JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NAIROBI CITY COUNCIL
MINISTRY OF LOCAL AUTHORITIES
THE REPUBLIC OF KENYA

THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

FINAL REPORT

VOLUME 7

DRAWINGS

AUGUST 1998

CTI ENGINEERING CO., LTD.
ENVIRONMENTAL TECHNOLOGY CONSULTANTS CO., LTD.

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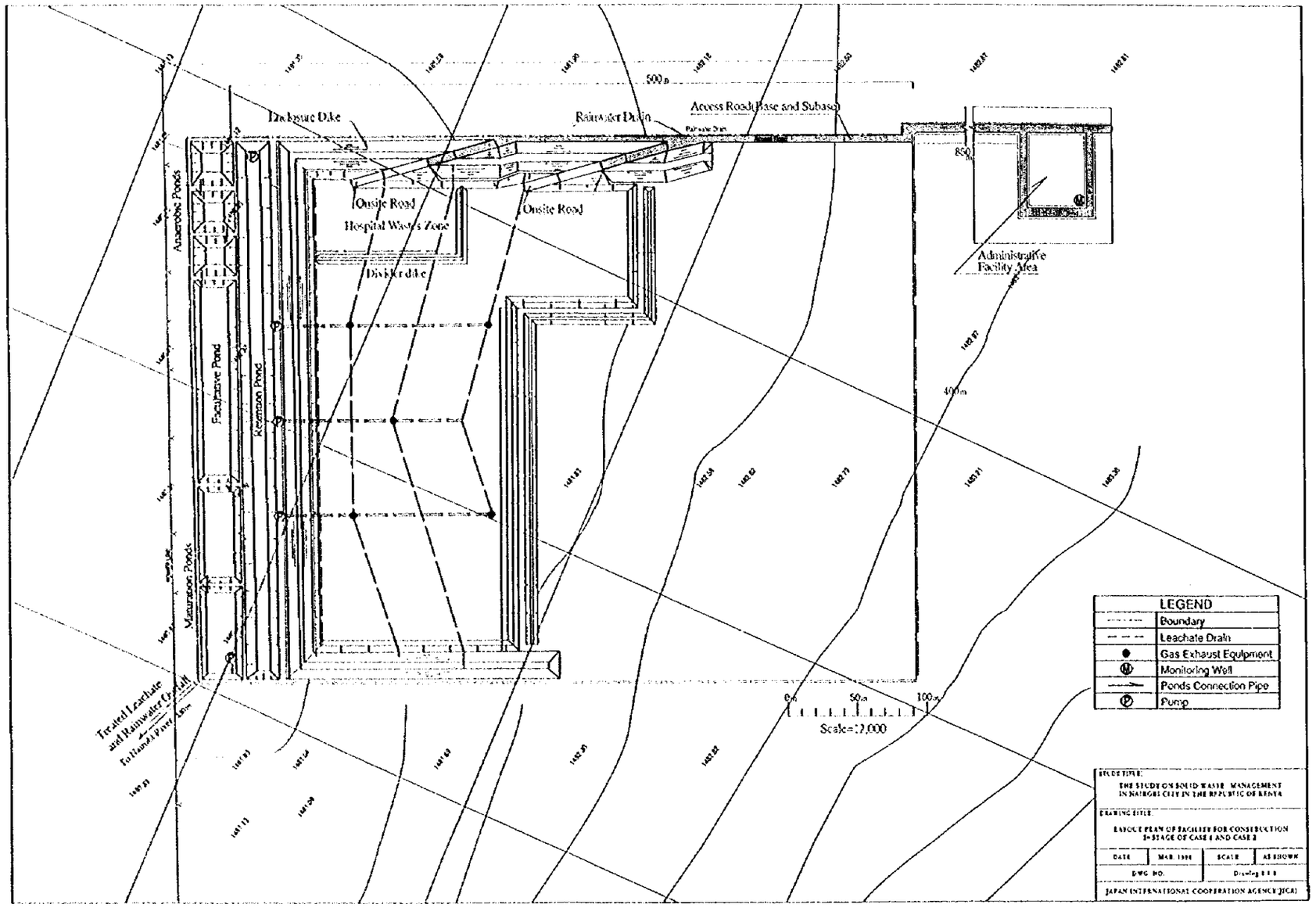
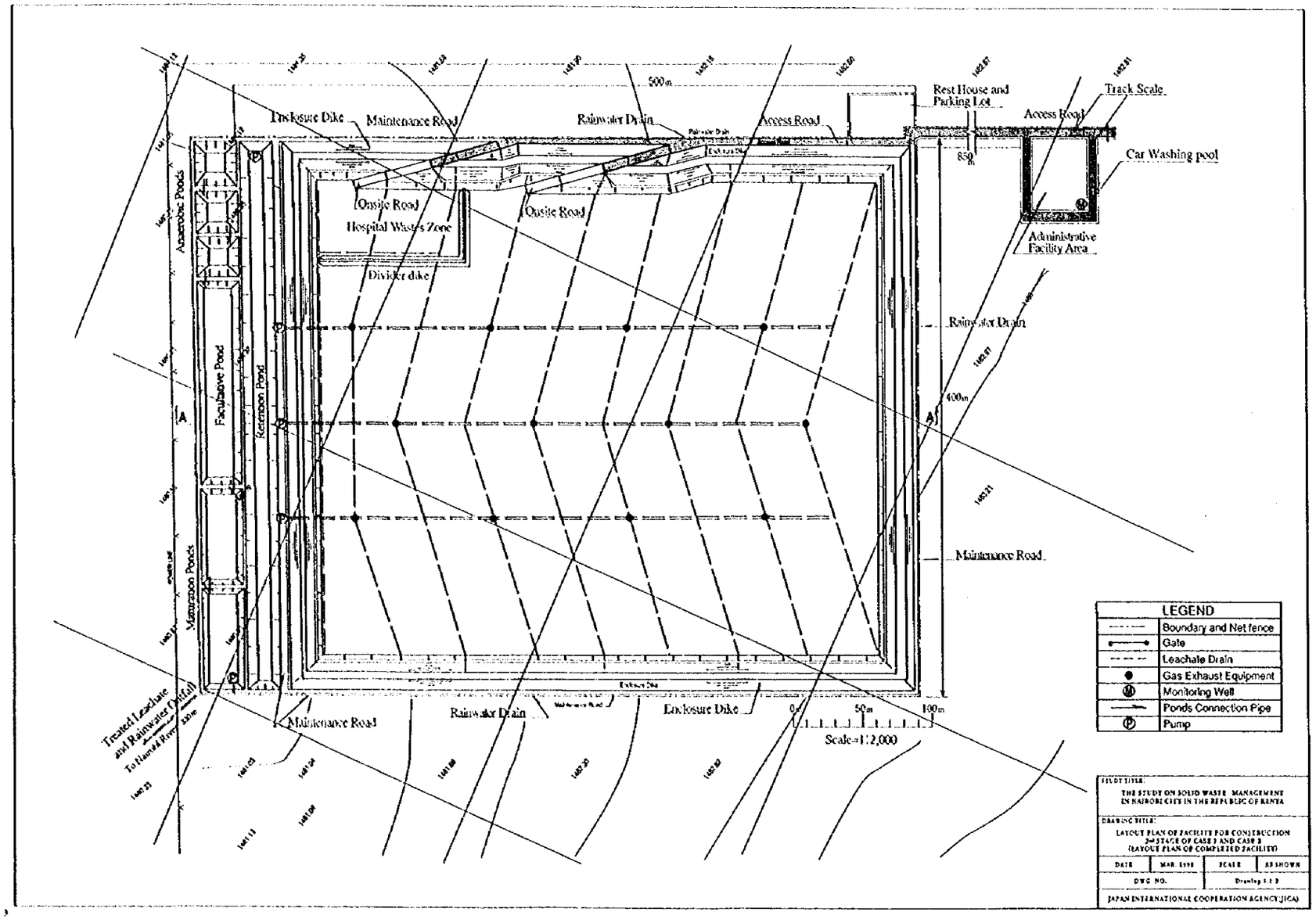
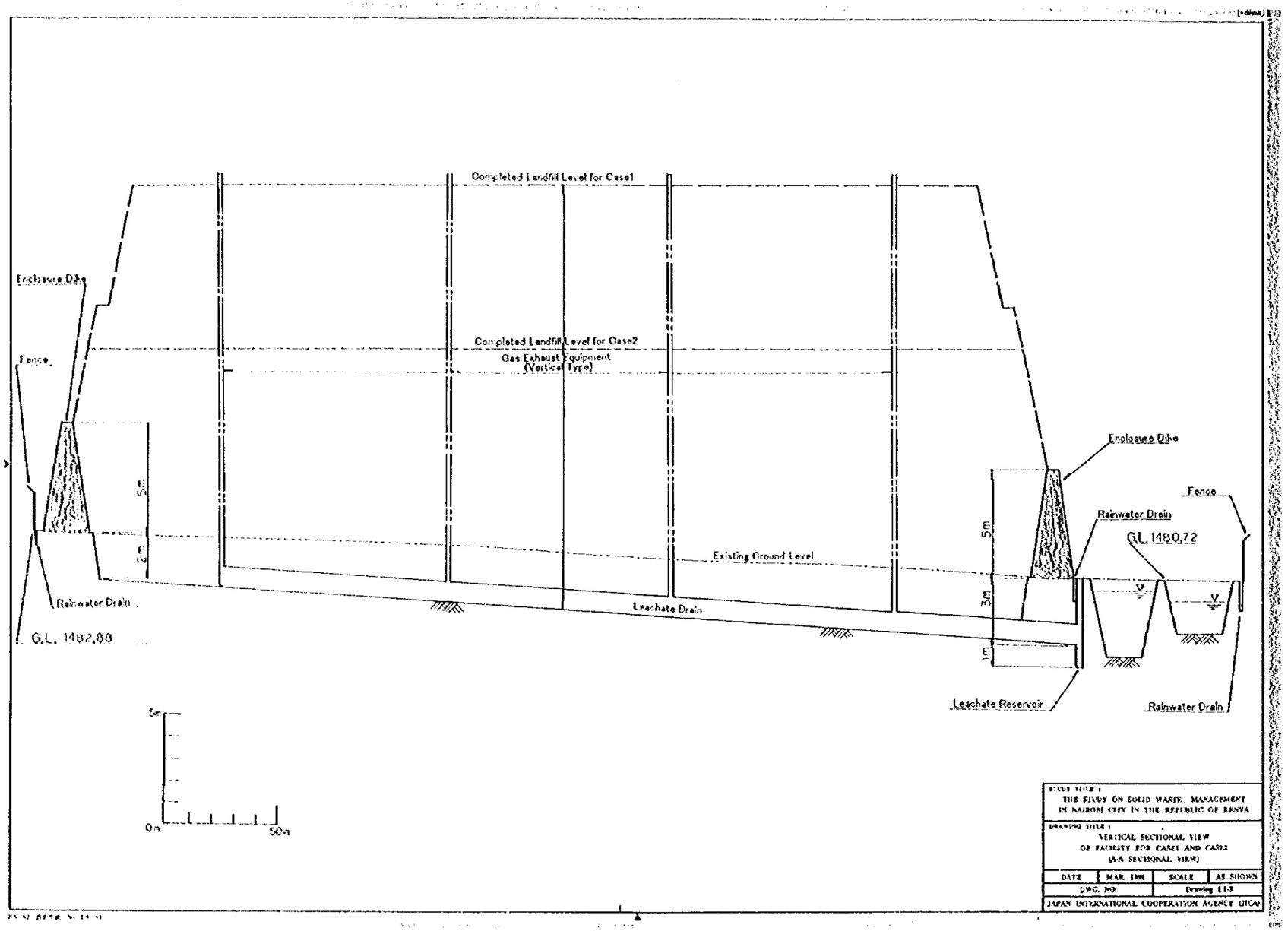
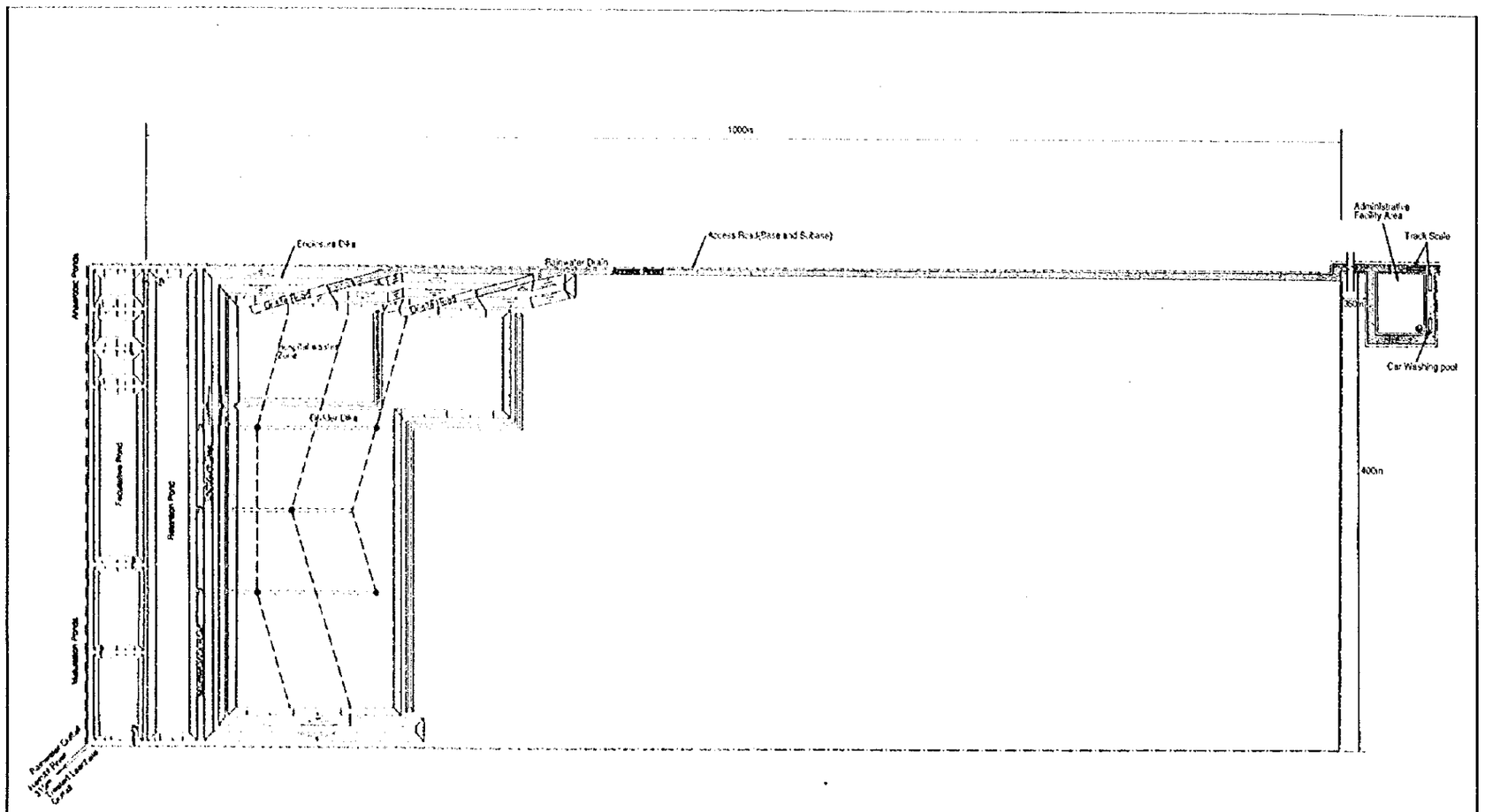
DESIGNING CASES

Designing Case	Case 1 and Case 2	Case 3 and Case 4	Case 5 and Case 6
Site	Ruai		Ngong Road Forest
Area	20 ha	40 ha	27 ha
Drawing No.	1.1-1 1.1-2 1.1-3	1.2-1 1.2-2 1.2-3 1.2-4	1.3-1 1.3-2 1.3-3
	2.1 2.2 2.3		


Dackgate Dike
Rainwater Drain
Access Road(Base and Subase)
500 m
850 m
Onsite Road
Hospital Wastes Zone
Onsite Road
Divider dike
Administrative Facility Area
Anaerobic Ponds
Facultative Pond
Maturation Ponds
Treated Leachate and Rainwater Outfall to Ilando River
0m
50m
100m
Scale=1/2,000
LEGEND
Boundary
Leachate Drain
Gas Exhaust Equipment
Monitoring Well
Ponds Connection Pipe
Pump
STUDY TITLE:
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA
DRAWING TITLE:
LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 1st STAGE OF CASE 1 AND CASE 2
DATE
MAR. 1996
SCALE
AS SHOWN
DWG. NO.
Drawing S 1 3
JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)


Rest House and Parking Lot
Track Scale
Access Road
Car Washing pool
Administrative Facility Area
Perimeter Dike
Maintenance Road
Rainwater Drain
Access Road
Onsite Road
Hospital Wastes Zone
Onsite Road
Divider dike
Anaerobic Ponds
Facultative Pond
Maturation Ponds
Rainwater Drain
Maintenance Road
Treated Leachate and Rainwater Outfall
To Nairobi River
Maintenance Road
Rainwater Drain
Enclosure Dike
0
50m
100m
Scale=1:2,000
LEGEND
Boundary and Net fence
Gate
Leachate Drain
Gas Exhaust Equipment
Monitoring Well
Ponds Connection Pipe
Pump
STUDY TITLE:
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA
DRAWING TITLE:
LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 2nd STAGE OF CASE 3 AND CASE 2 (LAYOUT PLAN OF COMPLETED FACILITY)
DATE
MAR. 1998
SCALE
AS SHOWN
DWG NO.
Drawing 5 1 2
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)


Completed Landfill Level for Case1
Enclosure Dike
Completed Landfill Level for Case2
Fence
Gas Exhaust Equipment
(Vertical Type)
Enclosure Dike
Fence
Rainwater Drain
G.L. 1480,72
5m
2m
Existing Ground Level
Leachate Drain
5m
3m
1m
Rainwater Drain
G.L. 1482,00
Leachate Reservoir
Rainwater Drain
5m
0m
50m
STUDY TITLE :
THE STUDY ON SOLID WASTE MANAGEMENT
IN NAIROBI CITY IN THE REPUBLIC OF KENYA
DRAWING TITLE :
VERTICAL SECTIONAL VIEW
OF FACILITY FOR CASE1 AND CASE2
(A-A SECTIONAL VIEW)
DATE : MAR. 1991
SCALE : AS SHOWN
DWG. NO. : Drawing 11-3
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

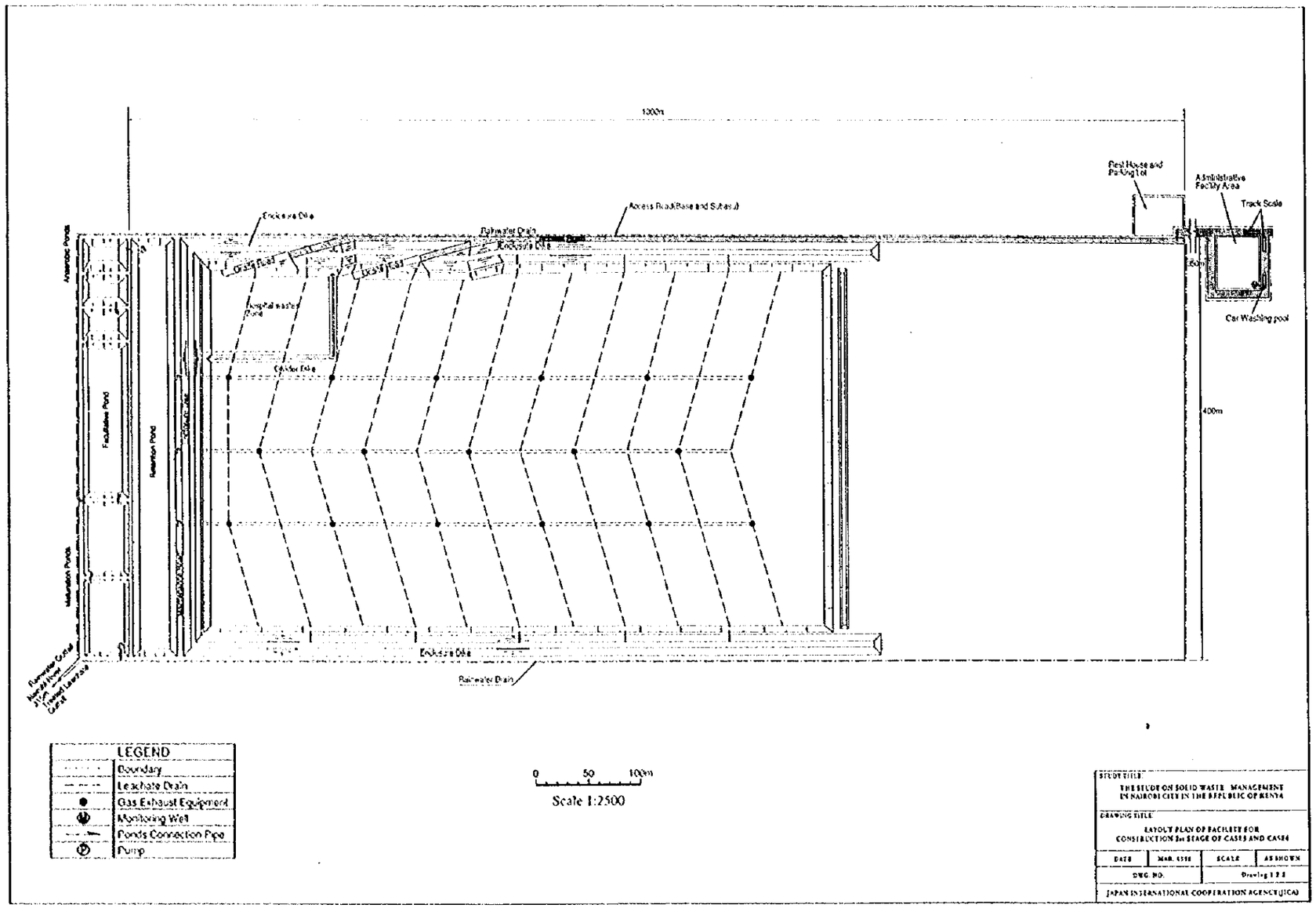


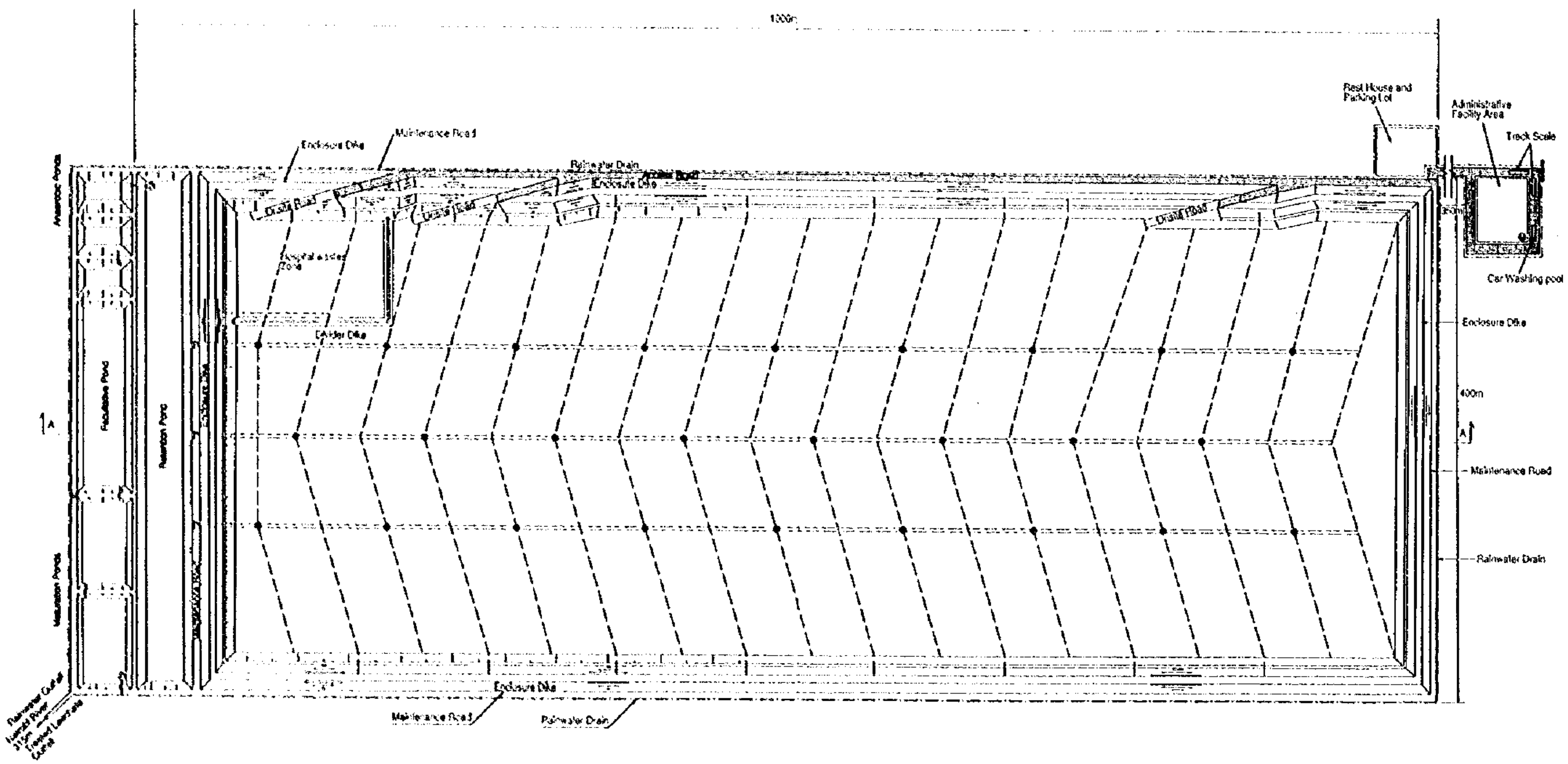
LEGEND	
	Boundary
	Leachate Drain
	Gas Exhaust Equipment
	Monitoring Well
	Ponds Connection Pipe
	Pump

0 50 100m

Scale 1:2500

STUDY TITLE: THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA	
DRAWING TITLE: LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 1st STAGE OF CASE1 AND CASE2	
DATE: MAR. 1998	SCALE: AS SHOWN
DWG. NO.	Drawing 12.1
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	


1000m
Rest House and Parking lot
Administrative Facility Area
Track Scale
Car Washing pool
400m
Access Road(Base and Subase)
Enclosure Dike
Railway's Drain
Anaerobic Ponds
Facultative Pond
Retention Pond
Maturation Ponds
Flowmeter Outlet
Nairobi River
Effluent Lagoons
Outlet
LEGEND
Boundary
Leachate Drain
Gas Exhaust Equipment
Monitoring Well
Ponds Connection Pipe
Pump
0 50 100m
Scale 1:2500
STUDY TITLE
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA
DRAWING TITLE
LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 2nd STAGE OF CASE3 AND CASE4
DATE
SCALE
AS SHOWN
DWG. NO.
JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

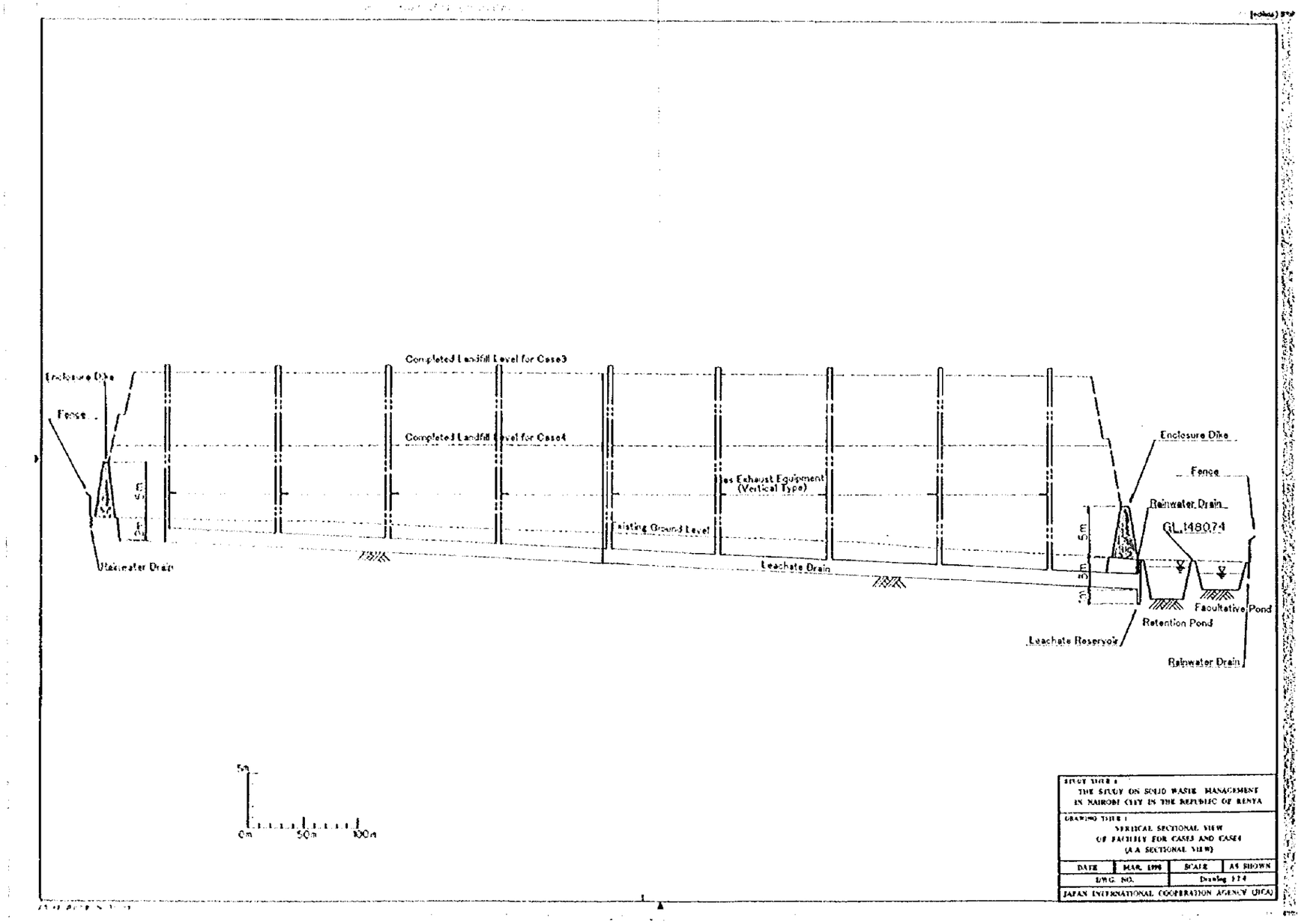


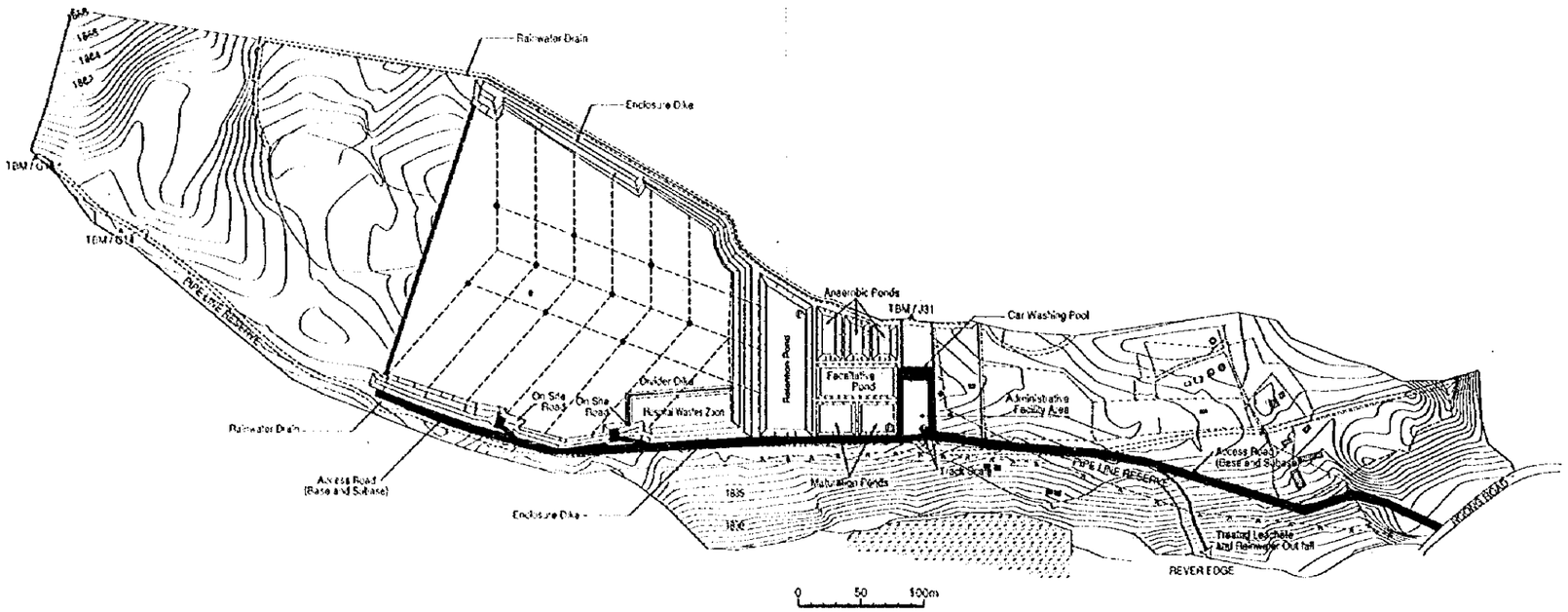
LEGEND	
	Boundary and Net fence
	Gate
	Leachate Drain
	Gas Exhaust Equipment
	Monitoring Well
	Ponds Connection Pipe
	Pump

0 50 100m

Scale 1:2500

STUDY TITLE: THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA			
DRAWING TITLE: LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 3rd STAGE OF CASE 3 AND CASE 6 (LAYOUT PLAN OF COMPLETED FACILITY)			
DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 7.7-9	
JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)			


Completed Landfill Level for Case3
Enclosure Dike
Fence
Completed Landfill Level for Case4
Gas Exhaust Equipment (Vertical Type)
Existing Ground Level
Rainwater Drain
Leachate Drain
Enclosure Dike
Fence
Rainwater Drain
GL.1480.74
Facultative Pond
Retention Pond
Leachate Reservoir
Rainwater Drain
5m
0m
50m
100m
STUDY TITLE :
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA
DRAWING TITLE :
VERTICAL SECTIONAL VIEW OF FACILITY FOR CASE3 AND CASE4 (A-A SECTIONAL VIEW)
DATE
MAR. 1998
SCALE
AS SHOWN
DWG. NO.
Drawing 1.7.4
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



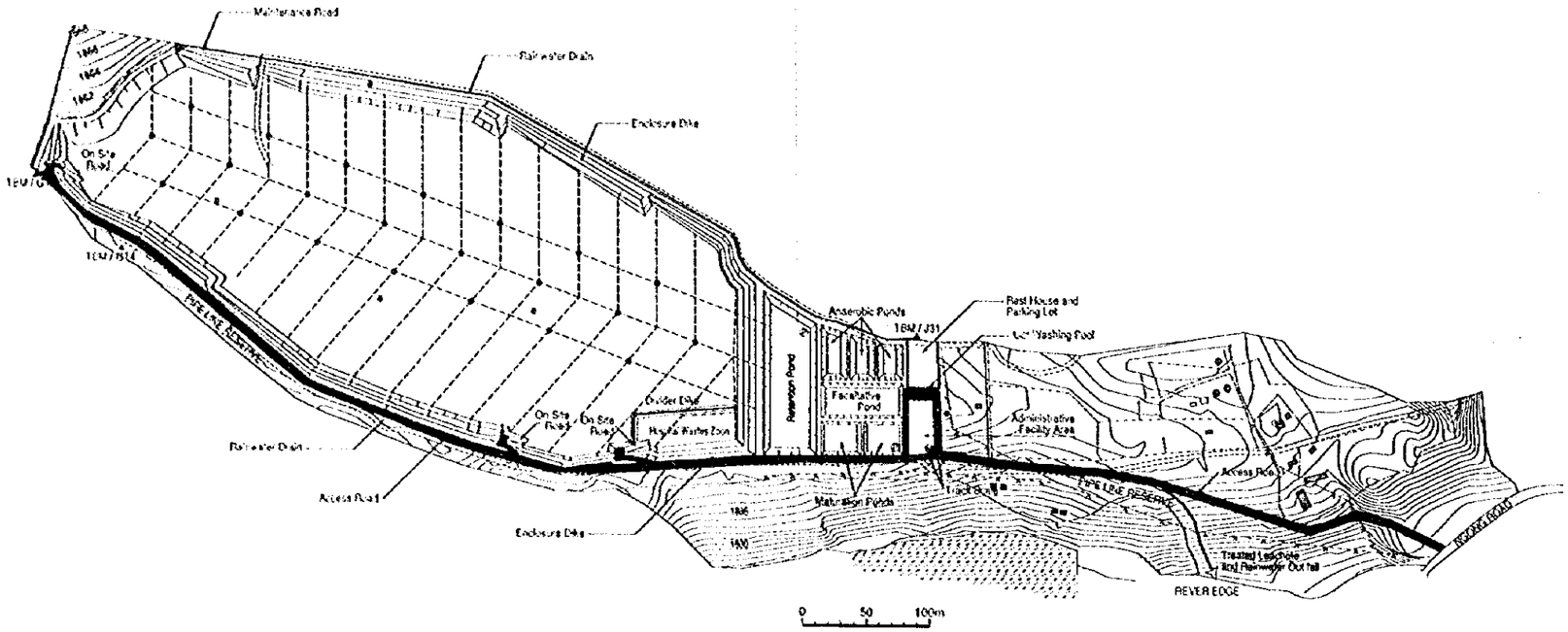
LEGEND	
	Boundary
	Leachate Drain
	Gas Exhaust Equipment
	Monitoring Well
	Ponds Connection Pipe
	Pump

STUDY TITLE:
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

DRAWING TITLE:
LAYOUT PLAN OF FACILITY FOR CONSTRUCTION IN STAGE OF CASE3 AND CASE6

DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 8.3.1	

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)



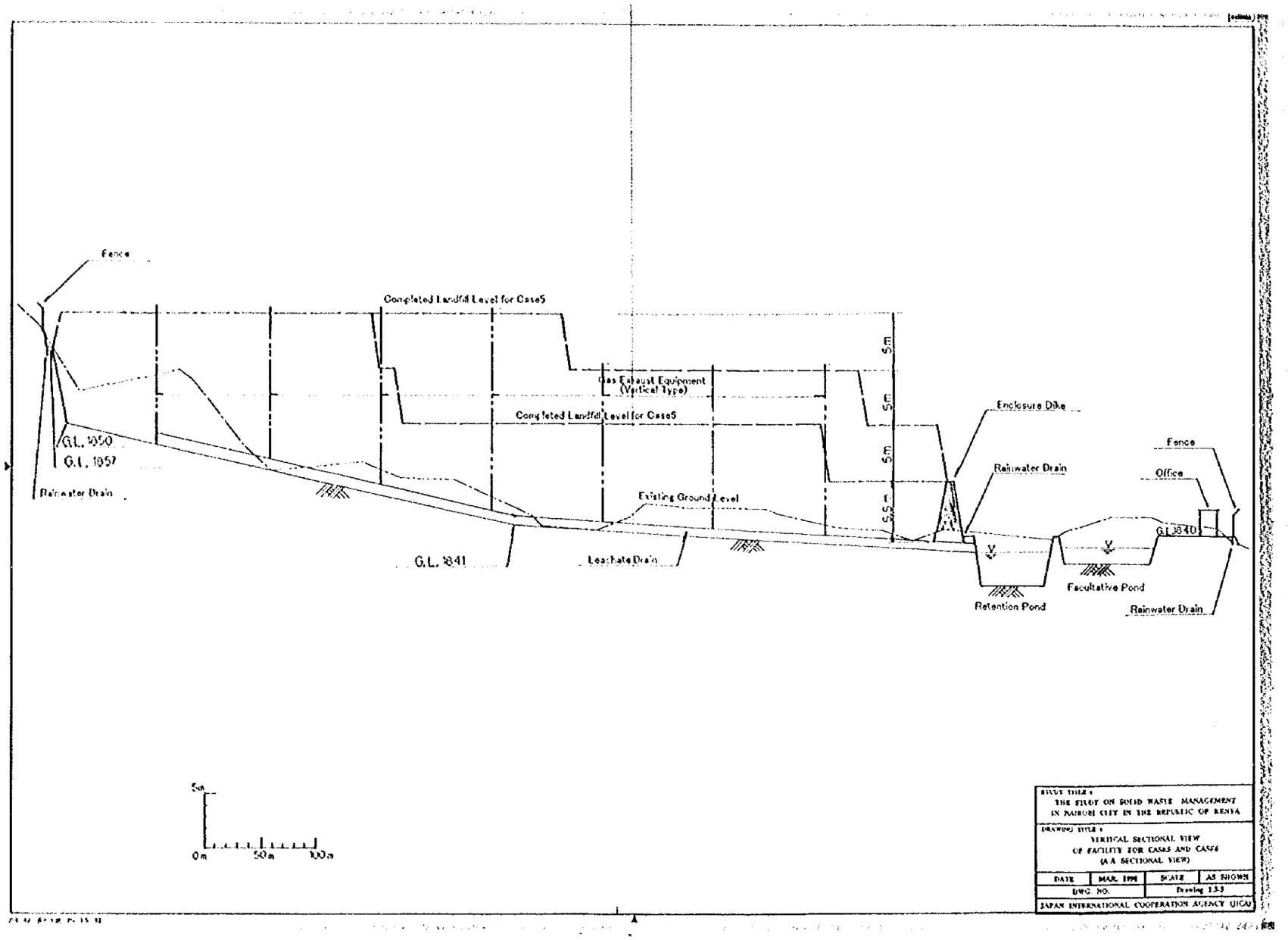
LEGEND	
	Boundary and Net fence
	Gate
	Leachate Drain
	Gas Exhaust Equipment
	Monitoring Well
	Ponds Connection Pipe
	Pump

STUDY TITLE:
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

DRAWING TITLE:
LAYOUT PLAN OF FACILITY FOR CONSTRUCTION 2nd STAGE OF CASE5 AND CASE6 (LAYOUT PLAN OF COMPLETED FACILITY)

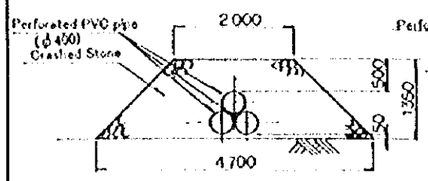
DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 13.3	

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

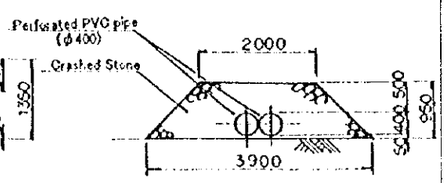

Fence
Completed Landfill Level for Case5
Gas Exhaust Equipment (Vertical Type)
Completed Landfill Level for Case6
5m
5m
5m
5.5m
G.L. 1850
G.L. 1857
Rainwater Drain
Existing Ground Level
G.L. 1841
Leachate Drain
Enclosure Dike
Rainwater Drain
Fence
Office
G.L. 1840
Facultative Pond
Retention Pond
Rainwater Drain
5m
0m
50m
100m
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA
VERTICAL SECTIONAL VIEW OF FACILITY FOR CASE5 AND CASE6 (A-A SECTIONAL VIEW)
DATE
MAR. 1996
SCALE
AS SHOWN
DWG NO.
Drawing 13-3
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

LEACHATE DRAIN
(Scale=1:50)

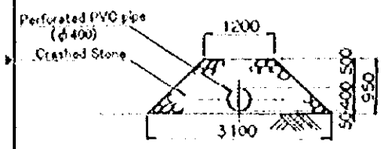
TYPE A



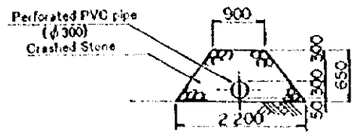
TYPE B



TYPE C



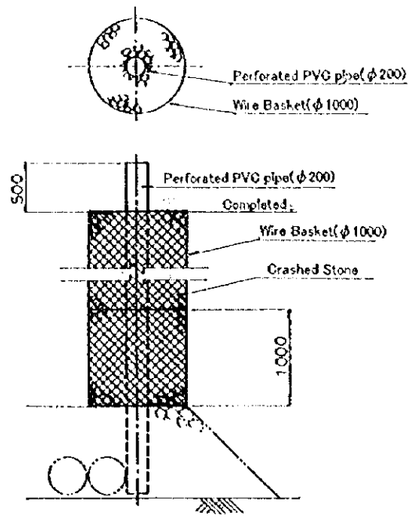
TYPE D



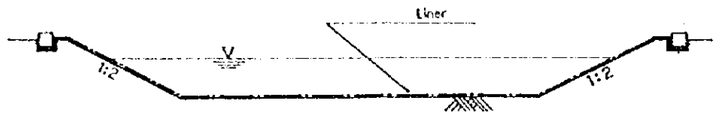
TYPE OF LEACHATE DRAIN

CASES	SITE	AREA (ha)	MAIN PIPE	BRANCH PIPE
Case 1	Road	20	Type B	Type D
Case 2				
Case 3		40	Type A	
Case 4				
Case 5	Nging Road Event	27	Type B and Type C	
Case 6				

GAS EXHAUST EQUIPMENT
(Scale=1:30)



LEACHATE TREATMENT POND
(STANDARD SECTIONAL VIEW)
(Scale=none)



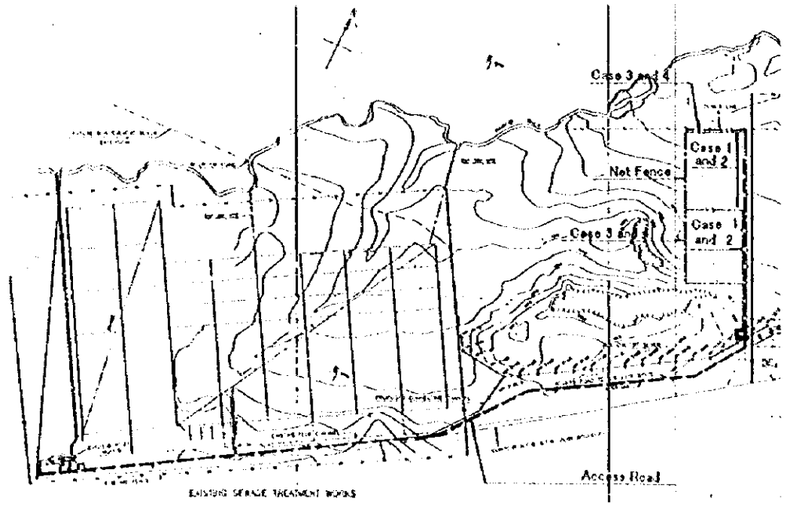
STUDY TITLE :
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

DRAWING TITLE :
LEACHATE DRAIN,GAS EXHAUST EQUIPMENT AND LEACHATE TREATMENT POND (STANDARD SECTIONAL VIEW)

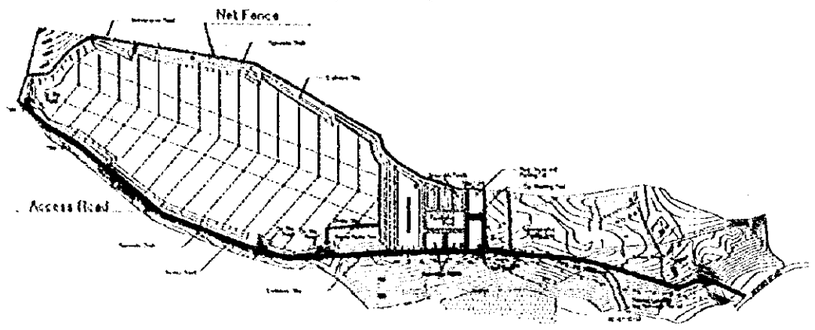
DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 5.5	

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

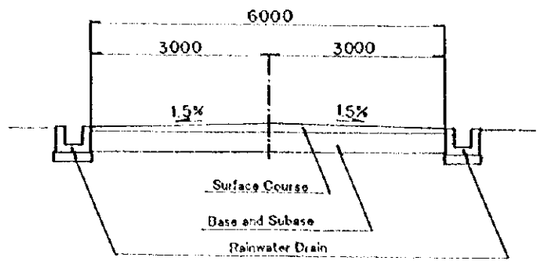
PLAN OF ACCESS ROAD FOR CASE 1,2,3,4
(Scale=1:20000)



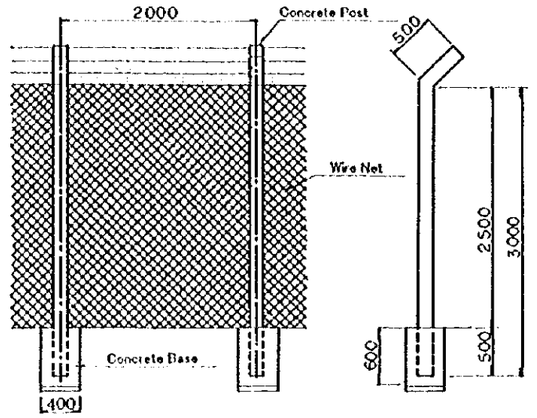
PLAN OF ACCESS ROAD FOR CASE 5 AND 6
(Scale=1:5000)



ACCESS ROAD
(STANDARD SECTIONAL VIEW)
(Scale=1:50)



NET FENCE
(Scale=1:30)



STUDY TITLE :
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

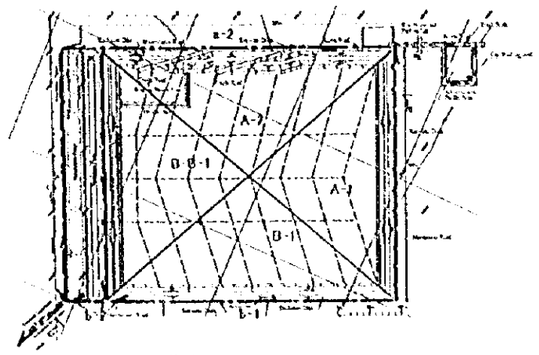
DRAWING TITLE :
ACCESS ROAD(STANDARD SECTIONAL VIEW) AND NET FENCE

DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 2.1	

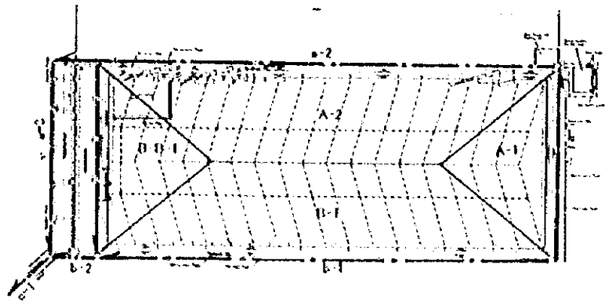
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PLAN OF RAINWATER DRAIN
(Scale=none)

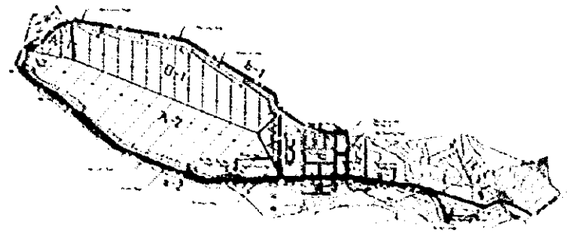
CASE 1 AND 2



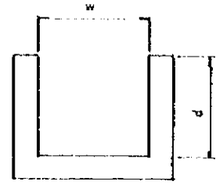
CASE 3 AND 4



CASE 5 AND 6



RAINWATER DRAIN
(STANDARD SECTIONAL VIEW)
(Scale=none)



DRAINAGE AREA AND CHANNEL LENGTH

CASES	CANNEL SECTION	DRAINAGE AREA	w (mm)	d (mm)	SLOPE
	a-1	(A-1)	700	600	0.002
	a-2	A=(A-1)+(A-2)	800	800	0.003
Case 1	a-3	A	1,400	1,400	0.0001
	b-1	(B-1)	600	500	0.0051
Case 2	b-b-1	(B-B-1)	1,200	900	0.0001
	b-2	B=(B-1)+(B-B-1)	1,400	1,400	0.0001
	c-1	A+B	1,500	1,500	0.0015
	a-1	(A-1)	800	800	0.002
	a-2	A=(A-1)+(A-2)	1,200	900	0.0015
Case 3	a-3	A	2,100	1,400	0.0001
	b-1	(B-1)	800	800	0.0025
Case 4	b-b-1	(B-B-1)	1,600	1,200	0.0001
	b-2	B=(B-1)+(B-B-1)	2,200	1,400	0.0001
	c-1	A+B	2,200	1,500	0.0016
	a-1	A-1	700	600	0.0001
	a-2	A=(A-1)+(A-2)	700	600	0.019
Case 5	a-a-1	(A-A-1)	700	600	0.0001
	a-3	A*=A+(A-A-1)	2,000	1,400	0.0001
Case 6	b-1	(B-1)	700	600	0.02
	b-2	(B-1)	2,200	1,400	0.0001
	c-1	A*+(B-1)	1,500	1,500	0.0033

STUDY TITLE :
THE STUDY ON SOLID WASTE MANAGEMENT IN NAIROBI CITY IN THE REPUBLIC OF KENYA

DRAWING TITLE :
RAINWATER DRAIN

DATE	MAR. 1998	SCALE	AS SHOWN
DWG. NO.		Drawing 3.3	

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)