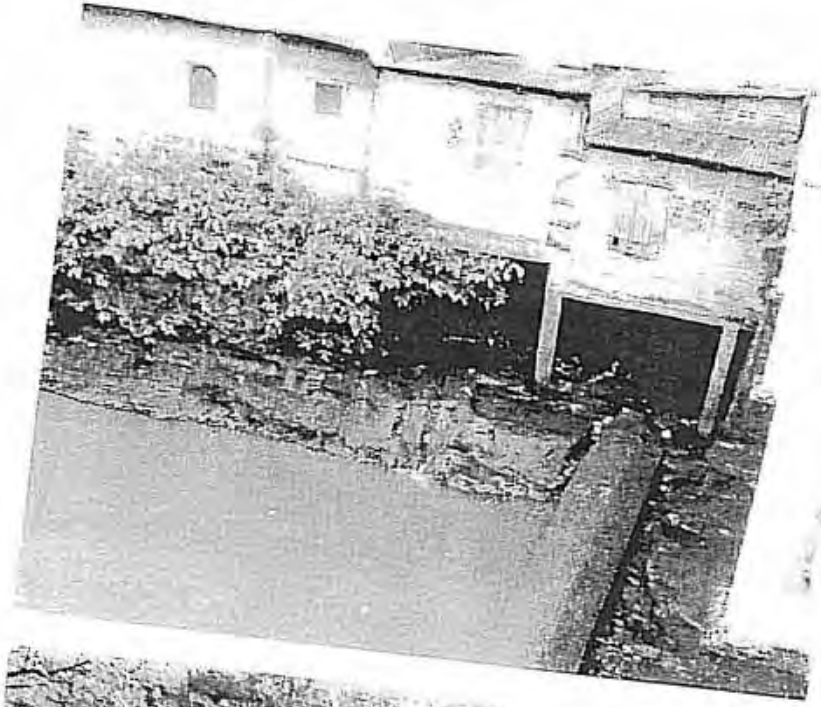
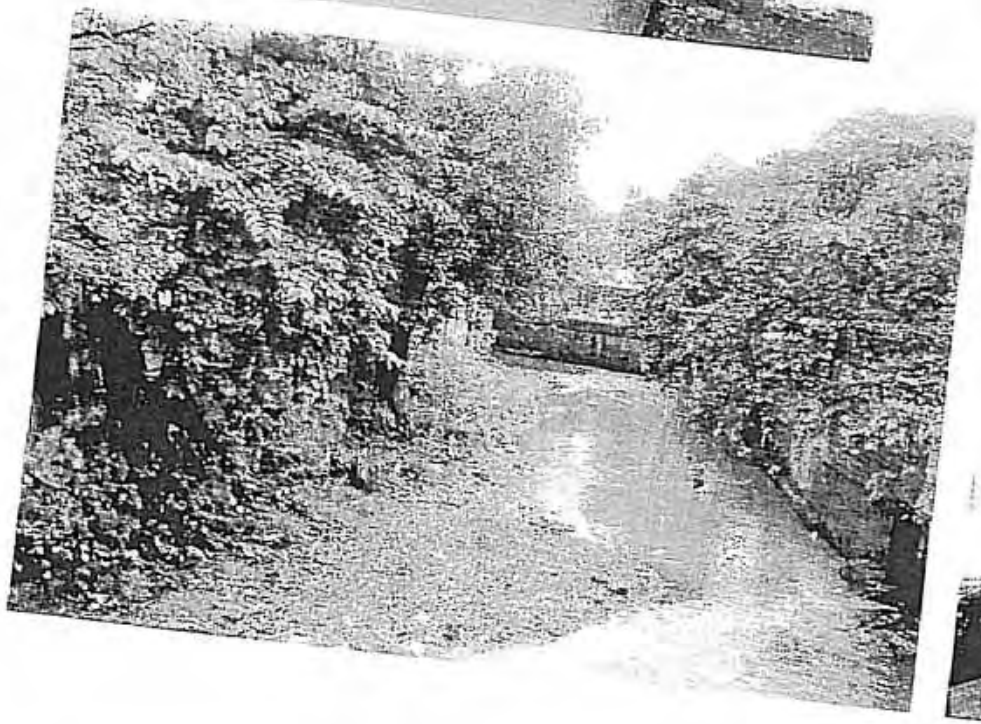
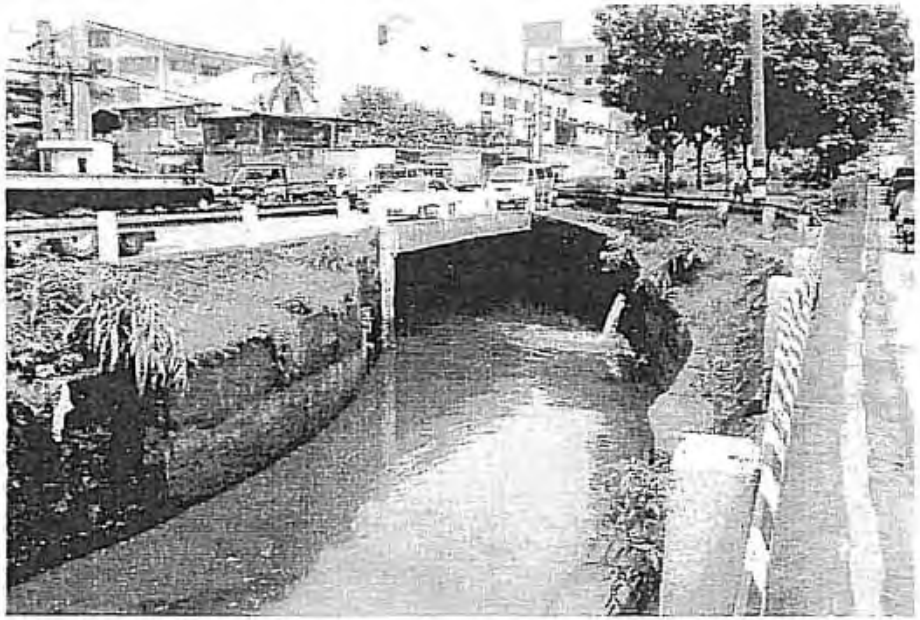


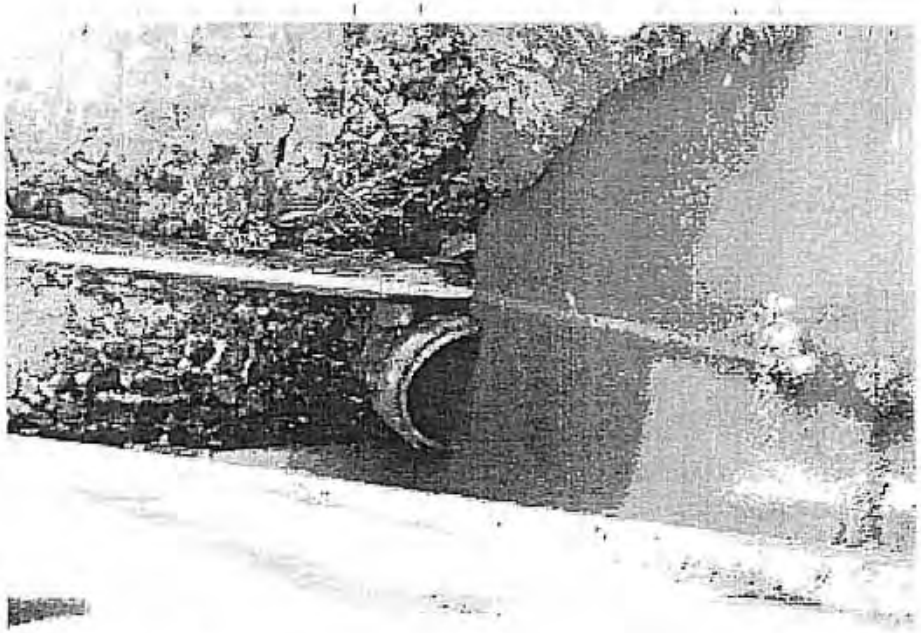


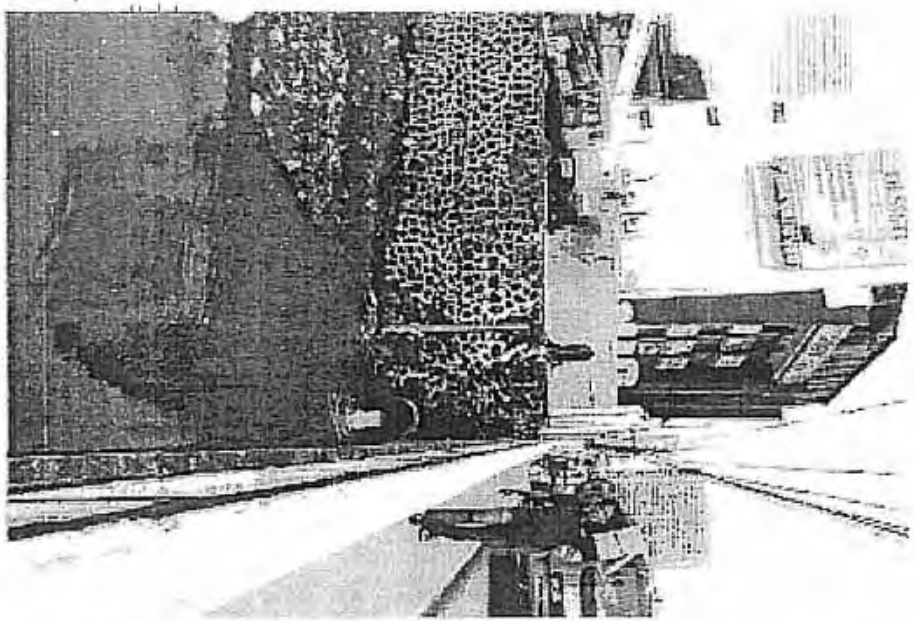


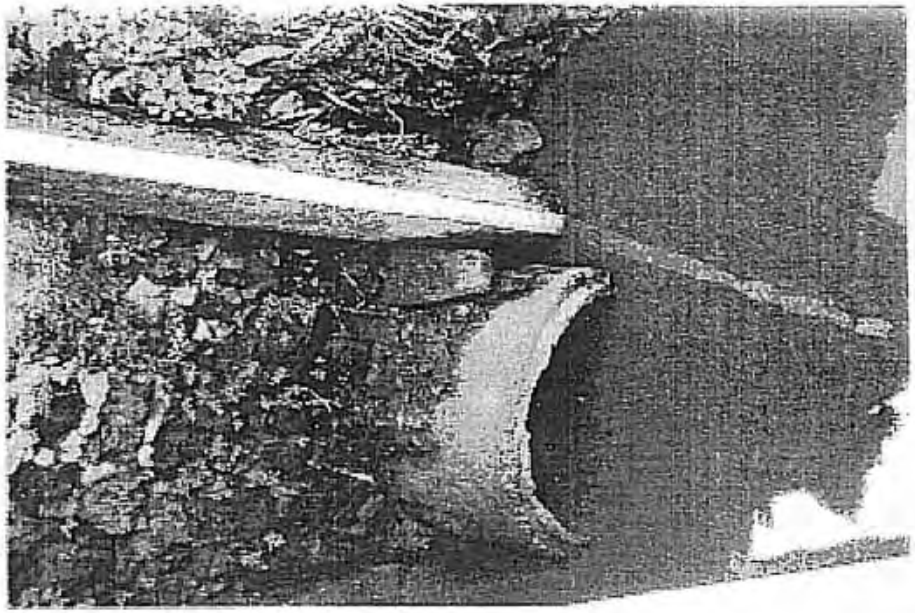


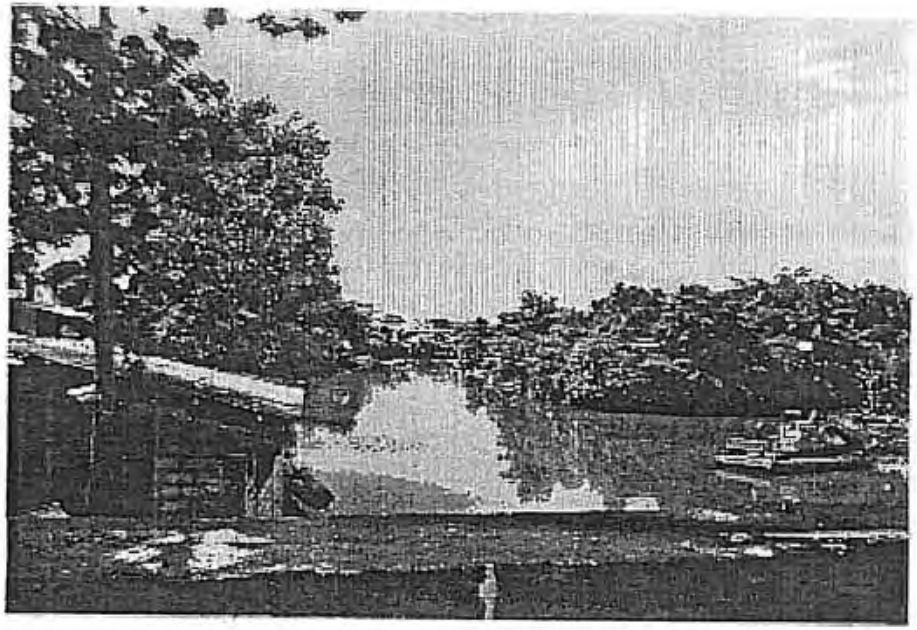


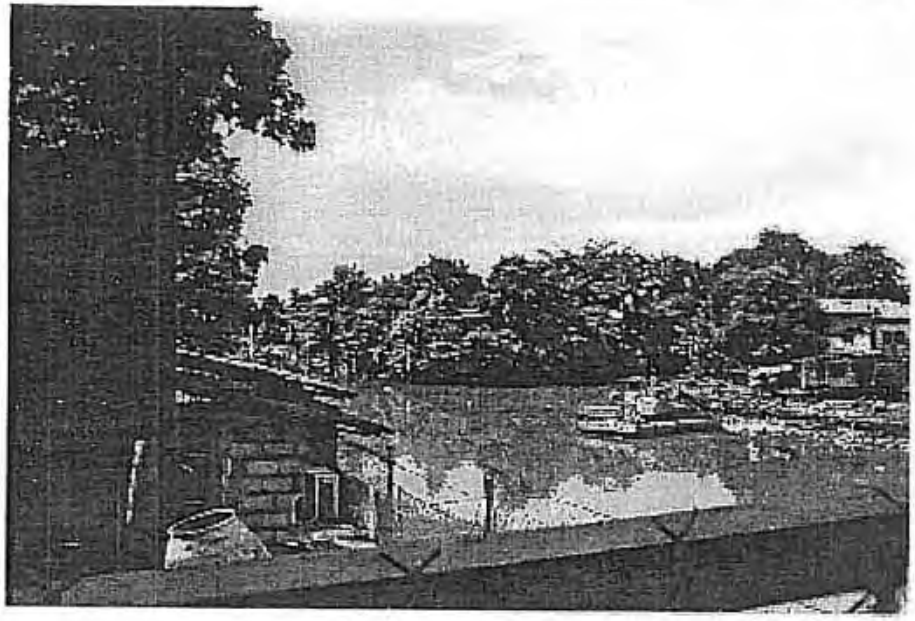


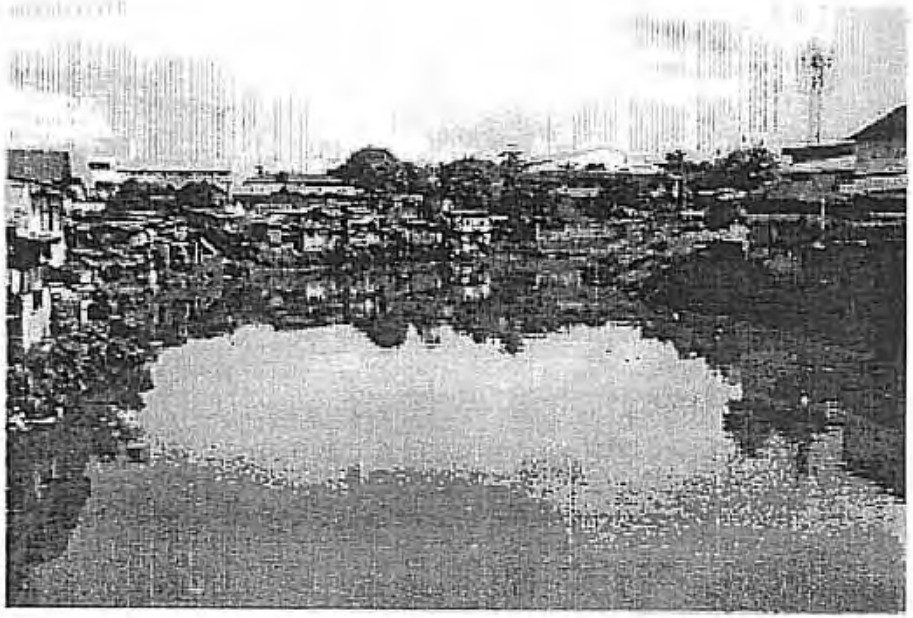


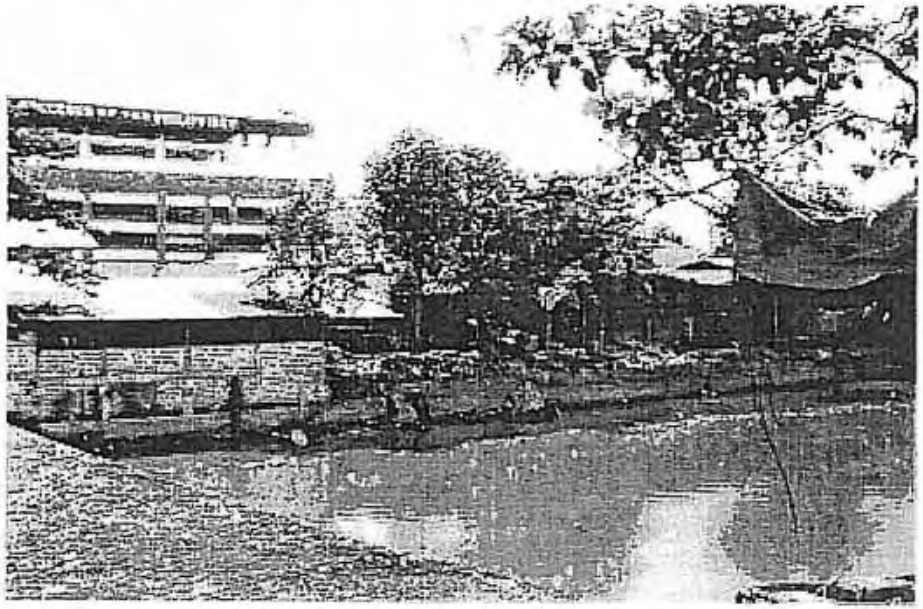


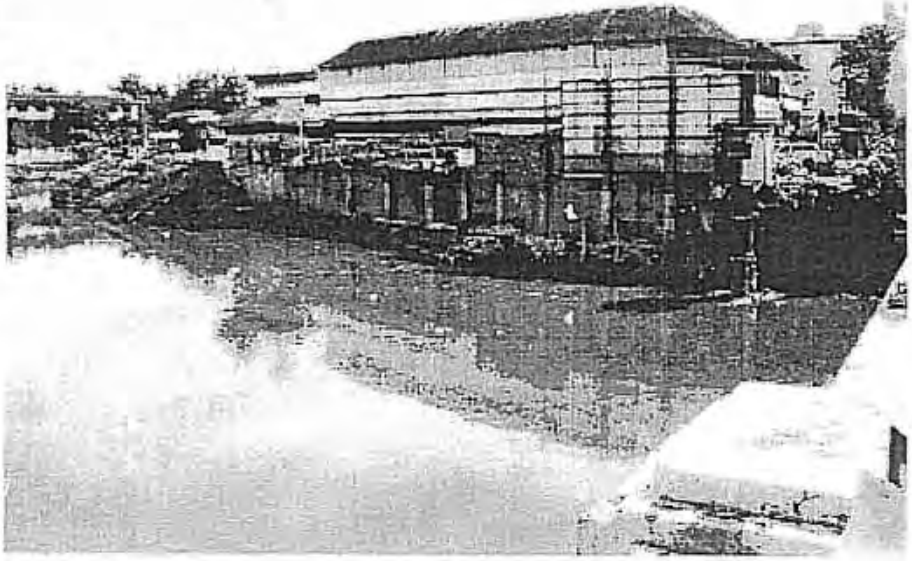


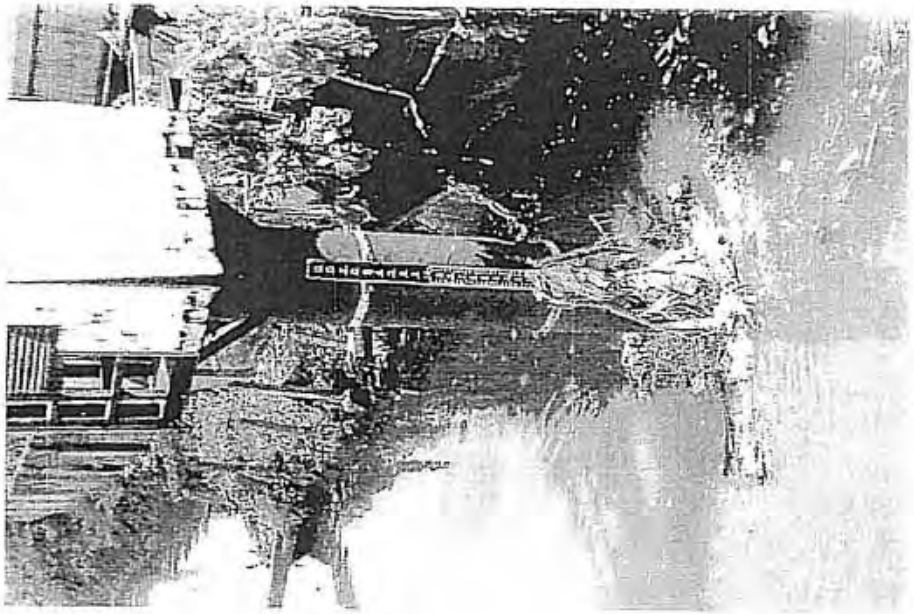












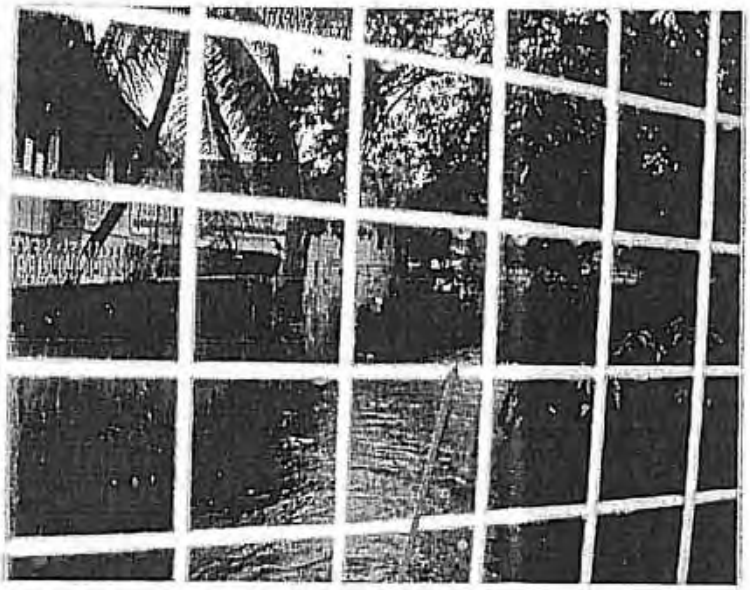
DARIO RIVER

1

DARIO CREEK

FROM DOWNSIDE

ROAD20



2

DARIO CREEK

FROM UPSIDE

ROAD20

3

DARIO CREEK

FROM LEFT ROAD

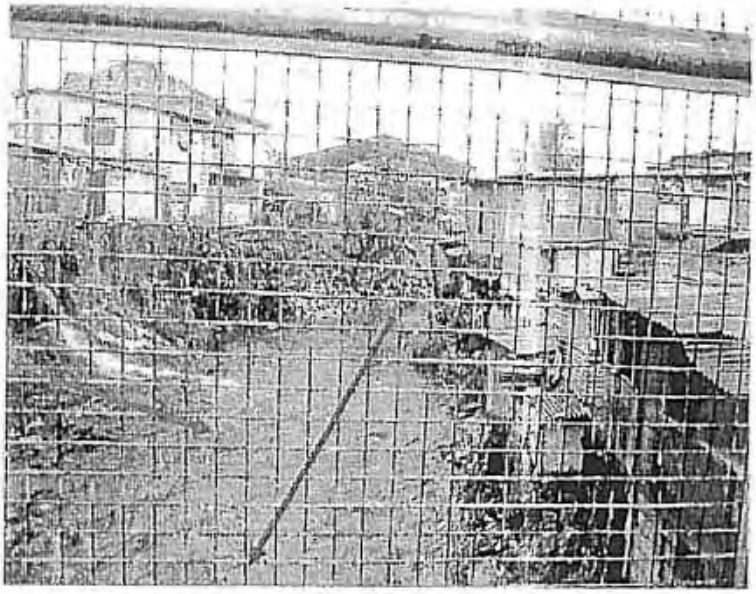
ROAD20

4

DARIO CREEK

FROM RIGHT ROAD

MENDEZ ROAD

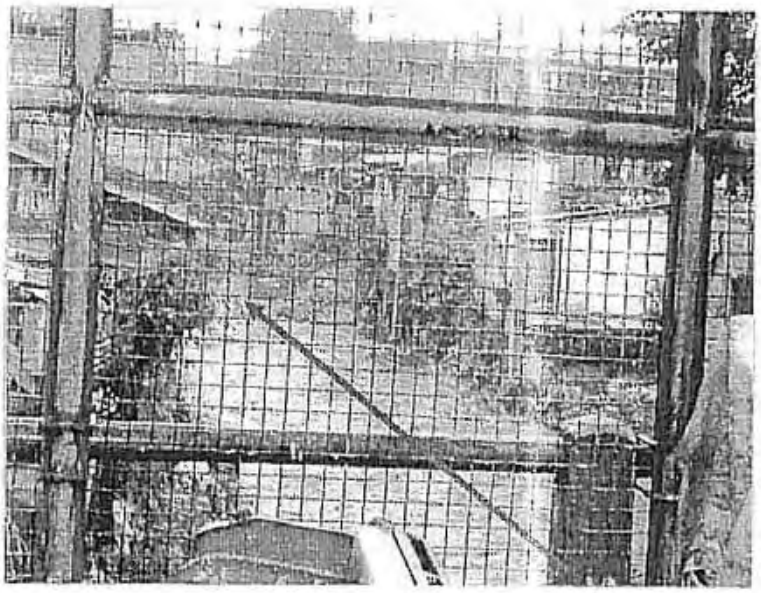


5

DARIO CREEK

FROM DOWNSIDE

SEMINARY ROAD

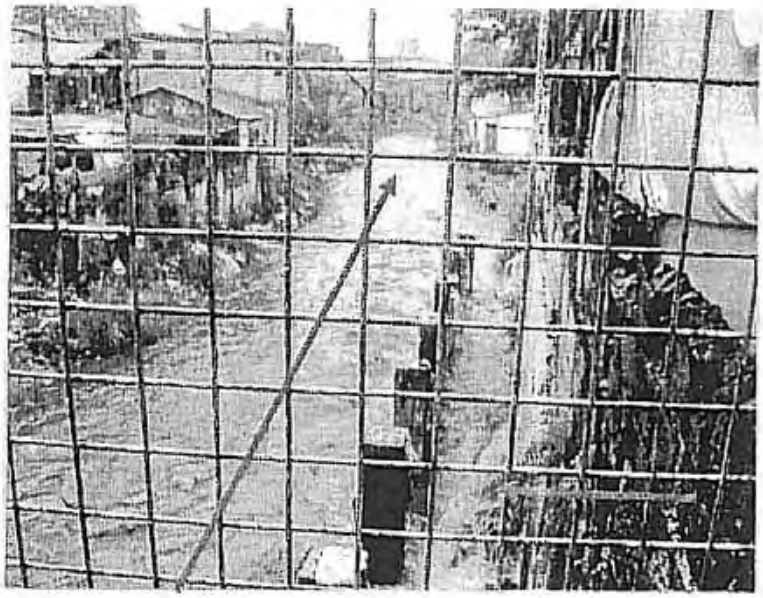


6

DARIO CREEK

FROM UPSIDE

SEMINARY ROAD



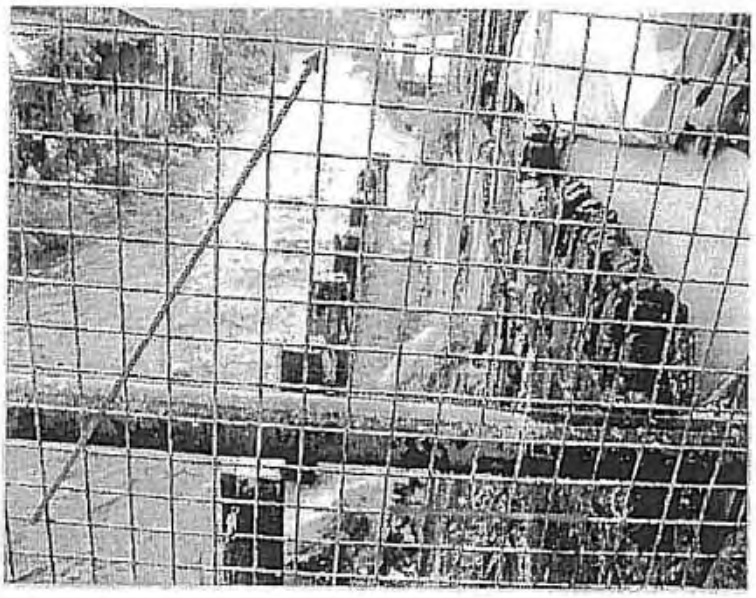
7

DARIO CREEK

FROM UPSIDE

DETAIL 1

SEMINARY ROAD



8

DARIO CREEK

FROM UPSIDE

DETAIL 2

SEMINARY ROAD

9

DARIO CREEK

FROM RIGHT ROAD

SEMINARY ROAD

BAGBAG CREEK

1

BAG BAG CREEK

FROM DOWNSIDE

SOLIBILLE

2

BAG BAG CREEK

FROM DOWNSIDE

SOLIBILLE

3

BAG BAG CREEK

FROM UPSIDE

SOLIBILLE

4

BAG BAG CREEK

TO CREEK

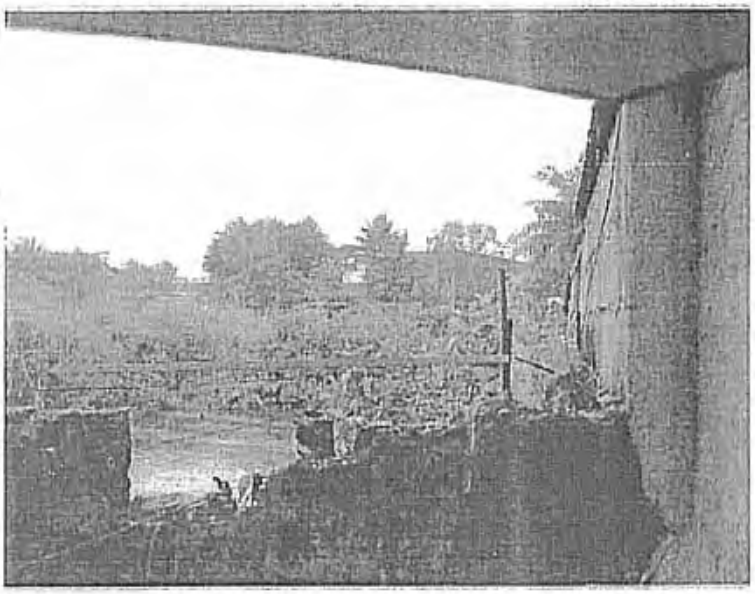
BISGO

5

BAG BAG CREEK

FROM CREEK

BISGO



6

BAG BAG CREEK

TO CREEK

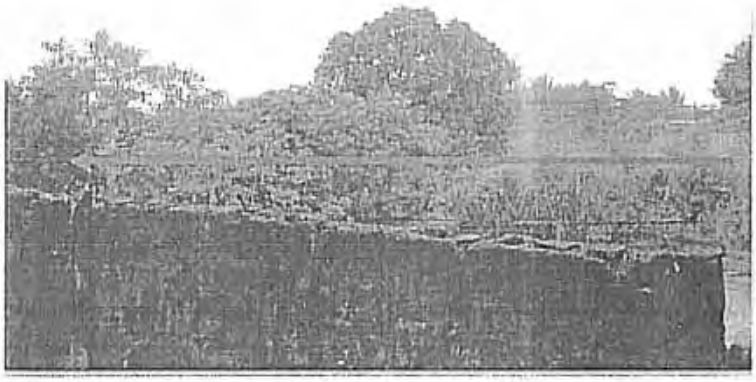
1 OF UPSIDE

7

BAG BAG CREEK

TO CREEK

2 OF UPSIDE



8

BAG BAG CREEK

TO CREEK

3 OF UPSIDE

9

BAG BAG CREEK

TO CREEK

4 OF UPSIDE

10

BAG BAG CREEK

TO CREEK

5 OF UPSIDE

11

BAG BAG CREEK

TO BISUGO

TALAYAN CREEK

1

TARAYAN CREEK

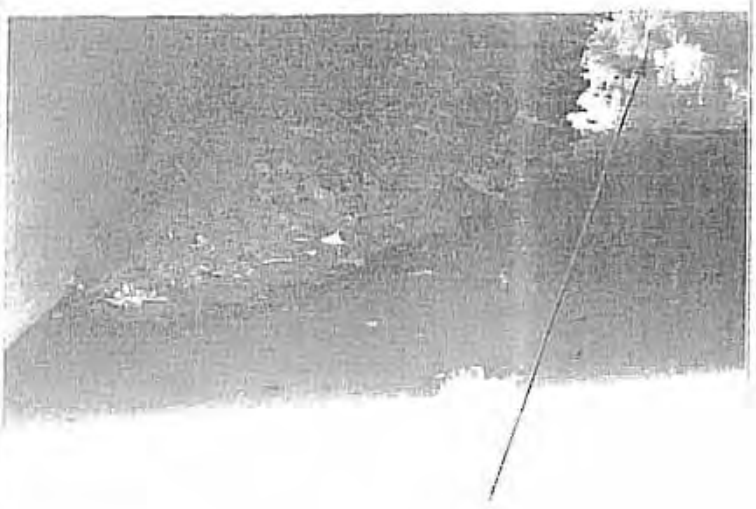
FROM DOWNSIDE

2

TARAYAN CREEK

CROSS PART OF A ROAD

FROM UPSIDE

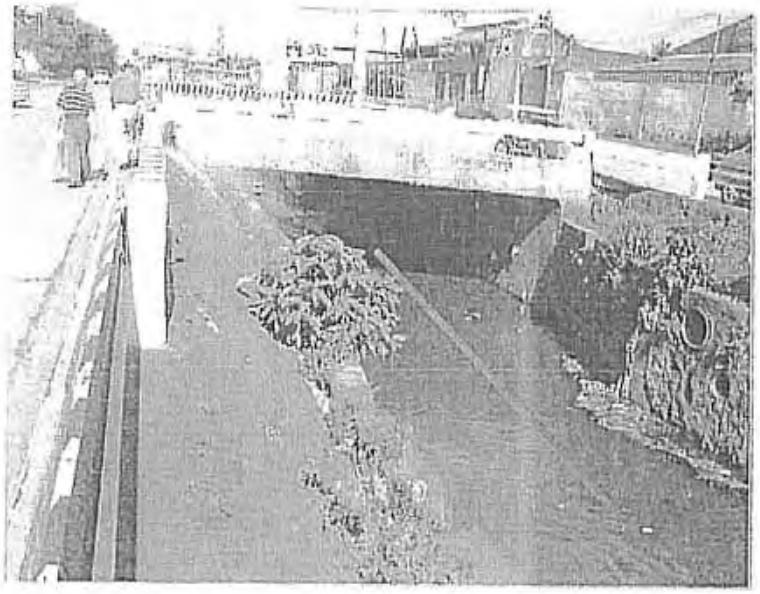


3

TARAYAN CREEK

CROSS PART OF A ROAD

FROM UPSIDE



4

TARAYAN CREEK

FROM DOWNSIDE

5

TARAYAN CREEK

FROM GREGORIO ARANETA AVE

TO QUEZON AVE

PHILIPPINES
MAYNILAD WATER SERVICES, INC.
WATER CAPITAL PROJECTS

Sewerage and Sanitation Improvement Project

MASTER PLAN

VOLUME II

ADDENDUM I

SEWERAGE AND SANITATION PROJECT

IN

SAN JUAN RIVER BASIN

2008 November

OEC ORIGINAL ENGINEERING CONSULTANTS CO., LTD.

TABLE OF CONTENTS

ATTACHMENTS

SAN JUAN RIVER BASIN SANITATION AND SEWERAGE PROJECT

1. Background

Metropolitan Manila (MM) consists of 4 cities and 13 municipalities and almost all of wastewater generated in the area is eventually discharged into Manila Bay through rivers, esteros or creeks, and street drainage systems because of the topographical terrain. In order to mitigate the water contamination in the Manila Bay or improve the environmental condition or Manila Bay Coastal Area, the sanitation and sewerage management services for MM shall be encouraged to implement possible and effective sanitation and sewerage system projects to comply with MWSI business plan.

Water pollutants mainly travel through several main rivers, such as Pasig River, Tullajan Tinejeros River, Paranaque River, and Imus River, passing through MM gathering wastewater directly and/or their tributaries. Especially Pasig River contamination is serious and San Juan River, one of the tributaries, in San Juan Basin is seriously contaminated. The sanitation and sewerage service program shall be urgently established.

2. San Juan Basin

San Juan River Basin is located in Quezon City, the Central North of MM (refer **Fig. 1**) and its total area is 9,471.8ha including Mainilad area of 2,487.57ha. The existing sewerage systems in this area (Maynilad) are 4 communal septic tanks, 1 Imhoff tank and 18 km-long sewer lines (refer **Fig. 2**). The capacities of the Septic Tanks are follows;

Roosevelt	93 m^3/d
Herehold	567 m^3/d
Grants	621 m^3/d
Legal	409 m^3/d

San Juan River and the tributaries in the basin are shown in **Fig. 3**.

Main tributaries in MWSI area are:

San Juan River
Talayan Creek
Balingasa Creek
Mariablo Creek
San Francisco Creek
Dario River
Curiat Creek
Bagbag Creek

Fig. 1 Location of San Juan River Basin

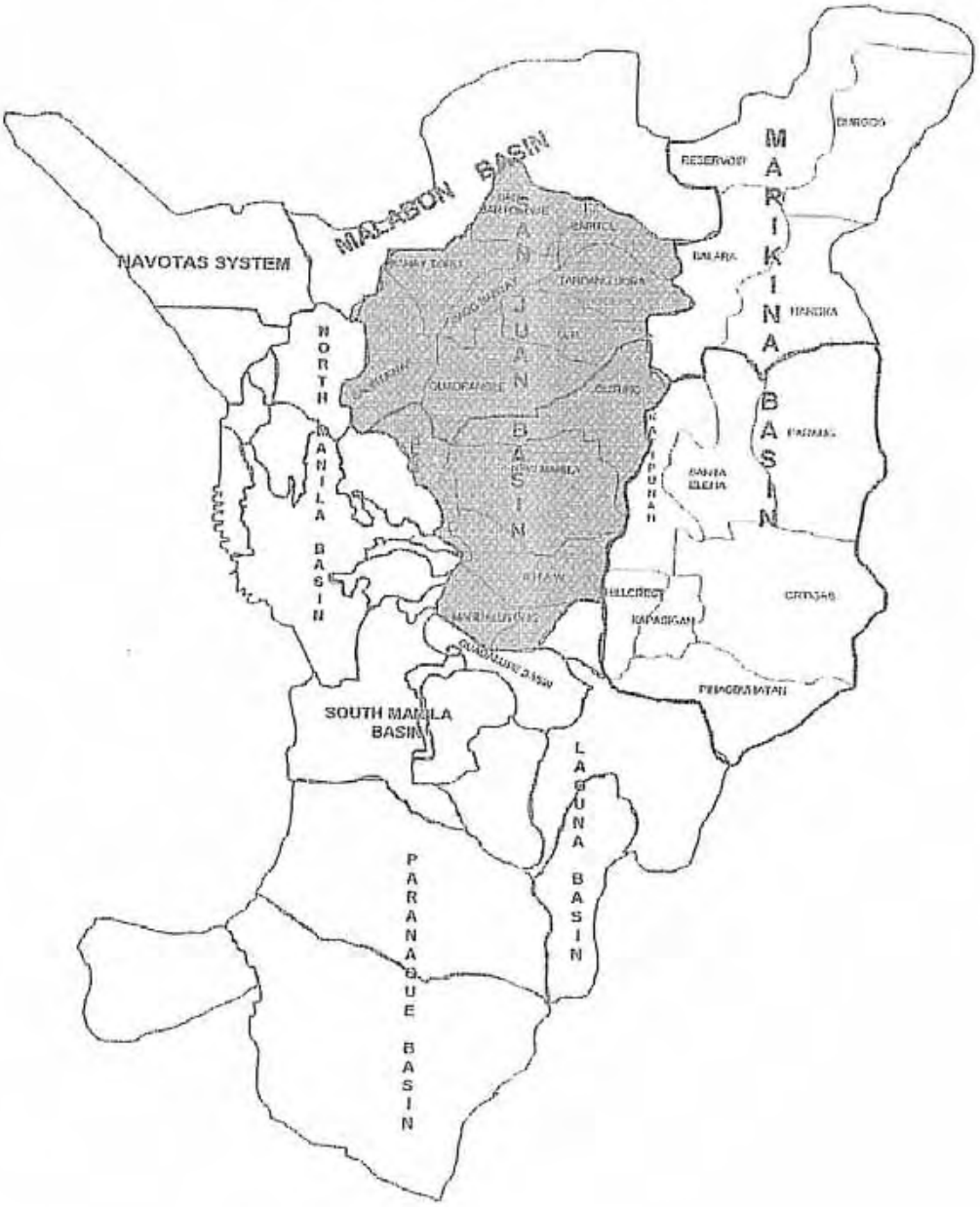


Fig. 2 San Juan Basin of Maynilad Jurisdiction and Existing Sewerage Systems

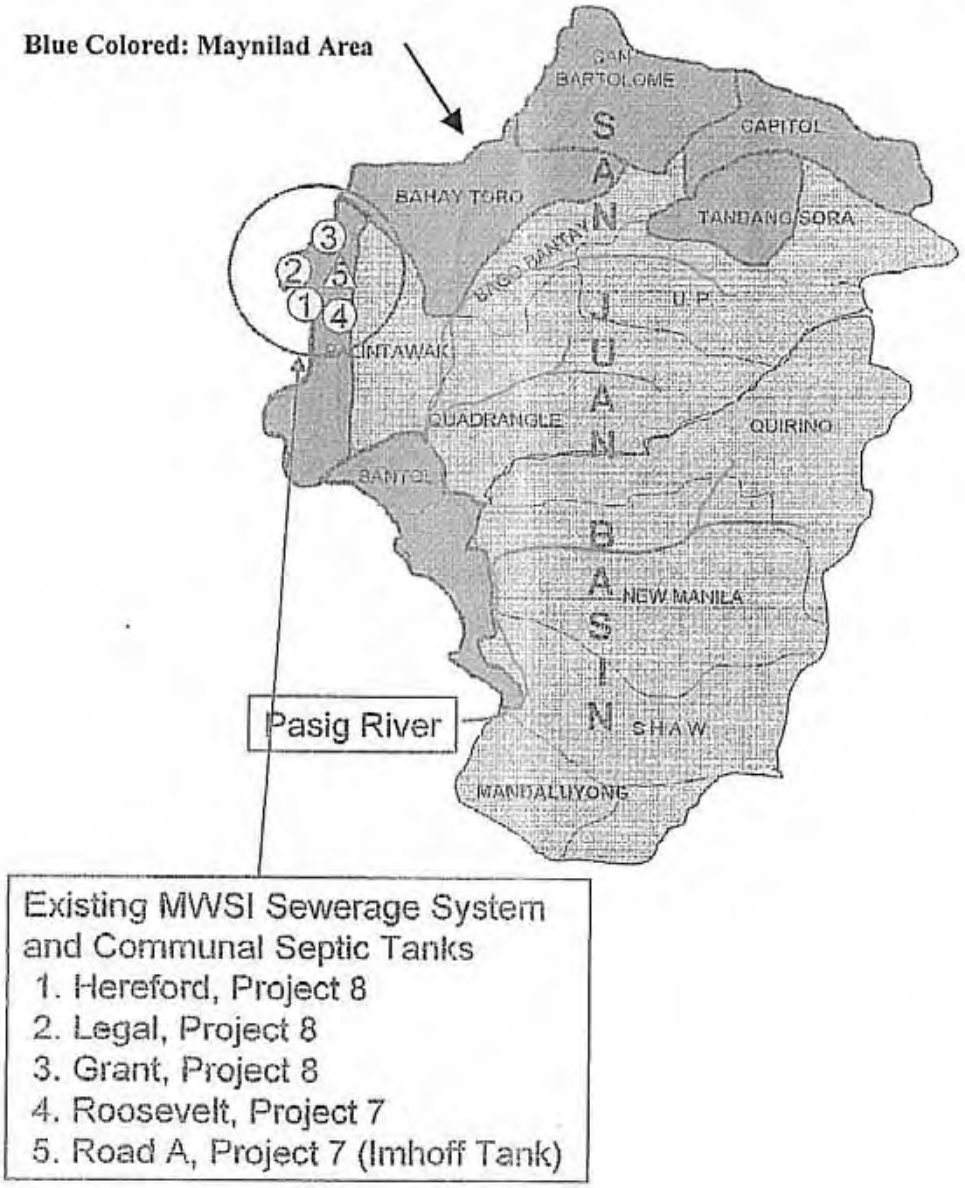
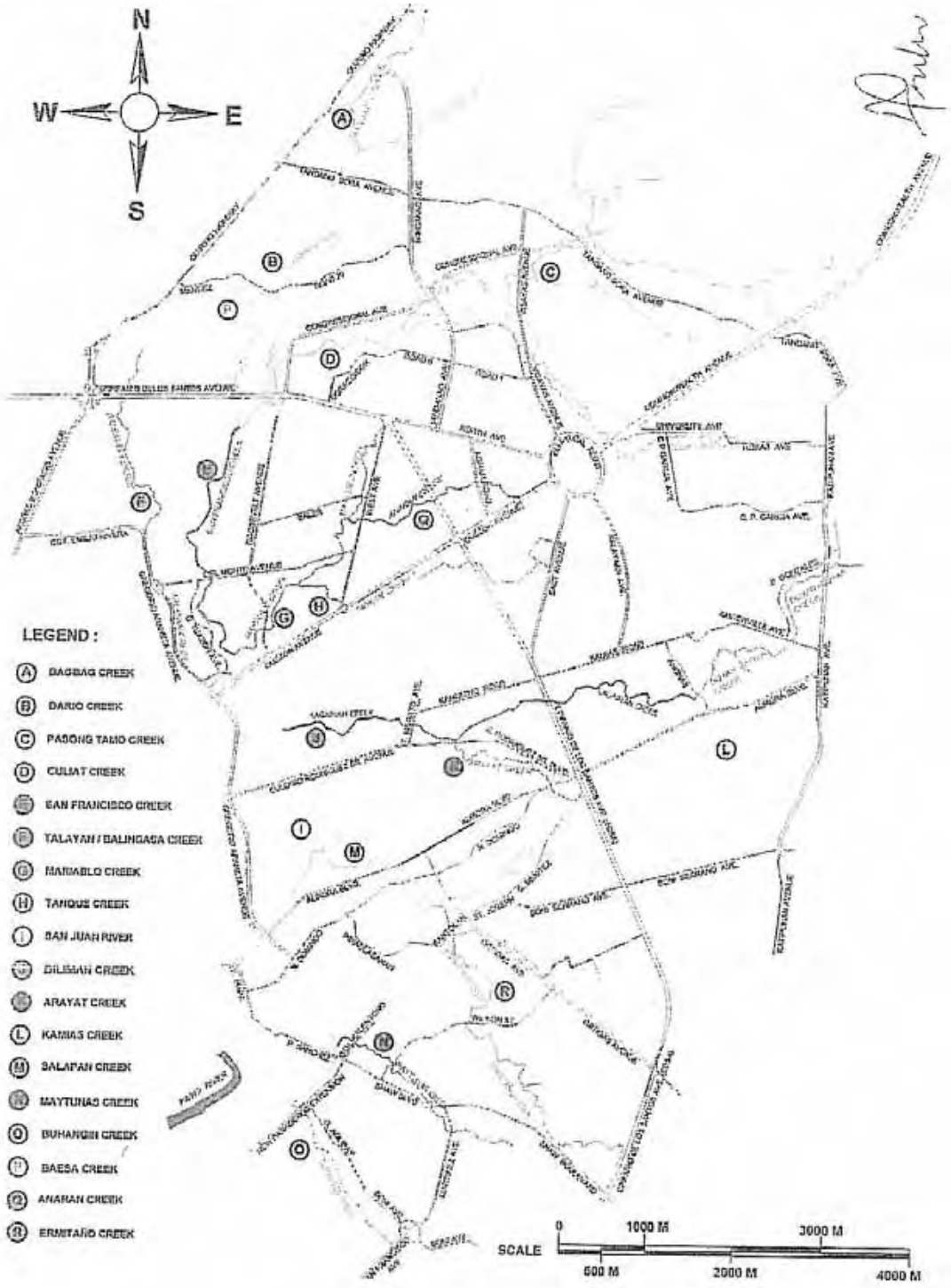


Fig. 3 San Juan River and Tributaries



3. Sanitation and Sewerage Project Plan in San Juan River Basin

3.1 Topographical Terrain and Wastewater Gravity Directions

As the master plan described, the sanitation and sewerage services in MM by Maynilad would conducted with combination of Septage Collection and Treatment, Sewage Treatment with sewage collection lines, and Communal Plants. The residential areas in San Juan River Basin are mostly congestion areas, where accessibility of septage collection vehicle would be difficult in many places. The project target areas to mitigate San Juan River contamination shall be defined the areas where all wastewater generated in the areas would be flowing down to San Jual River and/or its tributaries. Therefore the project target areas are defined by contour map, where the wastewater gravity flow directions are going to San Juan River and/or its tributaries. **Fig. 4** shows the project areas identified in the San Juan Basin divided into 7 sub-basins, that is, Bagbag Creek Basin, Dario River Basin, Curiat Creek Basin, Tarayan/Balingasa Creek Basin, San Francisco Creek Basin, Mariabro Creek Basin, and San Juan Basin. The west side of the project area border line (left side of the map), black line in Fig. 4, is the concession area of Manila Water Company Incorporation (MWCI).
Fig. 5 shows the wastewater gravity flow directions in the barangay, and **Fig. 6** shows the detail wastewater gravity flow directions in the barangay streets.
The gravity flow directions in the North, East and South areas out of the target areas are mostly going to Malabon Basin, North Manila Basin (Turiahan River) and Pasig River (Refer **Fig. 7**). Sanitation and Sewerage service management for these outer areas of San Juan Basin in Quezon City areas are studied in the Master Plan together with the project plans for the other basin.
The existing 4 communal plants are located in the Dario River Basin and Curiat Creek Basin.

3.2 Sub Basins of San Juan River Basin and Project Plan Overview

The project plan shall be studied in each basin, not in each barangay, because of economical reasons and difficulty to find appropriate facility locations.
The plant proposals will be studied from the upstream of San Juan River, and the sub-basins of San Juan River Basin shall be categorized in aspect of geographical terrain and wastewater gravity flow directions.

3.2.1 Populations in the Project Basin Areas

The populations of the barangays in the project target area are Table. 1. There are barangays belonging to MWCI service area and the barangays which have the areas partially with the wastewater gravity directions going to the other basins. The populations in the areas are segregated in the table.
The total population of the barangays related to San Juan River Basin target area is 734,588 and 70,133 in the total is belonging to MWCI service area. 86,877 in the total are in the areas where the wastewater gravity flow directions are out of the target basin area. Eventually total amount of the population 577,578 (78.6% of the barangays) are the target population to get the sanitation and sewerage service by MWSI in the San Juan Basin.

Table. 1 Area and Population of BGY included in San Juan River Basin

No.	Name of Barangay	Upper/Low Part/Low of Population Year of 2007													
		Total	Creek or River							Communal System				Other	
			Tampan /Balirasa	San Juan	Bagbag	Dam	San Francisco	Culiat	Maribb	Legal	Gaot	Communal	Reservoir	Territory of Manila Water	Other
1	Sauyo	246.0			62.0	64.0									120.0
		67,587			17,034	17,584									32,969
2	Baglag	205.0			82.0										123.0
		38,799			15,520										23,279
3	Talipapa	185.0			78.0	22.0									85.0
		34,642			14,606	4,120									15,916
4	Tandang Sora	421.0				120.0				20.0				281.0	
		74,863				21,339				3,556				49,968	
5	Sangandaan	91.0				64.0					27.0				
		24,100				16,949					7,151				
6	Baesa	168.0	21.0			127.0					8.0				12.0
		55,414	6,927			41,090					2,639				3,958
7	Bahay Toro	287.0				75.0		79.0		17.0		28.0		88.0	
		65,767				17,186		18,103		3,896		6,416		20,165	1
8	Balintawak	88.0	79.0												9.0
		7,902	7,094												809
9	Balingasa	65.0	65.0												
		19,947	19,947												
10	A Sanson	239.0	110.0			72.0	57.0								
		35,397	16,292			10,664	8,442								0
11	Katipunan	13.0				7.0							6.0		
		2,935				1,257							1,678		
12	San Antonio	74.0					66.0	4.0					4.0		
		24,666					21,999	1,333					1,333		1
13	Veterans	59.0					59.0								
		9,635					9,635								
14	Bungad	39.0					39.0								
		10,180					10,180								
15	Paltok	56.0					3.0		53.0						
		18,277					979		17,298						
16	Del Monte	54.0					54.0								
		12,971					12,971								
17	Damar	25.0	25.0												
		1,651	1,651												
18	Pag-ibig Sa Nayon	28.0	28.0												
		5,992	5,992												
19	Masambong	34.0	24.0				10.0								
		11,935	8,425				3,510								
20	Manresa	83.0	83.0												
		17,501	17,501												
21	San Jose	20.0	20.0												
		6,277	6,277												
22	Damayan	21.0					21.0								
		8,256					8,256								
23	Pinaso	18.0					9.0		9.0						
		3,659					1,830		1,830						0
24	Maribb	13.0					13.0								
		4,076					4,076								
25	Tinyan	49.0	49.0												
		5,515	5,515												
26	Sierra	39.0	39.0												
		5,414	5,414												
27	ST Peter	26.0	26.0												
		5,197	5,197												
28	Maharlika	39.0	39.0												
		5,209	5,209												
29	Sto Domingo	90.0	90.0												
		9,310	9,310												
30	Lourdes	75.0	34.0												41.0
		4,762	2,159												2,603
31	Tatalon	91.0		91.0											
		57,930		57,930											
32	Dona Imelda	92.0		88.0											4.0
		17,647		16,880											767
33	Santol	43.0		43.0											
		44,631		44,631											
34	Dona Aurora	13.0		2.0											11.0
		5,382		828											4,554
35	Dona Josefa	28.0		10.0											18.0
		3,163		1,130											2,033
36	Sta Mesa	36.0		36.0											
		8,497		8,497											
TOTAL		3,153.0	732.0	270.0	222.0	551.0	331.0	83.0	62.0	37.0	35.0	28.0	10.0	369.0	423.0
		734,588	122,510	129,896	47,160	130,989	82,380	19,436	19,128	7,452	9,790	6,416	2,411	70,133	86,887

Fig. 4Sub-Basin of San Juan River and Project Area

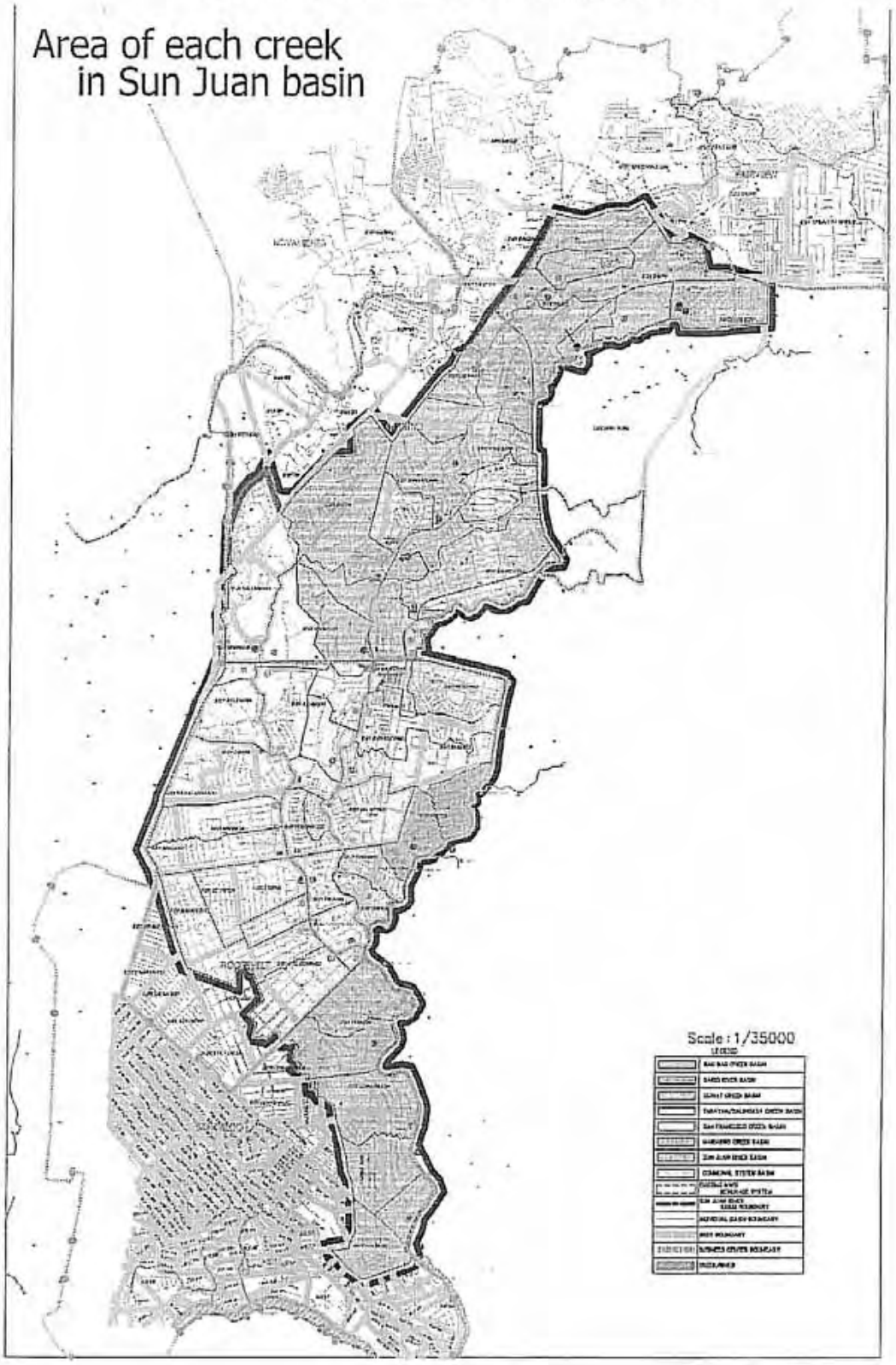


Fig. 5 Wastewater Gravity Flow Direction in Sub-Basin

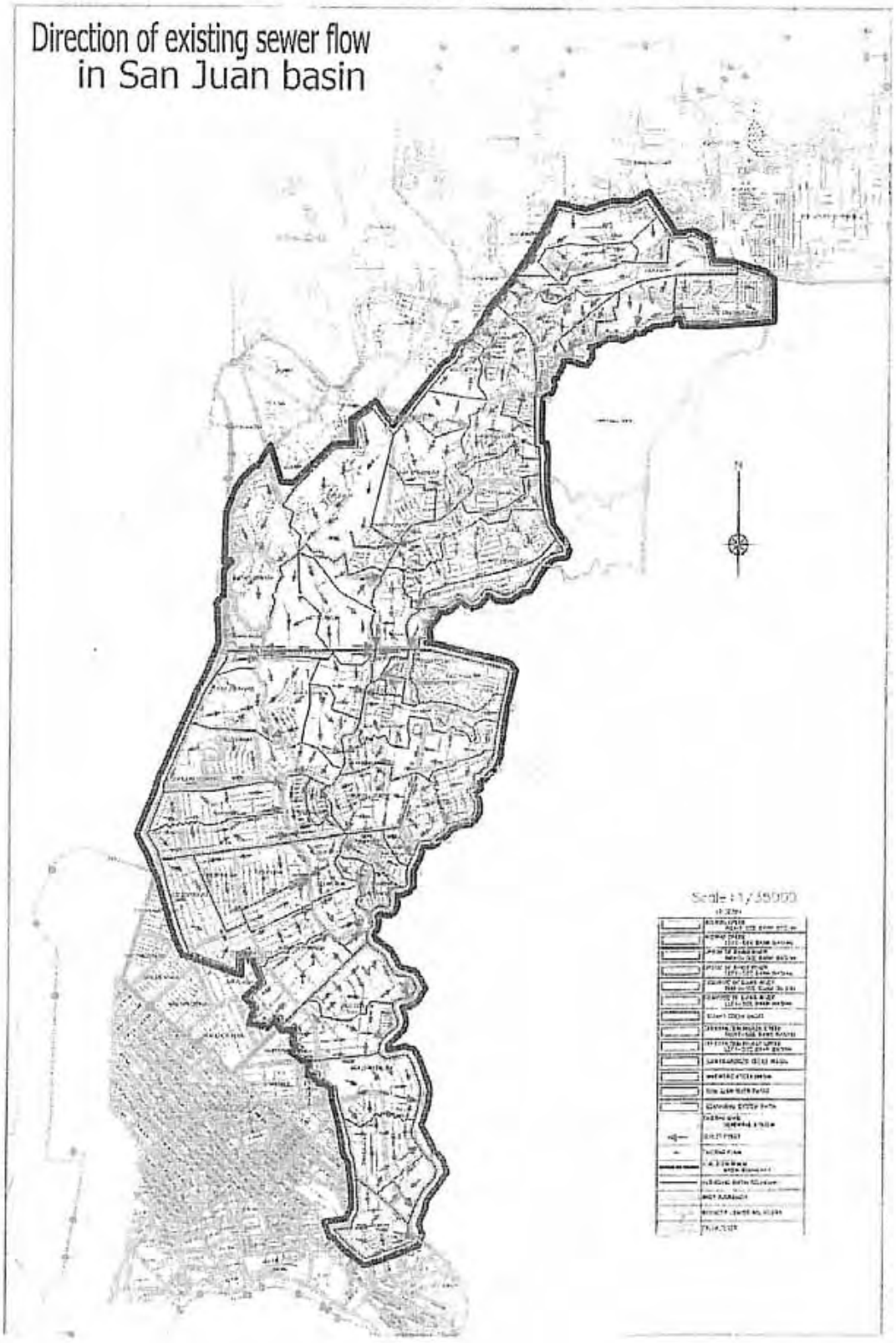


Fig. 6Wastewater Gravity Flow Directions in the Streets of Project Area

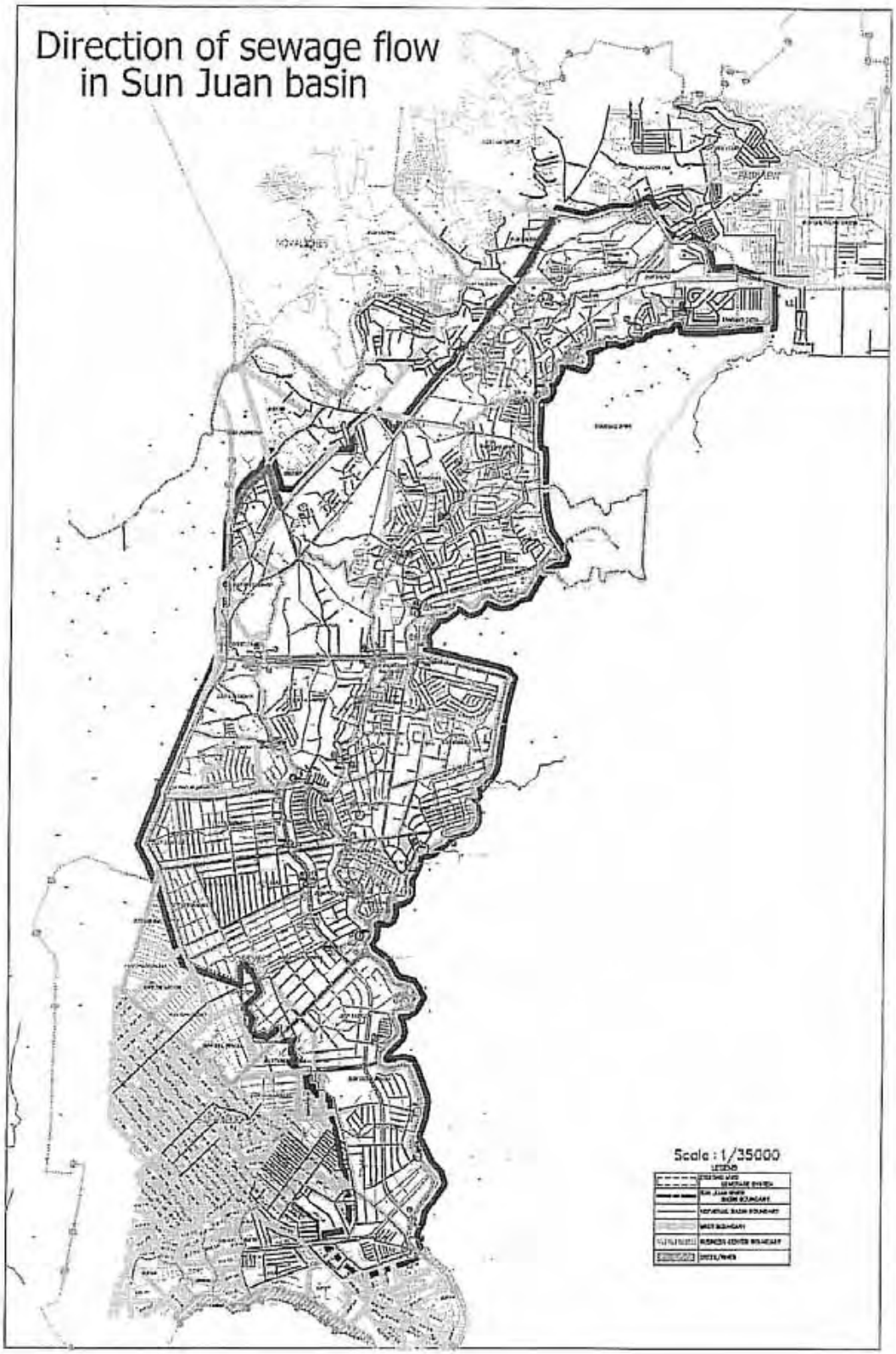
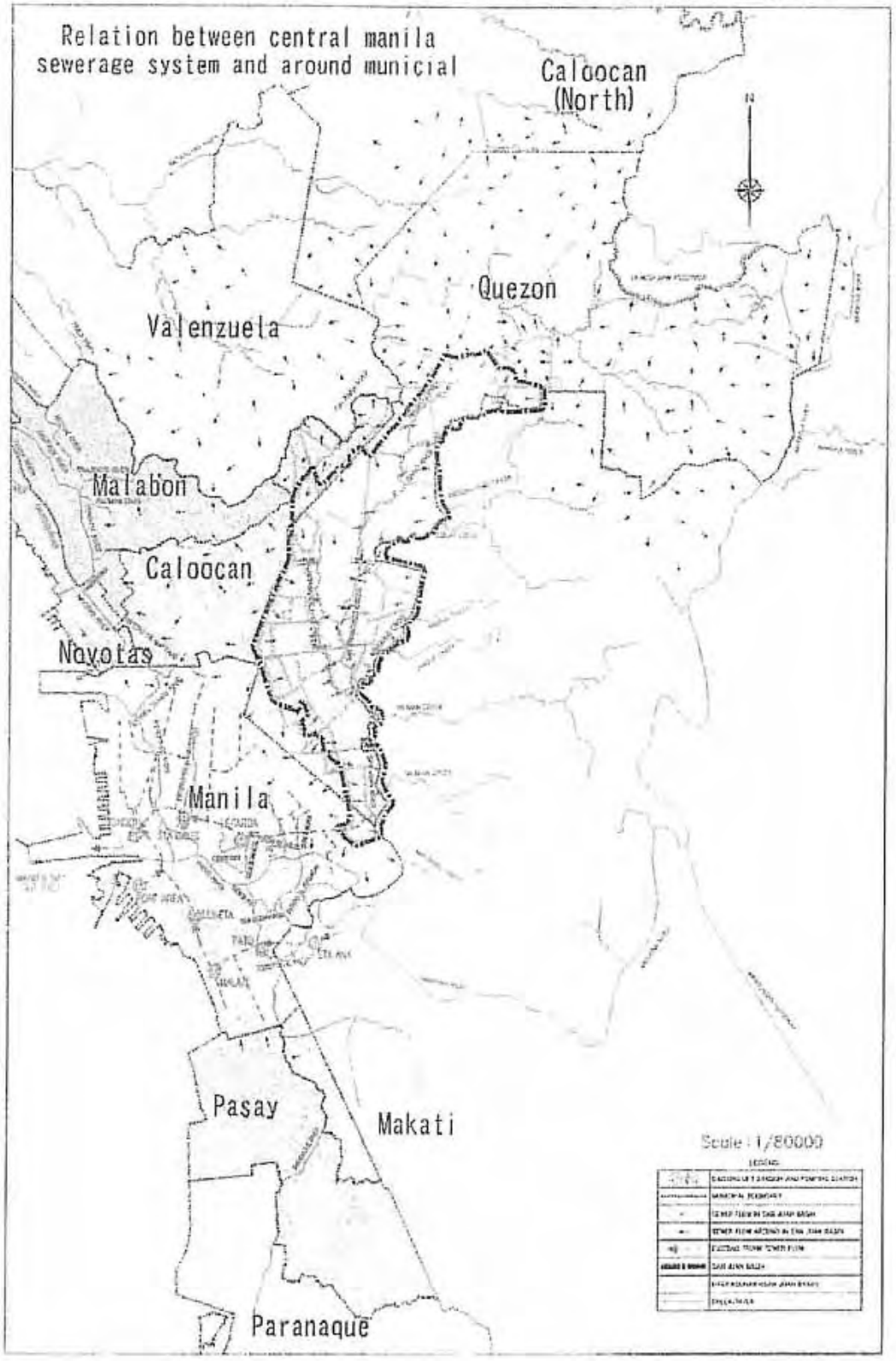


Fig. 7 Wastewater Gravity Flow Directions Outside of the Project Target Area



3.2.2. Overview Plan of Sanitation and Sewerage Project in the Target Areas

The outside areas of the barangays partially belonging to San Juan River Basin (project target areas) are studied in the master plan. The followings are overview plan for each sub-basin sanitation and sewerage project.

Overview plan of sanitation and sewerage project in the area is studied from the upstream areas of San Juan River basin.

(1) Bagbag Creek-Dario River North Basin

This basin includes barangays, Sauyo, Bagbag, Talipapa and Tandang Sola. They have the areas partially belonging to the outside basin or MWCI service area.

The Dario River North means the Dario River upstream starting from the joint point of Dario River and Bagbag creek.

Each population of the barangays is as follows.

Bagbag	38,799
Talipapa	34,642
Sauyo	67,587
Tandan Sola	74,863
(Total)	(215,891)

In the total population described, Bagbag Creek-Dario River North Basin include 77,762 including 4,120 of Talipapa in Dario River Basin. Because of the geological reason, including this area would be more economical.

(2) Culiat Creek-Dario River South Basin.

Dario River South means Dario River downstream from the joint point of Dario River and Bagbag creek. This basin includes barangays, Tandang Sora, Baesa, Bahay Toro, A. Samson, and Sangandaan. Talipapa south shall be connected to Bagbag creek-Dario River North Basin.

Population belonging to each basin is as follows;

Tandang Sora	74,863
Sangandaan	24,100
Baesa	55,414
Bahay Toro	65,767
A. Samson	35,397
Katipunan	2,335
(Total)	(257,876)

Three existing communal plants, Legal, Grants, Congressional, and Roosevelt are serving the sewerage treatment system to 24,736 people. The wastewater generated by about 6,000 people living near the center line of barangay shall be connected to Tarayan-Balingasa creek basin area, and 1,333 of San Antonio shall be included in San Francisco-Marabro Basin.

Therefore, the balance of population in this basin to be considered to provide MWSI services is **114,489.**

(3) Sanfrancisco-Marabro Creek Basin

Barangays belonging to this basins are; A. Samson, Veterans, San Antonio, Bungad, Del Monte, Paltok, Damayan, Praiso, Masambong, and Mariblo. The partial residents of 9,518 of the total population of 34,301 in Sam Antonio and Veterans are connected to the existing Roosevelt Communal Plant. Residents of 1,333 of San Antonio are in the Curiat Basin□but these people shall be categorized in Sanfrancisco-Marabro Basin.

Therefore, populations belonging to this basin are as follows;

A. Samson	8,442
Veterans	9,635
San Antonio	24,666
Bungad	10,180
Del Monte	12,971
Paltok	18,277
Damayan	8,758
Praiso	3,659
Masambong	0
Mariblo	4,076
(Total)	(100,664)

Therefore, balance of **94,009** people without Roosevelt service population shall be considered to provide MWSI services in this basin.

(4) Tarayan-Balingasa Creek Basin

The population in the Barangays where the wastewater gravity flow directions are going to Tarayan and Balingasa Creeks are as follows. However, Balangay Masambong includes the area belonging to San Francisco Basin.

Baesa	6,927
Balumbato	7,094
Balingasa	19,947
A. Samson	16,292
Damar	1,651
Pag-ig Sa Nayon	5,592
Masambong	8,425
Manresa	17,501
San Jose	6,277
Tlayan	5,515
Siena	5,414
ST. Peter	5,197
Maharika	5,209
St. Domingo	9,310
Lourdes	2,159
(Total)	(125,113)

The wastewater generated by about 6,000 people living near the center line of barangays in Curiat Creek-Dario River South Basin shall be connected to Tarayan-Balingasa creek basin area. And 2,033 of Lourdes is out of this basin. Thus total population belonging to Tarayan-Balingasa Creek Basin is **132,020**.

(5) San Juan Basin

The Balangays belonging to San Juan River Basin are as follows.

Tatalon	57,930
Dona Imelda	17,647
Santol	44,631
Dona Aurora	5,382

Dono Josefa	3,163
Sta Mesa	8,497
(Total)	(137,250)

Residents of **129,826** would be in the project target area

3.3 Sanitation and Sewerage Project Alternatives

3.2.1 Populations in the Categorized Sub-Basins

As described in Item 3.2.2, the residents living in the San Juan River Basin and its tributaries are 548,176 except people under the services of 4 communal plants. These resident areas are mostly located in the congestion areas, therefore the sewage treatment system services are preferable. The total population in the project target areas occupies about 36.5%. Population in each categorized basin is shown in **Table. 2**

Table. 2 Barangays and Populations in Each Categorized Basin

No.	Name of Barangay	Upper/Area/Classification/Lower/Population/Year of 2007											
		Total	Creek or River					Communal System				Other	
			Tarayan /Balingasa	San Juan	Bagbag/ Dario N	Curiot/ Dario S	San Francisco/ Marabou	Legal	Grant	Congressional	Roosevelt	Territory of Manila Water	Other
1	Sauyo	246.0			126.0								120.0
		67,587			34,618								32,969
2	Bagbag	205.0			82.0								123.0
		38,799			15,520								23,279
3	Talipapa	185.0			100.0								85.0
		34,642			18,725								15,917
4	Tandang Sora	421.0			50.0	70.0		20.0				281.0	
		74,863			8,899	12,440		3,556				49,968	
5	Sangandaan	91.0				64.0			27.0				
		24,100				16,949			7,151				
6	Baesa	168.0	21.0			127.0			8.0				12.0
		55,414	8,927			39,890			2,639				3,958
7	Bahay Toro	287.0				154.0		17.0		28.0		86.0	
		65,767				35,289		3,896		6,416		20,165	1
8	Balintawak	88.0	79.0										9.0
		7,902	7,094										808
9	Balingasa	65.0	65.0										
		19,947	19,947										
10	A Samson	239.0	110.0			72.0	57.0						
		35,397	20,292			8,664	6,442						(1)
11	Katipunan	13.0				7.0					6.0		
		2,335				1,257					1,078		
12	San Antonio	74.0				4.0	66.0				4.0		
		24,666				1,333	21,999				1,333		1
13	Veterans	59.0					59.0						
		9,635					9,635						
14	Bungad	39.0					39.0						
		10,180					10,180						
15	Paltok	56.0					56.0						
		18,277					18,277						
16	DelMonte	54.0					54.0						
		12,971					12,971						
17	Damar	25.0	25.0										
		1,651	1,651										
18	Pag-ibig SA Nayon	28.0	28.0										
		5,592	5,592										
19	Masambong	34.0	34.0				(0.0)						
		11,935	11,935				(3,510)						
20	Manresa	83.0	83.0										
		17,501	17,501										
21	San Jose	20.0	20.0										
		6,277	6,277										
22	Damayan	21.0					21.0						
		8,758					8,758						
23	Pinyo	18.0					18.0						
		3,659					3,659						
24	Marlib	13.0					13.0						
		4,076					4,076						
25	Tibyan	49.0	49.0										
		5,515	5,515										
26	Siena	39.0	39.0										
		5,414	5,414										
27	ST Peter	26.0	26.0										
		5,197	5,197										
28	Maharlika	39.0	39.0										
		5,209	5,209										
29	Sto Domingo	90.0	90.0										
		9,310	9,310										
30	Lourdes	75.0	34.0										41.0
		4,762	2,159										2,603
31	Tatalon	91.0		91.0									
		57,930		57,930									
32	Dona Imelda	92.0		88.0									4.0
		17,647		16,880									767
33	Santol	43.0		43.0									
		44,631		44,631									
34	Dona Aurora	13.0		2.0									11.0
		5,382		828									4,554
35	Dona Josefa	28.0		10.0									18.0
		3,163		1,130									2,033
36	Sta Mesa	36.0		36.0									
		8,497		8,497									
TOTAL		3,153.0	742.0	270.0	358.0	498.0	373.0	37.0	35.0	28.0	10.0	369.0	423.0
		734,588	132,020	129,896	77,762	115,822	92,487	7,452	9,790	6,416	2,411	70,133	86,889

3.2.2 Proposed Project Alternatives

The general concept to establish the sanitation and sewerage treatment system is described in the Master Plan, that is, the sanitation and sewerage management will be basically conducted with combination of Septage Treatment Plants with septage collection vehicles, and Sewage Treatment Plants and Communal Plants together with sewer line connections. The sanitation and sewerage management in this target area shall mainly establish sewage treatment system applications.

3.2.2.1 Bagbag Creek-Dario River North Basin

Wastewater generated the area in the Bagbag Creek shall be collected through Bagbag Creek. At that time, Bagbag Creek is used as a combined collection sewers. A Sewage Treatment Plant (Bagbag Sewage Treatment Plant-BSTP) shall be established at the swamp area located at the connection point of Bagbag Creek to Dario River. The vacant area size is around 5,500m^2. (refer **Fig 8**).

The Requirements for the sewerage treatment plant are as follows.

Treatment System	SBR
Treatment Capacity	10,400m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	0.30ha
Service Population	800,000

The plant site shall be protected by the wall of 1.5meters and more height than the creek side way against over-flood incidents. Tauyo and part of Tandan Sora are in Dario River North Basin, and total wastewater of 30,000 m^3/d shall be transported to the Bagbag Sewage Treatment Plant (BSTP) by four combined manhole pumps.

A part of Taripapa is also in Dario River Basin. 400 m^3/d of wastewater generated in this area shall be conveyed by one combined manhole pump.

Requirements for the manhole pumps and sewers are as follows.

Combined Manhole Pumps	3 x 400l/s (Submersible)
Ditto	2 x 10l/s (Ditto)
Connection Sewers	600Φ x 2,500m
	150Φ x 500m

Fig. 9 shows the connection sewer lines and **Fig. 10** shows BSTP sewage treatment process.

Fig. 8 BSTP Location

Fig. 9 Connection Sewer Lines to BSTP

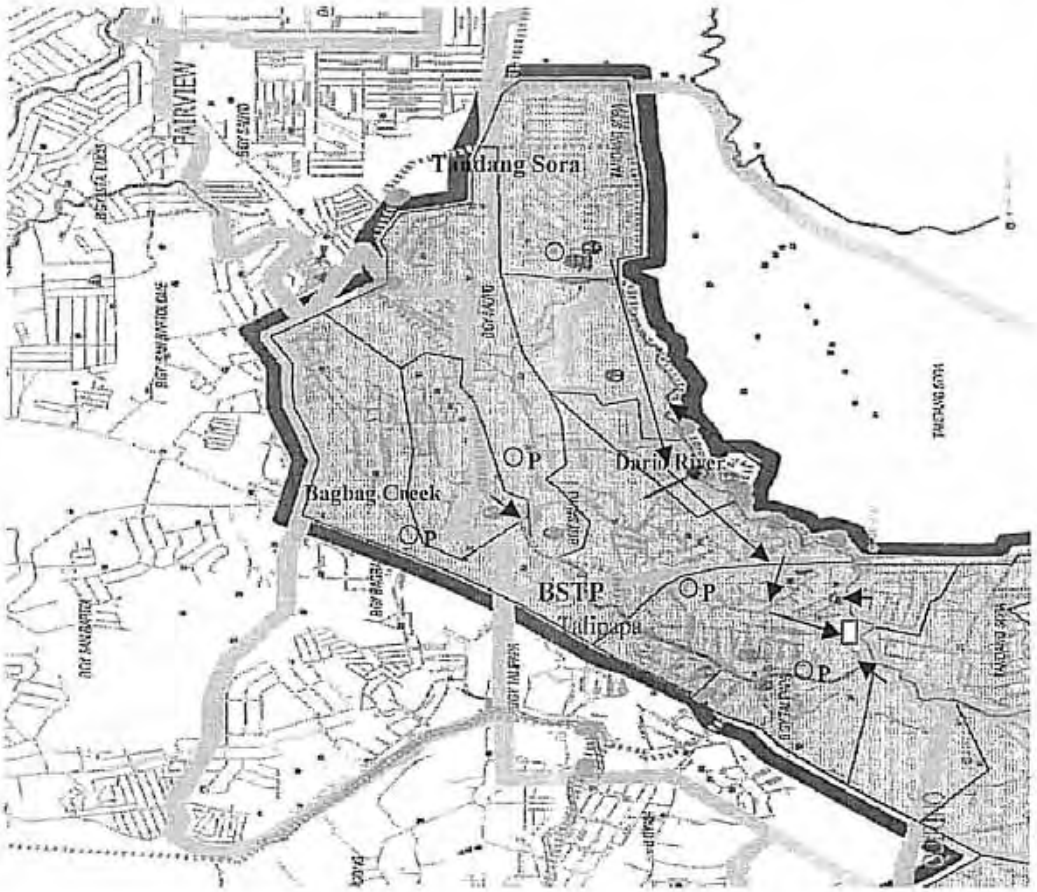
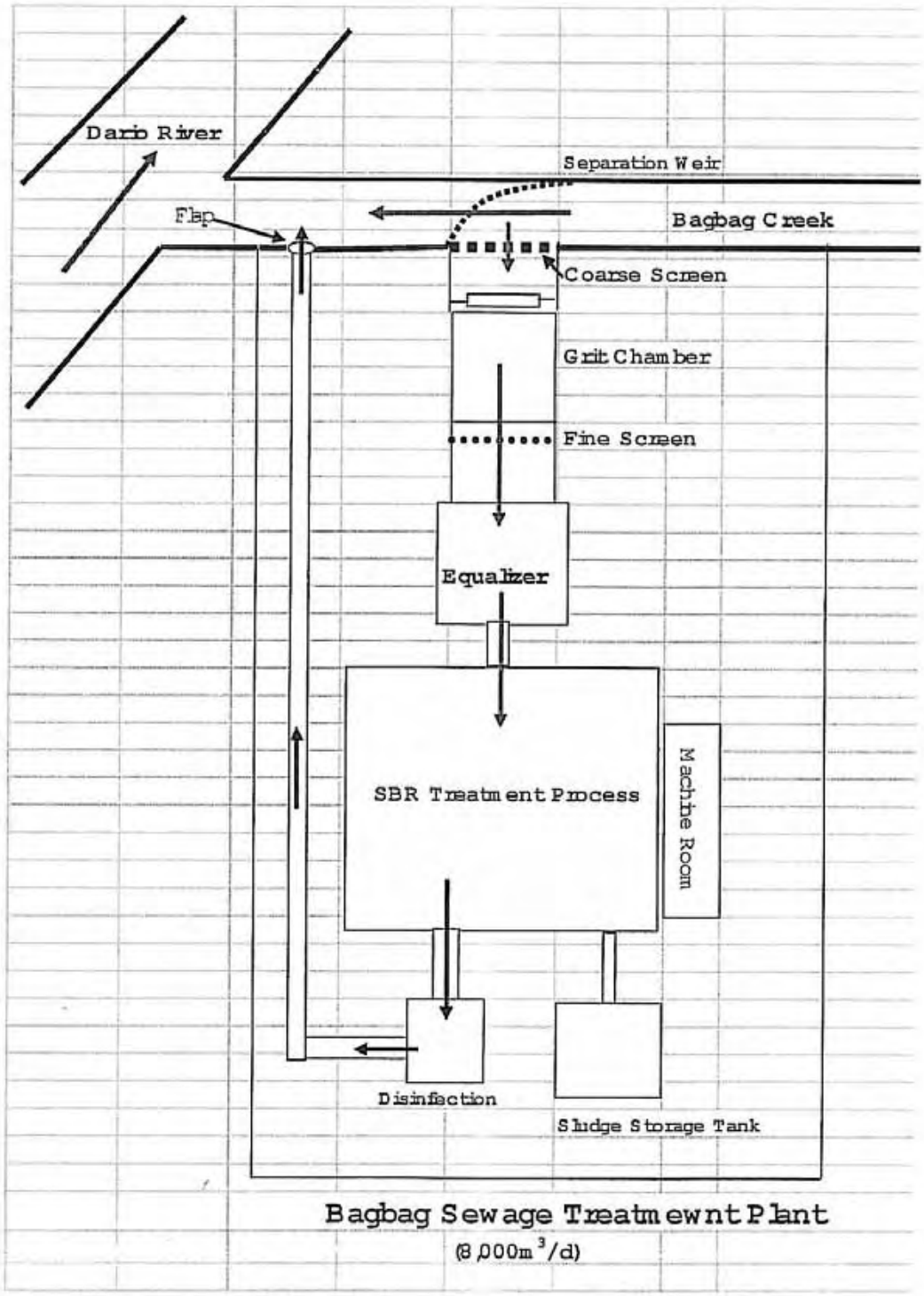


Fig. 10 BSTP Sewage Treatment Process



3.2.2.2 Talayan-Balingasa Creek Basin

Balingasa Creek is connected to the far end of Talayan Creek. The wastewater generated in this basin is eventually discharged into San Juan River. Talayan- Balingasa Creek could be used as combined sewer lines. Talayan Sewage Treatment Plant (TSTP) should be constructed at the discharge point of Talayan Creek to San Juan River (available area of 0.5hr.Refer **Fig. 11**).

In this case, coarse screen shall be installed in the Talayan Creek. After the screen, the creek to the TSTP inlet would be used as grit chamber. **Fig. 12** shows a picture of the part of the creek to TSTP inlet used as grit chamber. **Fig.** 13 shows a picture of the site area seen from the creek downstream. The site area boundary wall shall be at least 1.5 meter higher than G.L of Araneta Avenue, because to prevent the site areas from inundation by the town over-flood. TSTP inlet gate shall be installed after fine screen in order to shut down the plant during high water level of the creek. **Fig. 14** shows positions of the coarse and fine screen, TSTP inlet gate, additional access road and treated water discharge point. **Fig. 15** is a picture showing downstream scenery from the discharge point.

Access road shall be installed over the creek and the road might be combined with the existing pathway of the barangay alongside the creek. (Refer Fig. 15)

The treatment process is shown in **Fig. 16.**

The requirements for the TSTP are as follows.

Treatment System	SBR
Treatment Capacity	15,600^3/d
In/0ut Water Quality	200mg/20mg/l BOD5
Required Area	0.50ha
Service Population	1,200,000

Fig. 11 ASTP Site Area

Fig. 12 Creek Flow to be used as Grit Chamber to TSTP Inlet Fine Screen

Fig. 13 Picture Current ATSP Site Area seen from the Creek Downstream

Fig. 14 TSTP Facilities Positioning

Fig. 14 TSTP Facilities Positioning

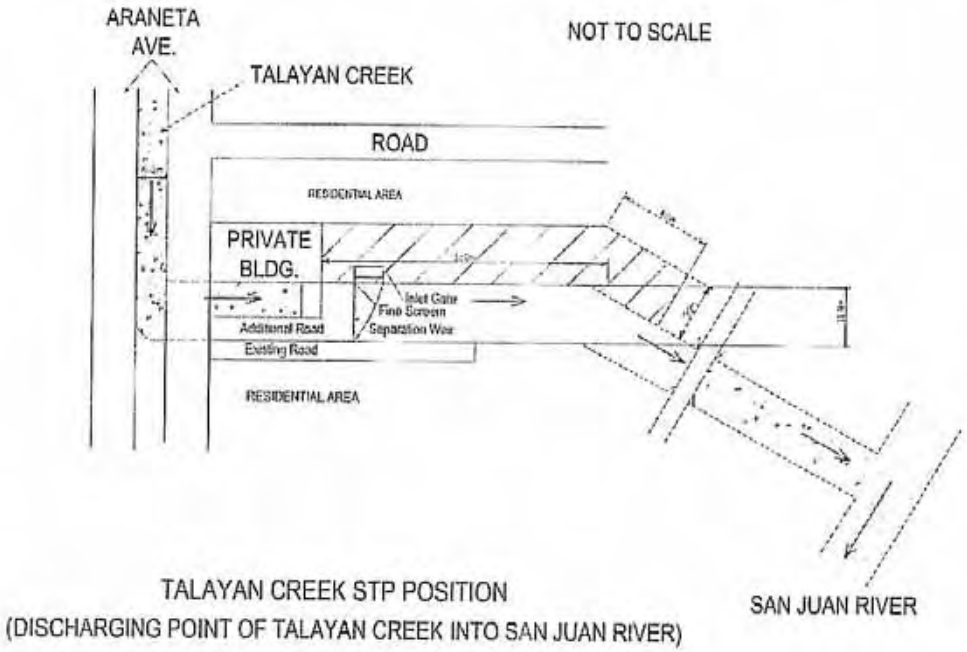
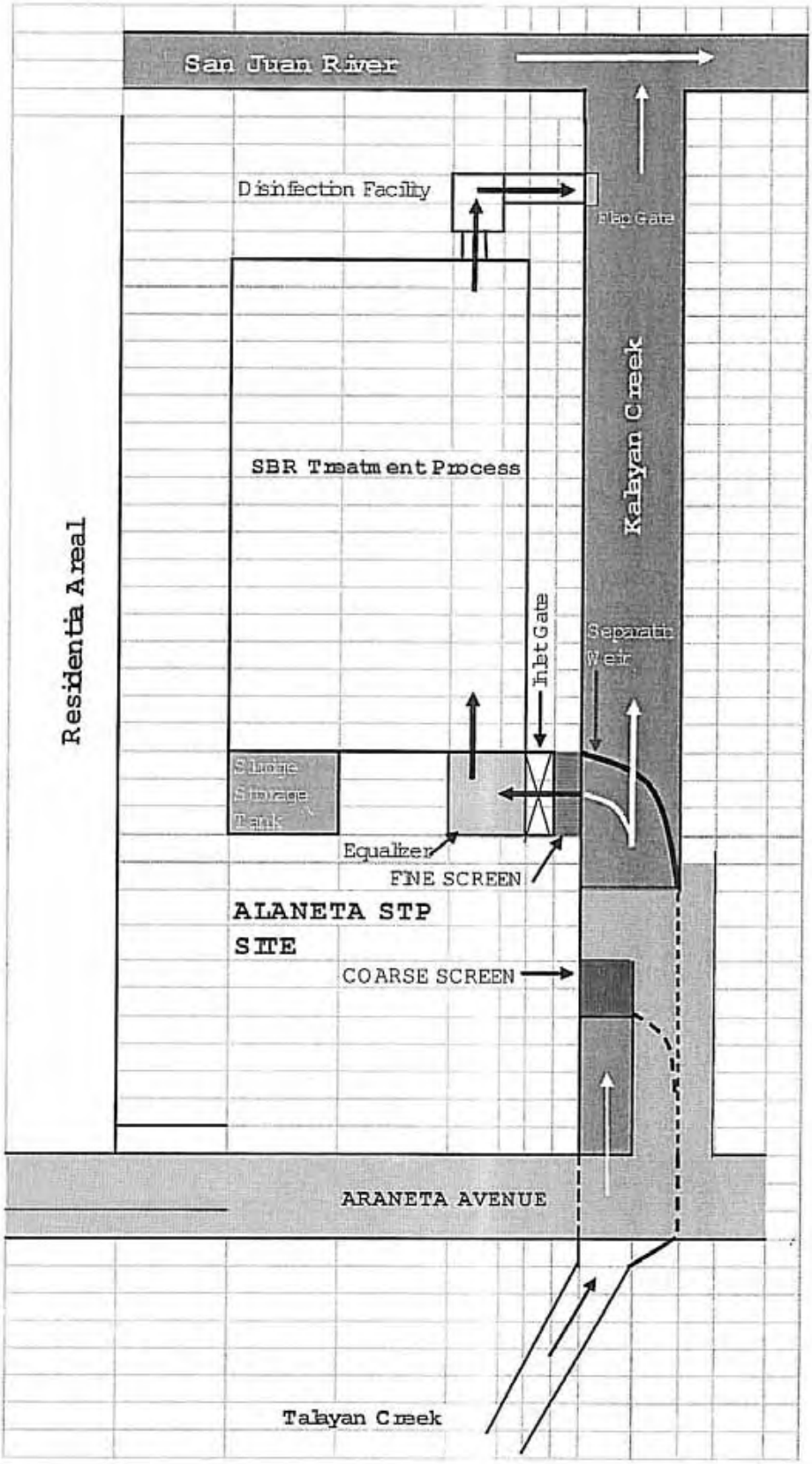


Fig. 15 Picture of Outlet to San Juan River from ATSP Discharge Point

Fig. 16 ATSP Sewage Treatment Process



3.2.2.3 Cliat Creek-Dario River South Basin

Sewerage systems in this basin shall be studied by each barangay.

(1) Katipnan

The left side area of Dario River is already served by the communal plant of Roosevelt. The population of 1,257 in the right side of the river shall be serviced by a new communal plant of Joukaso (KSTP).

The specification of Joukaso is as follows

Treatment System	Jokasou
Treatment Capacity	156m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	15m x 10m
Service Population	1,200

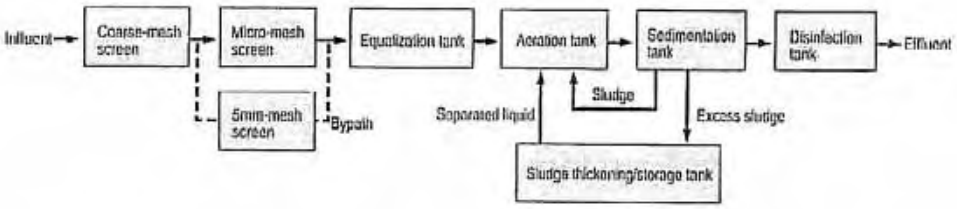
The Jokasou shall be installed in the right side of Dario River. Before inlet of the Jokasou, a combined type manhole is installed. Specification of the manhole with discharge pipe is as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L2,000mm x1

The flow diagram of Jokasou is shown in **Fig. 17** and the site layout is shown in **Fig. 18.**

Fig. 17 Jokasou Treatment Process

(1) Number of people: 201 to 500



(2) Number of people: 501 or more

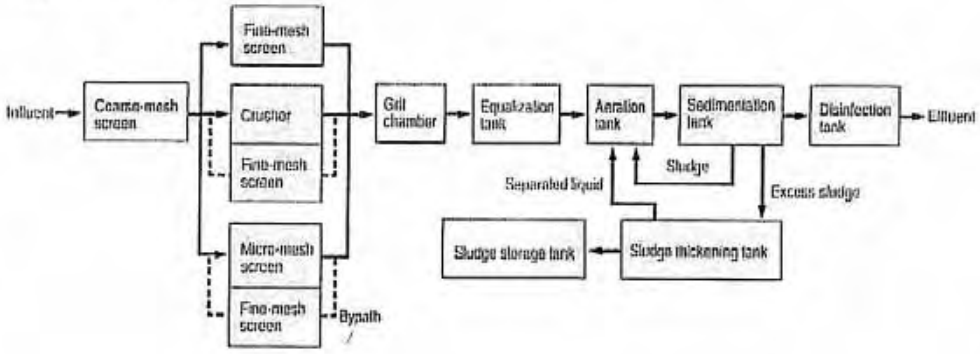
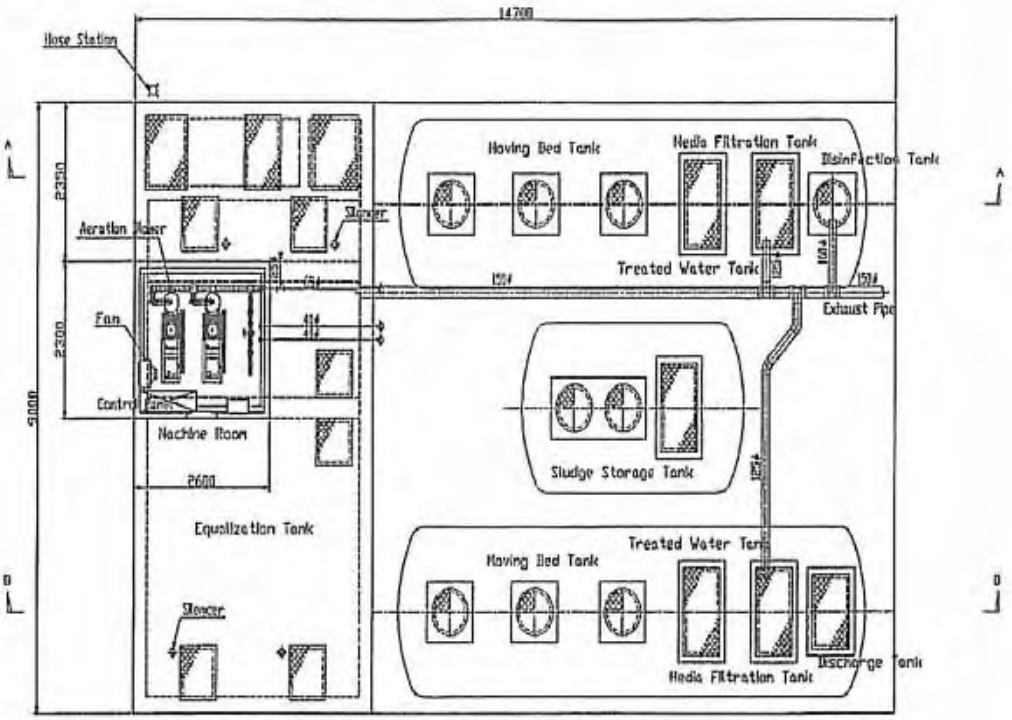
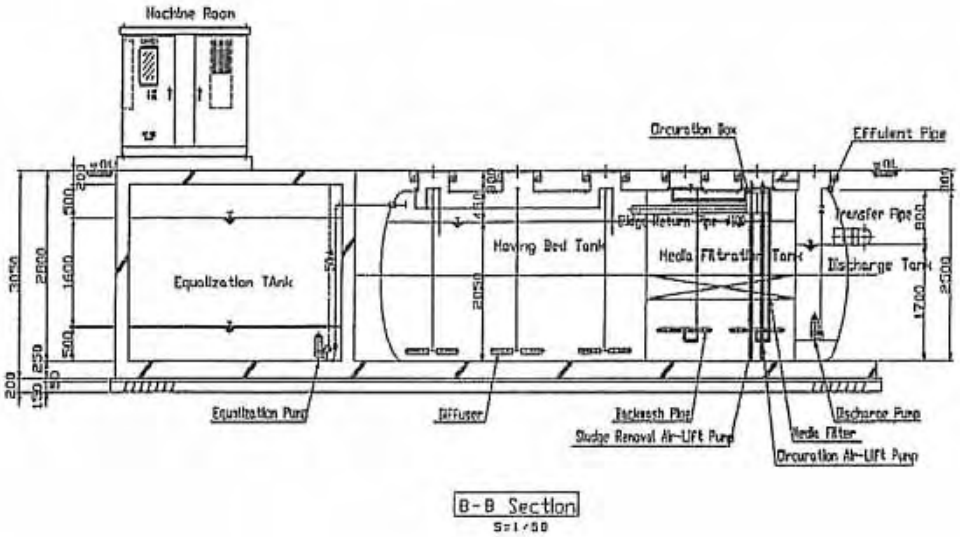


Fig. 18 Layout of Jokasou



Plan
S=1/100



B-B Section
S=1/50

This area has a communal plant of Legal, and remaining population in this basin is 12,440. A sewage treatment plant (TsSTP) shall be installed at the lowest ground level in this basin alongside of Dario River. The specification of TsSTP is as follows.

Treatment System	SBR
Treatment Capacity	1,560m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	30m x 25m (0.075ha)
Service Population	12,000

The picture of the site candidate area is shown in **Fig. 19**, and the treatment flow is shown in **Fig.20.**

Fig. 19 TsSTP Site Candidate Area

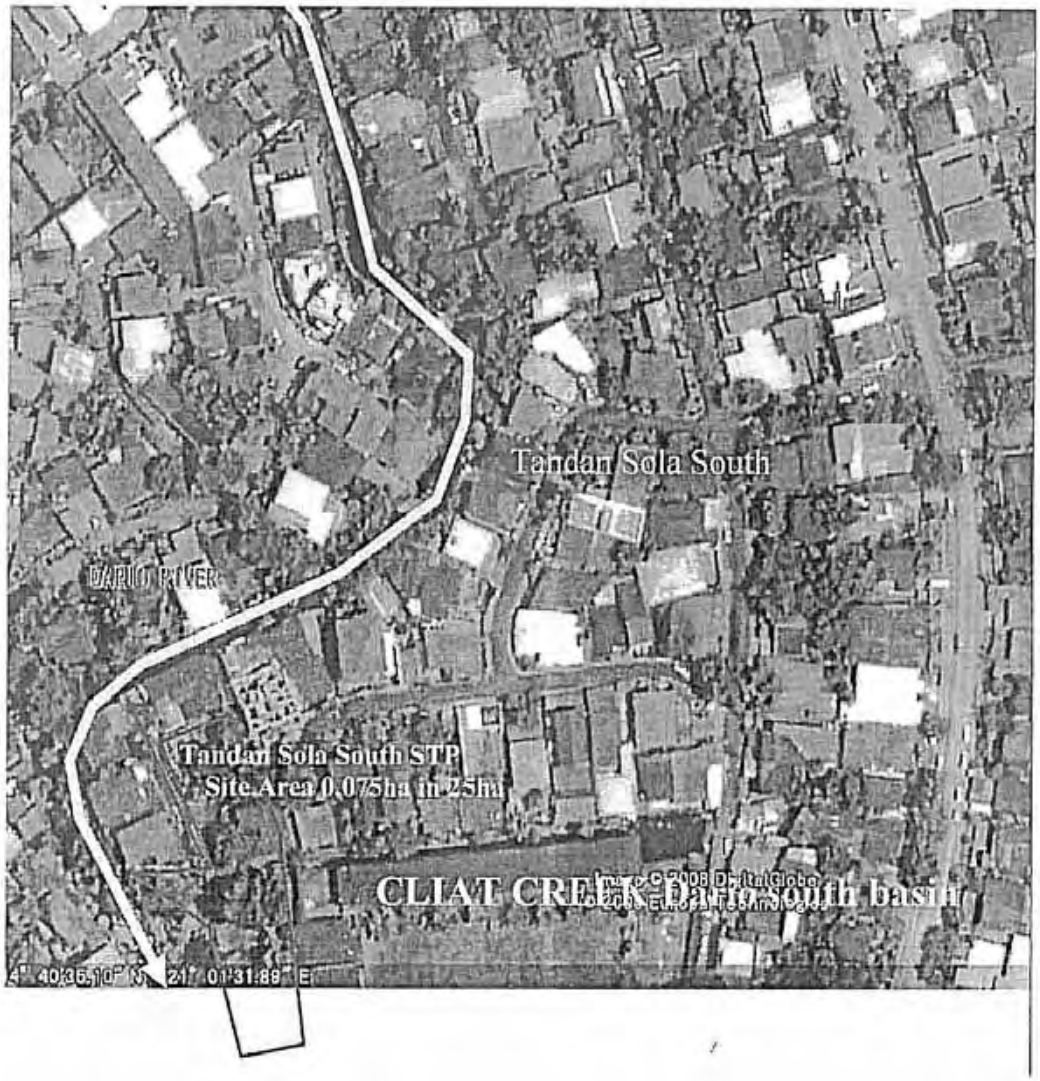
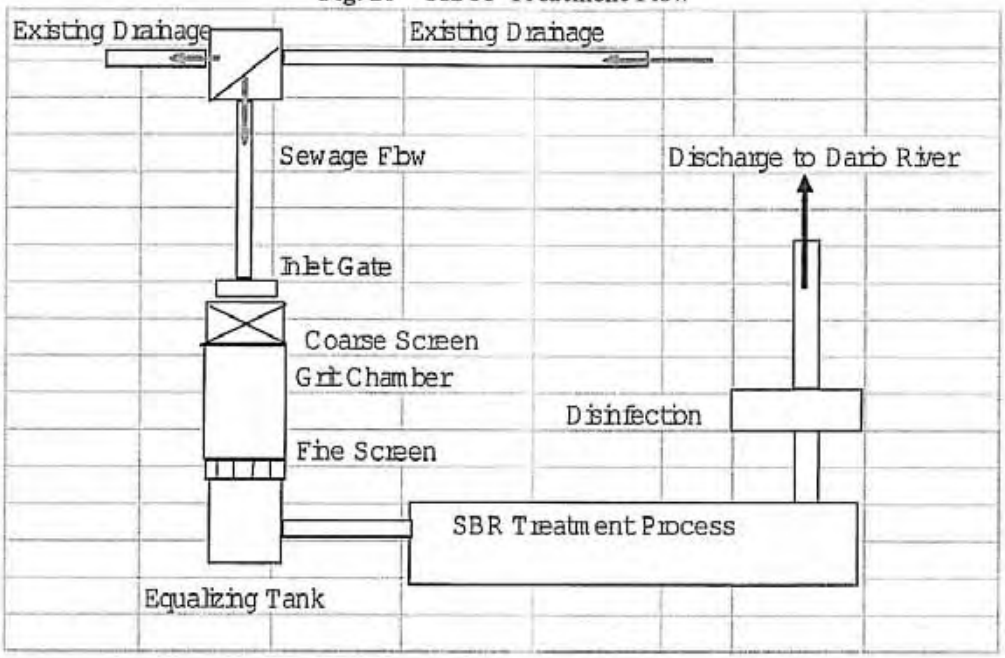


Fig. 20 TsSTP Treatment Flow



(3) Sangadaan

This area has a communal plant of Grants, and remaining population of 16,949 in this basin is targeted for the project. A sewage treatment plant (SSTP) shall be installed at the lowest ground level in this basin alongside of Dario River. The specification of SSTP is as follows.

Treatment System	SBR
Treatment Capacity	2,210m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	30m x 25m (0.075ha)
Service Population	17,000

The picture of the site candidate area is shown in **Fig. 21**, and the treatment flow is shown in **Fig.22.**

The SSTP would be located not in the riverside, so the following discharge pipe to Dario River is needed.

Discharge Pipe	φ200mm x L200m

Fig. 21 SSTP Site Candidate Area

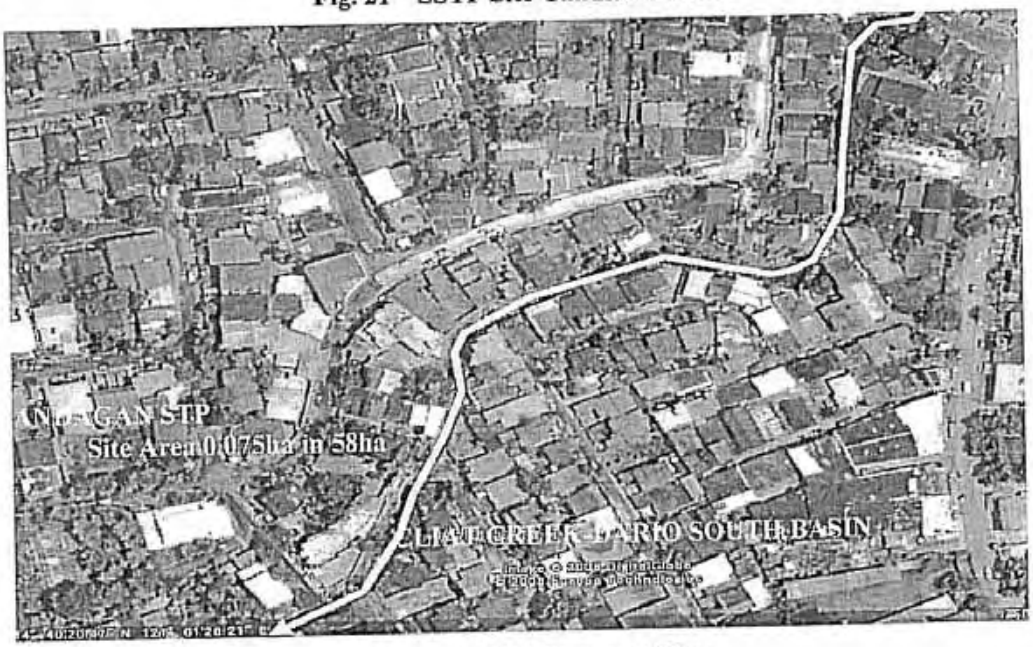
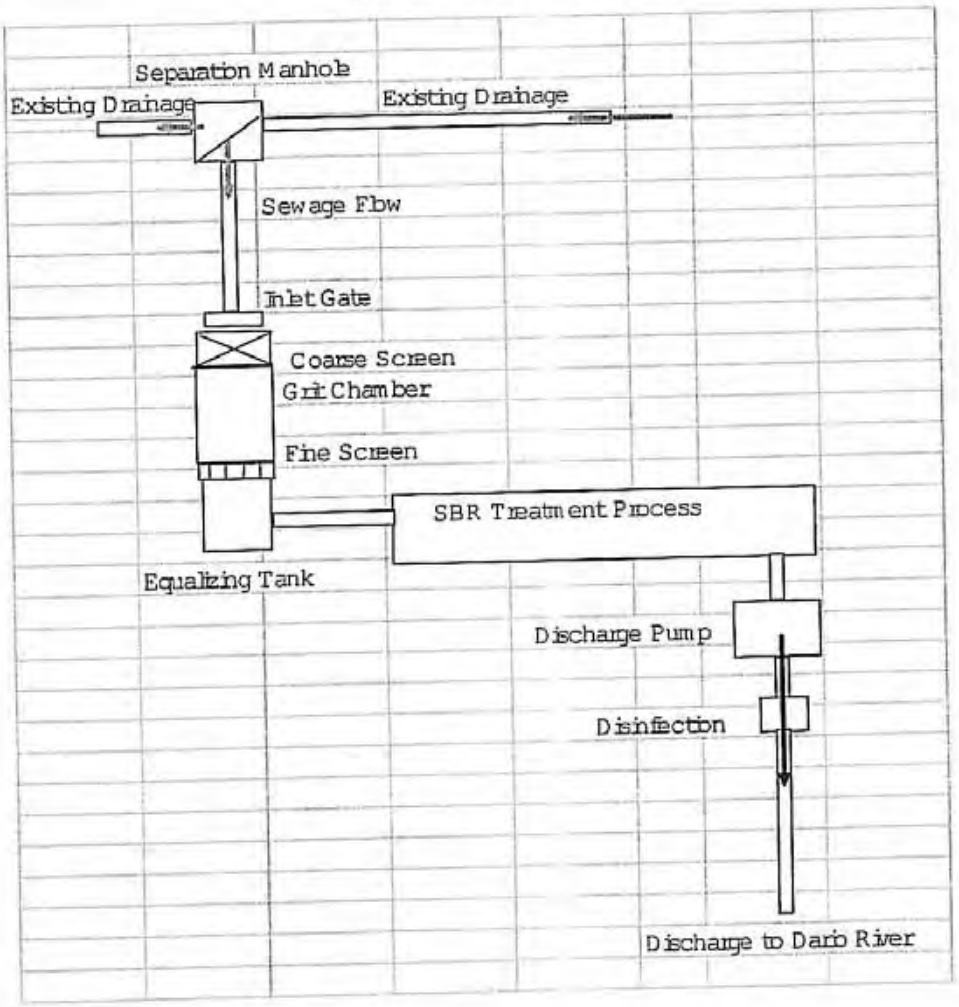


Fig. 22 SSTP Treatment Flow



(4) Baesa

A part of this area is served the existing communal plant of Grants, and 2,000 people of the remaining 41,890 shall be connected to Talayan-Balingasa Creek Basin, because of wastewater gravity flow direction. Remaining population of 39,890 shall be served sewerage services by a new sewage treatment plant (BSTP).

The collection sewers are used the existing drainage lines as combined sewer lines, however, a large squatters settlement area are occupying in this area, therefore, the street drainages should be re-studied.

A sewage treatment plant (BaSTP) shall be installed at the lowest ground level in this basin alongside of Dario River. The specification of BSTP is as follows.

Treatment System	SBR
Treatment Capacity	5,200m^3/d
In/0ut Water Quality	200mg/20mg/l BOD5
Required Area	50m x 30m (0.15ha)
Service Population	40,000

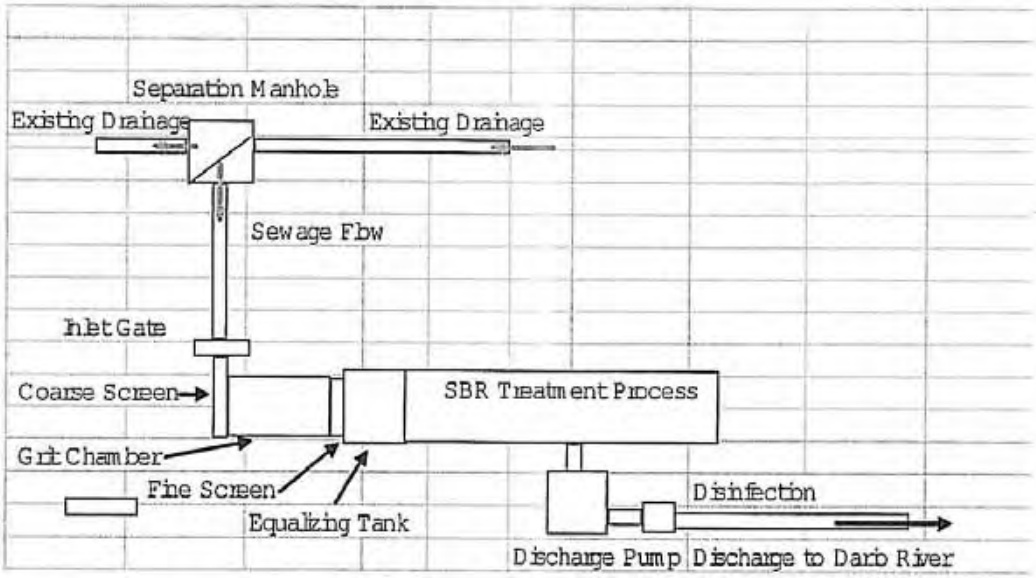
The picture of the site candidate area is shown in **Fig. 23**, and the treatment flow is shown in **Fig.24.**

One combined type manhole with transportation pipe to Talayan-Balingasa basin from this area is necessary. The specifications are as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L1,000mm x1

Fig. 23 BaSTP Site Candidate Area

Fig. 24 BaSTP Treatment Flow



(5) Bahay Toro

A part of this area is served the existing communal plants of Legal and Congressional. Remaining population of 35,289 shall be served sewerage services by two newly established sewage treatment plants (BtSTP-1 and BtSTP-2).

Because of gravity flow directions of the wastewater generated in this basin, people of 6,000 in the upstream of Dario River shall be served by Jokasou (BtSTP-1) to be located near the upstream of Dario River South. Remaining people of 29,289 shall be served by the sewage treatment plant (BtSTP-2) installed at the lowest ground level in this basin alongside of Dario River. BtSTP-2 is located 60 meters from Dario Riverside.

The specifications of the plants are as follows.

BtSTP-1

Treatment System	Jokasou
Treatment Capacity	780m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	25m x 30m
Service Population	6,000

Discharge Pipe

Plastic Pipe	φ200mm x L60m

Combined Type Manhole	φ900mm x 5,000mm x 1

BtSTP-2

Treatment System	SBR
Treatment Capacity	3900m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	50m x 30m (0.15ha)
Service Population	30,000

The picture of the site candidate area is shown in **Fig. 25 and 26**, and the treatment flow is shown in **Fig.27 and 28.** The layout of BtSTP-1 is shown in **Fig. 29.**

Fig. 25 BtSTP-1 Site Candidate Area

Fig. 26 BtSTP-2 Site Candidate Area

Fig. 27 BtSTP-1 Treatment Flow

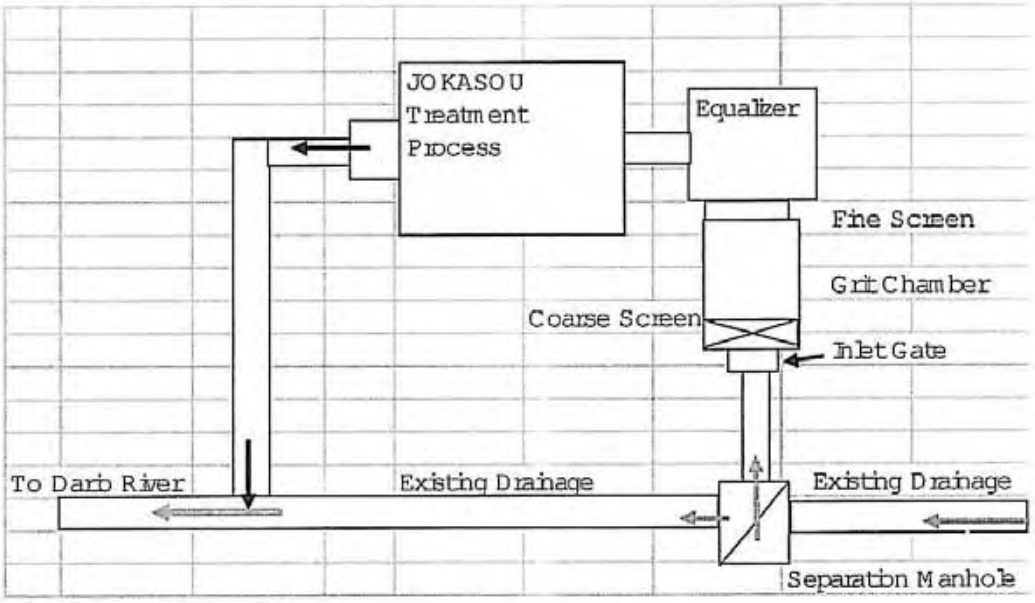


Fig. 28 BtSTP-2 Treatment Flow

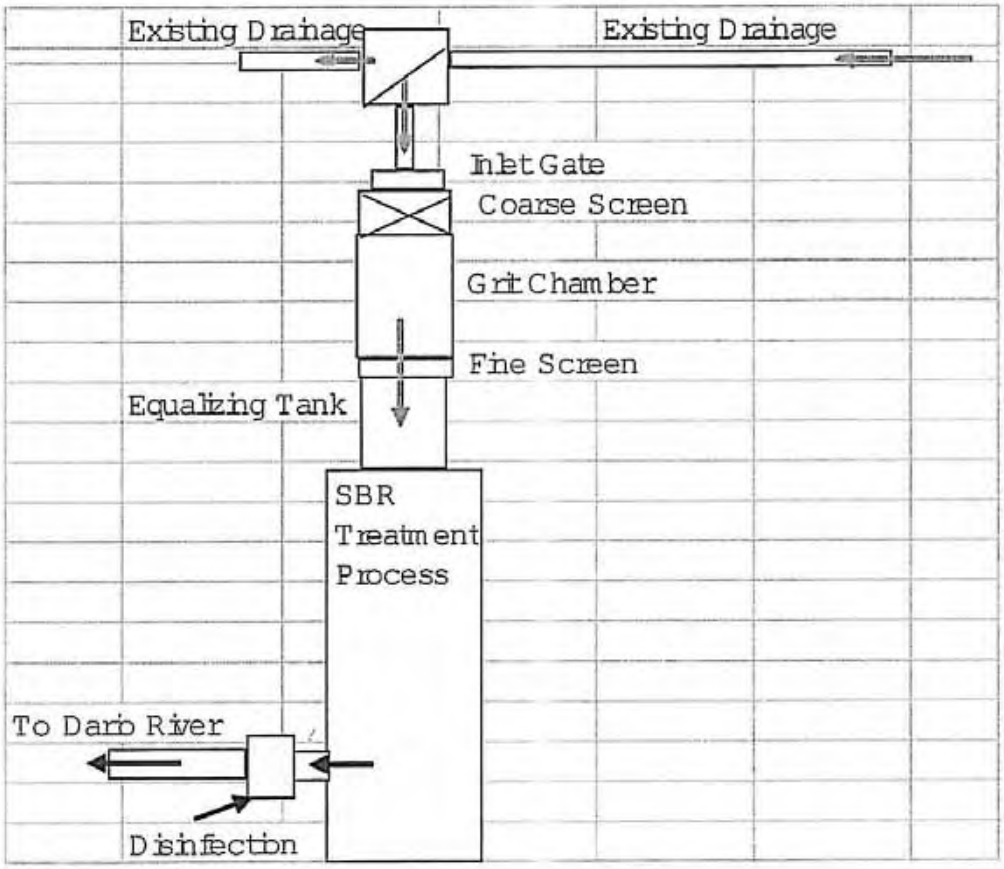
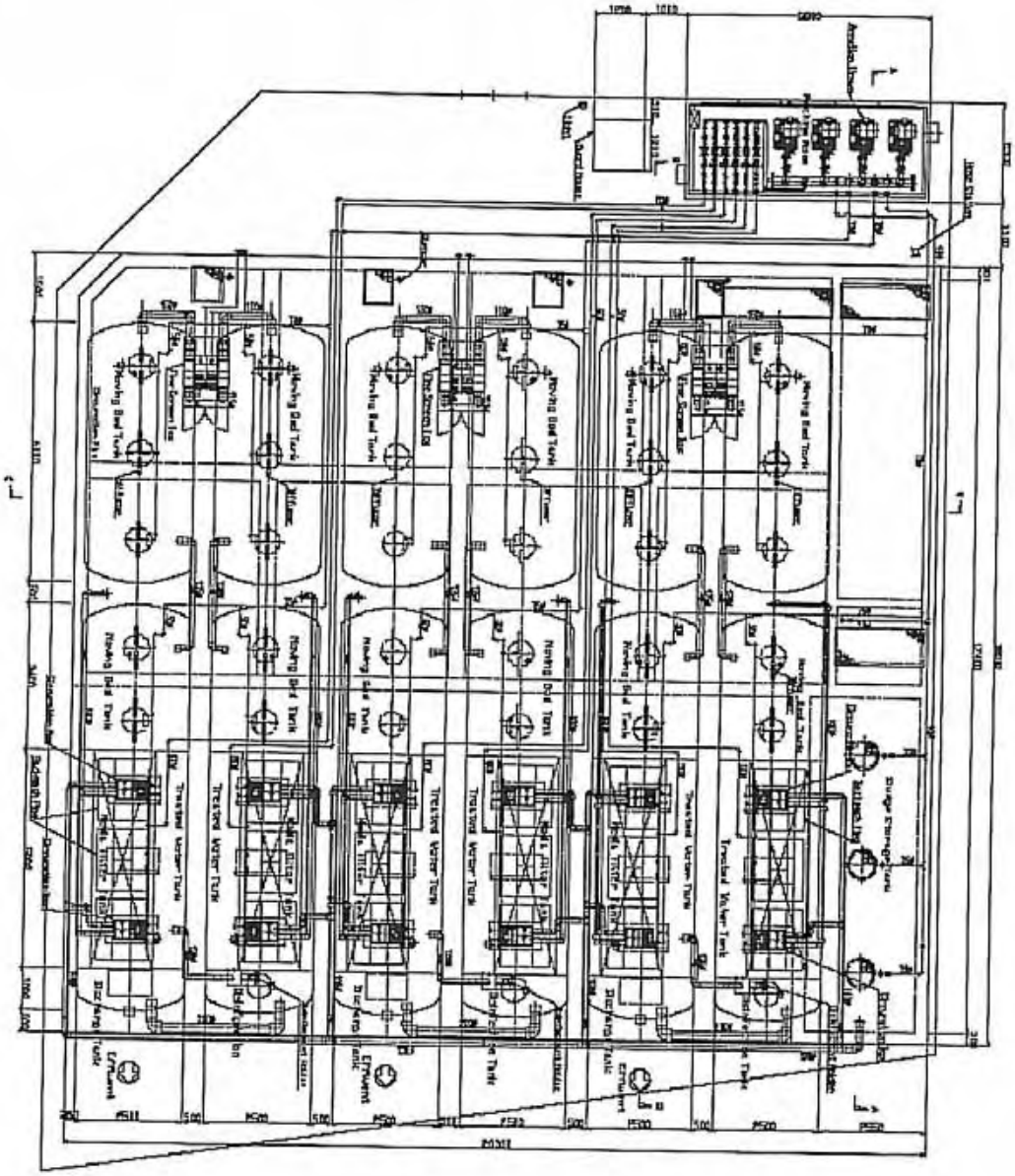


Fig. 29 BtSTP-1 Layout



(6) A. Samson

2,000 people of the target population of 10,684 in this basin shall be connected to Talayan-Balingasa Creek Basin, because of wastewater gravity flow direction. Remaining population of 8,664 shall be served sewerage services by a new sewage treatment plant (AsSTP). The collection sewers are used the existing drainage lines as combined sewer lines.

A sewage treatment plant (AsSTP) shall be installed at the lowest ground level in this basin alongside of Dario River. The specification of AsSTP is as follows.

Treatment System	Jokasou
Treatment Capacity	1170m^3/d
In/Out Water Quality	200mg/20mg/l BOD_5
Required Area	50m x 25m (0.125ha)
Service Population	9,000

Before inlet of the Jokasou, a combined type manhole is installed. Specification of the manhole with discharge pipe is as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L2,000mm x1

The picture of the site candidate area is shown in **Fig. 30**, and facilities locations are shown in **Fig. 31-1** and the AsSTP process is shown in **Fig.31-2.**

One combined type manhole with transportation pipe to Talayan-Balingasa basin from this area is necessary. The specifications are as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L1,000mm x1

Fig. 30 AsSTP Site Candidate Area

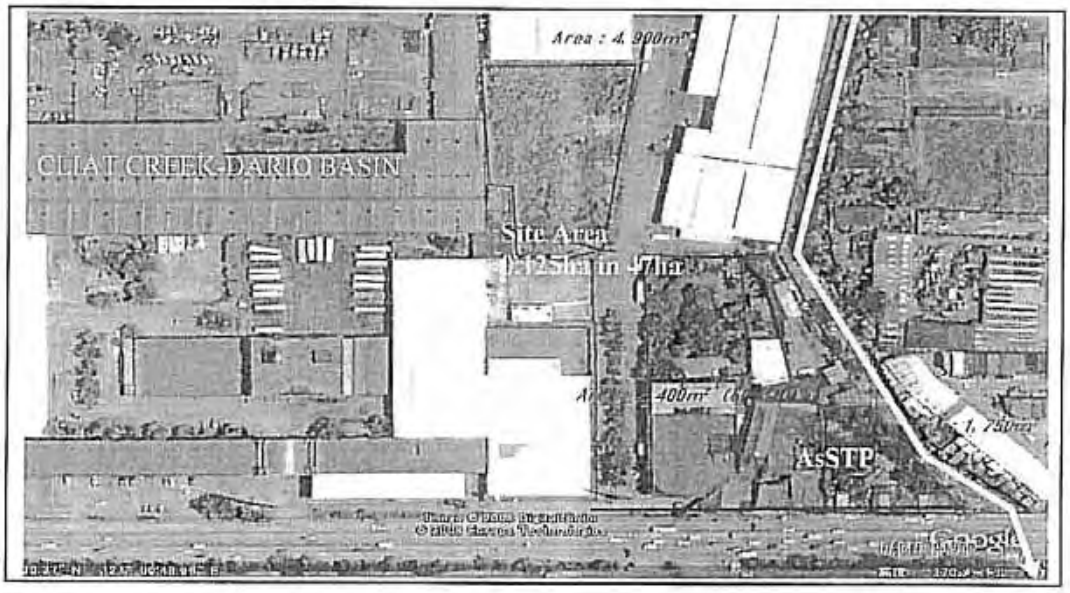


Fig. 31-1 AsSTP Site Locations

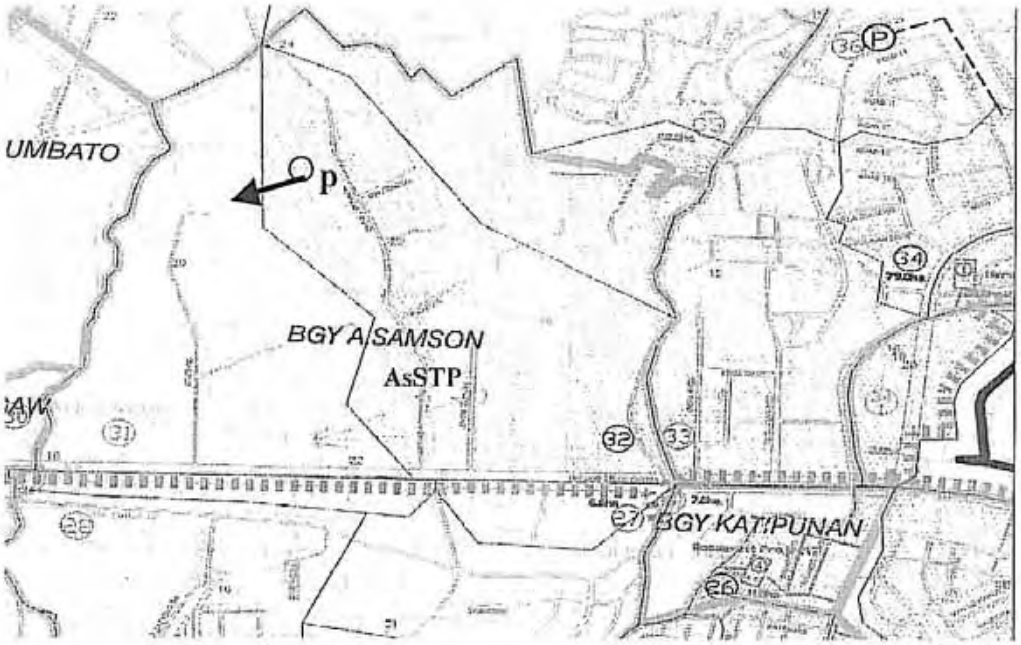
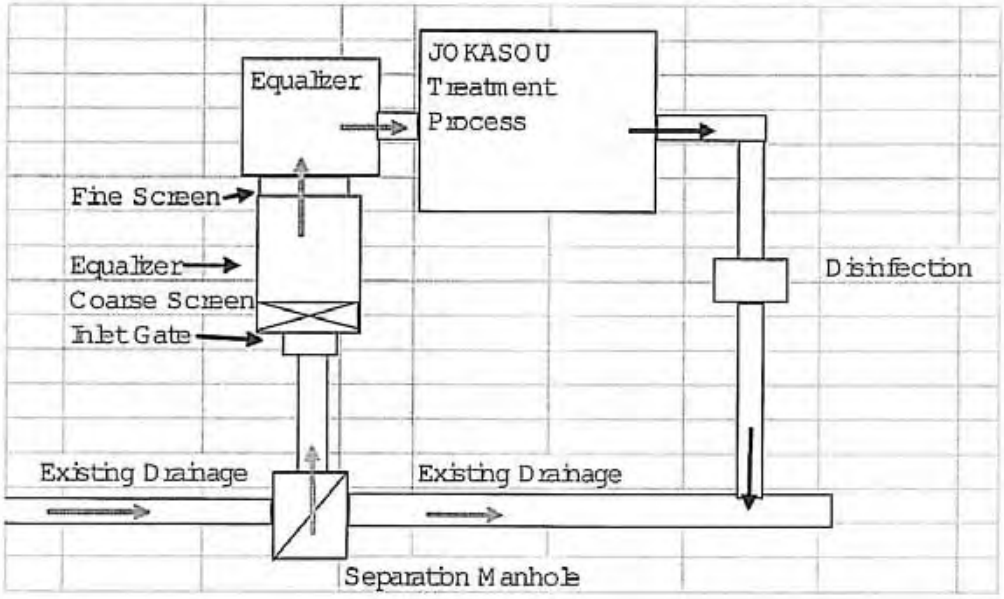


Fig 31-2 AsSTP Sewage Process



(7) San Antonio

The wastewater gravity flow directions in the north area of San Antonio where the left side of Roosevelt Community Plant area, is going to Culiat Creek. The population of the area is 1,333. This area shall be served by a new communal plant of Joukaso SaSTP-1.
The specification of Joukaso is as follows

Treatment System	Jokasou
Treatment Capacity	156m^3/d
In/0ut Water Quality	200mg/20mg/l BOD5
Required Area	15m x 10m
Service Population	1,200

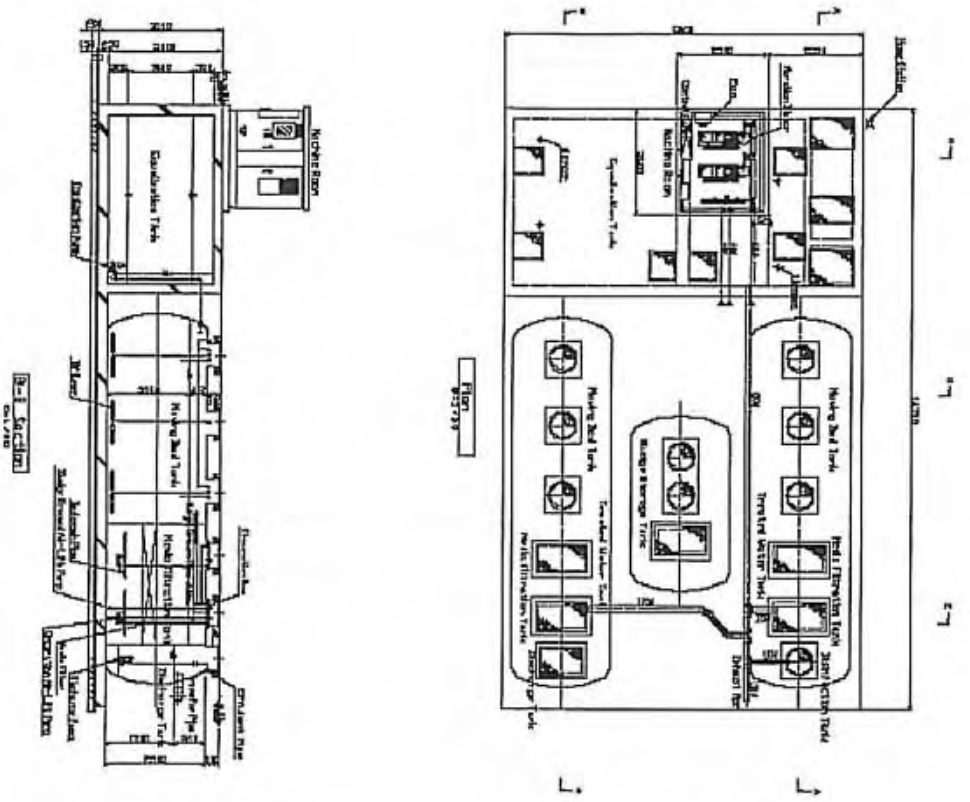
The Jokasou shall be installed in the tributary under Culiat Creek. Before inlet of the Jokasou, a combined type manhole is installed. Specification of the manhole with discharge pipe is as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L2,000mm x1

The candidate site picture of Jokasou is shown in **Fig. 32** and the site layout is shown in **Fig. 33.**

Fig. 32 Candidate Site of SaSTP-1

Fig. 33 SaSTP-1 Site Layout



(8) Existing Communal Plants Renovation

In Culiat Creek-Dario River South basin, there are four existing communal plants, such as, Legal Grants, Congressional and Roosevelt.

These Communal Septic Tanks have been enough deteriorated and now recovery of the functions are very difficult. In order to reestablish these communal plants, all septic tanks shall be replaced by Jokasou system, because of limited site areas. The other any process could not be superseded. New plants specifications are shown in Table. 3, and the site locations and outlines and layouts are shown in **Fig. 34 to 38.**

Table. 3 Technical Information of Four Communal Plants Renovation Program

		Roosevelt	Herehold	Grants	Legal
Wastewater Influent (m^3□□□		98	567	621	409
Treatment Process		Jokaso(Carrier Fluidized)	Jokaso(Membrane)	Jokaso(Carrier Fluidized)	Jokaso(Carrier Fluidized)
Jokaso Model		K-HC-R-3J	KM-SG-B-2J×2Train	K-HC-R-4J ×3Train	K-HC-R-4J ×2Train
Influent Water Quality (mg□□□	BOD	200	200	200	200
	SS	170	170	170	170
Final Effluent Water Quality (mg□□□	BOD	20	20□Ave10)	20	20
	SS	17	5Less	17	17
Electric Power (KW)		7.8	52.7	43.1	29.1
Main Apparatus					
Aeration Blower		φ50×3.7KW×□	φ□□□×□□KW×□	φ□□□×□□□□KW×□	φ□□□×□□KW×□
Balancing Tank Blower		φ32×0.75KW×□	φ65×4.5KW×□	φ65×4.5KW×□	φ65×3KW×□
Automatic Screen		W0.3×0.025KW	W0.3×0.2KW	W0.3×0.12KW	W0.3×0.1KW
Balancing Tank Pump		φ50×H5m×0.8KW×2	φ80×H15m×9KW×2	φ80×H15m×9KW×2	φ80×H15m×6KW×2
Recirculation Pump		-	φ80×H10m×6KW×2	-	-
Final Effluent Pump		φ50×H5m×0.5KW×2	φ80×H10m×6KW×2	φ80×H10m×9KW×2	φ80×H10m×6KW×2
Membrane		-	W2.19m×H2.0m	-	-

Fig. 34 4 Communal Plants Site Locations

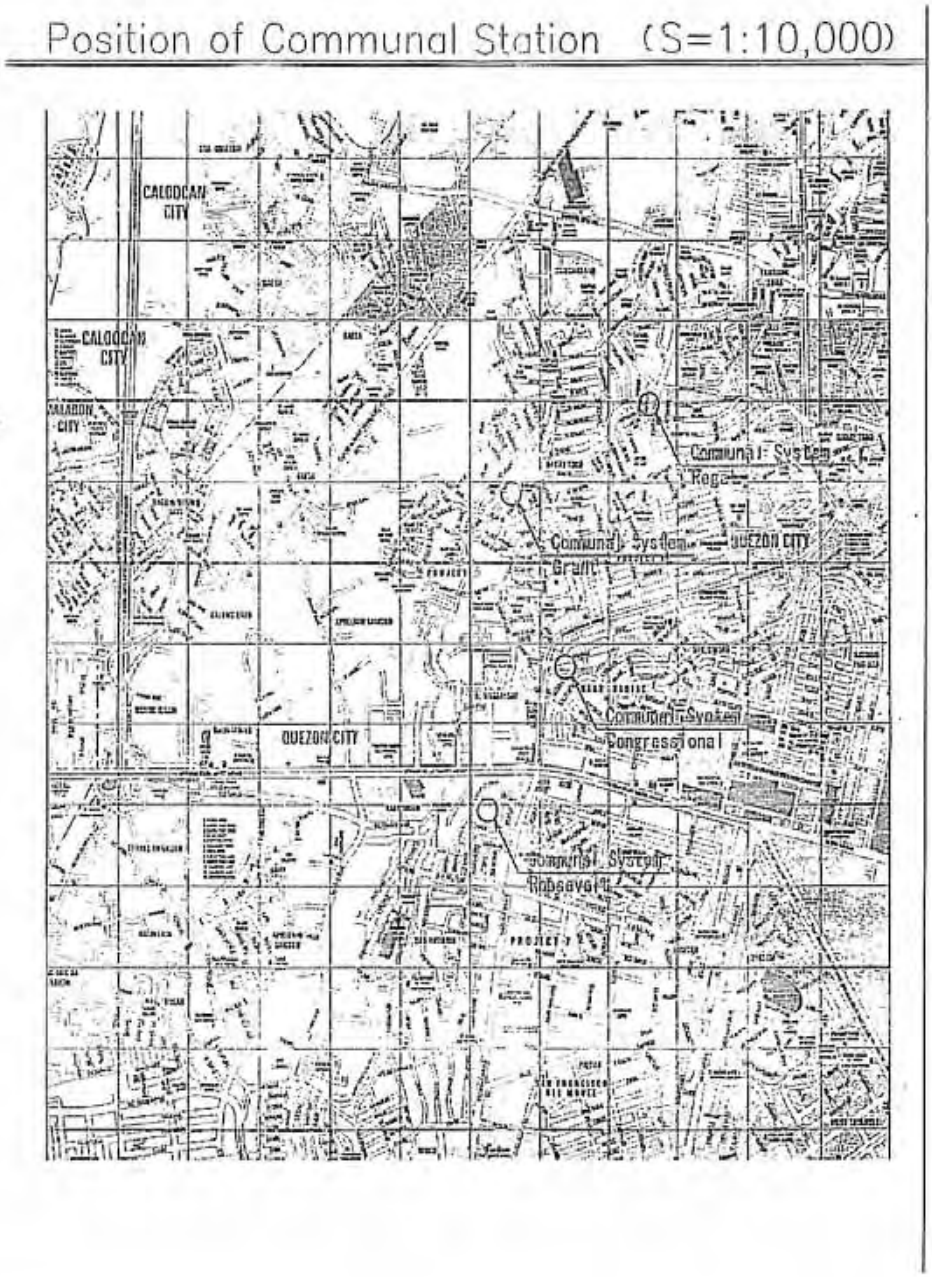


Fig. 35 layout of Jokasou (Congressional)

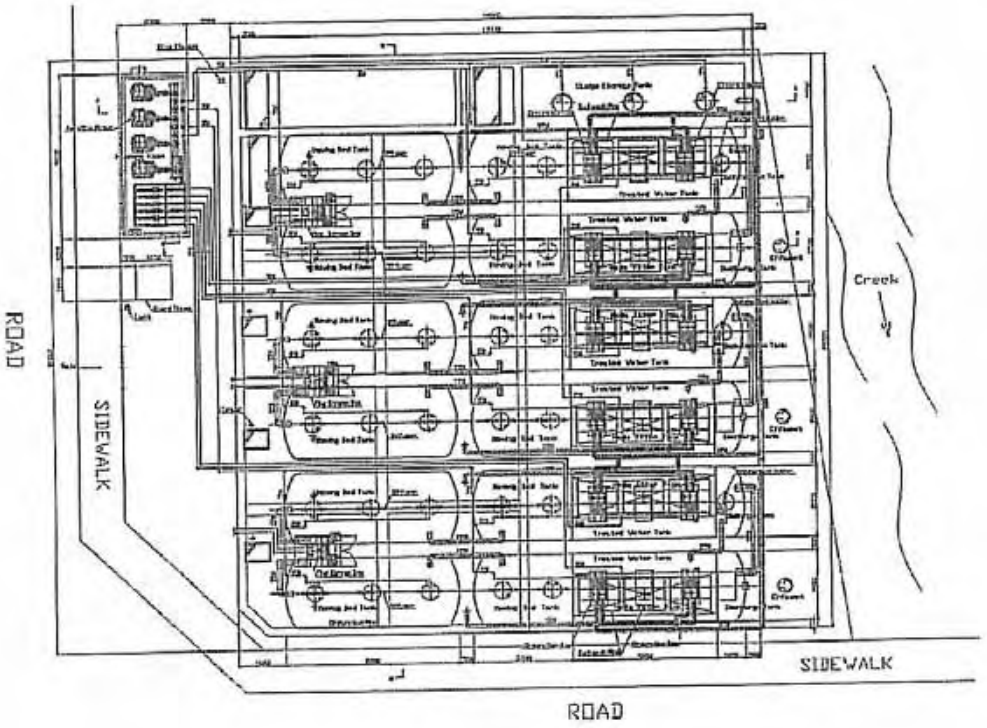


Fig. 36 layout of Jokasou (Grants)

Fig. 37 layout of Jokasou (Legal)

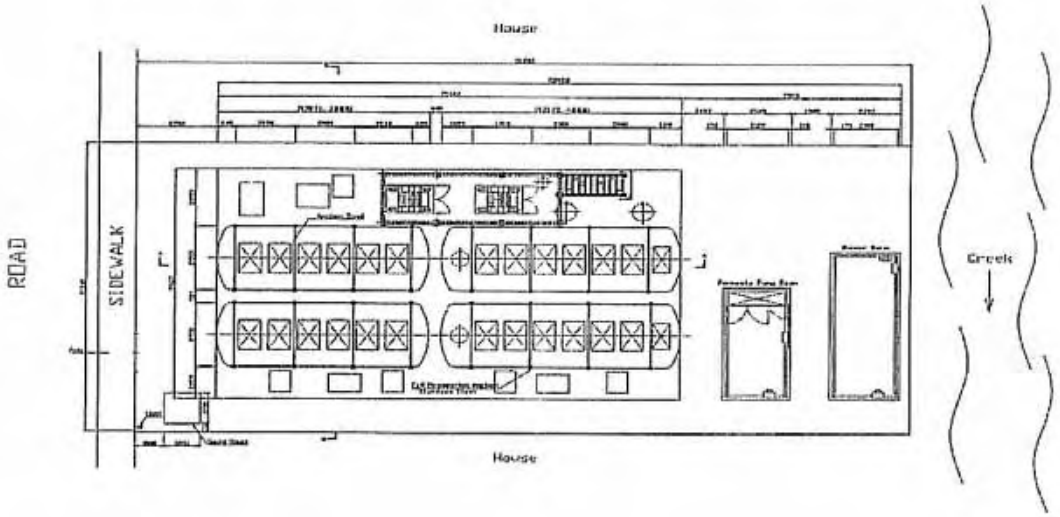
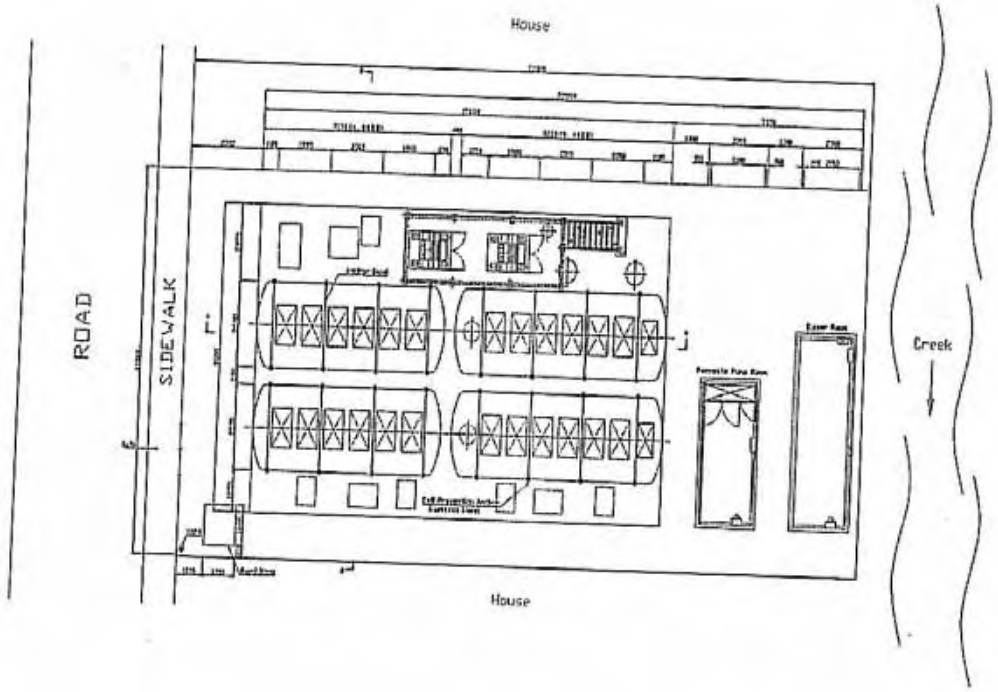


Fig. 38 layout of Jokasou (Roosevelt)



3.2.2.5 Sanfrancisco-Marabro Creek Basin

Sewerage systems in this basin shall be studied by each barangay.

(1) A. Samson

2,000 people of the target population of 8,442 in this basin shall be connected to Talayan-Balingasa Creek Basin, because of wastewater gravity flow direction. Remaining population of 6,442 shall be segregated into two areas, one for residents of 2,200 in the North, and another for residents of 4,242 in the South, served by two sewage treatment plants (AsSTP-1, AsTP-2).

The collection sewers are used the existing drainage lines as combined sewer lines.

A sewage treatment plants) shall be installed at the lowest ground level in each area of this basin alongside of Dario River. The specifications of STPs are as follows.

AsSTP-1

Treatment System	Jokasou
Treatment Capacity	$286m^3/d$
In/0ut Water Quality	200mg/20mg/l BOD_5
Required Area	15m x 30m
Service Population	2,200

AsSTP-2

Treatment System	Jokasou
Treatment Capacity	$546m^3/d$
In/0ut Water Quality	200mg/20mg/l BOD_5
Required Area	30m x 30m
Service Population	4,200

Before inlet of each Jokasou, a combined type manhole is installed. Specification of the manhole with discharge pipe is as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L2,00m x1

The picture of the site candidate area is shown in **Fig. 39 and 40**, and Locations of STPs and the connection pump and pipe to Talayan Basin is shown in **Fig. 41**. The AsSTP-1 and 2 layouts are shown in **Fig.42-1 and 42-2.**

One combined type manhole with transportation pipe to Talayan-Balingasa basin from this area is necessary. The specifications are as follows.

Even though the site requirement for AsSTP is as smallest as 0.045ha, the site candidate for AsSTP-2 would require a partial resettlement of the squatters' area.

Fig. 39 Site Candidate for AsSTP-1

Fig. 40 Site Candidate for AsSTP-2

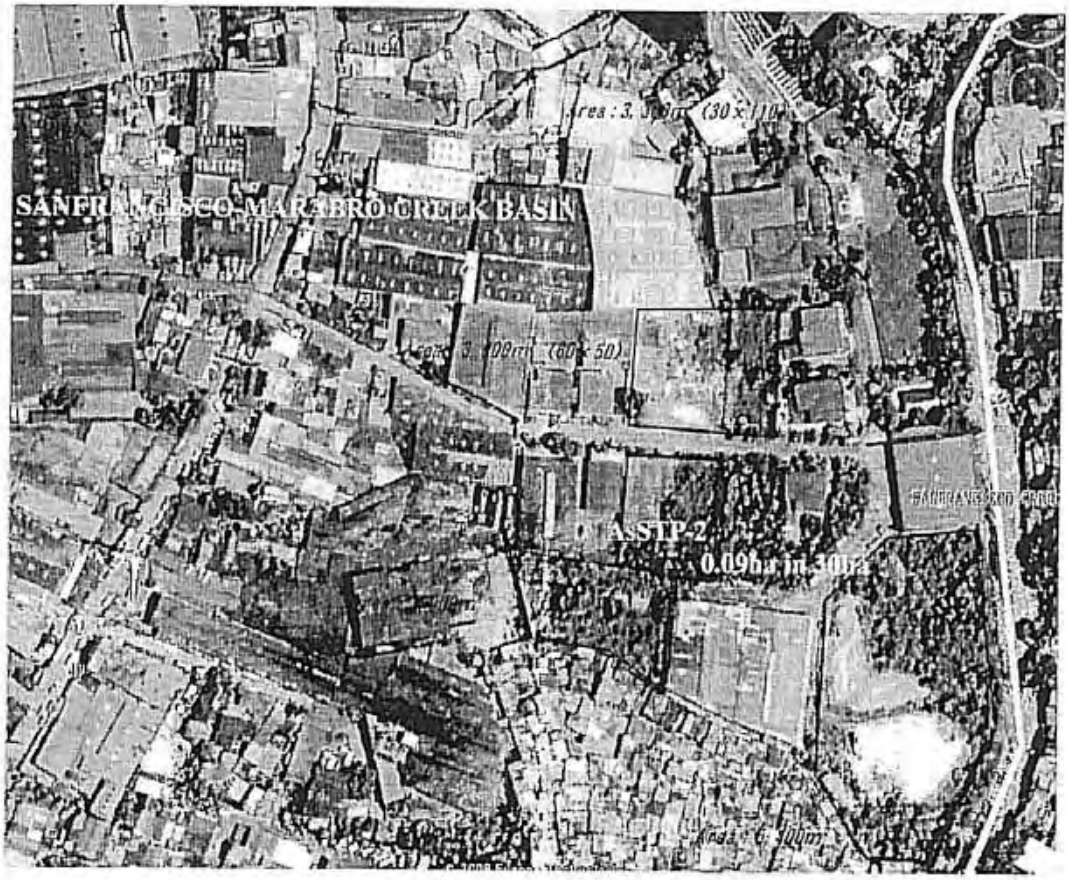


Fig 41 Location of Facilities in A. Samson South

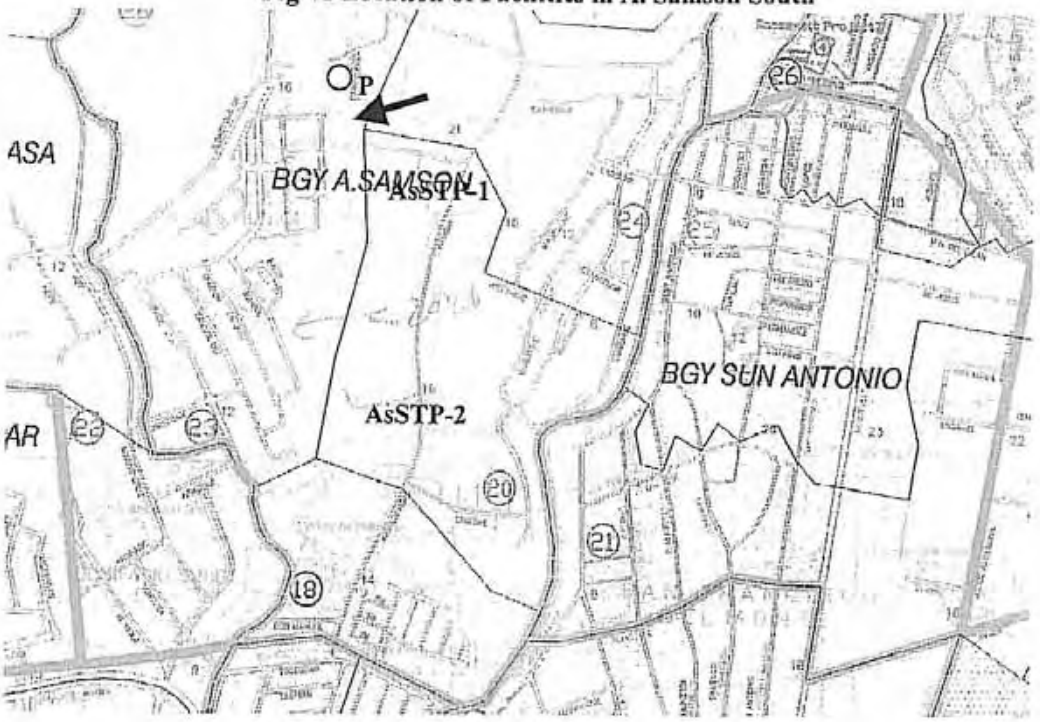


Fig. 42-1 STP Layout for AsSTP-1

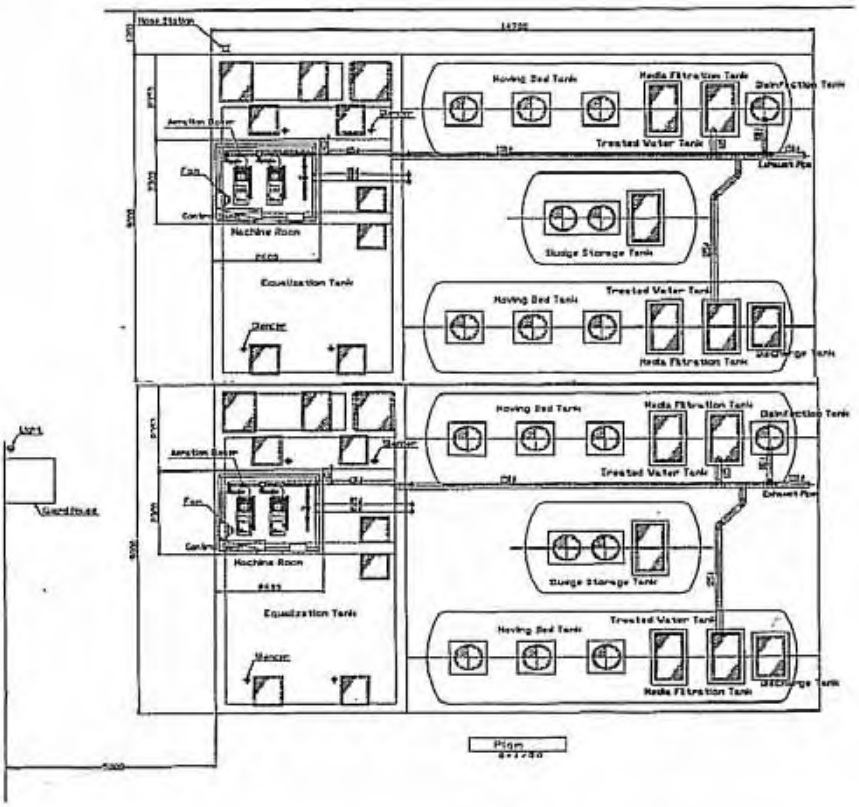
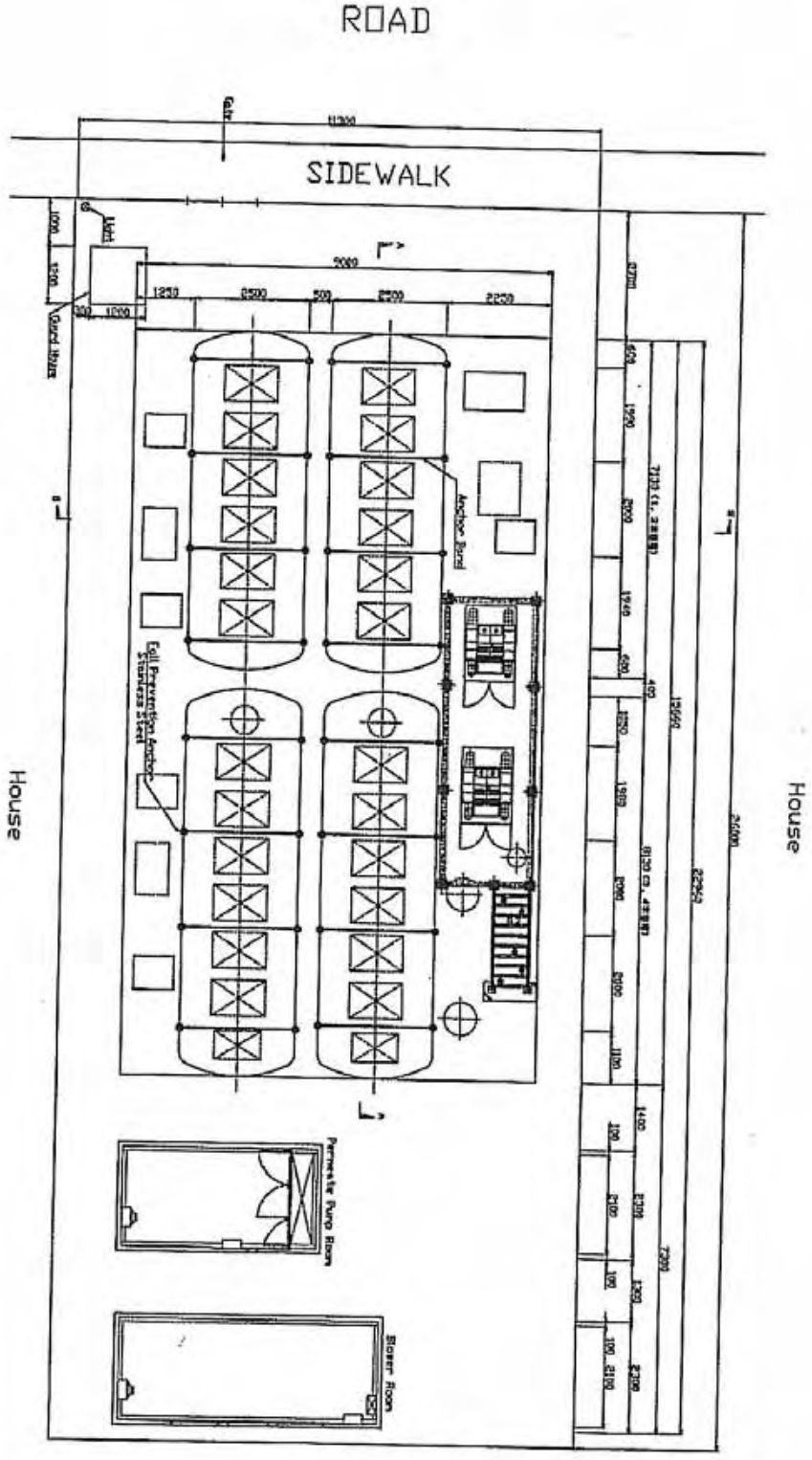


Fig. 42-2 STP Layout for AsSTP-2



(2) San Antonio

This area has a communal plant of Roosevelt, and remaining population of 21,999 in this basin is targeted for the project. A sewage treatment plant (SaSTP-2) shall be installed at the lowest ground level in this basin alongside of San Francisco Creek (far south of the barangay). The specification of SaSTP-2 is as follows.

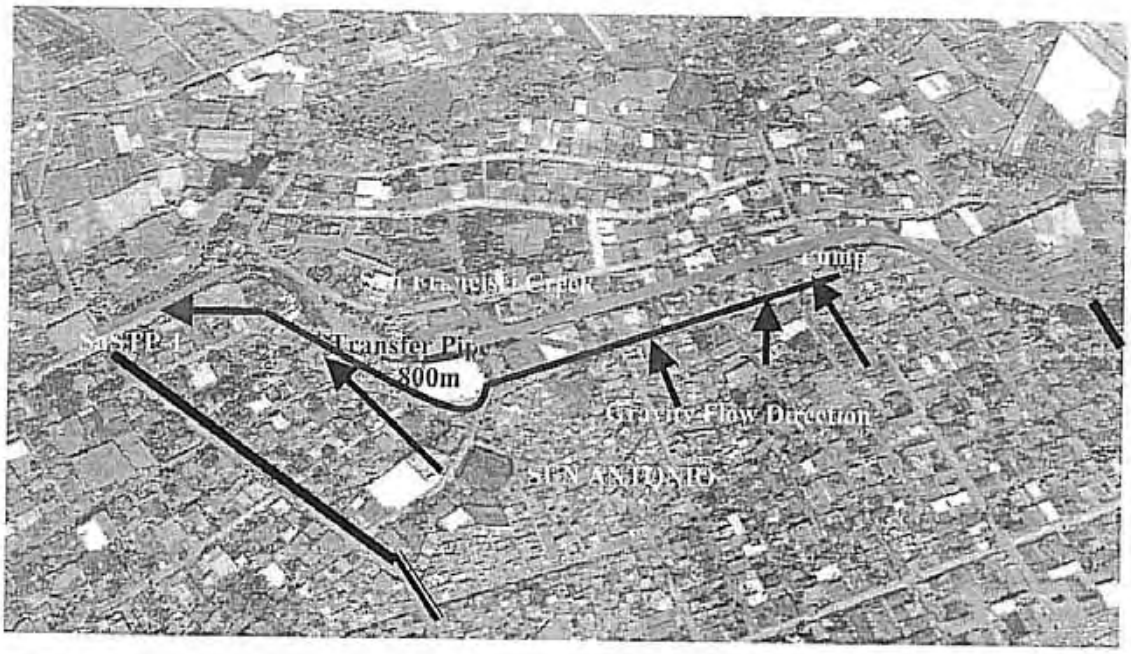
Treatment System	SBR
Treatment Capacity	2,860m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	30m x 25m (0.075ha)
Service Population	22,000

The picture of the site candidate area is shown in **Fig. 43**.
In the northern part of this basin, the gravity flow directions area not going to the south, therefore, one combined type manhole with transporting sewer pipes would be required. The transportation lines is shown in **Fig. 44.** Specification of the manhole and pipe are as follows.

Combined Type Manhole	φ900mm x D5,000mm x 1
Sewer Conveyer Pipe	φ200mm x L**800**m

Fig. 43 Candidate Site for SaSTP-2

Fig. 44 Sewage Transportation Line from San Antonio North



(3) Veterans

The population in this area is 9,635. Almost all of wastewater gravity flow direction is toward to Marabro Creek. Because of difficulty to find vacant land space, several connection sewers alongside Marabro Creek with combined type of manholes are required. Sewage Treatment Plant (VSTP) for this basin shall be located near Marabro Creek as shown in **Fig. 45.** The specifications of VSTP are as follows.

Treatment System	SBR
Treatment Capacity	1,300m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	20m x 25m (0.05ha)
Service Population	10,000

Specifications of the interceptor (connection sewers) pipeline and combined manholes are as follows.

Combined Type Manhole	φ900mm x D5,000mm x **7sets**
Connection Sewers	φ200mm x L**1,000**m

Fig. 46 shows VSTP Sewer Line.

toward to Malabo Creek. Because of difficulty to find vacant land space, several connection sewers alongside Marabro Creek with combined type of manholes are required. Sewage Treatment Plant (P-PSTP) for this basin shall be to procure the land near Marabro Creek as shown in **Fig. 47.** The specifications of P-PSTP are as follows.

Treatment System	SBR
Treatment Capacity	2,860m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	30m x 25m (0.075ha)
Service Population	22,000

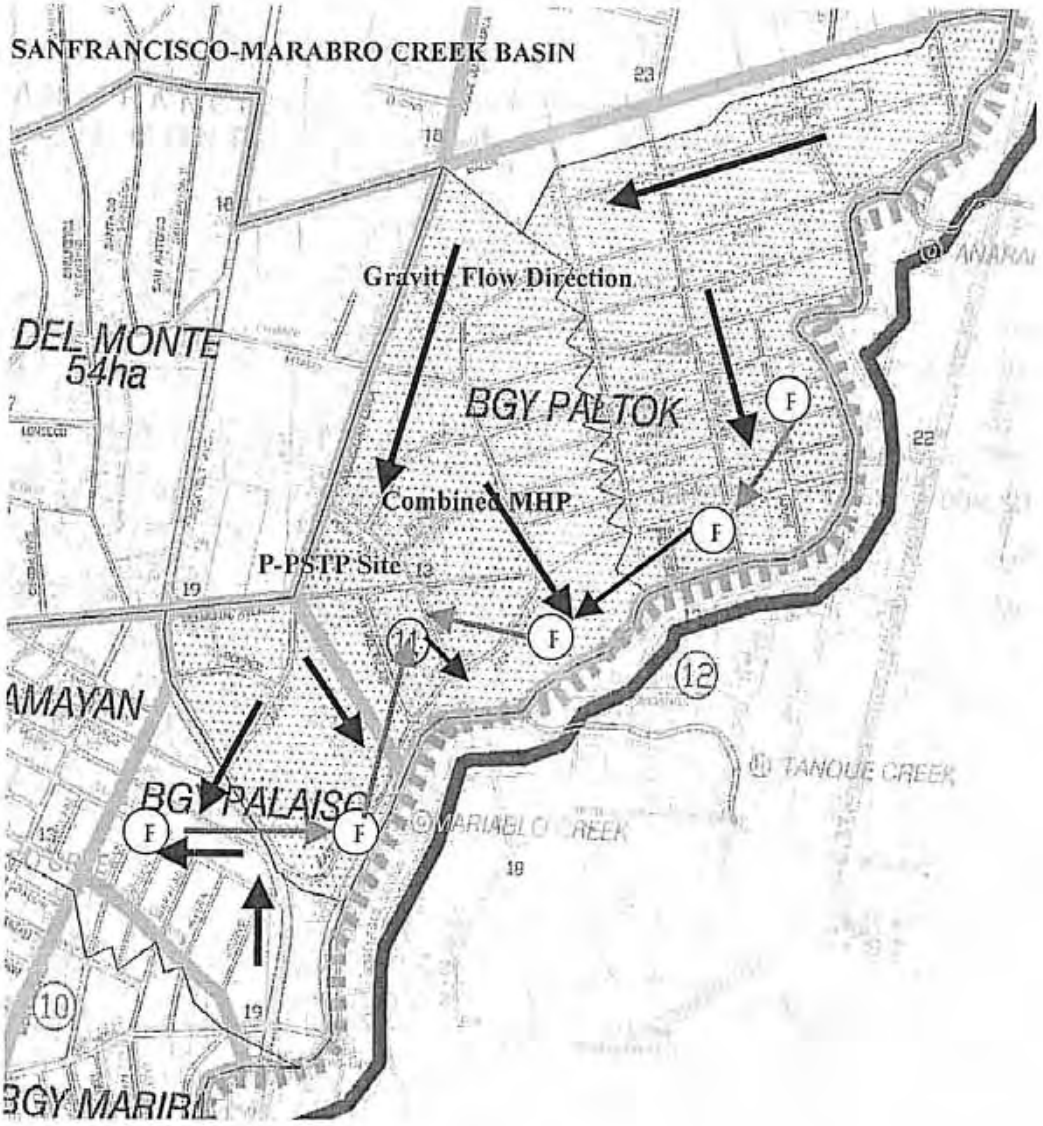
Specifications of the interceptor (connection sewers) pipeline and combined manholes are as follows.

Confined Type Manhole	φ900mm x D5,000mm x □**sets**
Connection Sewers	φ200mm x L**1,200**m

Fig. 48 shows P-PSTP Sewer Line.

Fig. 47 Candidate Site for P-PSTP

Fig. 48 P-PSTP Sewer Line

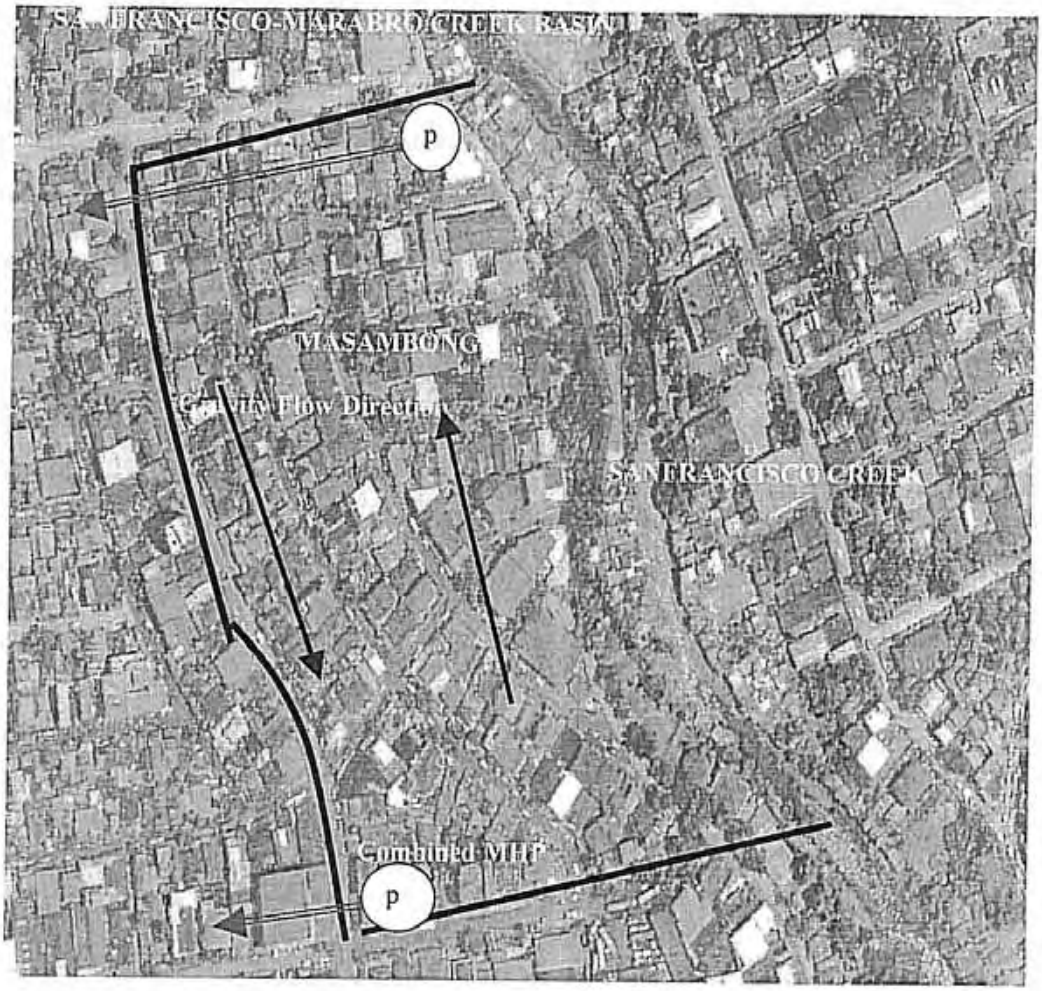


(5) Masambong

The population in this area is 3,510. The gravity flow direction is going to San Francisco Creek, however, Talayan-Balingasa Creek basin is neighboring and near. Therefore this basin shall connect to the Talayan-Balingasa Creek Basin for economical reason.
Connection sewer and a combined manhole are as follows **(Refer Fig. 49)**

Combined Type Manhole	φ900mm x D5,000mm x 1
Discharge Pipe	φ200mm x L250m 1

Fig. 49 Masambong Area and Combined Manhole and Discharge Pipe



(6) Bungad, Del Monte, Damayan and Mariblo

These barangays are located alongside San Francisco Creek and the gravity flow directions are all toward to San Francisco Creek. Total population in these areas is 35,985.

Because of difficulty to find vacant land space, several connection sewers alongside San Francisco Creek with combined type of manholes are required. Sewage Treatment Plant (SS-STP) for this basin shall use part of the squatters' area alongside of San Francisco Creek (the right bank of the river) as shown in **Fig. 50.** The specifications of SS-STP are as follows.

Treatment System	SBR
Treatment Capacity	4,550m^3/d
In/0ut Water Quality	200mg/20mg/l BOD5
Required Area	0.15ha
Service Population	35,000

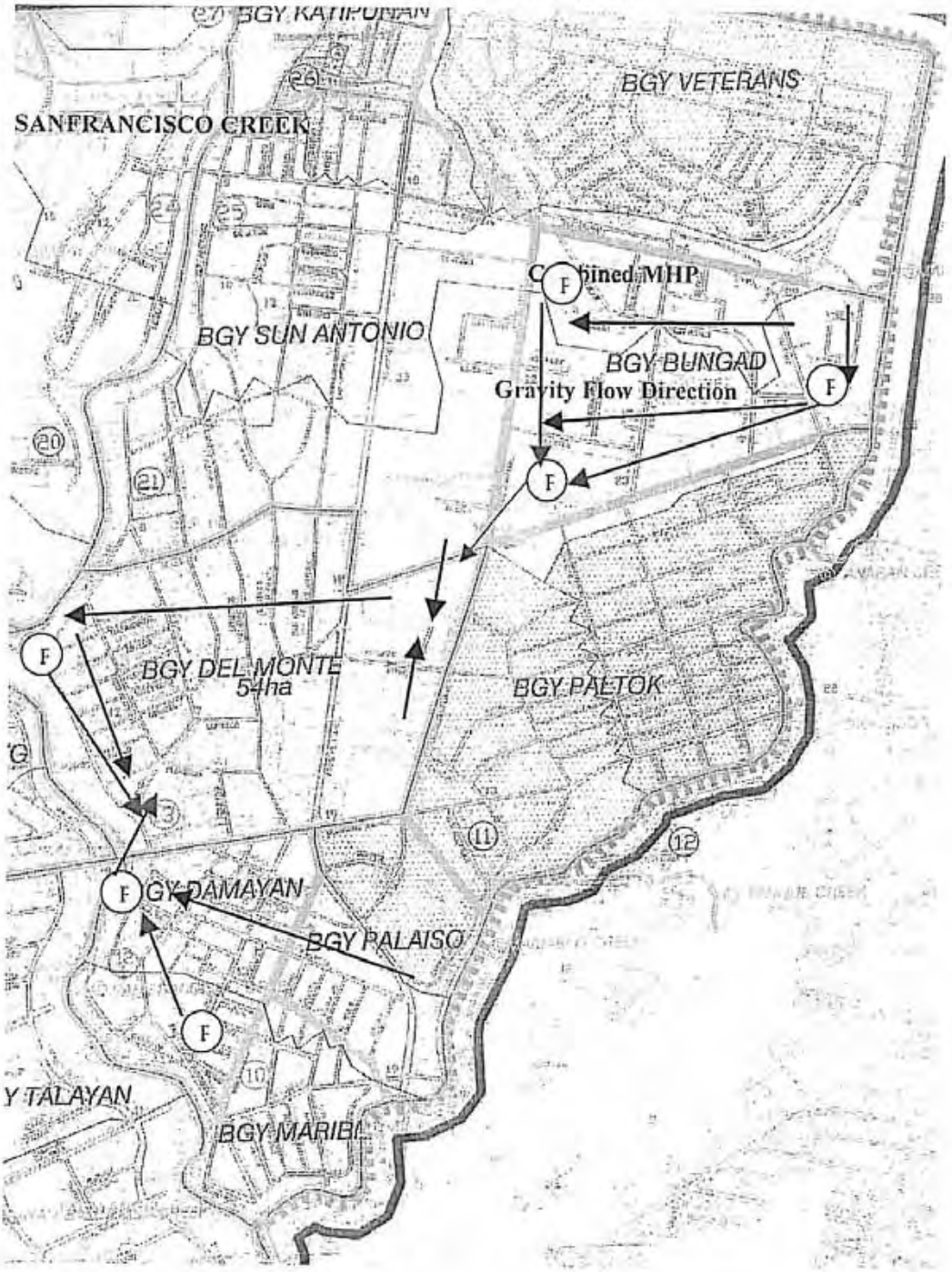
Specifications of the interceptor (connection sewers) pipeline and combined manholes are as follows.

Combined Type Manhole	φ900mm x D5,000mm x **6sets**
Connection Sewers	φ200mm x L**2,500**m

Fig. 51 shows SS-STP Sewer Line.

Fig. 50 Candidate Site for SS-STP

Fig. 51 SS-STP Sewer Line



3.2.2.5 San Juan Basin

San Juan Basin is the far end area of San Juan River and locating in rather lower ground level. Because of geographical terrain, wastewater generared in six barangays, that is, Totalon, Dona Imerda, Santol, Dona Aurora, Dona Josefa and Sts Mesa, are flowing to San Juan River. The wastewater discharged from outer area of these barangays are mainly flowing in gravity to Pasig River.

(1) Tatalon and Dona Josefa

The population in this area is 61,093. The gravity flow direction is going to San Juan River. Two combined Manhole Pumps would be necessary to collect sewage to the Tatalon-Josefa STP (TJSTP).

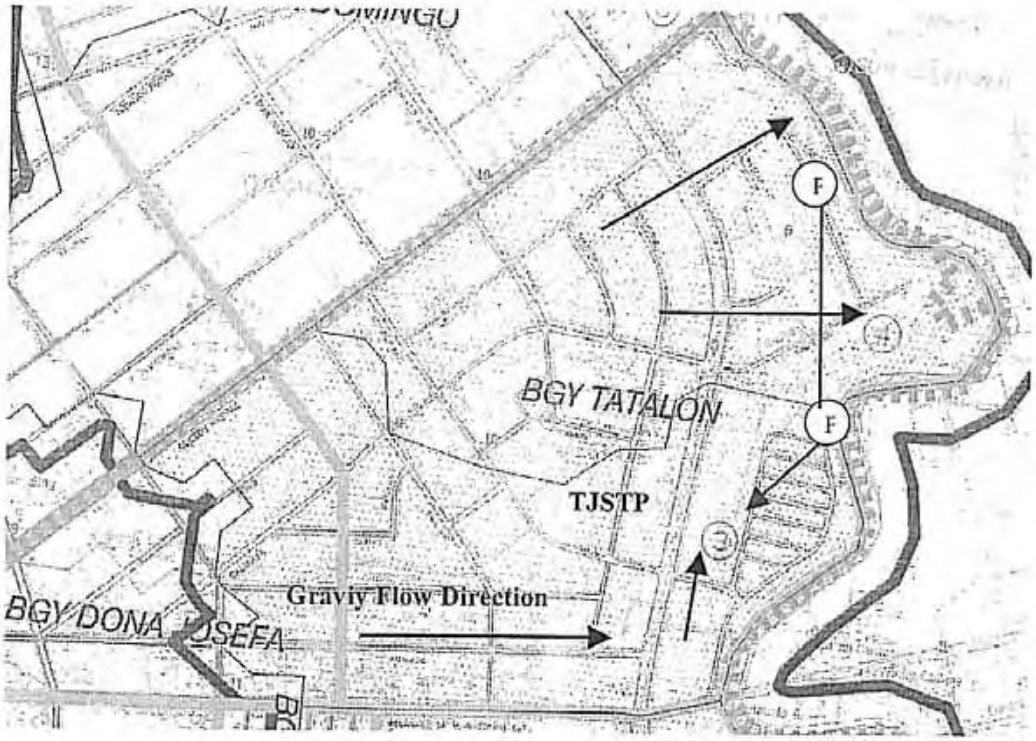
The specifications of SS-STP are as follows.

Treatment System	SBR
Treatment Capacity	7,800m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	0.225ha
Service Population	60,000
Combined Type Manhole	φ900mm x D5,000mm x **2sets**
Connection Sewers	φ200mm x L**400**m

Fig. 52 shows TSTP location and **Fig. 53** shows the combined sewer lines.

Fig. 52 TJSTP Location and Combined Sewer Lines

Fig. 53 Combined Manhole Pump and Sewer Lines



(2) Dona Imerda North, Dona Aurora and Santol North

The population in this area is 31,580. The gravity flow direction is going to San Juan River.One combined Manhole Pump would be necessary to collect sewage to Aurora-Imerda, Sanrol North STP (AISn-STP).

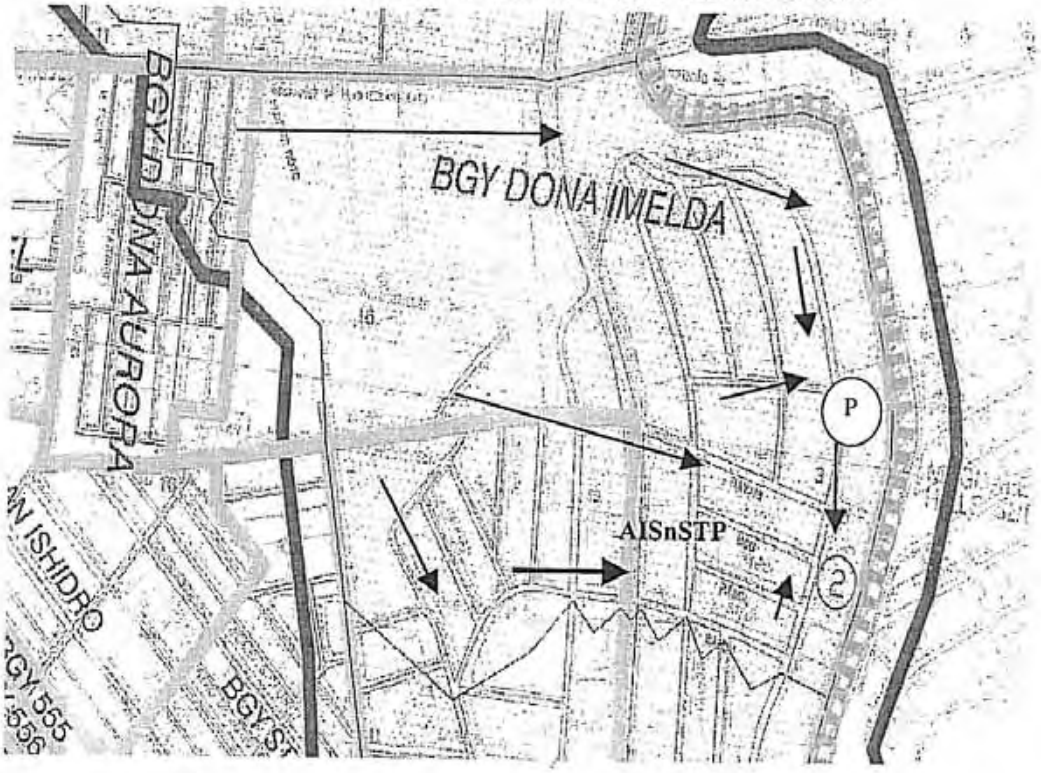
The specifications of IASn-STP are as follows.

Treatment System	SBR
Treatment Capacity	3,900m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	0.14ha
Service Population	30,000
Combined Type Manhole	φ900mm x D5,000mm x **1set**
Connection Sewers	φ200mm x L**200**m

Fig. 54 shows IASnSTP site candidate and **Fig. 55** shows combined MHP with sewer lines.

Fig. 54 AISn STP Site Candidate

Fig. 55 AISnSTP and Combined MHP with Sewer Lines



(3) Dona Imerda South, Santol South and Sta Mesa

The population in this area is 39,252. The gravity flow direction is going to San Juan River. One combined Manhole Pump would be necessary to collect sewage to Santa Mesa-Imerda, Santol South STP (SISs-STP)

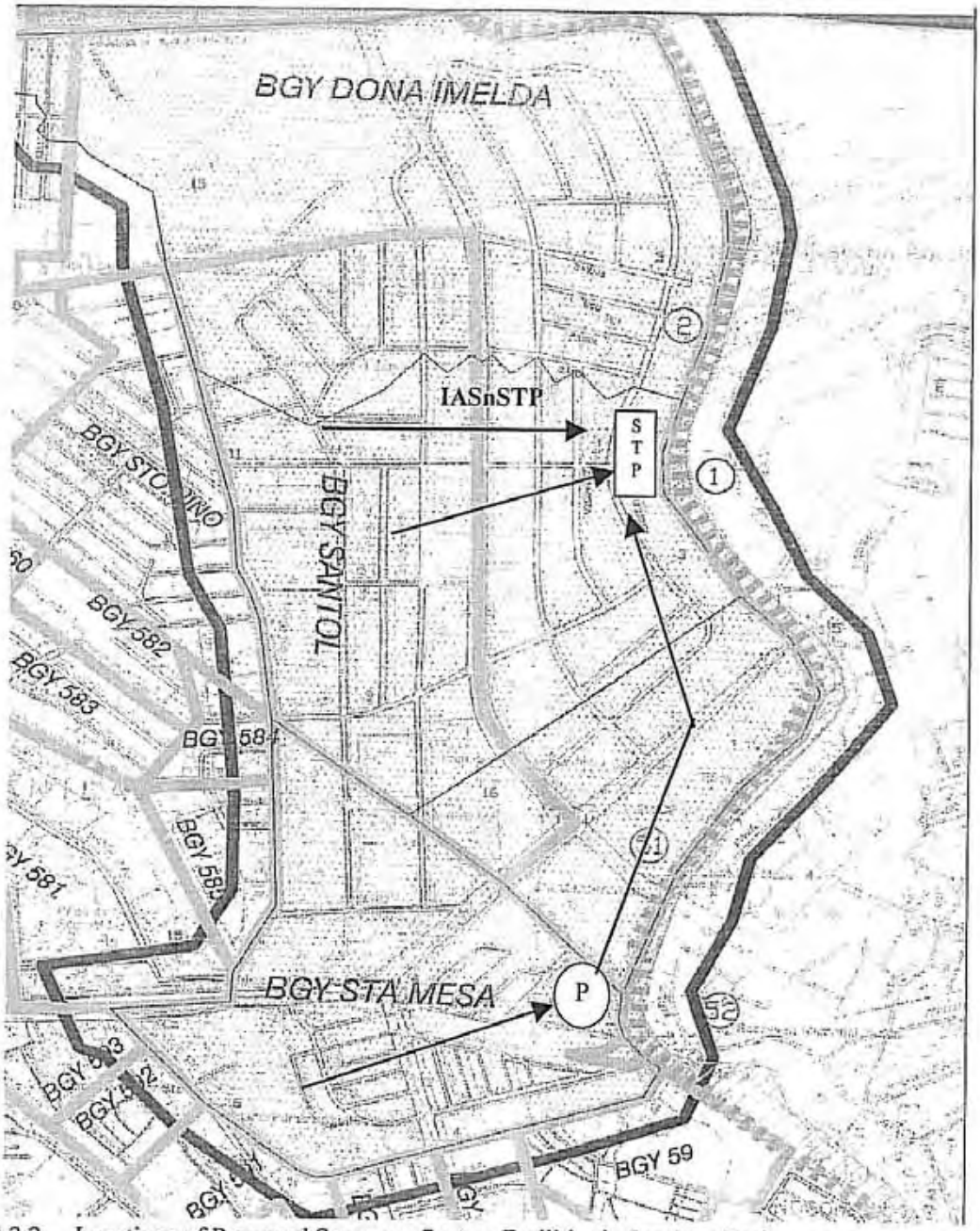
The specifications of SISs-STP are as follows.

Treatment System	SBR
Treatment Capacity	5,200m^3/d
In/Out Water Quality	200mg/20mg/l BOD5
Required Area	0.15ha
Service Population	40,000
Combined Type Manhole	φ900mm x D5,000mm x **1set**
Connection Sewers	φ200mm x **L200**m

Fig. 56 shows IASnSTP site candidate and **Fig. 57** shows combined MHP with sewer lines.

Fig. 56 SISs- STP Site Candidate

Fig. 57 SISs-STP and Combined MHP with Sewer Lines



3.2.2 Locations of Proposed Sewerage System Facilities in San Juan Basin

Table. 3 shows proposed sewerage system facilities and populations to be serviced by the systems.

Fig. 58 shows the location map of the sewerage systems proposed in San Juan River Basin.

Fig. 58 STP Site Location Map

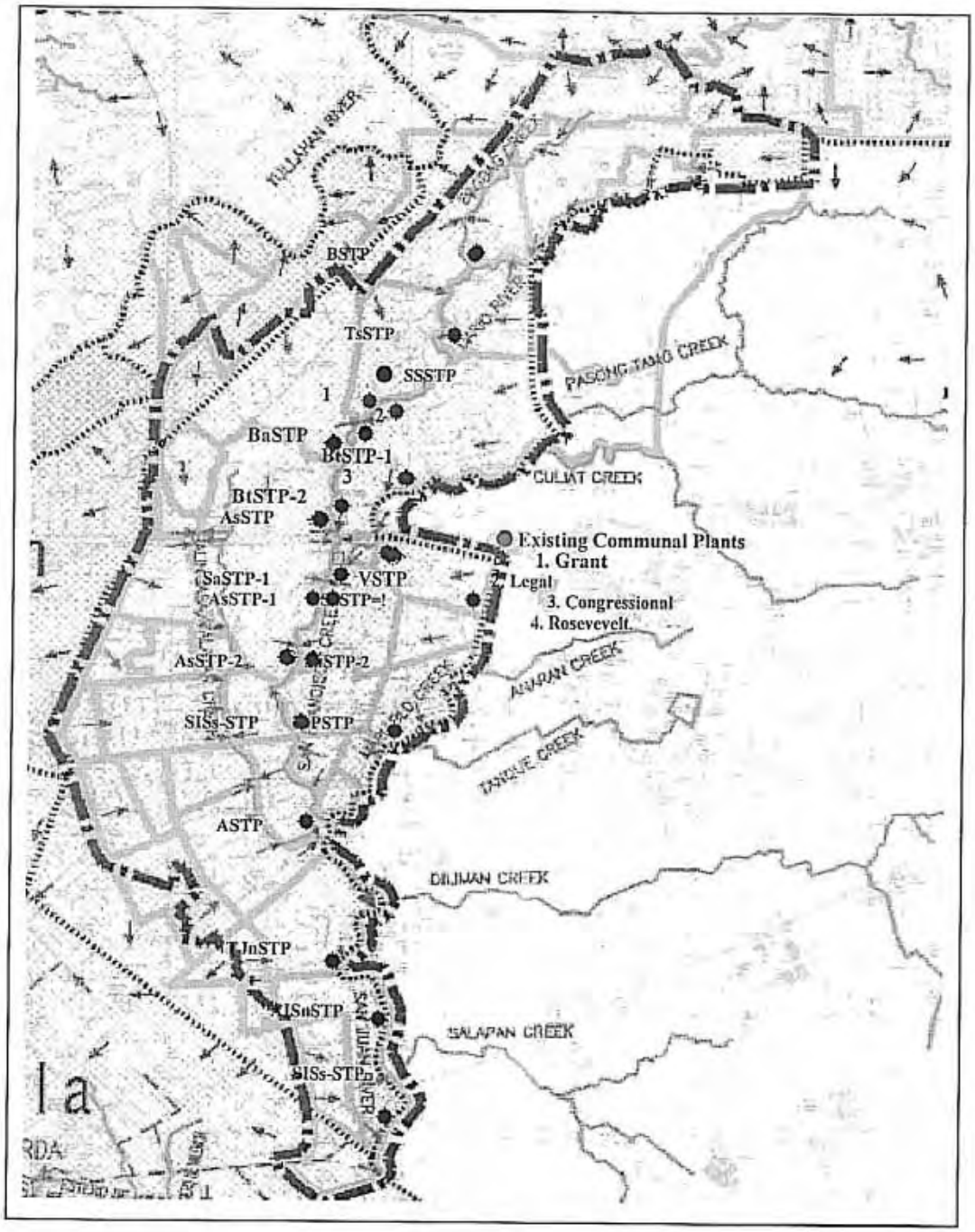


Table. 3 (1/2) Sewer System Facilities and Population Serviced

city 1 Basin	Facility Name	System	Capacity m^3/d	Service Population	Name of Barangay to be serviced			
Bagbag-Dario North Basin	BSTP	SBR	10,400	80,000	Bagbag	Tauyo	Tandan Soh	
	CMHP	3 x 400l/s						
	do	2 x 10l/s						
	CS	600φ □ 2,500m						
	do	150φ x 500m						
Tabyan-Balingasa Basin	TSTP	SBR	15,600	120,000	Baesa	Balumbato	Balingasa	A. Samson
					Damar	Sa Nayon	Masambong	Manresa
					San Jose	Tayan	Sena	ST. Peter
					Maharlika	St. Domingo	Lourdes	Baesa
Cist-Dario Basin	KTSP	Jokasou	156	1,200	Katipnan			
	CMHP	1 x 2l/s						
	Discharge Pipe	φ 200 x 20m						
	TsSTP	SBR	1,560	12,000	Tandan Soh			
	SSTP	SBR	2,210	17,000	Sangadaan			
	Discharge Pipe	φ 200 x 200m						
	BaSTP	SBR	5,200	40,000	Baesa			
	CMHP	1 x 50l/s						
	Discharge Pipe	φ 200 x 10m						
	Btstp-1	Jokasou	780	6,000	Bahay Toro			
	CMHP	1 x 70l/s						
	Discharge Pipe	φ 200 x 60m						
	BtSTP-2	SBR	3,900	30,000	Bahay Toro			
	AsSTP	Jokasou	1,170	9,000	A. Samson			
	CMHP	2 x 10l/s						
	Discharge Pipe	φ 200 x 30m						
	SaSTP-1	Jokasou	156	1,200	San Antonio			
	CMHP	1 x 15l/s						
	Discharge Pipe	φ 200 x 20m						
	Legal	Jokasou	409	4,090	Tandag Soh	Bahay Toro		(Existing)
	Grants	Jokasou	621	6,210	Sangandaan	Baesa		(Existing)
	Congressional	Jokasou	567	5,670	Bahay Toro			(Existing)
	Roosevelt	Joksou	93	2,411	Katipnan	San Antonio		(Existing)
Sanfrancisco-Marsino Basin	AsSTP-1	Jokasou	286	2,200	A. Samson			
	AsSTP-2	Jokasou	546	4,200	A. Samson			
	CMHP	1 x 3l/s						
	Discharge Pipe	φ 200 x 200m						
	SaSTP-2	SBR	2,860	22,000	San Antonio			
	CMHP	1 x 3l/s						
	Conveyer Pipe	φ 200 x800m						
	VSTP	SBR	1,300	10,000	Vetamns			
		1 x 3l/s						
		φ 200 x1,000m						

Note: CMHP=mbined Manhole Pump
CS:Connection sewer

Table. 3 (2/2) Sewer System Facilities and Population Serviced

Sub-Basin	Facility Name	System	Capacity m^3/d	Service Population	Name of Barangay to be serviced			
San Francisco-Marikina Basin	P-PSTP	SBR 5 x 31/s φ 200 x1,200m 1 x 31/s φ 200 x1,250m	2,600	20,000	Pabk Masambong	Paraiso		
	SS-STP	SBR 6 x 31/s φ 200 x2,500m	4,550	35,000	Bungad	Del Monte	Damayan	Marbb
San Juan Basin	TJSTP	SBR 2 x 351/s φ 200 x400m	7,800	60,000	Tatalon	Dona Josefa		
	ASn-STP	SBR 2 x 101/s φ 200 x200m	3,900	30,000	Dona Imeld	Dona Aurora	Santol	
	SSs-STP	SBR	5,200	40,000	Dona Imeld	Santol	Sta Mesa	
Total Treatment Capacity			71,864					
Total Population Serviced				558,181				

Note: CMH: Combined Manhole Pump
CS: Connection sewer

4.. Project Cost Estimation

The cost estimation is shown in **Table. 4.**

Table. 4 (1/2) Project Cost

Sub-Basin	Facility Name	System	Capacity m^3/d	Servce Population	Cost Estimation in 1,000 PhP
Bagbag-Dario North Basin	**BSTP**	SBR	10,400	80,000	523,120
	CMHP	3 x 400l/s			3,000
	do	2 x 10l/s			2,000
	CS	600φ □ 2,500m			2,000
	do	150φ x 500m			400
	Subtotal				**530,520**
Tabyan-Balingasa Basin	**TSTP**	SBR	15,600	120,000	784,680
	Subtotal				**784,680**
Cibit-Dario Basin	**KTSP**	Jokasou	156	1,200	44,587
	CMHP	1 x 2l/s			1,000
	Discharge Pipe	φ 200 x 20m			2
	Subtotal				**45,589**
	TsSTP	SBR	1,560	12,000	78,468
	Subtotal				**78,468**
	SSTP	SBR	2,210	17,000	111,163
	Discharge Pipe	φ 200 x 200m			160
	Subtotal				**111,323**
	BaSTP	SBR	5,200	40,000	261,560
	CMHP	1 x 50l/s			1,000
	Discharge Pipe	φ 200 x 10m			8
	Subtotal				**262,568**
	Btstp-1	Jokasou	780	6,000	81,528
	CMHP	1 x 70l/s			1,000
	Discharge Pipe	φ 200 x 60m			48
	Subtotal				**82,576**
	BtSTP-2	SBR	3,900	30,000	196,170
	Subtotal				**196,170**
	AsSTP	Jokasou	1,170	9,000	104,616
	CMHP	2 x 10l/s			2,000
	Discharge Pipe	φ 200 x 30m			24
	Subtotal				**106,642**
	SaSTP-1	Jokasou	156	1,200	44,587
	CMHP	1 x 15l/s			1,000
	Discharge Pipe	φ 200 x 20m			16
	Legal	Jokasou	409	4,090	69,904
	Grants	Jokasou	621	6,210	90,378
	Congressional	Jokasou	567	5,670	84,668
	Roosevelt	Jokasou	93	2,411	51,072
	Subtotal				**341,625**

Note: CMHP: Combined Manhole Pump
CS: Connection sewer

Table. 4 (2/2) Project Cost

Sub-Basin	Facility Name	System	Capacity m^3/d	Serve Population	Cost Estimation in 1,000 PhP
San Francisco-Marabon Basin	**AsSTP-1**	Jokascu	286	2,200	52,283
	Subtotal				52,283
	AsSTP-2	Jokasou	546	4,200	67,675
	CMHP	1 x 3l/s			1,000
	Discharge Pipe	φ 200 x 200m			160
	Subtotal				**173,401**
	SaSTP-2	SBR	2,860	22,000	143,858
	CMHP	1 x 3l/s			1,000
	Conveyer Pipe	φ 200 x800m			640
	Subtotal				**145,498**
	VSTP	SBR	1,300	10,000	65,390
		1 x 3l/s			1,000
		φ 200 x1,000m			1,000
	Subtotal				**67,390**
	P-PSTP	SBR	2,600	20,000	130,780
		5 x 3l/s			5,000
		φ 200 x1,200m			960
		1 x 3l/s			1,000
		φ 200 x1,250m			1,000
	Subtotal				**138,740**
	SS-STP	SBR	4,550	35,000	228,865
		6 x 3l/s			6,000
		φ 200 x2,500m			2,000
	Subtotal				**236,865**
San Juan Basin	**TJSTP**	SBR	7,800	60,000	392,340
		2 x 35l/s			2,000
		φ 200 x400m			320
	Subtotal				**394,660**
	AlSn-STP	SBR	3,900	30,000	196,170
		2 x 10l/s			2,000
		φ 200 x200m			160
	Subtotal				**198,330**
	SlSs-STP	SBR	5,200	40,000	261,560
	Subtotal				**261,560**
	Total Treatment Capacity		71,864		
	Total Population Serviced			558,181	
	Total Cost				**4,156,605**

Note: 1. Engineering fee and land procurement cost are not included in the tables.

2. Engineering fees are: Design Fee 7% of the project cost

Construction Supervision: 10% of the project cost.

5. Project Implementation and Budget Schedule

Environmental Improvement Project of San Juan River Basin will be included in Maynilad Sanitation and Sewerage Master Plan, and these project components shall follow overall project plan up to year of 2022 in line with the other projects implementation plan for all of Maynilad Concession Areas.
The overall project implementation and budget schedule shall basically follow Maynilad business plan reviewed in 2007.
The detail project implementation plan and budgetary schedule are shown in Chapter 6 to 8 in the main report of Master Plan.

Attachment 1 Project Site Candidate for San Juan River Basin (Satellite Photos)

Attachment 2 Site Photos in San Juan River Basin (Pictures taken September '02)