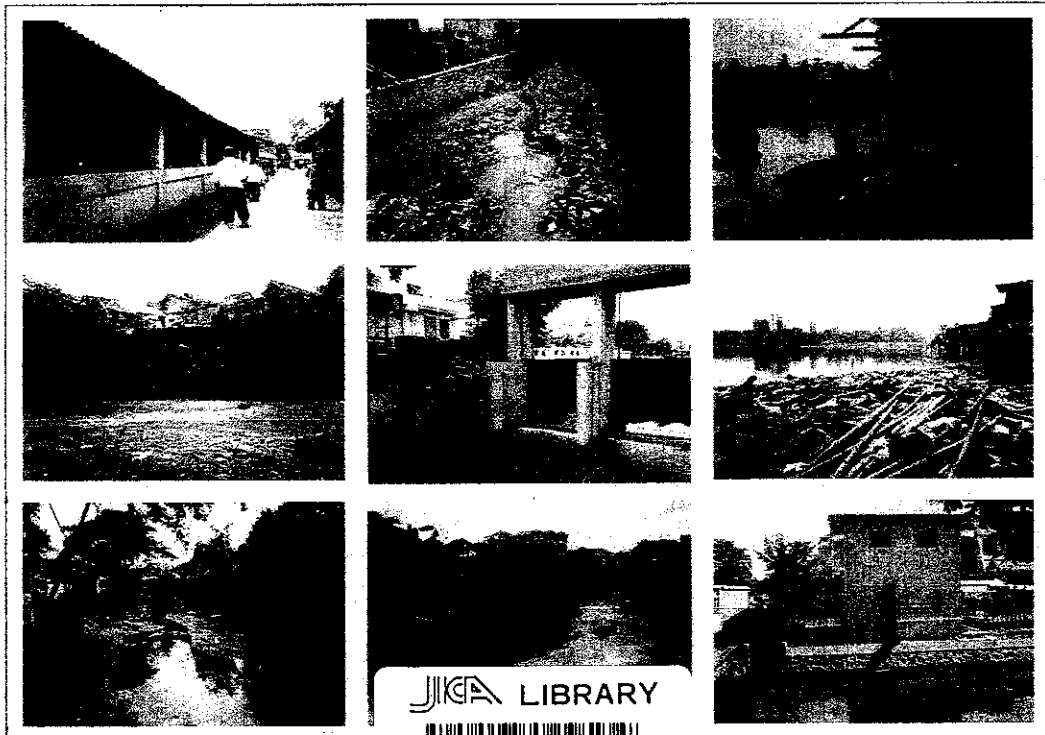


JAPAN INTERNATIONAL COOPERATION AGENCY

**URGENT INVENTORY STUDY
ON
DAMAGE OF FLOOD 2002
IN
JABODETABEK AREA IN INDONESIA**



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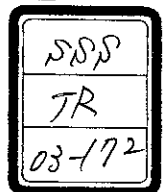
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APPENDIX

MAY, 2003

PT. MITRAPACIFIC CONSULINDO INTERNATIONAL

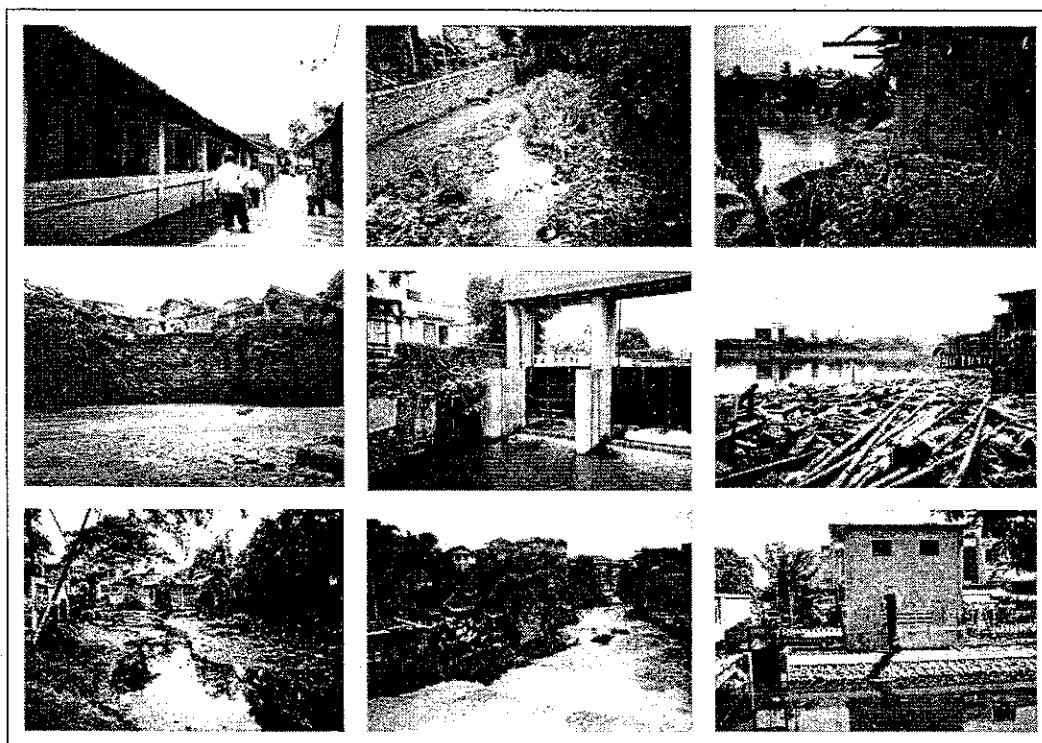
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ON
DAMAGE OF FLOOD 2002
IN
JABODETABEK AREA IN INDONESIA**



APPENDIX

MAY, 2003

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APPENDIX

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| Appendix B | Documentation of River Survey | B-1 – B-55 |
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APPENDIX A

**LAND USE OBSERVATION
IN
RIVER BASIN**

OBSERVATION RESULT

- ***Land use observation***

Time lapsed satellite land sat imagery is used for assessment of development in 6 major river basin/watershed areas. Although 6 series of land sat images are collected (1989-2002), only 3 images have better consistency in color reflectance with minimum cloud cover and haze (dated July 1989, July 1997 and July 2002). These land sat imagery series are provided by BTIC (Biotrop), Drawing land sat imagery series of 1989, 1997 and 2002 as shown on Figure A-1. Bogor, after radiometric and geometric correction undertaken.

A further comparison is made to 1989 and 2002 image to identify land cover condition, using unsupervised ISOCLASS, and classification of pixels color value method without confirmation to the field condition. The number and proportion of land cover gained from land sat image is utilize for indicative purpose only, its could not use for detailed measurement since resolution only achieved over 50 m- 100 m accuracy within 1: 500,000 scale. The classification is made into 4 major land coverage interpreted from image without field confirmation. Land cover of Jabodetabek 1989 to 2002 as shown in Figure A-2.

The comparison indicates that large area of green (Forestry, plantation and rain fed agriculture) area change and decrease into development area both in upstream and downstream. Change of land cover (1) and (2) as shown on Figure A-3.

Figure A-1. Landsat Imagery of Jabodetabek 1989, 1997 and 2002

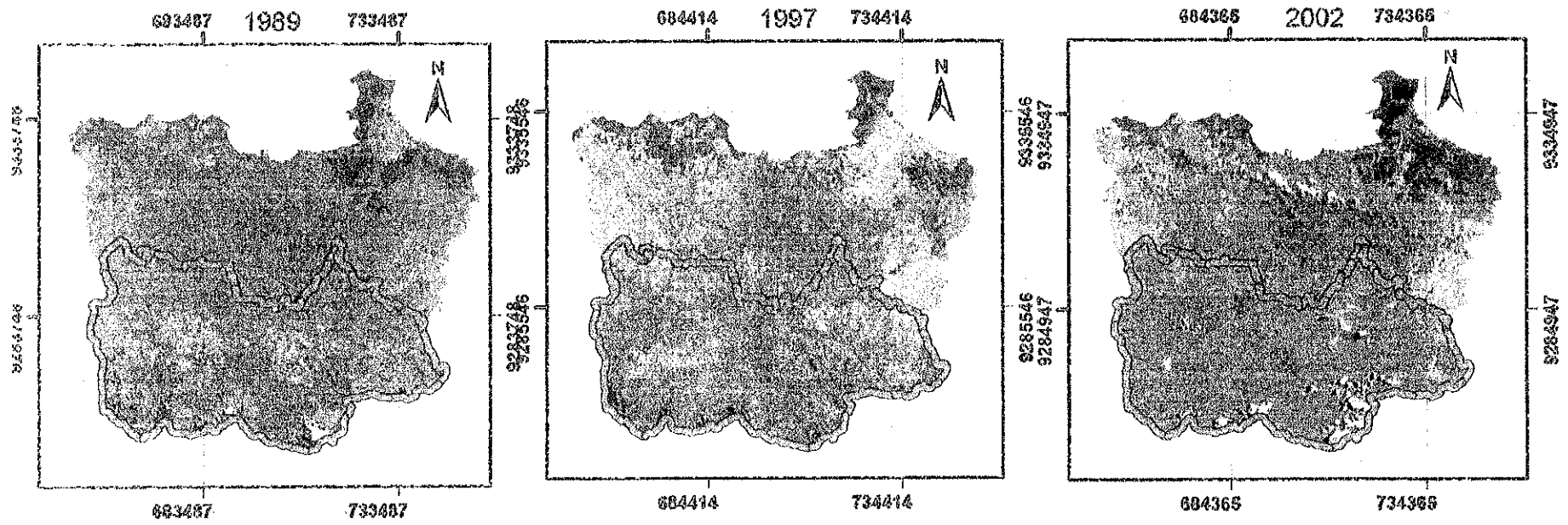


Figure A-2. Landcover of Jabodetabek 1989 to 2002

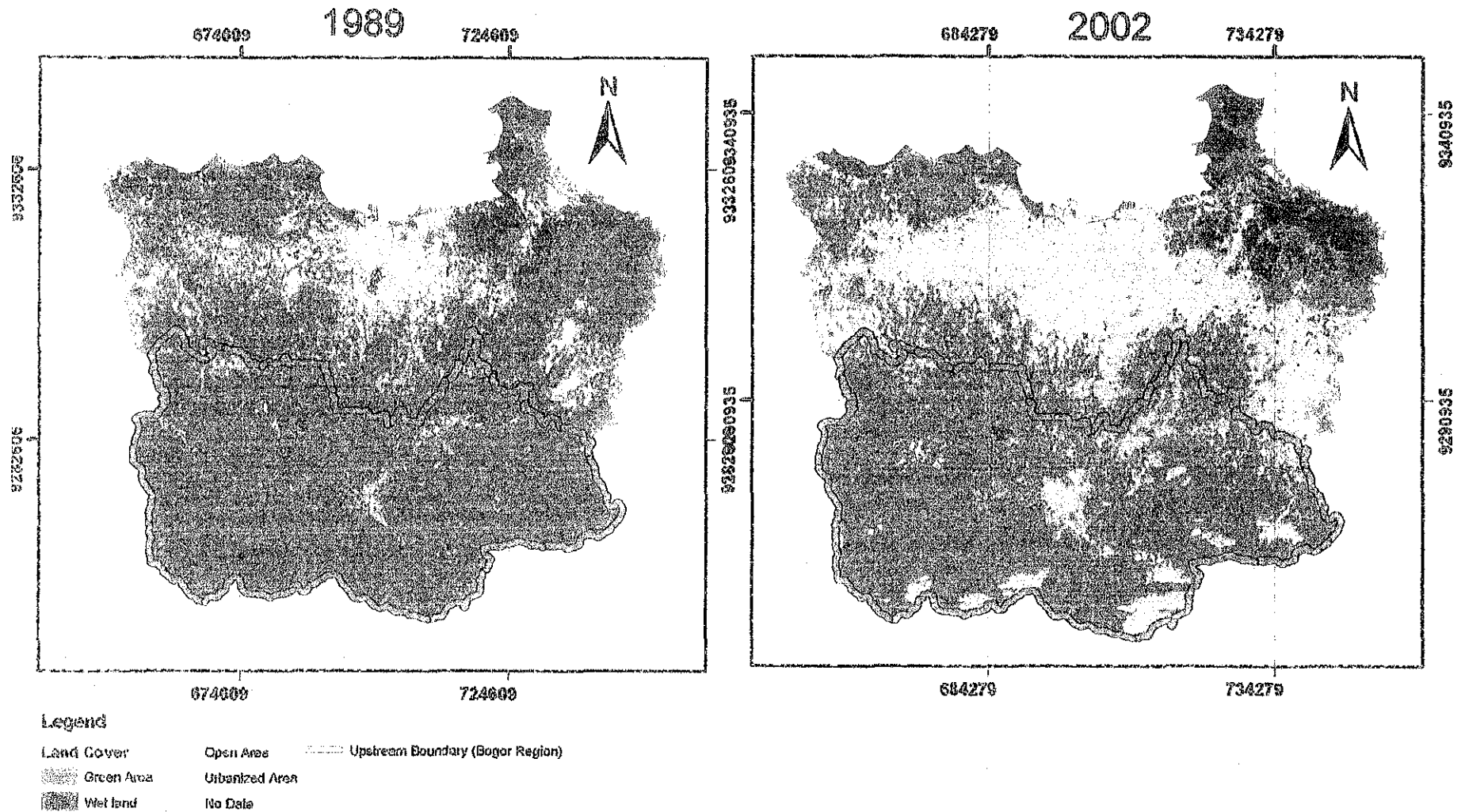
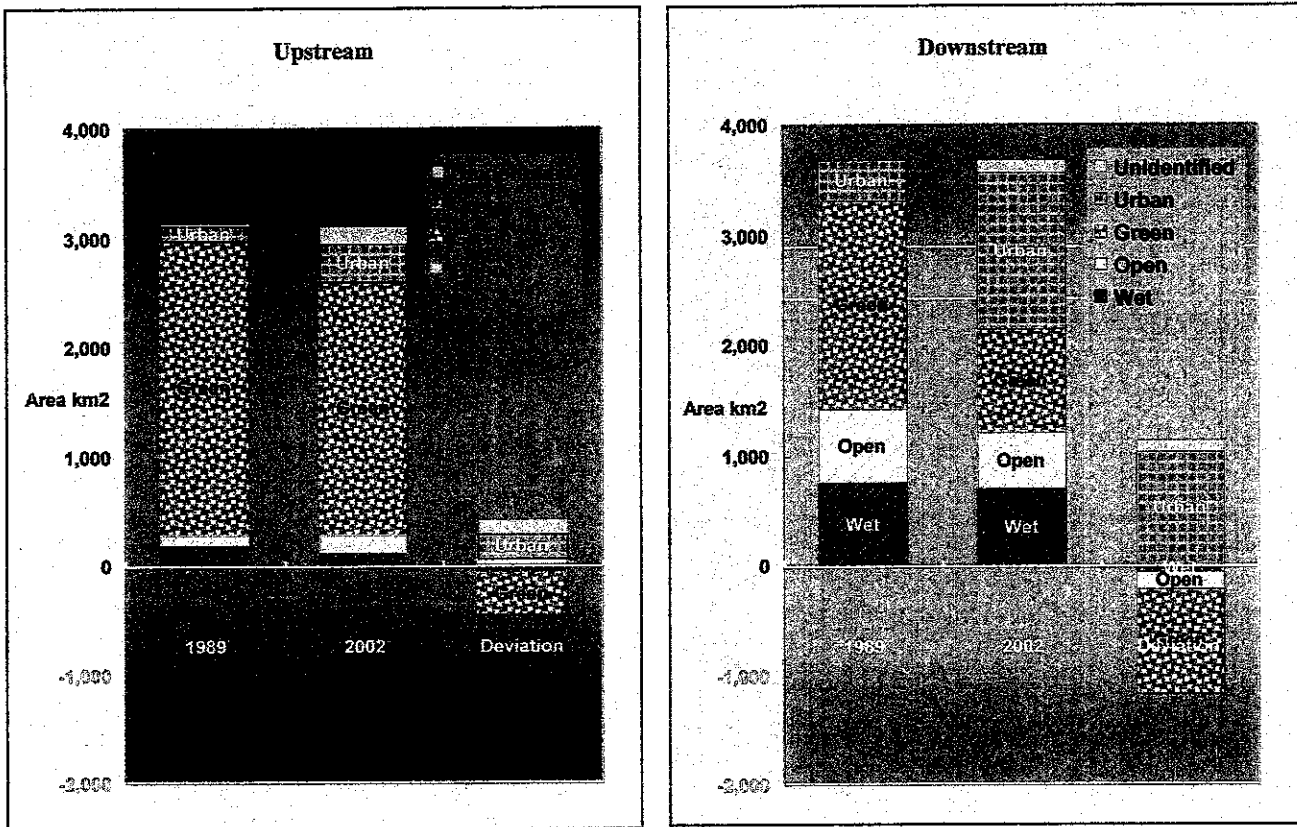
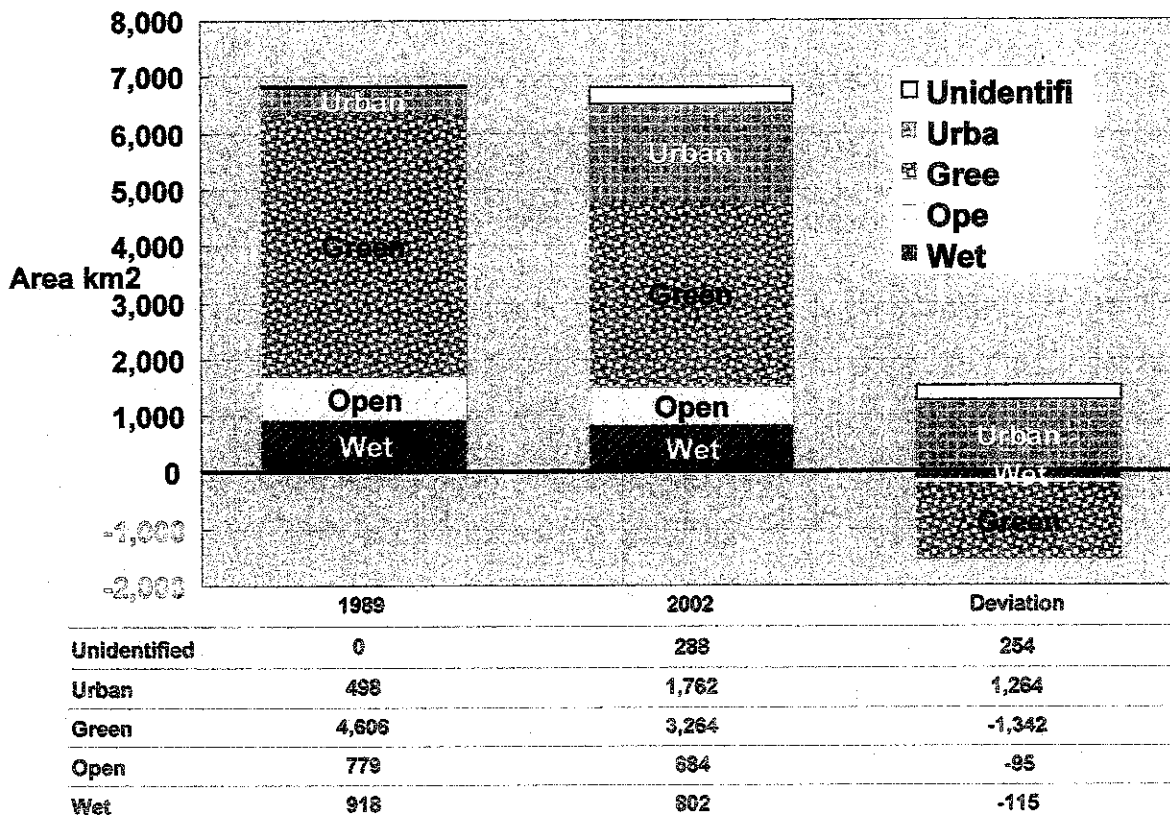


Figure A-3. Change of Land Cover



Landcover of Jabodetabek in 1989 and 2002



Urban area in both upstream and downstream area has increased of 498 km² in year 1989 to 1,762 km² in year 2002.

The present condition of development, as indicated during field reconnaissance are mostly concentrated along toll road Jakarta-Cikampek and Jakarta-Merak in downstream and Jagorawi Toll road in mid-stream and upstream. This development dominated by large scale (classified as more than 100 ha development) properties area for either residential and industries (predominant industrial cities along Jakarta-Cikampek). Land allocation permit and progress of properties development are showed in the following Table A-1 and Table A-2.

Data from Bekasi District exhibit an intensive increase of settlement and industrial development during period 1993-1996 as show on Table A-3.

Table A-1. List of Property Development Larger than 100 ha in Selected Watershed in The Jabodetabek Region (Upstream)

| No. | Location | Sub-district | Area (ha) | Developed (ha) | Percentage (%) |
|----------------------------------|---|---------------------|---------------|----------------|----------------|
| 1. Upstream Watershed | | | | | |
| Cikeas Watershed | | | 10,630 | 3,715 | |
| 1 | Gunung Geulis Resort | Megamendung | 460 | 200 | 43 |
| | Bukit Pelangi Resort | Cijayanti | 350 | 120 | 34 |
| 2 | Bogor Raya Housing Property and Golf Course | Baranangsiang | 450 | 200 | 44 |
| 3 | Seentul Highland | Sentul | 1,800 | 600 | 33 |
| | Palm Hill Resort | Sentul | 150 | 80 | 53 |
| | Permata Sentul Golf Housing | Sentul | 250 | 90 | 36 |
| 4 | Sentul Industrial Estate | Sentul | 120 | 40 | 33 |
| 5 | Jagorawi Golf Course and Residential | Cibinong | 300 | 220 | 73 |
| 6 | Riverside Golf Course | Gunung Putri | 150 | 85 | 57 |
| | Gunung Putri New Town | Gunung Putri | 1,600 | 300 | 19 |
| 7 | Industrial area : Indocement | Citeureup | 500 | 150 | 30 |
| | Industrial Estate CCIE | Citeureup | | | |
| 8 | Industrial Estate Vika | Citeureup | 600 | 200 | 33 |
| | Cement Cibinong | Citeureup | | | |
| | Cileungsi Industrial Park | Citeureup | | | |
| 9 | Kota Wisata | Citeureup/Cileungsi | 2,700 | 800 | 30 |
| | Legenda Wisata | Citeureup/Cileungsi | | 60 | |
| | Taman Buah Mekar Sari | Citeureup/Cileungsi | | 120 | |
| 10 | Citra Indah | Jonggol | 1,200 | 450 | 38 |
| Ciliwung Watershed | | | 1,000 | 740 | |
| 1 | Mega Mendung Permai | Cipayung | 400 | 320 | 80 |
| | Mega Indah | Cipayung | | | |
| 2 | Taman Safari | Cisarua | 600 | 420 | 70 |
| | Bukit Nirwana | Cisarua | | | |
| 3 | Bogor Municipal | | | | |
| Cisadane Watershed | | | 2,700 | 650 | |
| 1 | Duta Country Estate | Caringin | 200 | 150 | 75 |
| 2 | Lido Resort | Lido/Cigombong | 1,800 | 300 | 17 |
| | Mutiara Lido | | | | |
| 3 | Ranca Maya | | 400 | | 0 |
| 4 | IPB Kampus Darmaga | Darmaga | 300 | 200 | 67 |
| 5 | Bogor Municipal | | | | |
| Sunter/Cipinang watershed | | | 900 | 620 | |
| 1 | Emeralda Golf Residential | Cimanggis | 400 | 120 | 30 |
| 2 | Taman Bunga / Bumi perkemahan Cibubur | Cibubur | 500 | 500 | 100 |
| | Rafflesia and Kranggan Permai | | | | |
| Total | | | 15,230 | 5,725 | |

Source:
Urgent Inventory Study on Damage of Flood 2002 in Jabodetabek area in Indonesia, PT. Mitrapacific Consulindo International, February 2

Table A-2. List of Property Development Larger than 100 ha in Selected Watershed in The Jabodetabek Region (Downstream)

| No. | Location | Sub-district | Area (ha) | Developed (ha) | Percentage (%) |
|--|---|--------------------|---------------|----------------|----------------|
| 2. Downstream | | | | | |
| Cimanceuri / Cidurian Middle reach | | | | | |
| 1 | Tiga Raksa Township Golf Takara Housing | Tigaraksa / Cisoka | 900 | 180 | 20 |
| 2 | New Town Tenjo Bukit Cikasungka Taman Adhiyasa | Cisoka | 800 | 90 | 11 |
| 3 | Citra Raya Township | Cikupa / Curug | 2,500 | 260 | 10 |
| 4 | Kawasan Industri: Sukanagara Lyman CCM Cikupa Mas | Balaraja | 850 | 440 | 52 |
| Cisadane Middle Reach | | | | | |
| 1 | Bumi Serpong Damai Township (Include extension) Villa Melati Mas Alam Sutra Gading Serpong Regency | Serpong and Legok | 6,000 | 2,400 | 40 |
| 2 | Lippo Karawaci Township | Curug | 600 | 320 | 53 |
| 3 | Modern land | Pangerang | 500 | 410 | 82 |
| 4 | Kawasan Industri: Pasar Kemis Jatake Manis Periuk Jaya Istem | Pasar Kemis | 2,000 | 1,400 | 70 |
| Cikarang middle reach / Down Stream | | | | | |
| 1 | Industrial Estate and Residential Lippo Cikarang | Cikarang | 2,500 | 1,100 | 44 |
| 2 | Industrial and Residential Jababeka | Cikarang | 2,000 | 950 | 48 |
| 3 | Industrial Township MM 2100 | Cibitung | 1,200 | 800 | 67 |
| 4 | New Township Legenda | Tambun | 2,000 | 400 | 20 |
| Total | | | 21,850 | 8,750 | |

Source:

Urgent Inventory Study on Damage of Flood 2002 in Jabodetabek area in Indonesia, PT. Mitrapacific Consulindo International, February 2002.

Table A-3. Increasing of Settlement and Industrial Development

| No. | Sub-district | Total Area (Ha) | Land use for settlement and industry | | | | Increase area proportion | | Growth rate (%/year) |
|-----|-----------------|-----------------|--------------------------------------|----|-----------|----|--------------------------|-----|----------------------|
| | | | 1993 | | 1996 | | Area (Ha) | (%) | |
| | | | Area (Ha) | % | Area (Ha) | % | | | |
| 1 | Setu | 7,273 | 1,030 | 14 | 2,074 | 29 | 1,044 | 14 | 34 |
| 2 | Cibarusah | 11,240 | 556 | 5 | 1,020 | 9 | 464 | 4 | 28 |
| 3 | Serang | 11,924 | 1,545 | 13 | 3,720 | 31 | 2,715 | 18 | 47 |
| 4 | Lemah abang | 10,084 | 3,555 | 35 | 5,284 | 52 | 1,729 | 17 | 16 |
| 5 | Cikarang | 6,456 | 1,162 | 18 | 1,285 | 20 | 123 | 2 | 4 |
| 6 | Kedung waringin | 3,865 | 557 | 14 | 579 | 15 | 22 | 1 | 1 |
| 7 | Cibitung | 9,503 | 4,482 | 47 | 4,998 | 53 | 516 | 5 | 4 |
| 8 | Tambun | 7,878 | 3,052 | 39 | 3,919 | 50 | 867 | 11 | 10 |
| 9 | Tarumajaya | 5,463 | 373 | 7 | 702 | 13 | 329 | 6 | 29 |
| 10 | Babelan | 6,361 | 654 | 10 | 1,845 | 29 | 1,191 | 19 | 61 |
| 11 | Tambelang | 9,919 | 706 | 7 | 706 | 7 | - | 0 | 0 |
| 12 | Sukatani | 8,836 | 353 | 4 | 358 | 4 | 5 | 0 | 1 |
| 13 | Pebayuran | 9,635 | 748 | 8 | 748 | 8 | - | 0 | 0 |
| 14 | Cabangbungin | 6,643 | 1,214 | 18 | 1,214 | 18 | - | 0 | 0 |
| 15 | Muaragembong | 12,290 | 319 | 3 | 1,003 | 8 | 684 | 6 | 72 |
| | Total | 127,388 | 20,306 | 16 | 29,455 | 23 | 9,149 | 7 | 15 |

Source: BPS, Kabupaten Bekasi dalam Angka 1993-1996.

The table showed that around 15 % of settlement and industry areas increase per year during 1994 to 1997.

Bappeda data of Bekasi District, informed that accumulation number of land permit for settlement areas (172 locations with total area of 13,970 ha) and land permit for industrial (122 locations with total area of 4,408 ha) has been issued by local government until year 1997.

The development consequently has potential for increasing run off coefficient and peak flow, which cause of flood, if no protection facilities provided before all area developed.

In fringe areas which were growing between large scale development (Bekasi, Serpong, Ciputat and Pamulang sub-district, intensive in individual or smaller scale development are not prepared with proper local drainage, resulting increase of flood frequency and flood area.

A particular land use changes area appeared in upstream of Ciliwung (Cisarua, Puncak) and upstream of Citarum (Cipanas); converting plantation areas and other

agriculture areas even conservation areas into settlement development (second homes) for Jakarta consumer.

A specific phenomenon of high supply and high demand of mid class consumer are continuously raising from upper class demand interest during 1985-1990.

This condition bring consequence of large production of house unit at high rate building coverage ratio ($> 50\%$), comparea to larger house lot production (building coverage ratio less than 25%) entered upper class market 15 year ago (Coolibah, Mega Indah property). Around 65 housing properties are occupying large area in Cipanas area (Citarum upstream) including less properties in Cisarua and Tugu (Ciliwung upstream). Among 17 properties surveyed, all are not providing significant retention area (lake, pond) and all property produce house limit with building coverage ratio (BCR) over 50% , as shown in Table A-4. Another study has indicate land use change in Ciliwung upstream (Forestry land use study, IPB, 2002) as shown in Table A-5, as significant contribution to flooding potential in downstream from its increase of peak flow and erosion.

Aware to this condition, Presidential decree No. 114, year 1999 produce a land use planning guidelines for Bogor-Puncak-Cianjur area (Ciliwung and Citarum upstream) to control excessive urban development and conserve upstream area as shown Table A-6.

Table A-4. High Density Settlement Property in Puncak Cianjur Area
(Survey were made on 17 properties from total 65 properties)

| No | Name of Property | Location | Total Area (ha) & Slope | Number of Houses (units) | Building area/ House lot | Building Coverage Ratio |
|----|----------------------------------|------------------------------|----------------------------|-----------------------------|--|----------------------------|
| 1 | Pesona Anggrek | Ds. Sindangjaya Kec.Pacet | 32 15 - 25 % | 600 | 31/80, 40/96, 40/104, 58/160, 74/160, 75/160, 104/240, 156/240, 143/320, 180/320 | 40 - 65 % |
| 2 | Vila Permata Gadog | Ds. Gadog Kec.Pacet | 15 10 - 18 % | 225 | 54/130, 70/150, 90/210, 120/400 | 40 - 65 % |
| 3 | Vila Palm Garden | Ds. Palasari Kec.Pacet | 23 15 - 28 % | 300 | 150/300, 200/400 | 40 - 60 % |
| 4 | Vila Lotus | Ds. Sindangjaya Kec.Pacet | 20 10 - 15 % | 300 | 65/166, 90/300, 120/450 | 35 - 45 % |
| 5 | Green Apple Garden (Tahap II) | Ds.Ciherang Kec.Pacet | 250 12 - 15 % | 5000 | 85/63, 90/63, 90/75, 60/110, 65/110, 68/110, 110/71.5, 96/136.5, 61/50 77/50, 38/33 | 50 - 70 % |
| 6 | Kota Bunga | Ds. Kec. Pacet | 350 18 - 35 % | 2000 | 65/124, 90/153, 156/240, 70/122, 60/99 297/390, 184/374, 143/224, 70/300, 184/374, 297/390, 170/300, 143/224, 57/105 | 45 - 65 % |
| 7 | Nusa Permai | Ds.Sukamulya Kec. | 16 12 - 20 % | 400 | 21/62, 36/120, 36/125, 36/143, 36/168, 36/180, 45/62, 45/120, 45/135, 54/144, 54/210, 54/320, 80/120, 80/210 | 45 - 65 % |
| 8 | Vila Bukit Cipendawa | Kec. Pacet | 50 25 - 45 % | 800 | 27/55, 40/96, 42.5/90, 75/150, 76/150, 117/252, 148/265, 202/400, 50/104, 90/150 129/240 | 35 - 55 % |
| 9 | Cipanas Baru | Ds. Ciherang Kec.Pacet | 14 18 - 30 % | 150 | 38/138, 38/199, 62/90, 90/150 43.8 (condovilla) | 45 - 60 % |

Table A-4. High Density Settlement Property in Puncak Cianjur Area
(Survey were made on 17 properties from total 65 properties)

| No | Name of Property | Location | Total Area (ha) & Slope | Number of Houses (units) | Building area/ House lot | Building Coverage Ratio |
|----|--------------------|--|----------------------------|-----------------------------|---|----------------------------|
| 10 | Vila Bukit Harmoni | Ds. Ciputri Kec.Pacet | 40 25 - 50 % | 1050 | 36/90, 45/105/85/200, 80/300, 120/300, 140/300 | 45 - 65 % |
| 11 | Ciherang Glenside | Ds. Ciherang Kec.Pacet | 8 18 - 25 % | 120 | 120/240, 280/500 | 50 - 56 % |
| 12 | Green Hill | Ds.Ciherang Kec.Pacet | 30 20 - 32 % | 400 | 58/160,76/192, 94/165, 95/298, 109/240 | 30 - 45 % |
| 13 | Taman Giri Indah | Ds. Sukanagalih Kec.Pacet | 5 20 - 32 % | 48 | 150/400 | 30 - 40 % |
| 14 | Puncak Resort | Ds. Sukanagalih Kec.Pacet | 70 15 - 24 % | 500 | 42/47, 76/72.25,99/96, | 45 - 55 % |
| 15 | Vila Bougenville | Ds. Palasari Kec. Pacet | 5 18 - 30 % | 92 | 115/315, 250/500 | 35 - 55 % |
| 16 | Vila Permata | Ds.Pakuwon & Ds.Cikanyere Kec. Sukaresmi | 8 20 - 45 % | 500 | 35/75, 45/78, 70/91 | 35 - 50 % |
| 17 | Vila Intan Permai | Ds.Cibadak Kec.Pacet | 10 18 - 25 % | 500 | 70/105, 80/130, 80/173, 80/179, 90/267 | 45 - 60 % |

Table A-5. Change of land use in Upper Ciliwung 1981-1996(Ciawi, Megamendung, Cisarua)

| No. | Utilization | Land use change | |
|-----|---|-----------------|--------------|
| | | Area (ha) | % of change |
| 1 | Primary Forest | - 971.4 | - (22.78 %) |
| 2 | Secondary Forest | + 712.5 | + (147.36 %) |
| 3 | Tertiary Forest | - 235.0 | - (48.46 %) |
| 4 | Mixed upland farming (dominant by tree crops) | - 53.6 | - (4.55 %) |
| 5 | Tea plantation | + 1,402.8 | + (47.41 %) |
| 6 | Rubber plantation | - 59.9 | - (100 %) |
| 7 | Settlement area | + 1,212.4 | + (160.7 %) |
| 8 | Shrubs and alang-alang | + 75.4 | + (118.44 %) |
| 9 | Rainfed farming | - 327.2 | - (34.64 %) |
| 10 | Wetland farming | - 1,762.8 | - (48.03 %) |

Source: Forest study land use change in relation with increasing surface drainage in upper Ciliwung watershed (2002), Bogor Institute of Agriculture.

Table A-6. Land Use Plan in Bogor-Puncak-Cianjur Area According to Presidential Decree No. 114/1999

| No. | Land Use | Area (ha) | Percentage (%) |
|-----|------------------------------|----------------|----------------|
| 1 | Urban development | 19,500 | 16.12 |
| 2 | Wet land region/ paddy field | 18,600 | 15.37 |
| 3 | Protected forest | 19,475 | 16.10 |
| 4 | Wildlife reserve | 550 | 0.45 |
| 5 | National garden | 3,500 | 2.89 |
| 6 | Nature tourist garden | 450 | 0.37 |
| 7 | Other uses | 59,020 | 48.70 |
| | Total | 121,095 | 100.00 |

Source : RTR Kawasan Bopunjur, 2001

Remarks : other uses includes agriculture, agricultural uplands, bare, etc.

This landuse guideline is not effective due to decentralization interest. The Presidential Decree 123/2001, focusing to inter sector and inter regional coordination for water resources management, coordination for river water management of Ciliwung basin established under joint ministry agreement (KIMPRASWIL and State ministry of Environment) with involving related districts and provinces (West Java, DKI Jakarta, Banten) issued in Ministry (KIMPRASWIL) decree No. 20/KPTS/M/2002.

The coordination Team divided into 3 working group: Spatial planning and environment, Housing & Settlement and Urban, Integrated River Management. The working groups understand coordinated task program in spatial planning, community empowerment legal & environment, urban infrastructure development and watershed and river management as shown in Figure A-4.

APPENDIX B

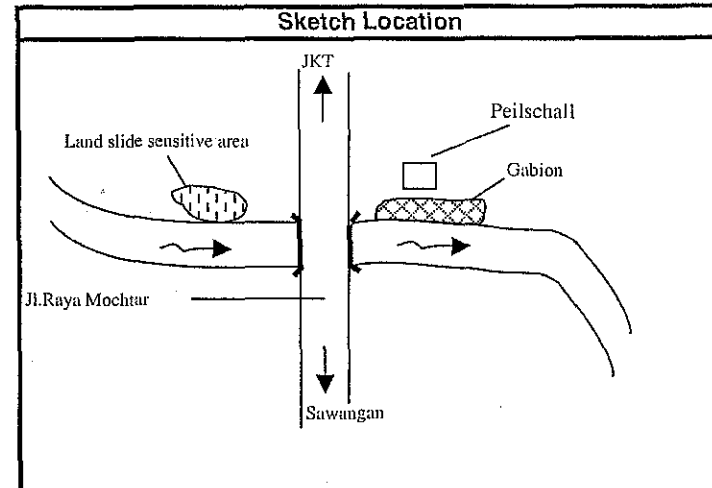
**DOCUMENTATION
OF
RIVER SURVEY**

List of River Survey Location 2003

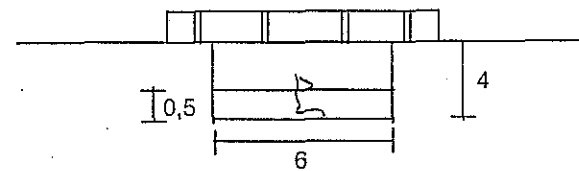
| No | Location | River / River System |
|----|-------------------------|---------------------------------|
| 1 | Sawangan | Pesanggrahan |
| 2 | Kel. Kedoya Utara | Angke / Pesanggrahan |
| 3 | Kel. Kapuk Muara | Cengkareng Drain / Pesanggrahan |
| 4 | Komp. IKPN Bintaro | Pesanggrahan |
| 5 | Perum Bukit Cengkeh II | Cipinang |
| 6 | Perum Lembah Hijau | Cipinang |
| 7 | Kel. Cipinang Muara | Sunter / Cipinang |
| 8 | Situ Arman Cimanggis | Jantung / Cipinang |
| 9 | Kel. Rawa Terate | Pertukangan / Cipinang |
| 10 | Kel. Cakung Barat | Cakung Drain / Cipinang |
| 11 | Kel. Rawa Terate | Cakung / Cipinang |
| 12 | Kel. Rawa Terate | Buaran / Cipinang |
| 13 | Kel. Pulogadung | Sunter / Cipinang |
| 14 | Waduk Pulomas | Sunter / Cipinang |
| 15 | Kel. Sumur Batu | Kali Item / Cipinang |
| 16 | Kel. Sunter Jaya | Sunter / Cipinang |
| 17 | Kel. Kebon Pala | Cipinang |
| 18 | Penas Tanggul | Cipinang |
| 19 | Kel. Cipinang Melayu | Sunter / Cipinang |
| 20 | Kel. Bukit Duri | Ciliwung |
| 21 | Kampung Pulo | Ciliwung |
| 22 | Kel. Pengadegan | Ciliwung |
| 23 | Perkebunan The Ciliwung | Ciliwung |
| 24 | Kel. Batulayang | Ciliwung |
| 25 | Kel. Mekar Jaya | Ciliwung |
| 26 | Jagorawi Golf | Cikeas / Cikarang |
| 27 | River Side G. Putri | Cikeas / Cikarang |
| 28 | Kel. Babelan | Bekasi / Cikarang |
| 29 | Kel. Sukabakti | Sasak Goban / Cikarang |
| 30 | Pantai Hurip | Bekasi / Cikarang |
| 31 | Pantai Hurip | CBL / Cikarang |
| 32 | Ds. Cibadak | Cimanceuri |
| 33 | Jl. Raya Tiga Raksa | Cimanceuri |
| 34 | Kec. Sukatani | Cikarang |
| 35 | Kel. Bantar Gebang | Cileungsi / Cikarang |
| 36 | Perum Kota Wisata | Cileungsi / Cikarang |
| 37 | Desa Bogor | Cipangaur / Cimanceuri |
| 38 | Kec. Jasinga | Cidurian / Cimanceuri |
| 39 | Desa Pasir Ampo | Cidurian / Cimanceuri |
| 40 | Kel. Renged | Cidurian / Cimanceuri |
| 41 | Ds. Gunung Kawi Dago | Cimanceuri |
| 42 | Ds. Kelebet | Cimanceuri |
| 43 | Kel. Paledang | Cisadane |
| 44 | Kel. Kebon Pedes | Kali Baru / Cisadane |
| 45 | Jl. Raya Tajur | Kali Cibalok / Cisadane |
| 46 | Kel. Gudang | Cisadane |
| 47 | Kel. Periuk Jaya | Kali Sabi / Cisadane |
| 48 | Gn. Pasir Gudang | Cisadane |

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-----------------------|----------------|---|
| Name of River / Canal | : Kali Pesanggrahan I | Date of Survey | : 14-02-2003 |
| Location | : Sawangan, Depok | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Dimension of Canal / Structure

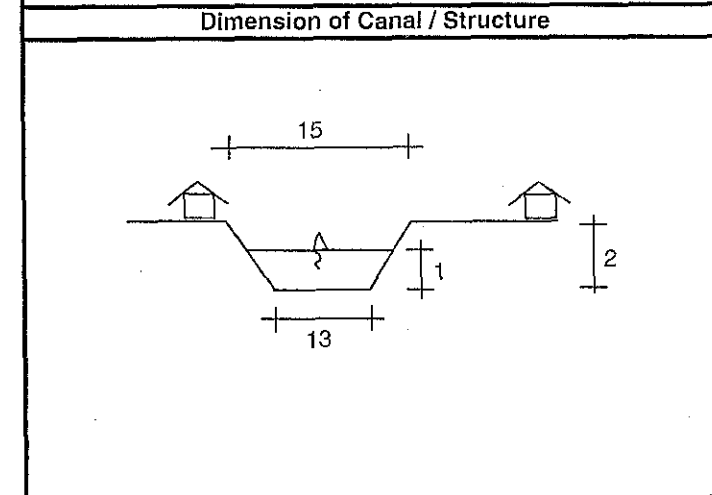
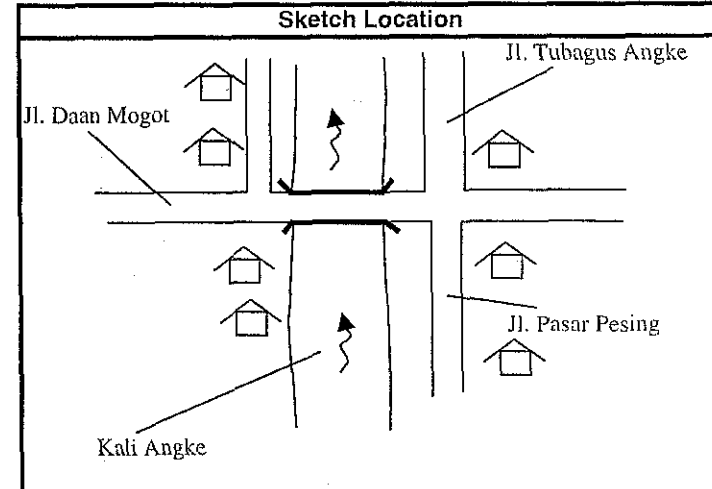


Remarks :

- AWLR is provided and in running condition.
- The river is meander, risk of erosion and land slide local community provide gabion to protect river bank.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|---------------|----------------|---|
| Name of River / Canal | : Kali Angke | Date of Survey | : 25-02-2003 |
| Location | : Kel. Kedoya | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

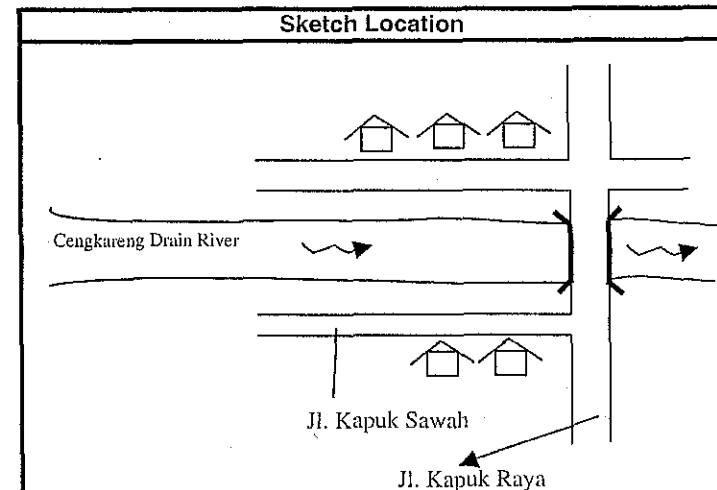


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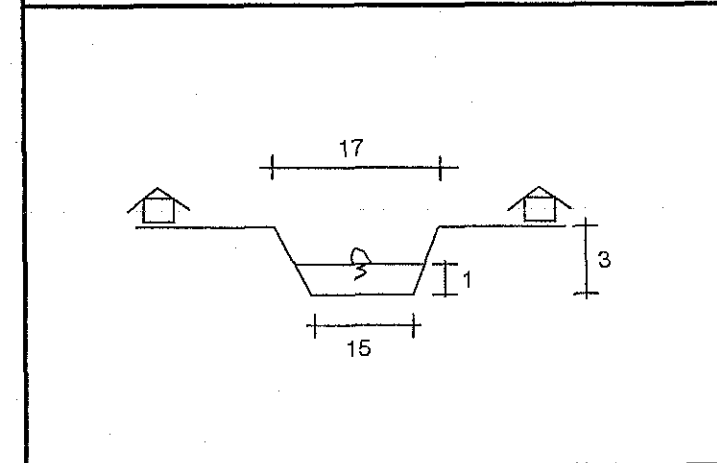
- Collecting plastic garbage for recycling but other garbage remain in the river, create sedimentation and decrease the river course flow.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|--------------------|----------------|---|
| Name of River / Canal | : Cengkareng Drain | Date of Survey | : 25-02-2003 |
| Location | : Kel. Kapuk Muara | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Dimension of Canal / Structure

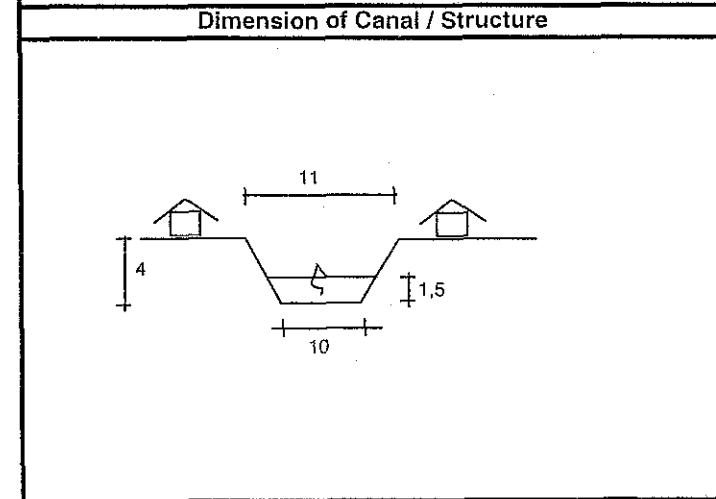
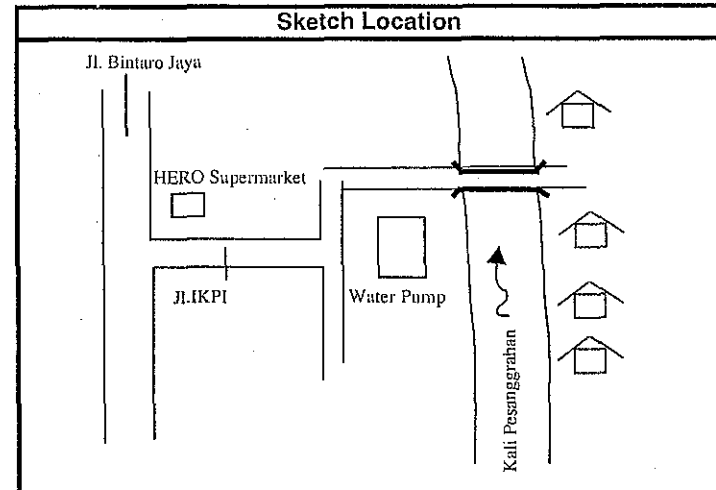


Remarks :

- Use the riverbank as garbage disposal collection, and many permanent illegal housing built in the riverbank, and potential increase of flood area.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|---------------------|----------------|---|
| Name of River / Canal | : Kali Pesanggrahan | Date of Survey | : 26-02-2003 |
| Location | : Komp.IKPN Bintaro | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

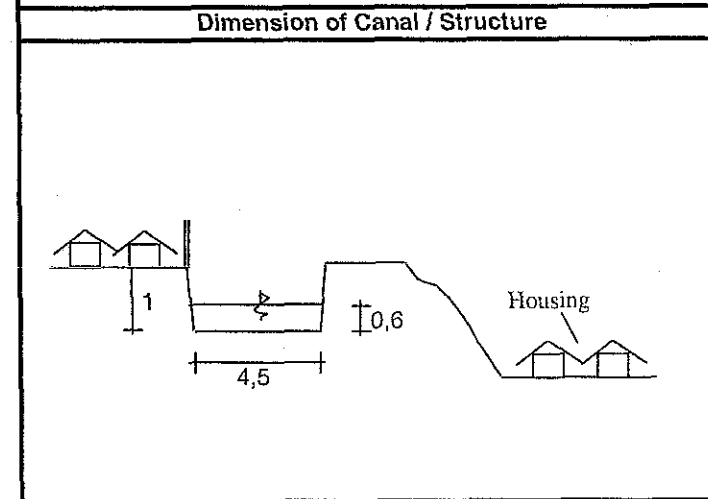
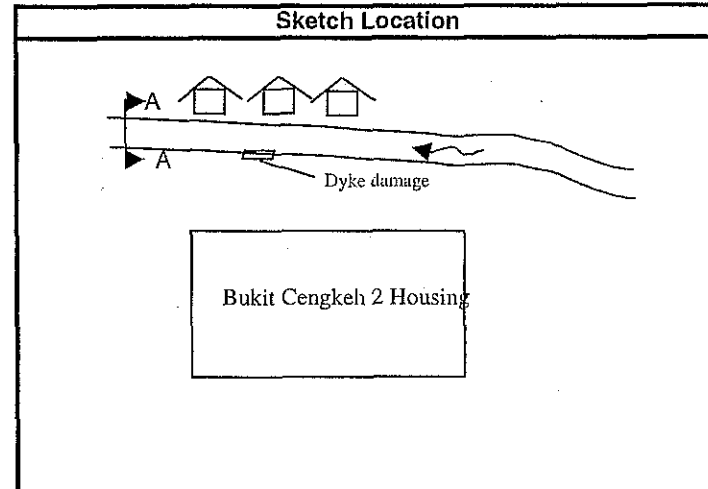
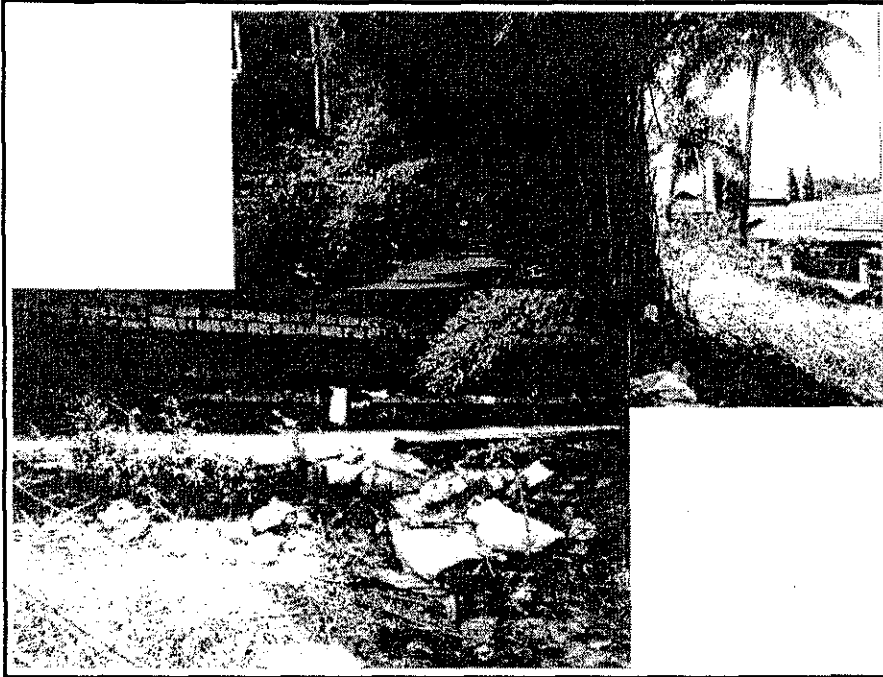


Remarks :

- Houses located low river areas during flood 2002 inundation occurred around one full month and water raises above 2 m in peak flooding.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|--------------------------|----------------|---|
| Name of River / Canal | : Sungai Laya | Date of Survey | : 15-02-2003 |
| Location | : Perum. Bukit Cengkeh 2 | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

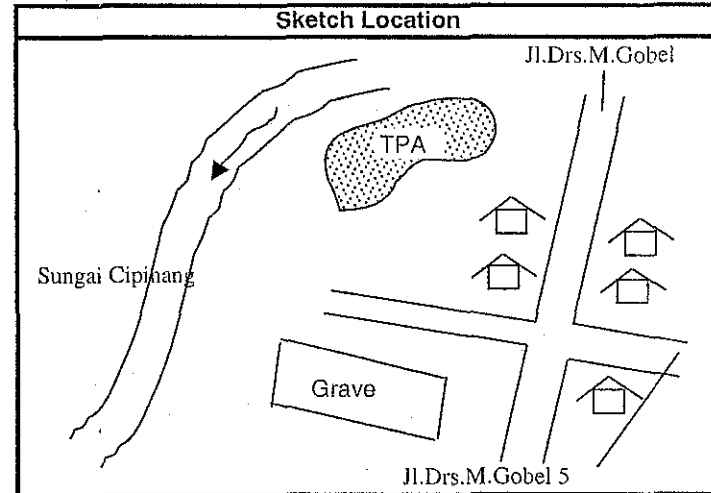
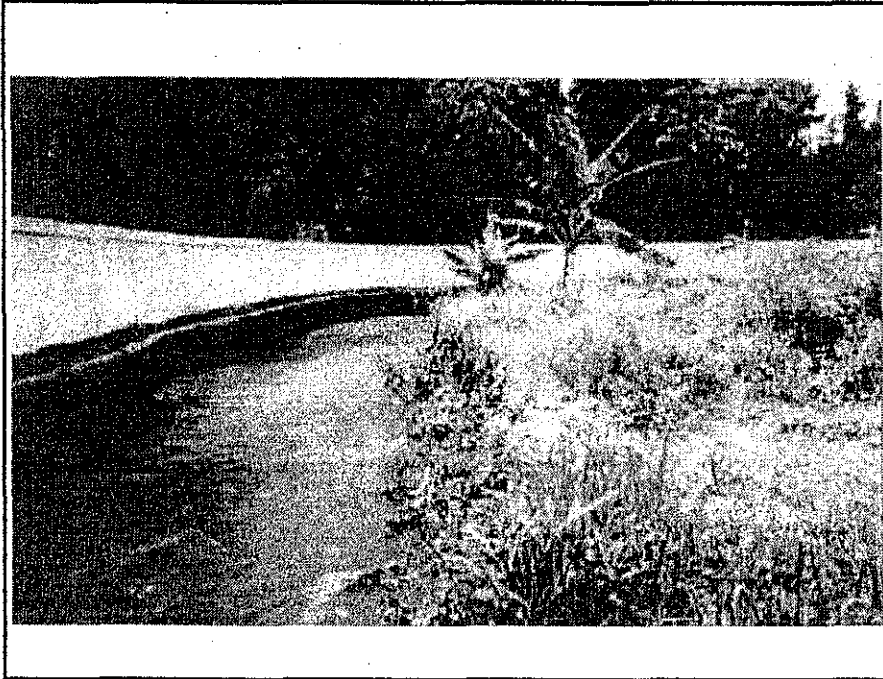


Remarks :

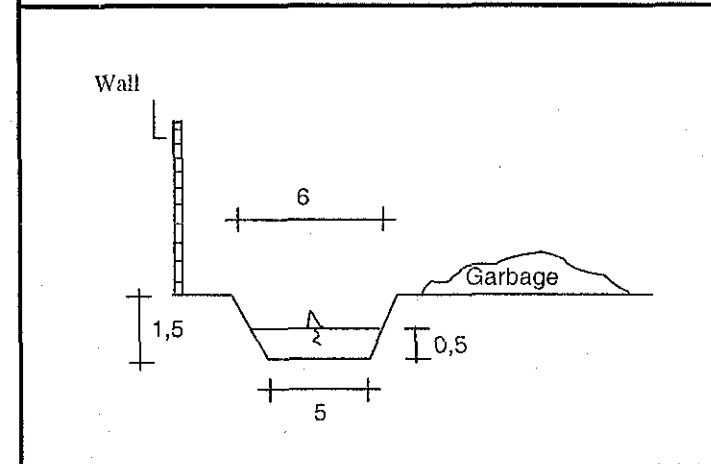
- Housing elevation lower than river interval water level and dyke damage create inundation at flood of the river

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-----------------------|----------------|---|
| Name of River / Canal | : Sungai Cipinang | Date of Survey | : 15-02-2003 |
| Location | : Perum. Lembah Hijau | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Dimension of Canal / Structure

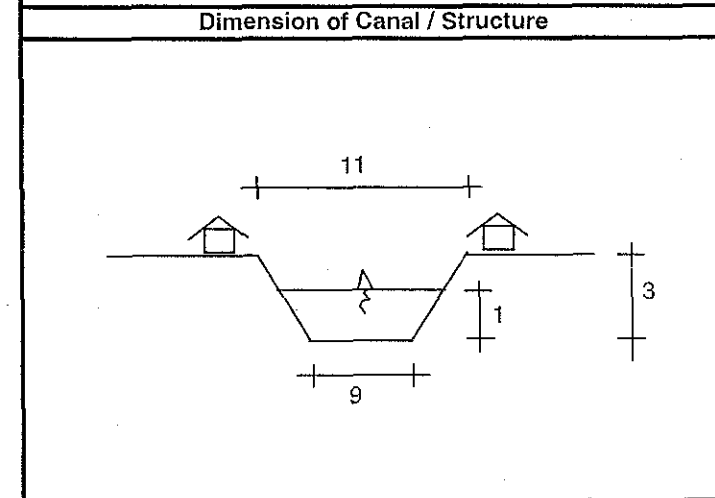
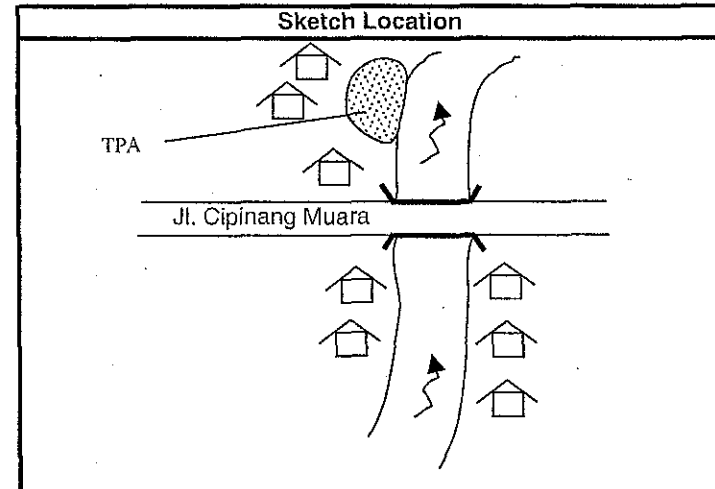
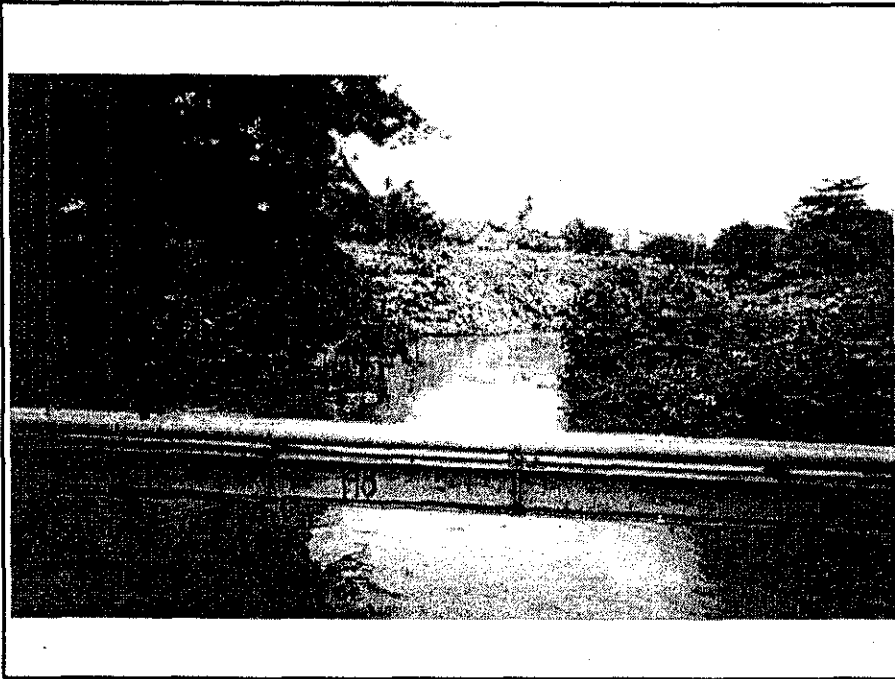


Remarks :

- Disposal collector (TPA) locate at rverside, and narrowing the river by accumulated debris.
- Damage from high density housing was clogged by garbage

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-----------------------|----------------|---|
| Name of River / Canal | : Kali Sunter | Date of Survey | : 13-02-2003 |
| Location | : Kel. Cipinang Muara | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

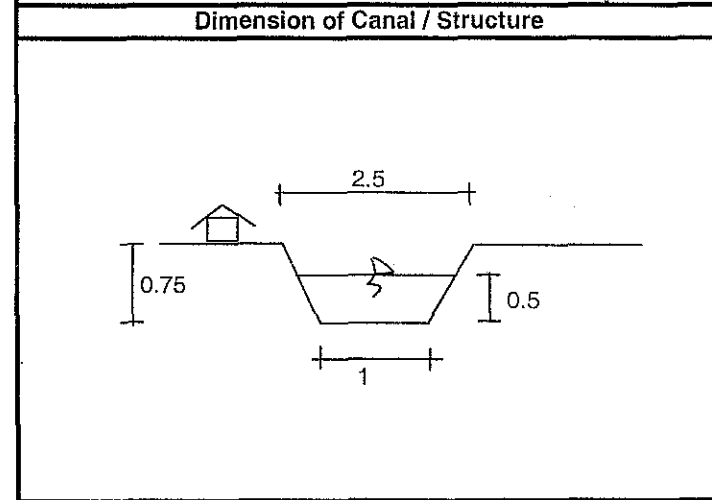
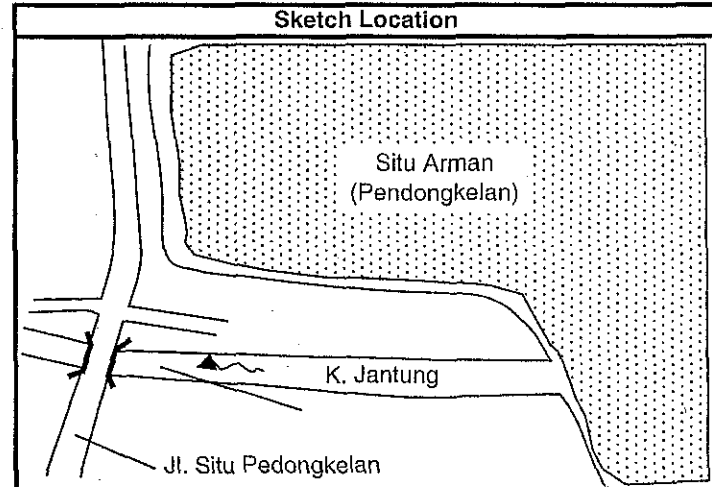


Remarks :

- Housing along the riverbank, against regulation and risk to erosion.
- TPA in river dyke, accumulalation of garbage / debris to the river.

DOCUMENTATION OF RIVER SURVEY 2003

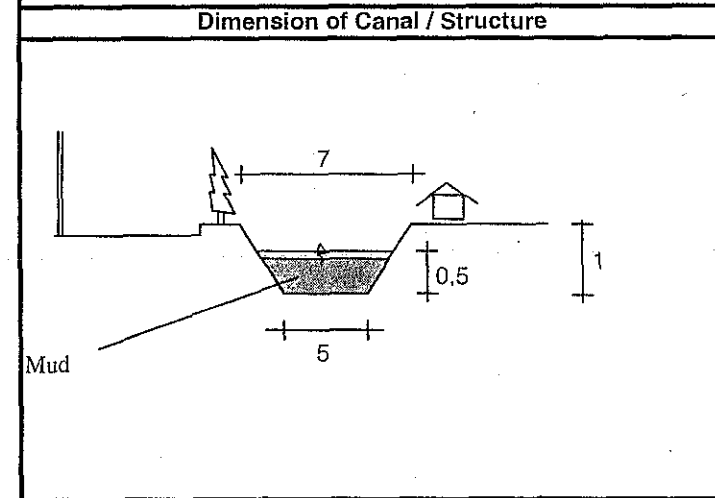
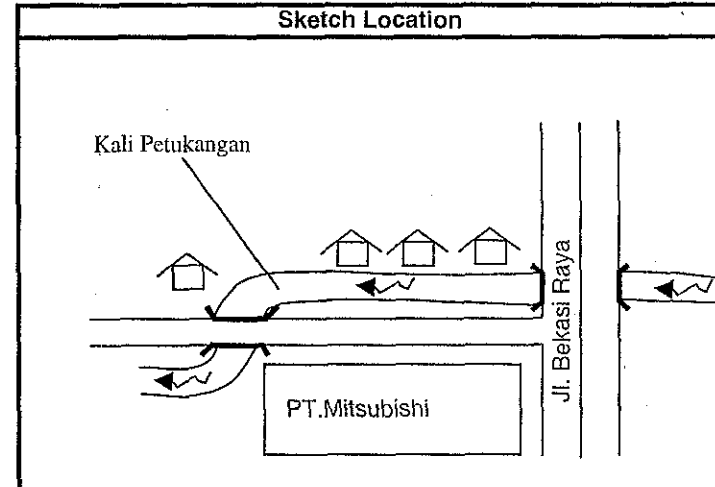
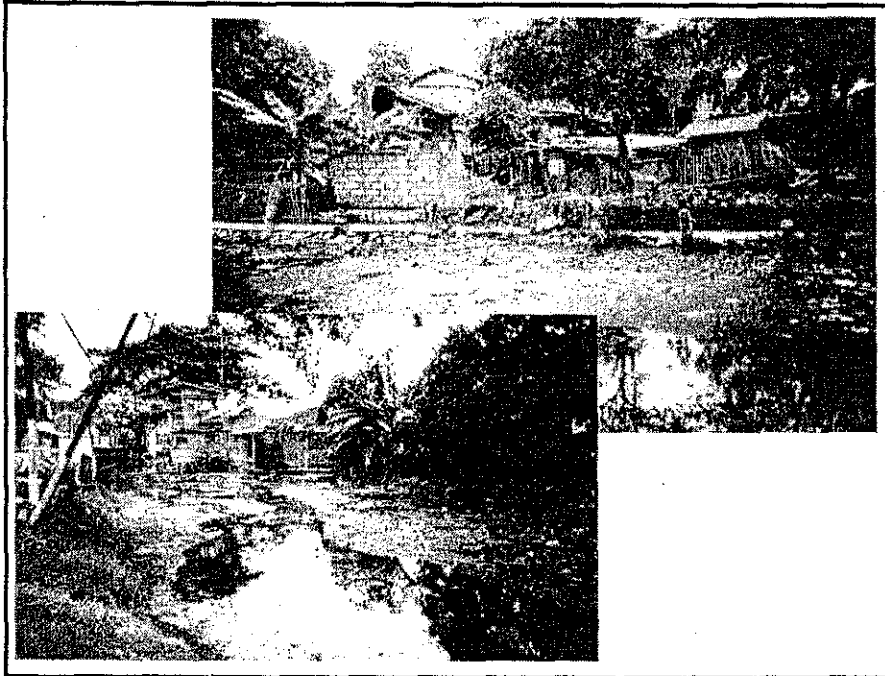
Name of River / Canal : Kali Jantung Date of Survey : 15-02-2003
Location : Situ Arman, Kel. Pekayon Filled by : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL
No. of Picture :
Title :



Remarks :
- The pond retains runoff from surrounding area

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|--------------------|----------------|---|
| Name of River / Canal | : Kali Petukangan | Date of Survey | : 24-02-2003 |
| Location | : Kel. Rawa terate | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

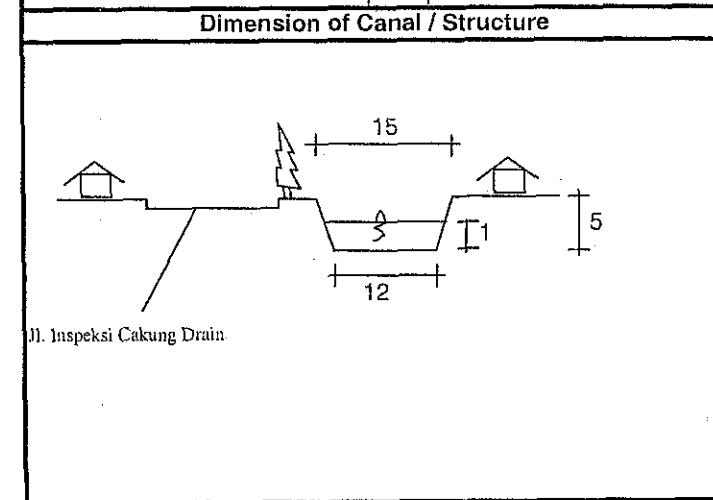
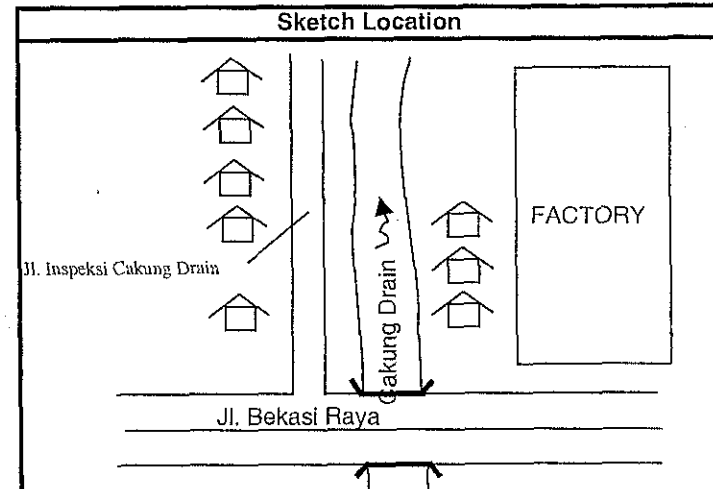
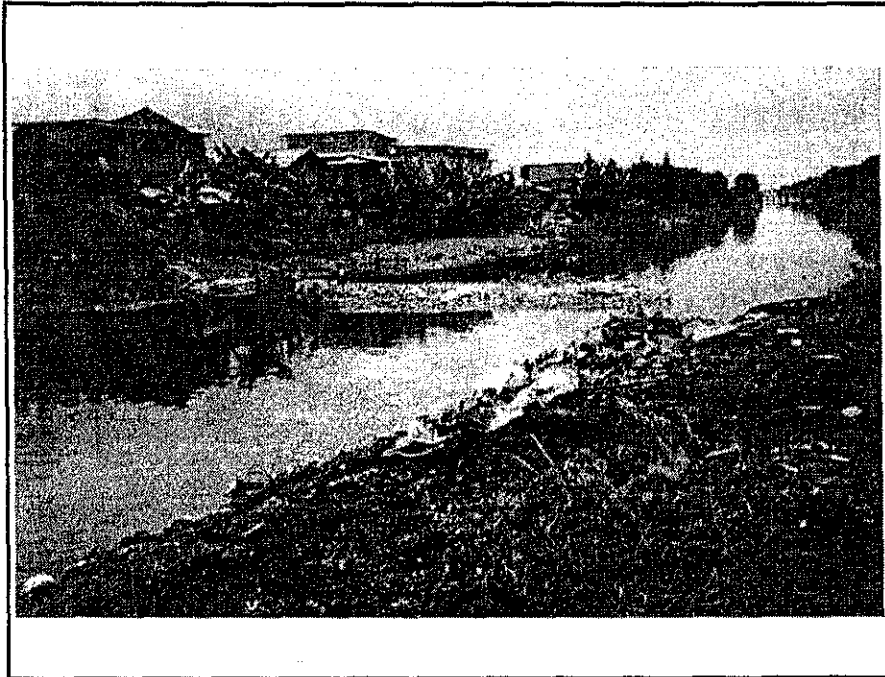


Remarks :

- Mud sediments and garbages accumulated in the river from high density settlement area, decrease the flow of water course and insrease flood area and flood frequency.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|---------------------|----------------|---|
| Name of River / Canal | : Cakung Drain | Date of Survey | : 24-02-2003 |
| Location | : Kel. Cakung Barat | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

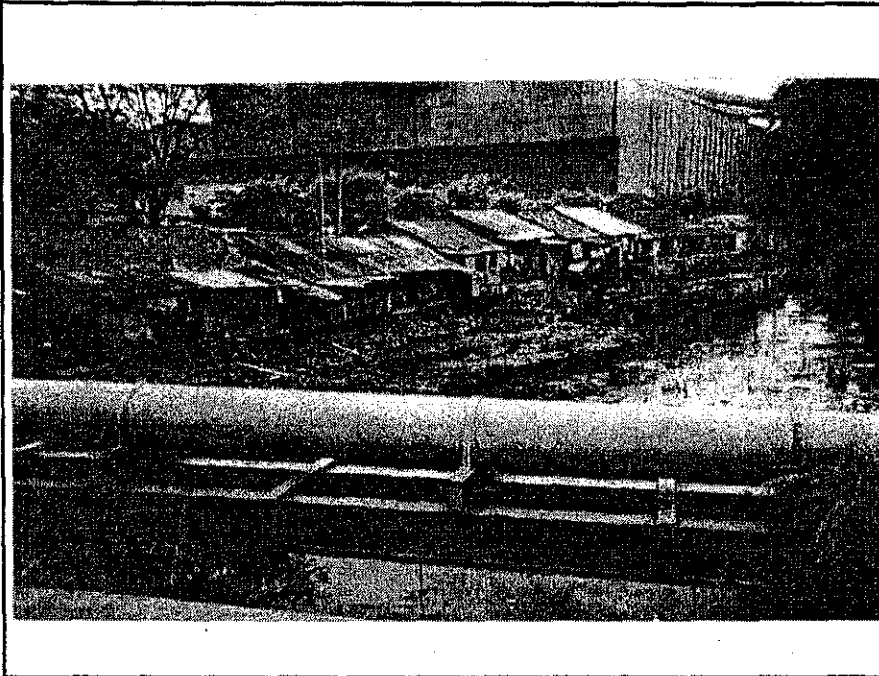


Remarks :

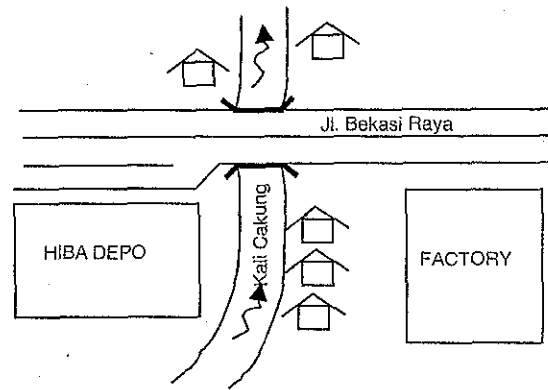
- Using riverbank as temporary disposal collector makes garbage accumulated in the river and along the riverbank, decrease flow capacity and increase flood area.

DOCUMENTATION OF RIVER SURVEY 2003

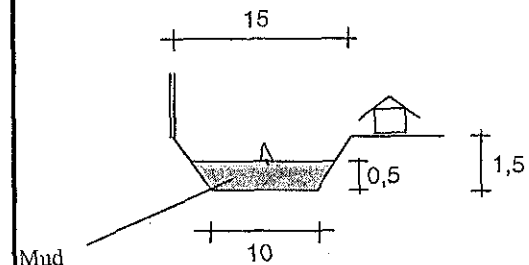
| | | | |
|-----------------------|--------------------|----------------|---|
| Name of River / Canal | : Kali Cakung | Date of Survey | : 24-02-2003 |
| Location | : Kel. Rawa Terate | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Sketch Location



Dimension of Canal / Structure

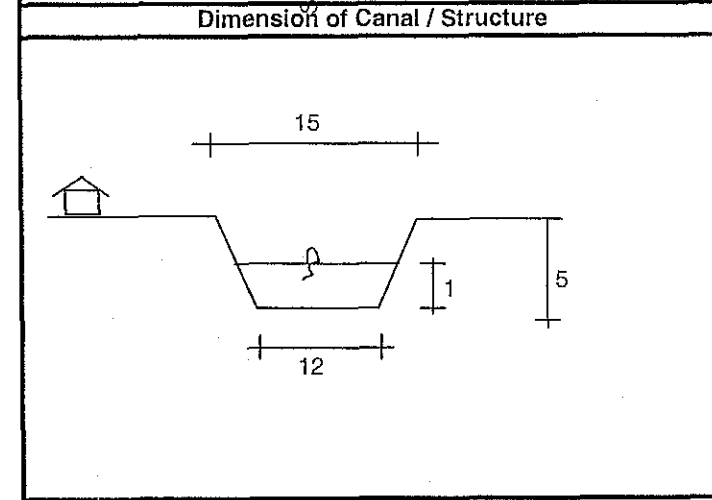
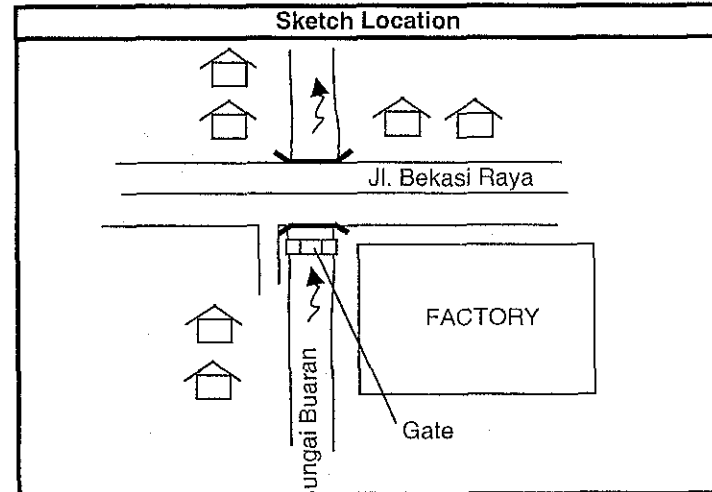


Remarks :

- Sediments and garbages accumulated along river, increasing the flow of river course.
- Illegal development in the riverbank, use river as disposal area.

DOCUMENTATION OF RIVER SURVEY 2003

Name of River / Canal : Sungai Buaran Date of Survey : 24-02-2003
Location : Kel. Rawa Terate Filled by : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL
No. of Picture :
Title :

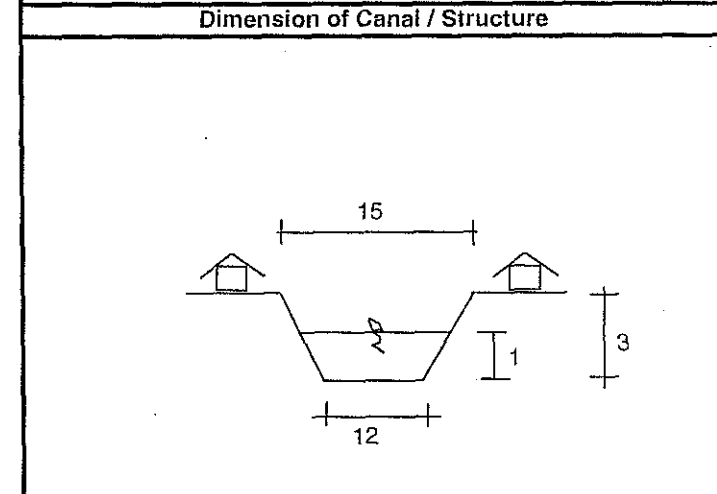
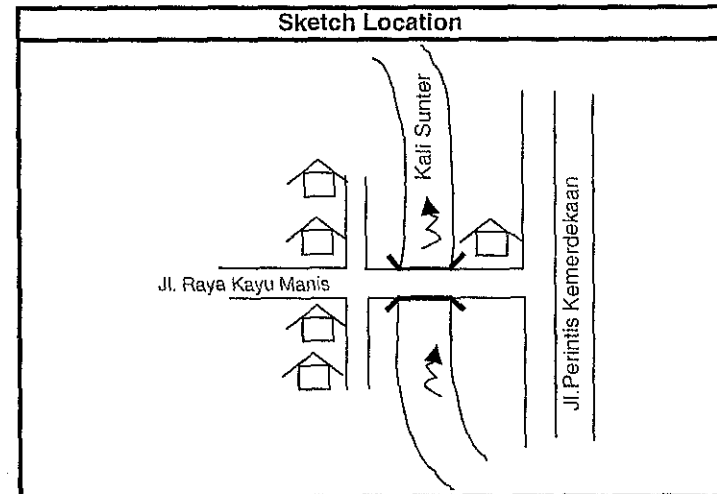


Remarks :

-Riverbank as garbage disposal collector, give sedimentation increase and debris accumulation which will decrease capacity of river.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-------------------|----------------|---|
| Name of River / Canal | : Kali Sunter | Date of Survey | : 24-02-2003 |
| Location | : Kel. Pulogadung | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |

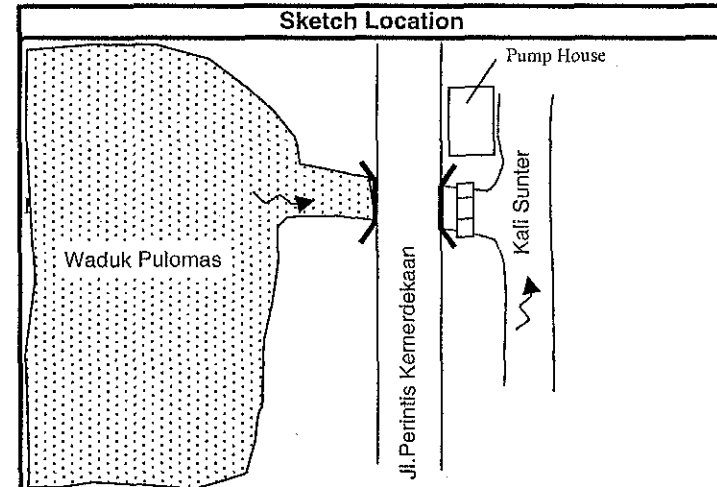
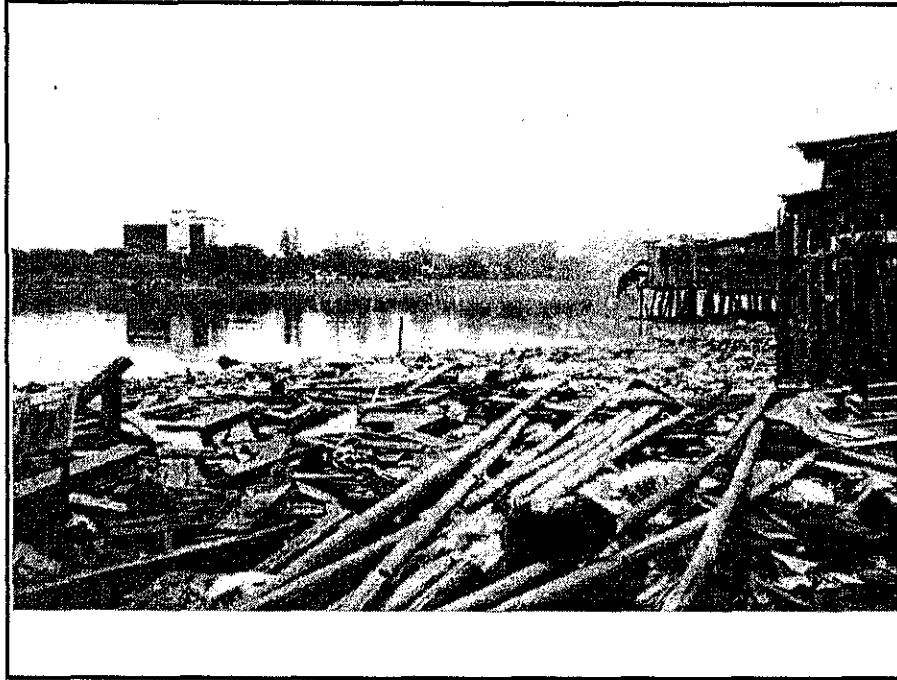


Remarks :

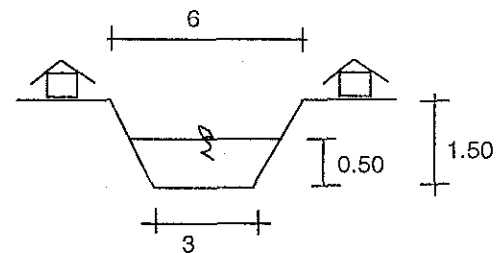
- Semi permanent and non permanent houses along the riverbank, in restricted zone people use river for disposal and makes flood area . increase.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-----------------|----------------|---|
| Name of River / Canal | : Kali Sunter | Date of Survey | : 24-02-2003 |
| Location | : Waduk Polomas | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Dimension of Canal / Structure

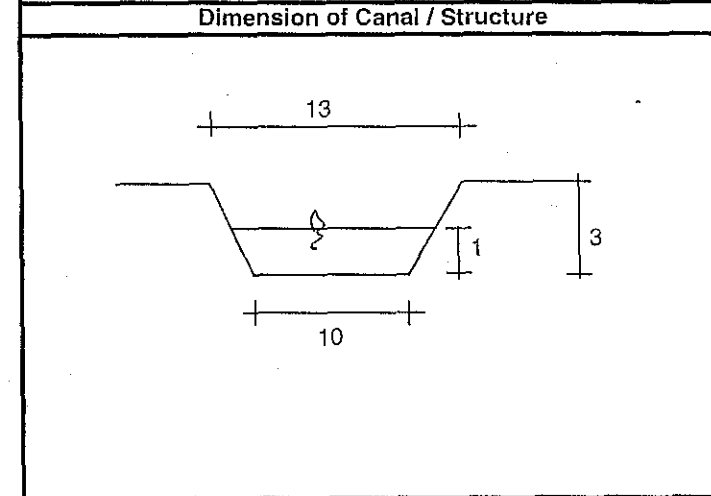
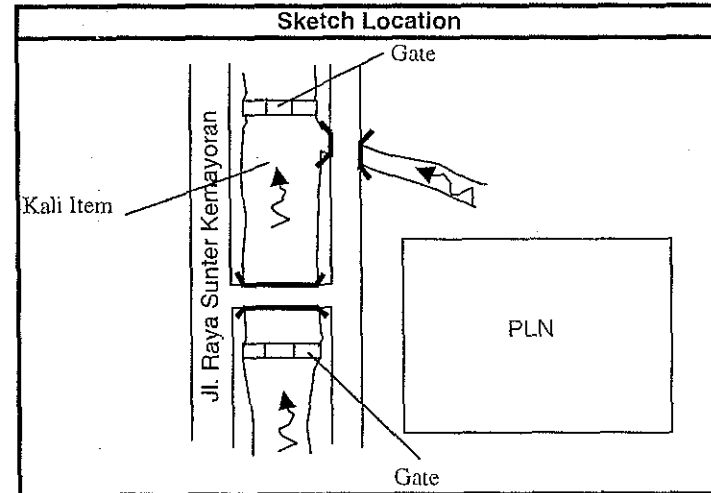
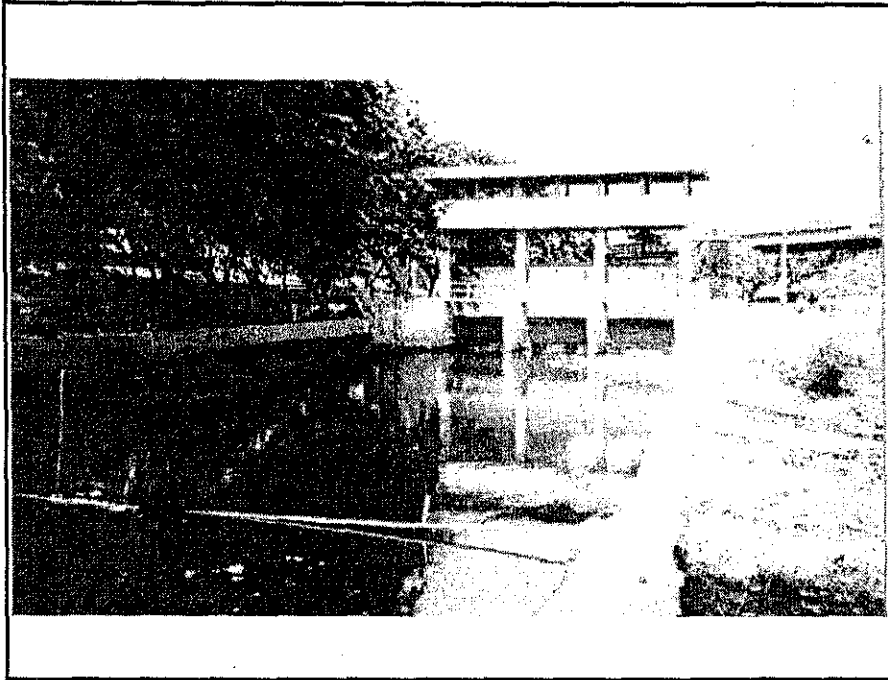


Remarks :

- Sedimentation in the reservoir, reduce retention capacity, and clogging from debris may increase flood area.

DOCUMENTATION OF RIVER SURVEY 2003

| | | | |
|-----------------------|-------------------|----------------|---|
| Name of River / Canal | : Kali Item | Date of Survey | : 24-02-2003 |
| Location | : Kel. Sumur Batu | Filled by | : PT. MITRAPACIFIC CONSULINDO INTERNATIONAL |
| No. of Picture | : | | |
| Title | : | | |



Remarks :

- Garbage and sediment reduce the capacity of river and risk to flooding area extension.
- The accumulation of garbage and debris occurred in front of the gate (Kali Item).