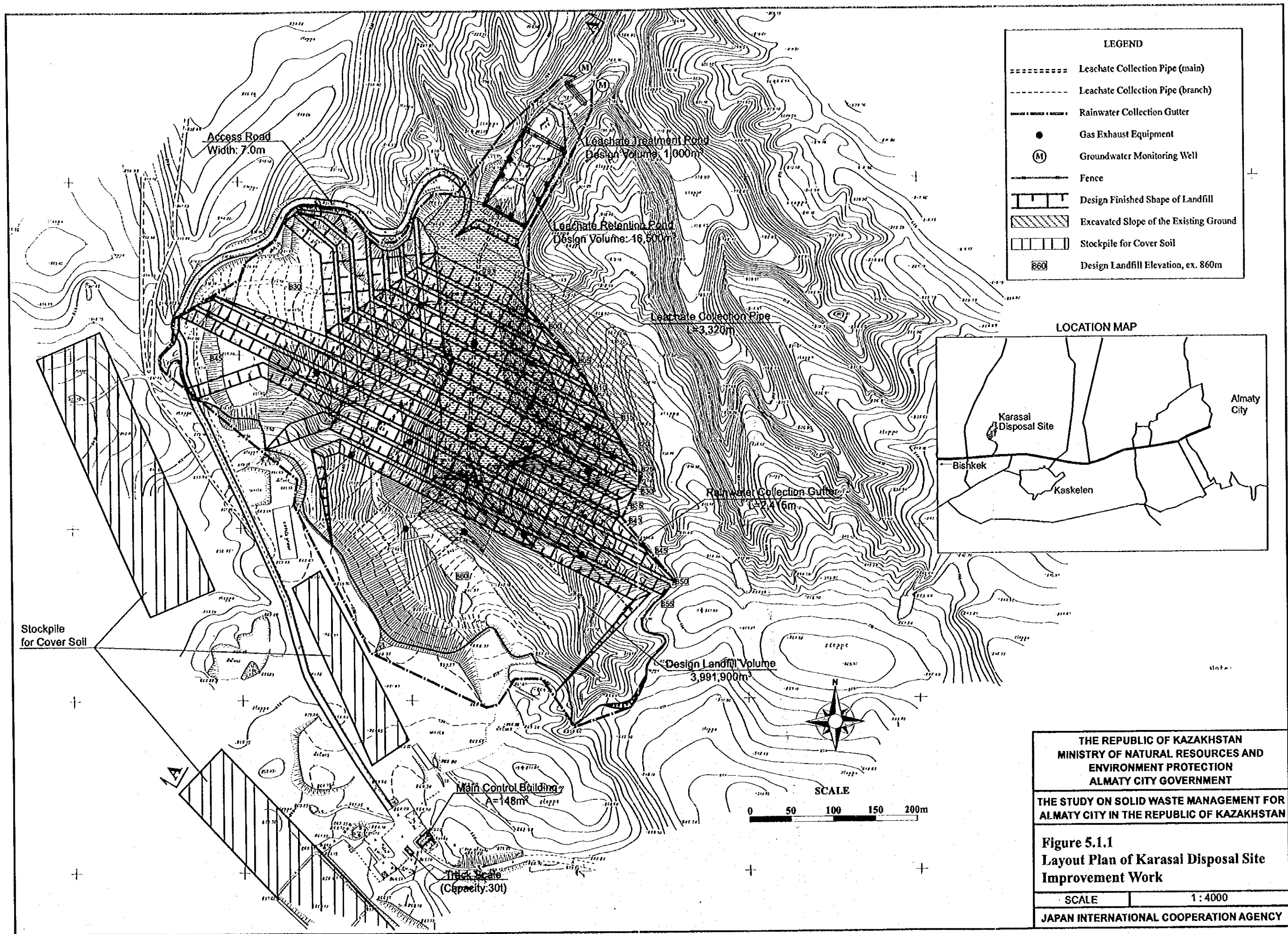


CHAPTER 5
DRAWINGS OF KARASAI DISPOSAL SITE
IMPROVEMENT WORK

LIST OF FIGURES

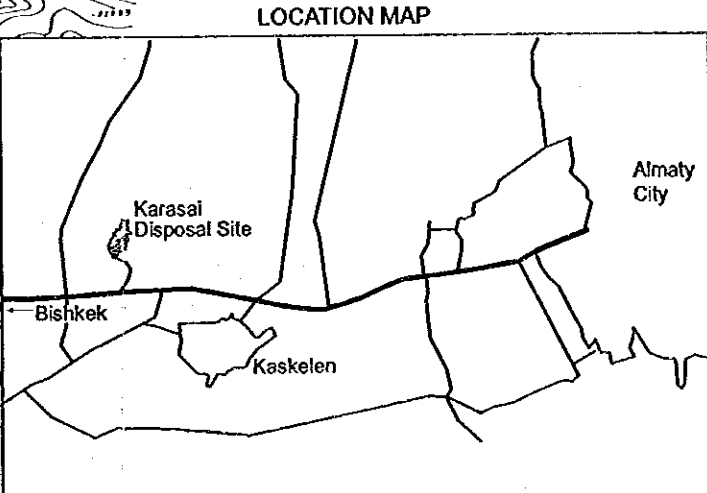
Figure 5.1.1	Layout Plan of Karasai Disposal Site Improvement Work	4 - 105
Figure 5.1.2	Longitudinal Section of Karasai Disposal Site Improvement Work	4 - 106
Figure 5.1.3	Leachate Collection and Drainage System of the Karasai Disposal Site Improvement Work.....	4 - 107
Figure 5.1.4	Gas Exhaust Equipment of the Karasai Disposal Site Improvement Work	4 - 108
Figure 5.1.5	Layout Plan of Rainwater Collection Gutter of the Karasai Disposal Site Improvement Work.....	4 - 109
Figure 5.1.6	Main Control Building of the Karasai Disposal Site Improvement Work	4 - 110
Figure 5.1.7	Estimation of the Existing Landfill Volume	4 - 110
Figure 5.1.8	First Stage (Year 2000-2001) of Landfill Plan of the Karasai Disposal Site Improvement Work	4 - 112

[The page contains extremely faint and illegible text, likely due to low contrast or scanning quality. The content is not discernible.]



LEGEND

=====	Leachate Collection Pipe (main)
-----	Leachate Collection Pipe (branch)
-----	Rainwater Collection Gutter
●	Gas Exhaust Equipment
Ⓜ	Groundwater Monitoring Well
-----	Fence
▬▬▬▬▬▬	Design Finished Shape of Landfill
▨▨▨▨▨▨	Excavated Slope of the Existing Ground
▧▧▧▧▧▧	Stockpile for Cover Soil
860	Design Landfill Elevation, ex. 860m



THE REPUBLIC OF KAZAKHSTAN MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION ALMATY CITY GOVERNMENT	
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN	
Figure 5.1.1 Layout Plan of Karasai Disposal Site Improvement Work	
SCALE	1 : 4000
JAPAN INTERNATIONAL COOPERATION AGENCY	

A-A

864
862
860
858
856
854
852
850
848
846
844
842
840
838
836
834
832
830
828
826
824
822
820
818
816
814
812
810
808
806
804
802
800
798
796
794
792
790
788
786
784
782

Finished Landfill Elevation
▽ EL 860m

5m

▽ 855

▽ 850

845

▽ 840

▽ 835

▽ 830

1:3

▽ 825

▽ 820

▽ 815

▽ 810

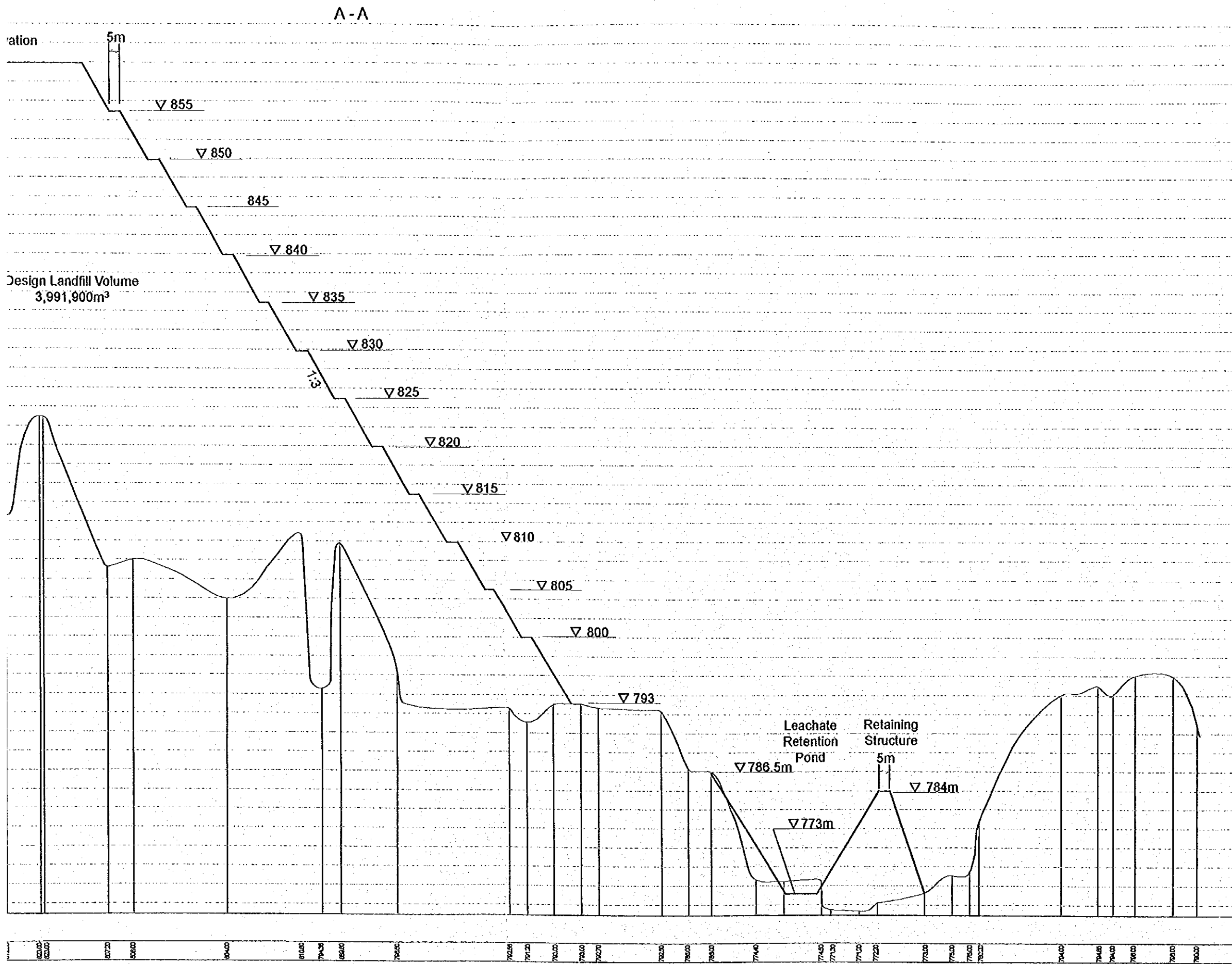
▽ 805

▽ 800

▽ 795

Design Landfill Volume
3,991,900m³

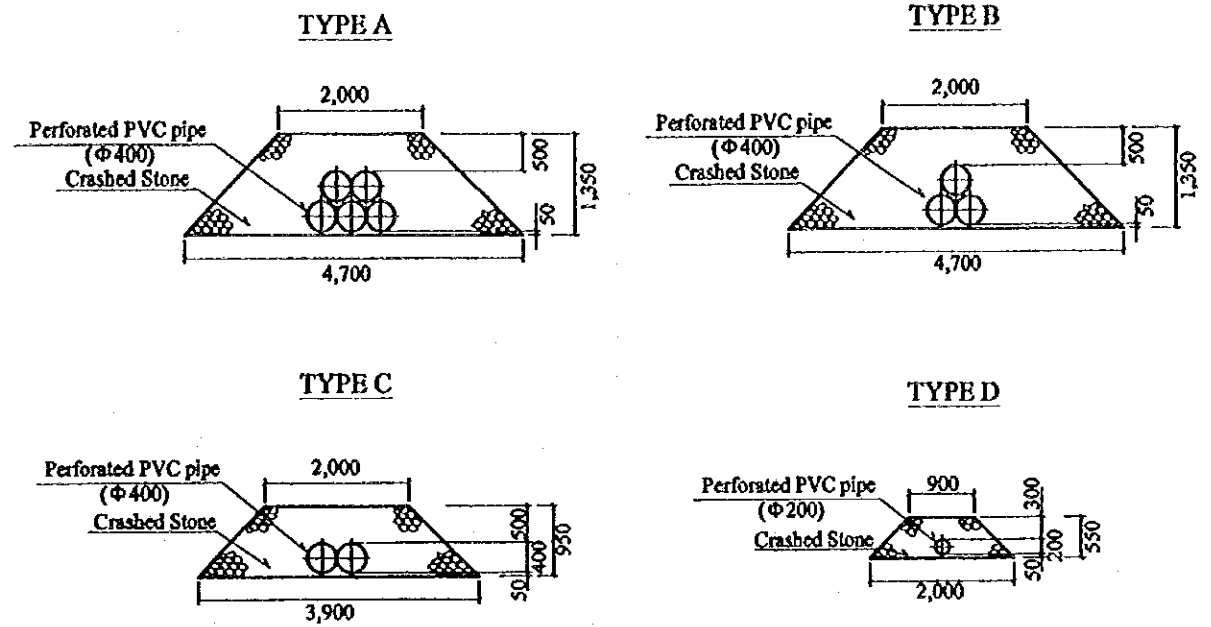
88000 88050 88100 88150 88200 88250 88300 88350 88400 88450 88500 88550 88600 88650 88700 88750 88800 88850 88900 88950 89000 89050 89100 89150 89200 89250 89300 89350 89400 89450 89500 89550 89600 89650 89700 89750 89800 89850 89900 89950 90000 90050 90100 90150 90200 90250 90300 90350 90400 90450 90500 90550 90600 90650 90700 90750 90800 90850 90900 90950 91000 91050 91100 91150 91200 91250 91300 91350 91400 91450 91500 91550 91600 91650 91700 91750 91800 91850 91900 91950 92000 92050 92100 92150 92200 92250 92300 92350 92400 92450 92500 92550 92600 92650 92700 92750 92800 92850 92900 92950 93000 93050 93100 93150 93200 93250 93300 93350 93400 93450 93500 93550 93600 93650 93700 93750 93800 93850 93900 93950 94000 94050 94100 94150 94200 94250 94300 94350 94400 94450 94500 94550 94600 94650 94700 94750 94800 94850 94900 94950 95000 95050 95100 95150 95200 95250 95300 95350 95400 95450 95500 95550 95600 95650 95700 95750 95800 95850 95900 95950 96000 96050 96100 96150 96200 96250 96300 96350 96400 96450 96500 96550 96600 96650 96700 96750 96800 96850 96900 96950 97000 97050 97100 97150 97200 97250 97300 97350 97400 97450 97500 97550 97600 97650 97700 97750 97800 97850 97900 97950 98000 98050 98100 98150 98200 98250 98300 98350 98400 98450 98500 98550 98600 98650 98700 98750 98800 98850 98900 98950 99000 99050 99100 99150 99200 99250 99300 99350 99400 99450 99500 99550 99600 99650 99700 99750 99800 99850 99900 99950 100000



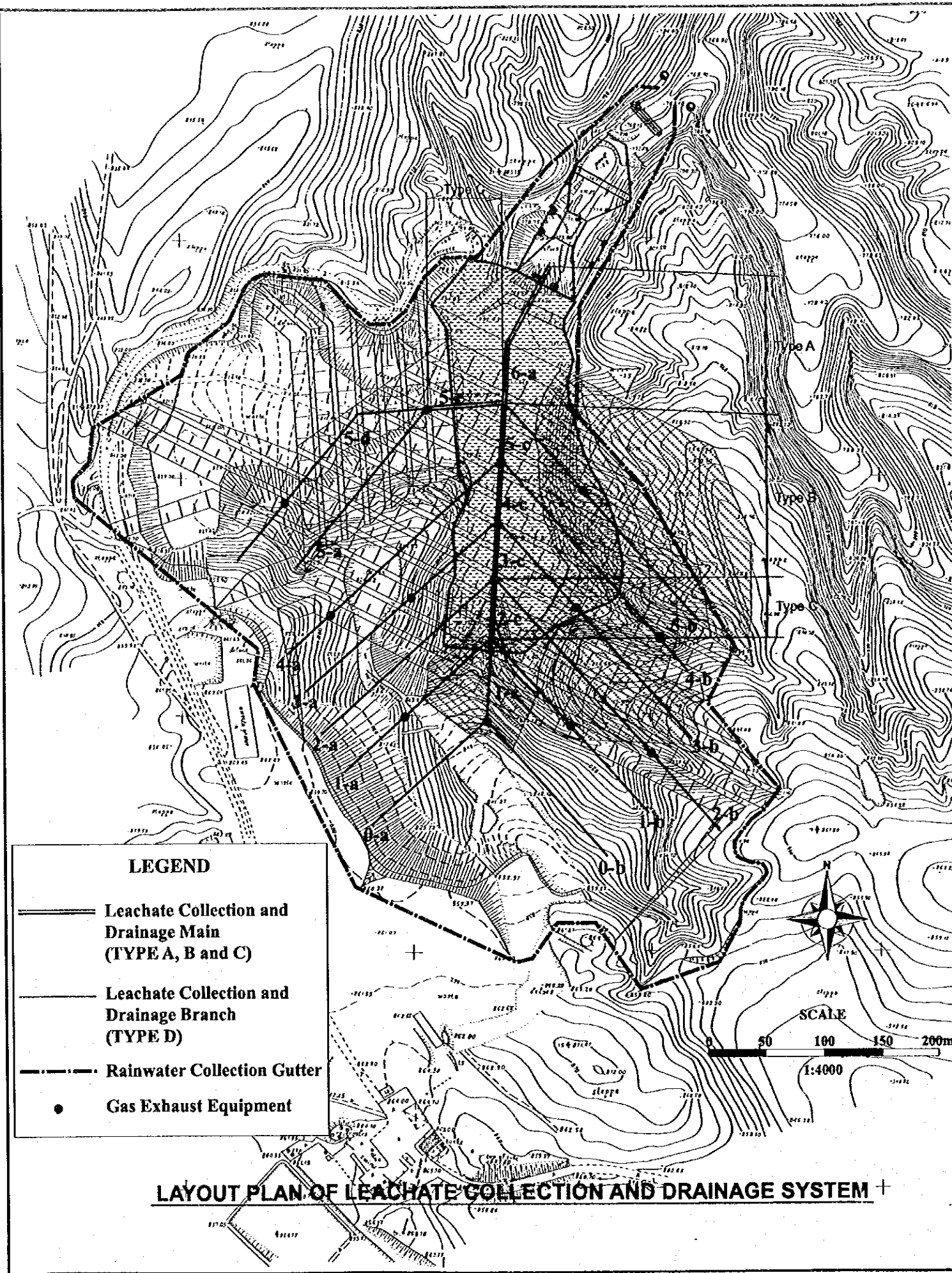
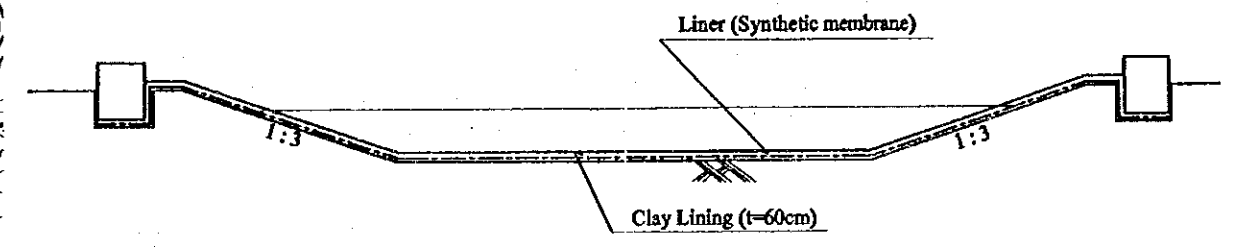
Horizontal 1/2000
Vertical 1/400

THE REPUBLIC OF KAZAKHSTAN MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION ALMATY CITY GOVERNMENT	
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN	
Figure 5.1.2 Longitudinal Section of Karasai Disposal Site Improvement Work	
SCALE	H 1 : 2000, V 1:400
JAPAN INTERNATIONAL COOPERATION AGENCY	

LEACHATE DRAIN (1:100)



**LEACHATE RETENTION POND
(STANDARD SECTIONAL VIEW)
(SCALE=NONE)**



LEGEND

- Leachate Collection and Drainage Main (TYPE A, B and C)
- Leachate Collection and Drainage Branch (TYPE D)
- - - Rainwater Collection Gutter
- Gas Exhaust Equipment

LAYOUT PLAN OF LEACHATE COLLECTION AND DRAINAGE SYSTEM

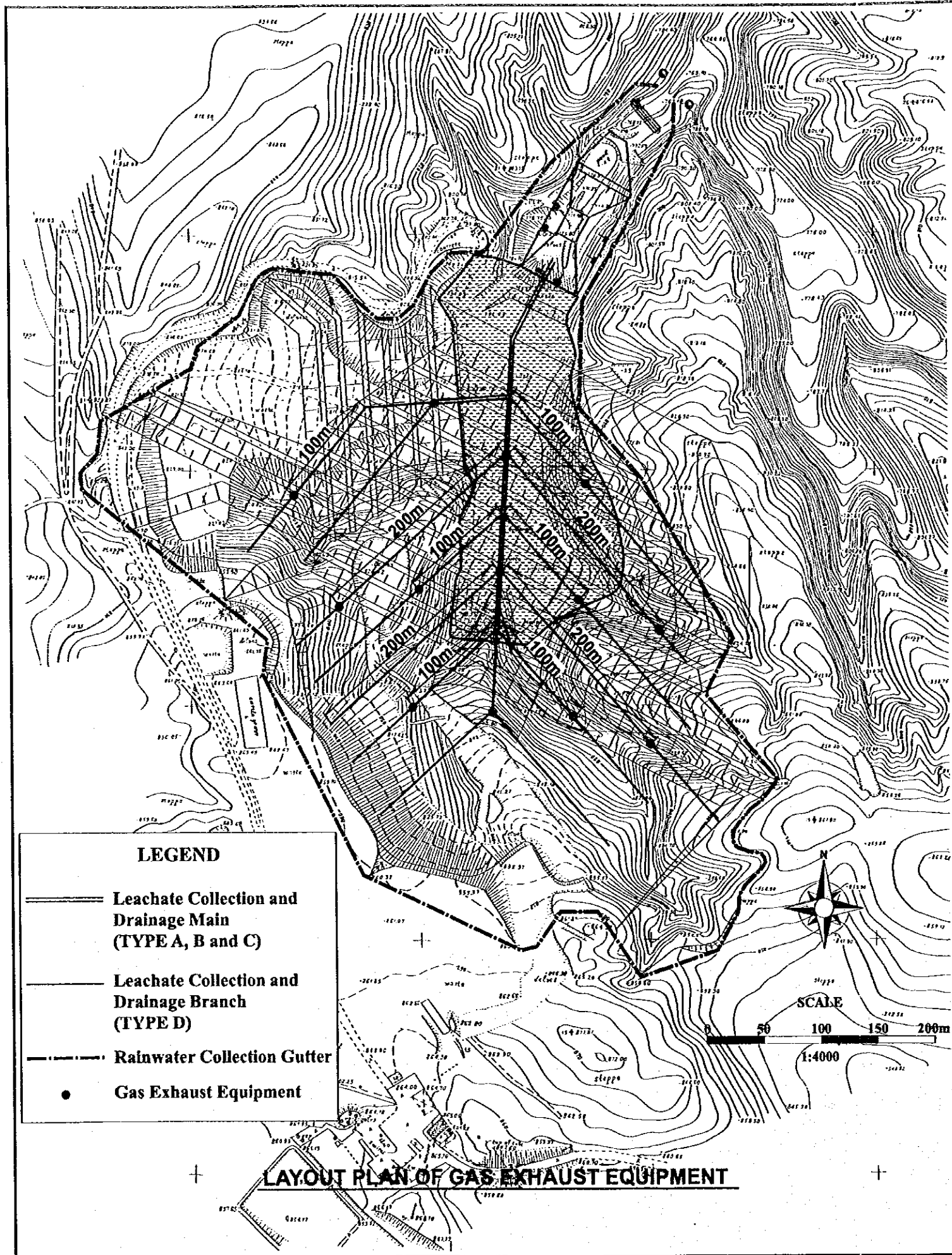
THE REPUBLIC OF KAZAKHSTAN
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

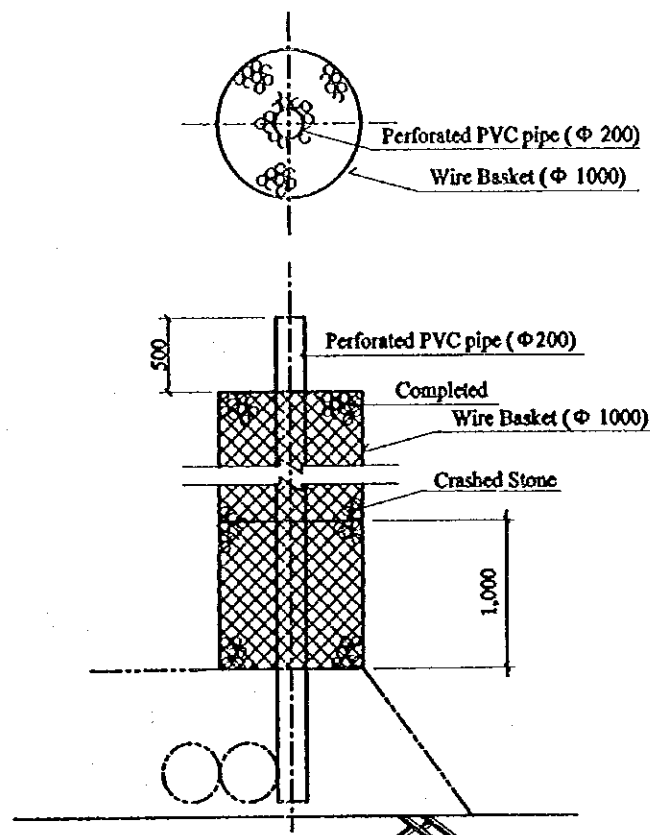
Figure 5.1.3
Leachate Collection and Drainage System of the Karasai Disposal Site Improvement Work

SCALE	1 : 4000, 1:100
-------	-----------------

JAPAN INTERNATIONAL COOPERATION AGENCY



GAS EXHAUST EQUIPMENT(1:50)



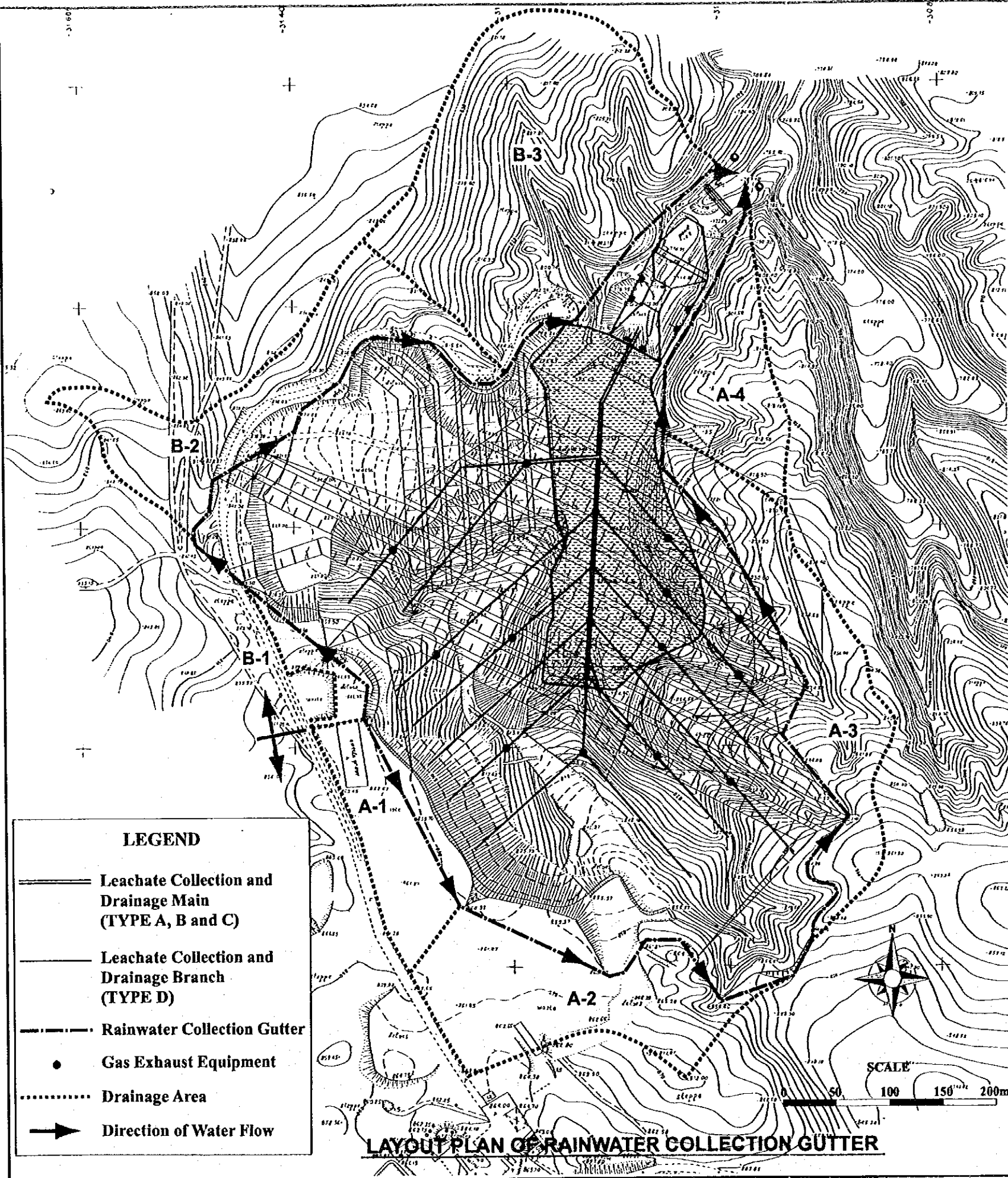
THE REPUBLIC OF KAZAKHSTAN
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

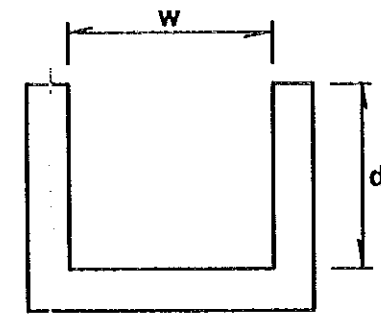
Figure 5.1.4
Gas Exhaust Equipment of the Karasai Disposal Site Improvement Work

SCALE 1:4000, 1:50

JAPAN INTERNATIONAL COOPERATION AGENCY



CROSS SECTION OF GUTTER



Channel Section	Channel Length (m)	Channel Slope	Drainage Area (ha)	w (mm)	d (mm)
A-1	195	0.010	1.280	300	300
A-2	383	0.024	2.715	400	400
A-3	620	0.084	2.676	350	350
A-4	246	0.093	1.720	400	400
B-1	236	0.064	0.324	300	300
B-2	423	0.092	2.760	300	300
B-3	312	0.100	6.014	400	400

LEGEND

- Leachate Collection and Drainage Main (TYPE A, B and C)
- Leachate Collection and Drainage Branch (TYPE D)
- Rainwater Collection Gutter
- Gas Exhaust Equipment
- Drainage Area
- Direction of Water Flow

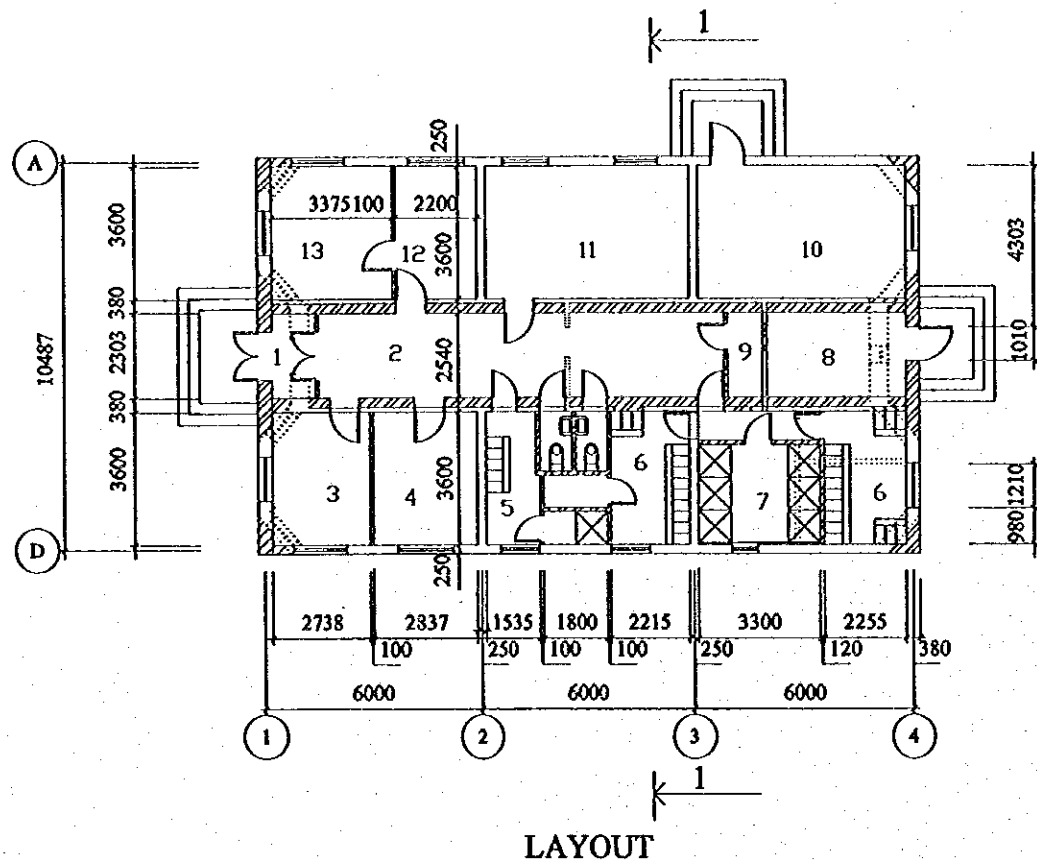
THE REPUBLIC OF KAZAKHSTAN
 MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
 ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

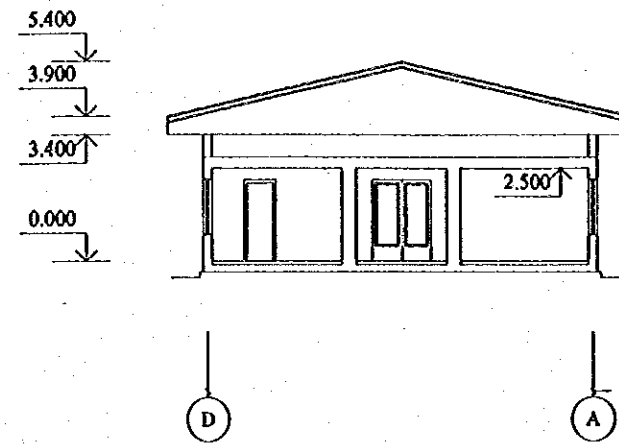
Figure 5.1.5
 Layout Plan of Rainwater Collection Gutter of the Karasai Disposal Site Improvement Work

SCALE 1 : 4000

JAPAN INTERNATIONAL COOPERATION AGENCY



LAYOUT



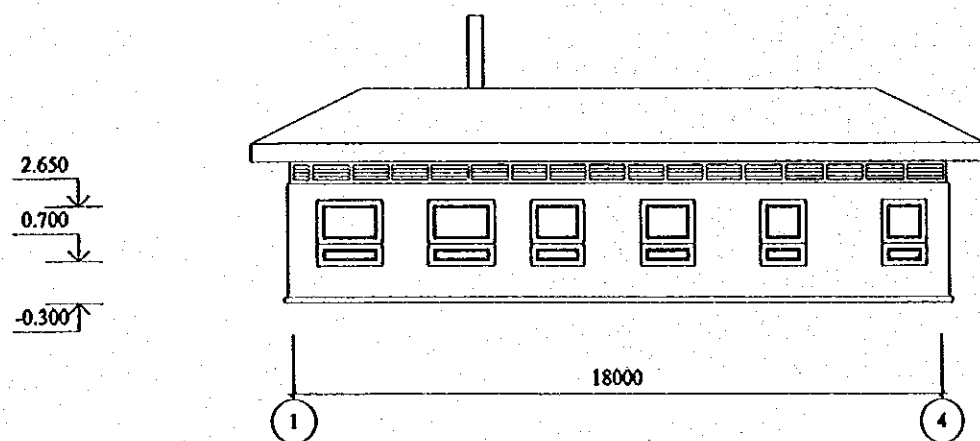
SECTION 1-1

EXPLICATION

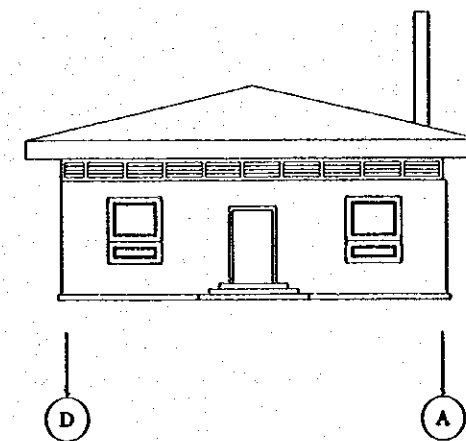
- 1 ENTRANCE
- 2 CORRIDOR
- 3 TRUCK-SCALE
- 4 OFFICE
- 5 LOCKER ROOM FOR WOMEN
- 6 LOCKER ROOM FOR MEN
- 7 SHOWER
- 8 FIRE EQUIPMENT STORE
- 9 STORE
- 10 BOILER
- 11 DINING ROOM
- 12 SECRETARY
- 13 DIRECTOR OFFICE

LEGEND

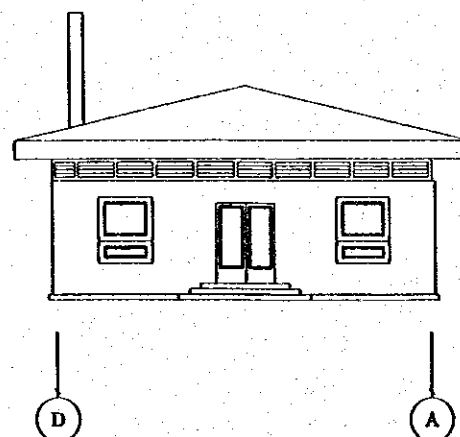
- NEWLY WALLS AND PARTITIONS
- WALLS AND PARTITIONS ARE DEMOLISHED
- EXISTING WALLS AND PARTITIONS



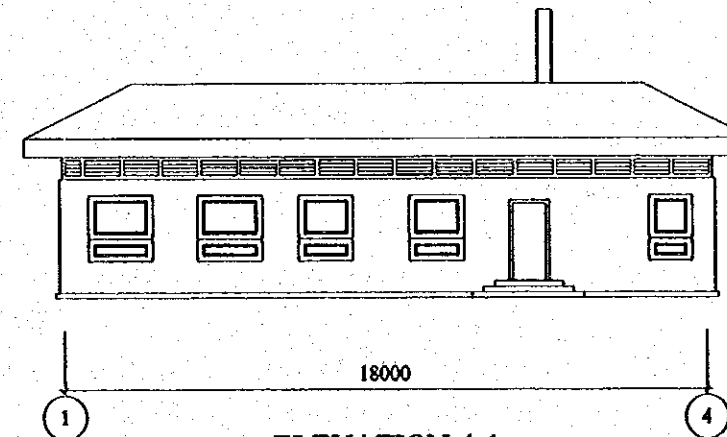
ELEVATION 1-4



ELEVATION D-A

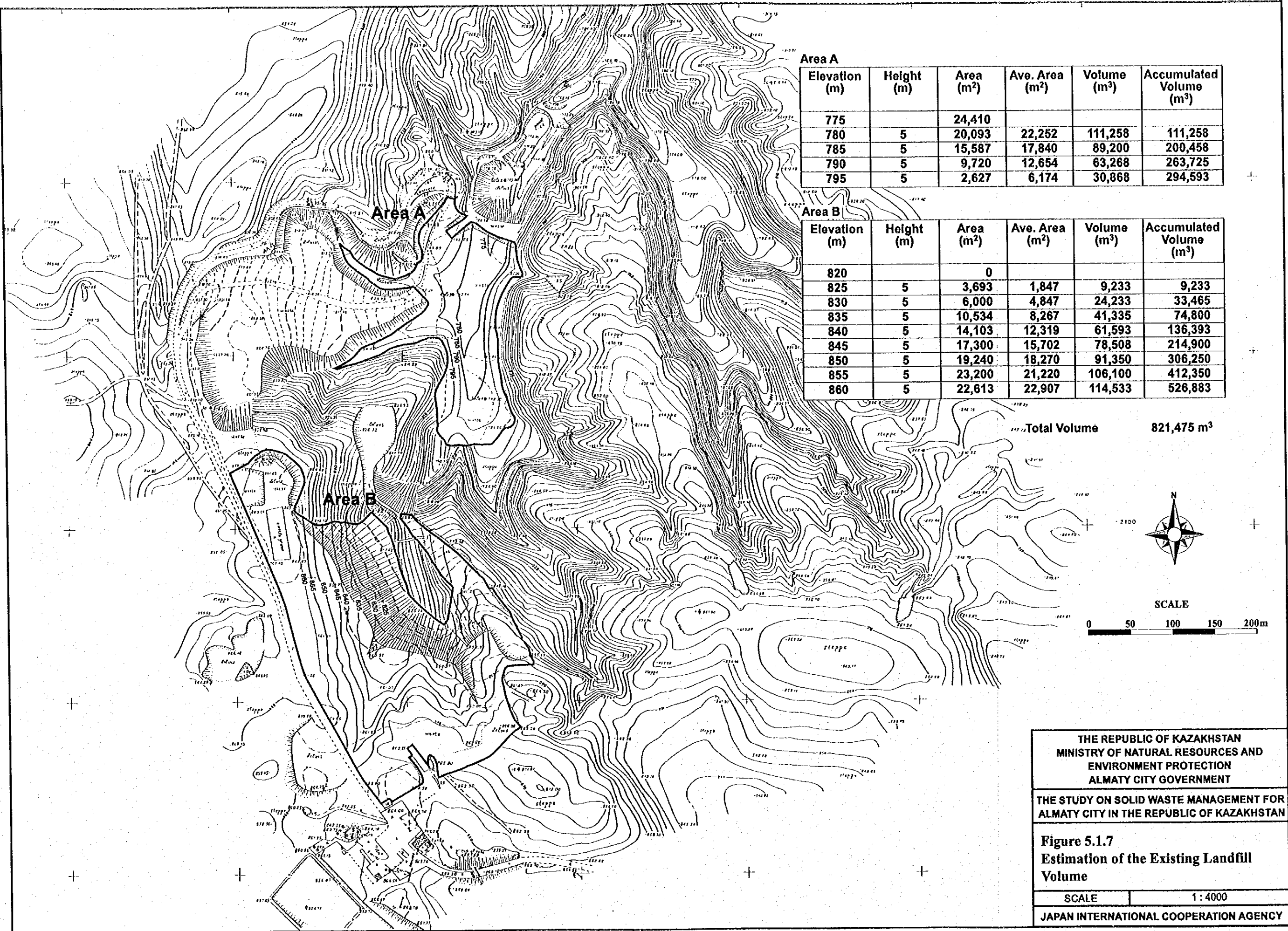


ELEVATION A-D



ELEVATION 4-1

THE REPUBLIC OF KAZAKHSTAN MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION ALMATY CITY GOVERNMENT	
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN	
Figure 5.1.6 Main Control Building of the Karasai Disposal Site Improvement Work.	
SCALE	1 : 200
JAPAN INTERNATIONAL COOPERATION AGENCY	



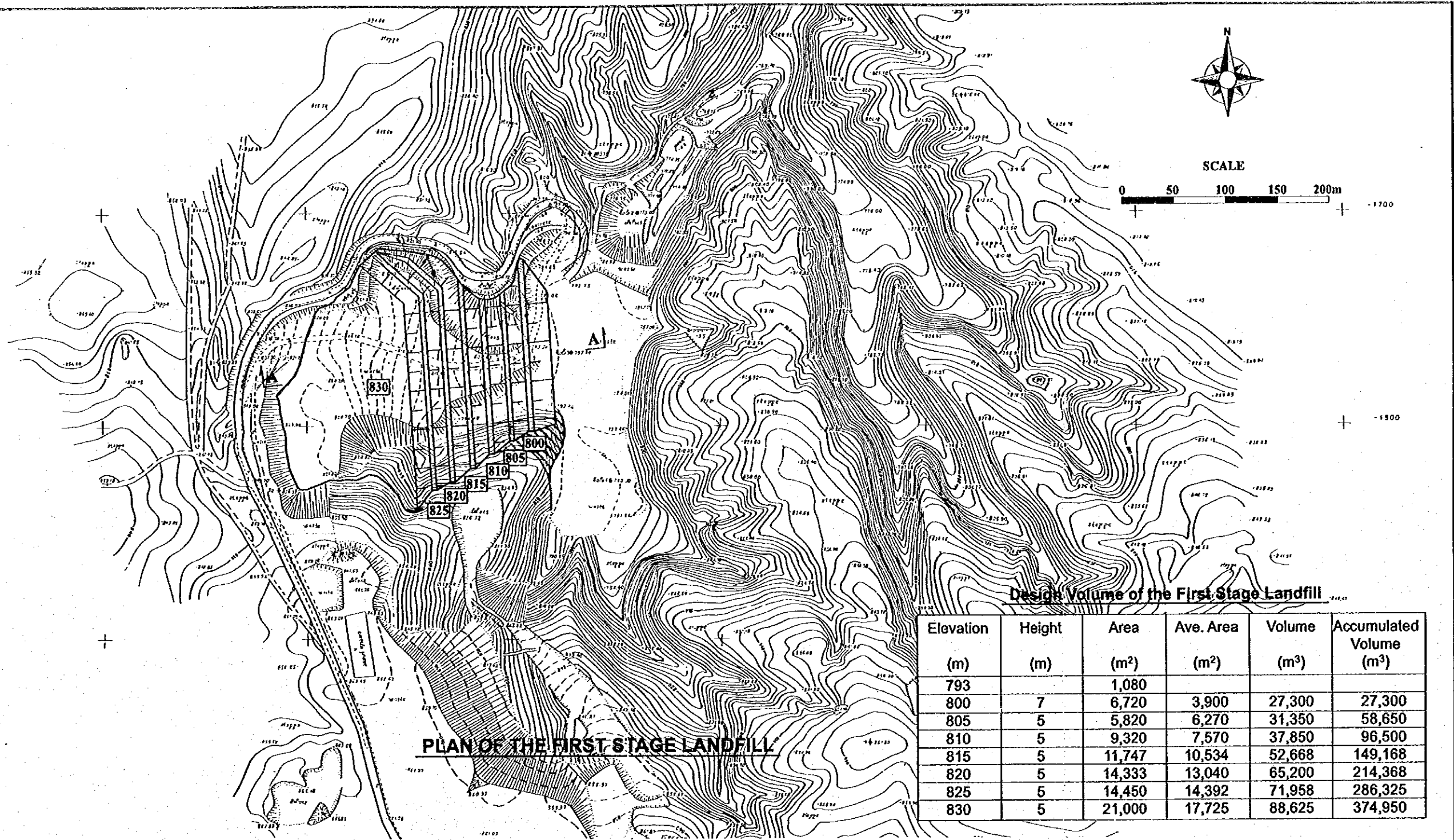
THE REPUBLIC OF KAZAKHSTAN
 MINISTRY OF NATURAL RESOURCES AND
 ENVIRONMENT PROTECTION
 ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR
 ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 5.1.7
 Estimation of the Existing Landfill
 Volume

SCALE 1 : 4000

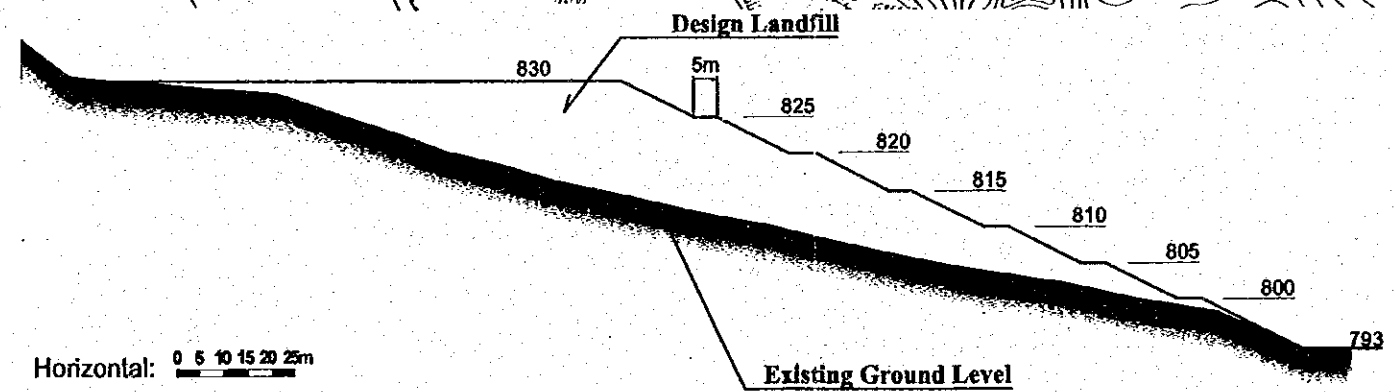
JAPAN INTERNATIONAL COOPERATION AGENCY



Design Volume of the First Stage Landfill

Elevation (m)	Height (m)	Area (m ²)	Ave. Area (m ²)	Volume (m ³)	Accumulated Volume (m ³)
793		1,080			
800	7	6,720	3,900	27,300	27,300
805	5	5,820	6,270	31,350	58,650
810	5	9,320	7,570	37,850	96,500
815	5	11,747	10,534	52,668	149,168
820	5	14,333	13,040	65,200	214,368
825	5	14,450	14,392	71,958	286,325
830	5	21,000	17,725	88,625	374,950

PLAN OF THE FIRST STAGE LANDFILL



Horizontal: 0 5 10 15 20 25m
 Vertical: 0 5 10 15 20 25m

CROSS SECTION (A-A)

THE REPUBLIC OF KAZAKHSTAN
 MINISTRY OF NATURAL RESOURCES AND
 ENVIRONMENT PROTECTION
 ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR
 ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 5.1.8
First Stage (Year 2000-2001) of Landfill
Plan of the Karasai Disposal Site
Improvement Work

SCALE: 1:4000

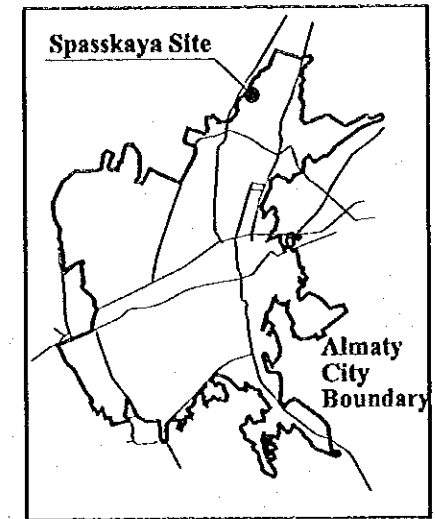
JAPAN INTERNATIONAL COOPERATION AGENCY

CHAPTER 6
DRAWINGS OF MODEL RECLAMATION PROJECT
FOR SPASSKAYA

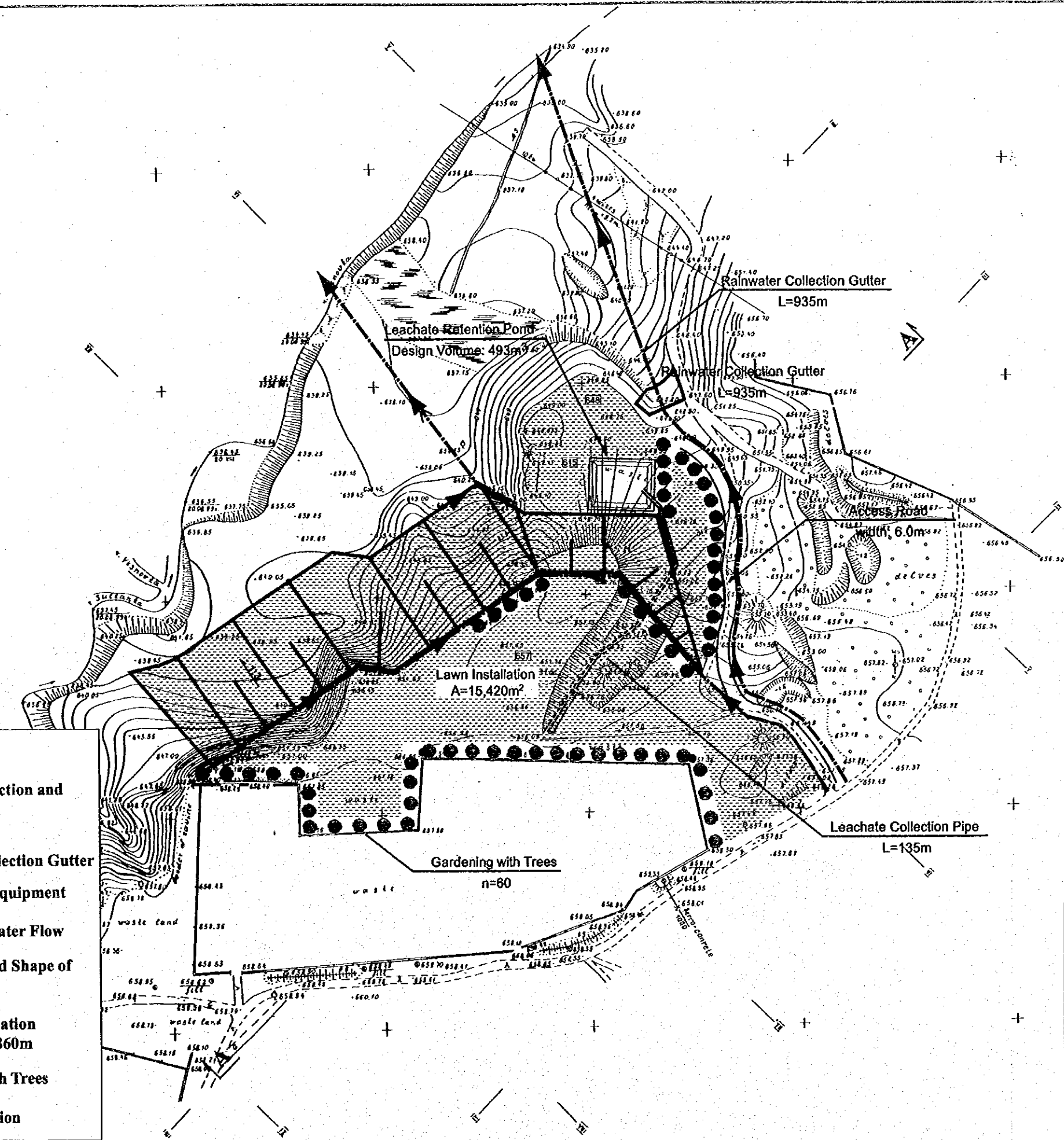
LIST OF FIGURES

Figure 6.1.1	Layout Plan of Model Reclamation Project for Spasskaya	4 - 114
Figure 6.1.2	Typical Cross Section of Model Reclamation Project for Spasskaya	4 - 115
Figure 6.1.3	Leachate Collection and Drainage System and Gas Exhaust Equipment of the Model Reclamation Project for Spasskaya	4 - 116
Figure 6.1.4	Layout Plan of Rainwater Collection Gutter and Landscaping of the Model Reclamation Project for Spasskaya	4 - 117

LOCATION MAP



13200
13100
13000



LEGEND

- Leachate Collection and Drainage Main (TYPE D)
- Rainwater Collection Gutter
- Gas Exhaust Equipment
- Direction of Water Flow
- Design Finished Shape of Reclamation
- Design Reclamation Elevation, ex. 860m
- Gardening with Trees
- Lawn Installation

0 25 50 75 100m

SCALE

THE REPUBLIC OF KAZAKHSTAN
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
ALMATY CITY GOVERNMENT

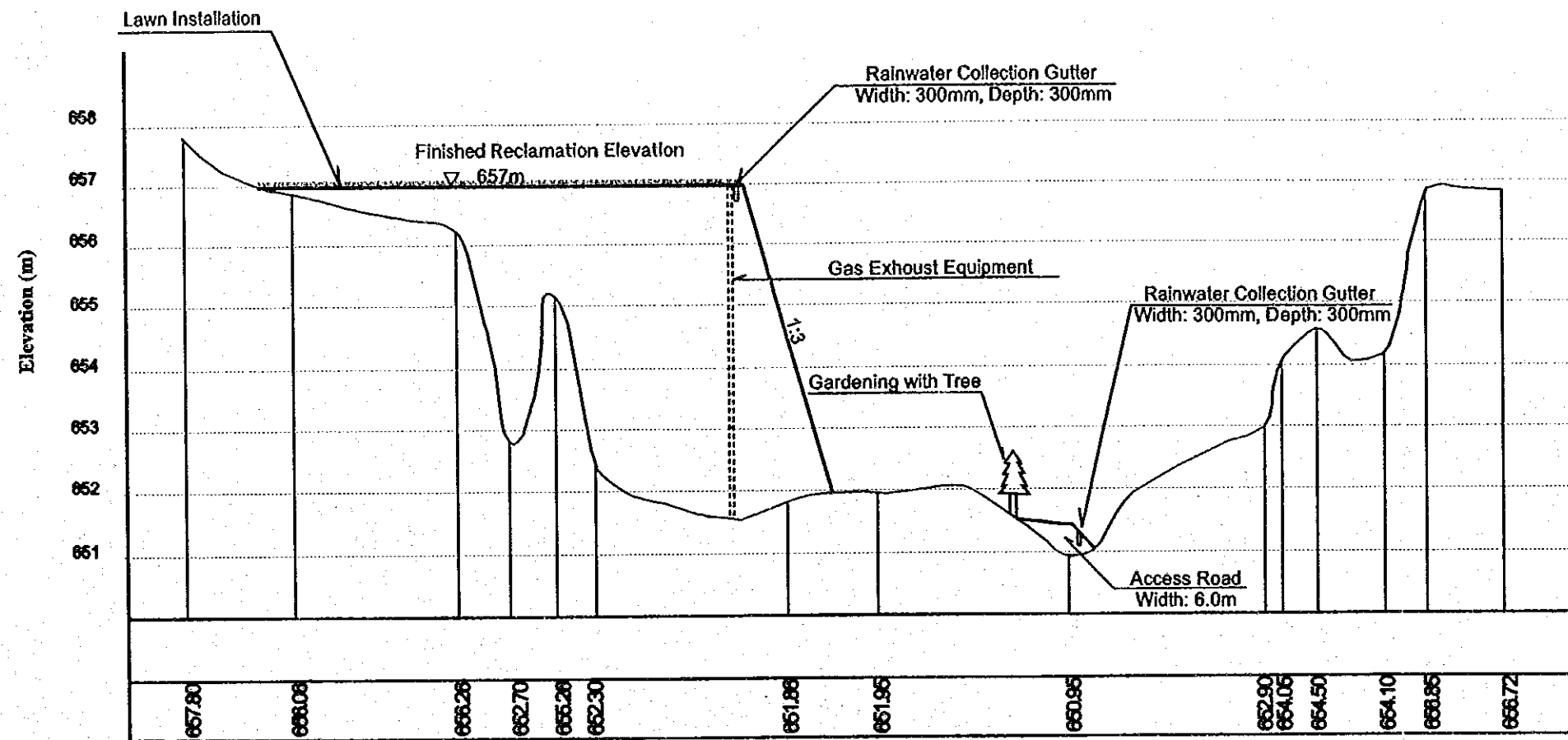
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 6.1.1
Layout Plan of Model Reclamation Project for Spasskaya

SCALE 1 : 2000

JAPAN INTERNATIONAL COOPERATION AGENCY

A-A

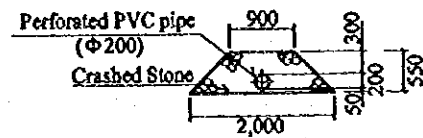


Horizontal 1/1000
Vertical 1/100

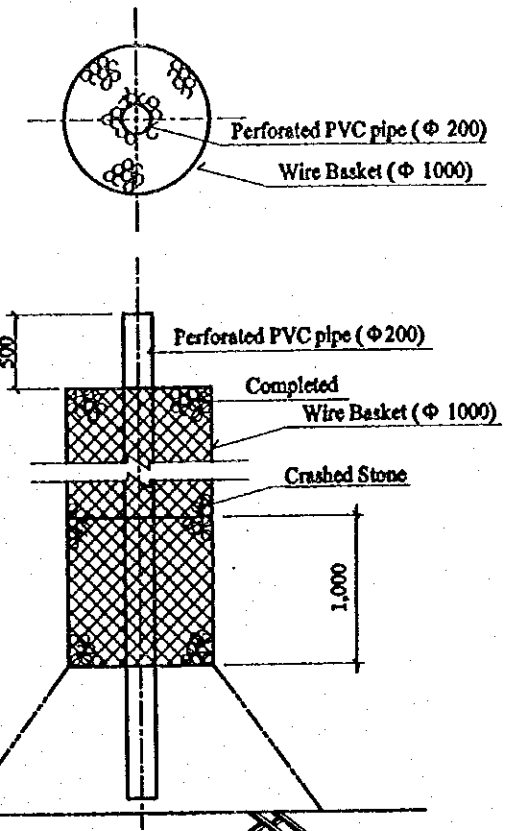
THE REPUBLIC OF KAZAKHSTAN MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION ALMATY CITY GOVERNMENT	
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN	
Figure 6.1.2 Typical Cross Section of Model Reclamation Project for Spasskaya	
SCALE	H 1:1000, V 1:100
JAPAN INTERNATIONAL COOPERATION AGENCY	

**LEACHATE DRAIN
(1/100)**

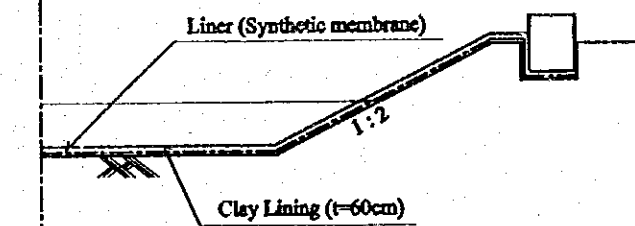
TYPE D



**GAS EXHAUST EQUIPMENT
(1:50)**

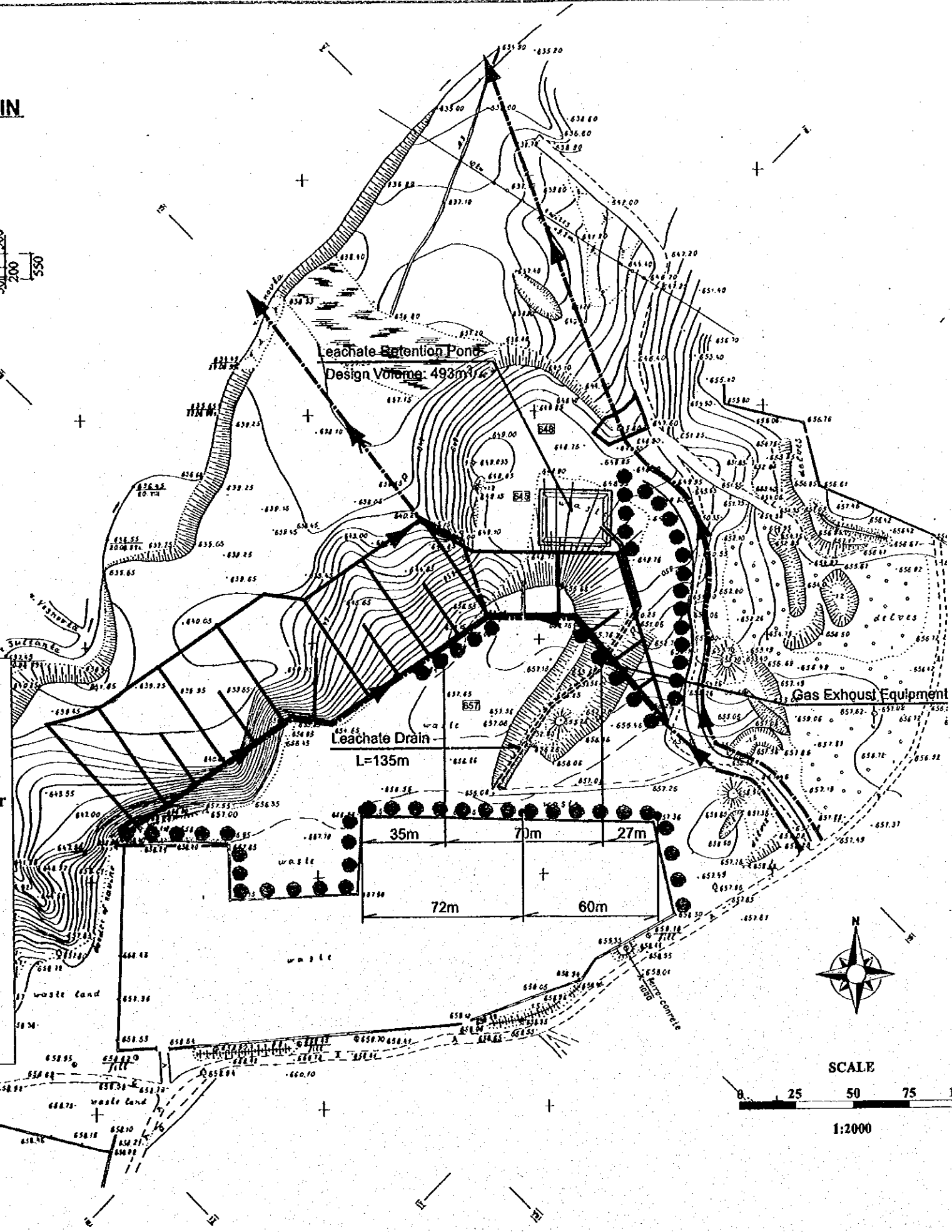


**LEACHATE RETENTION POND
(STANDARD SECTIONAL VIEW)
(SCALE=none)**



LEGEND

- Leachate Collection and Drainage Main (TYPED)
- Rainwater Collection Gutter
- Gas Exhaust Equipment
- Direction of Water Flow
- Design Finished Shape of Reclamation
- Design Reclamation Elevation, ex. 860m
- Gardening with Trees



THE REPUBLIC OF KAZAKHSTAN
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
ALMATY CITY GOVERNMENT

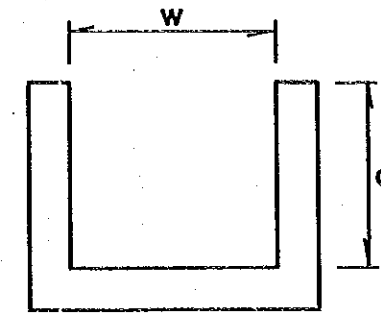
THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 6.1.3
Leachate Collection and Drainage System and Gas Exhaust Equipment of the Model Reclamation Project for Spasskaya

SCALE	1:2000, 1:100, 1:50
-------	---------------------

JAPAN INTERNATIONAL COOPERATION AGENCY

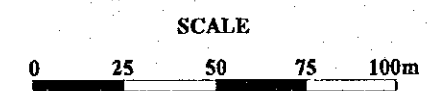
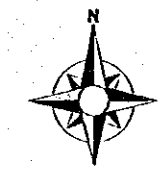
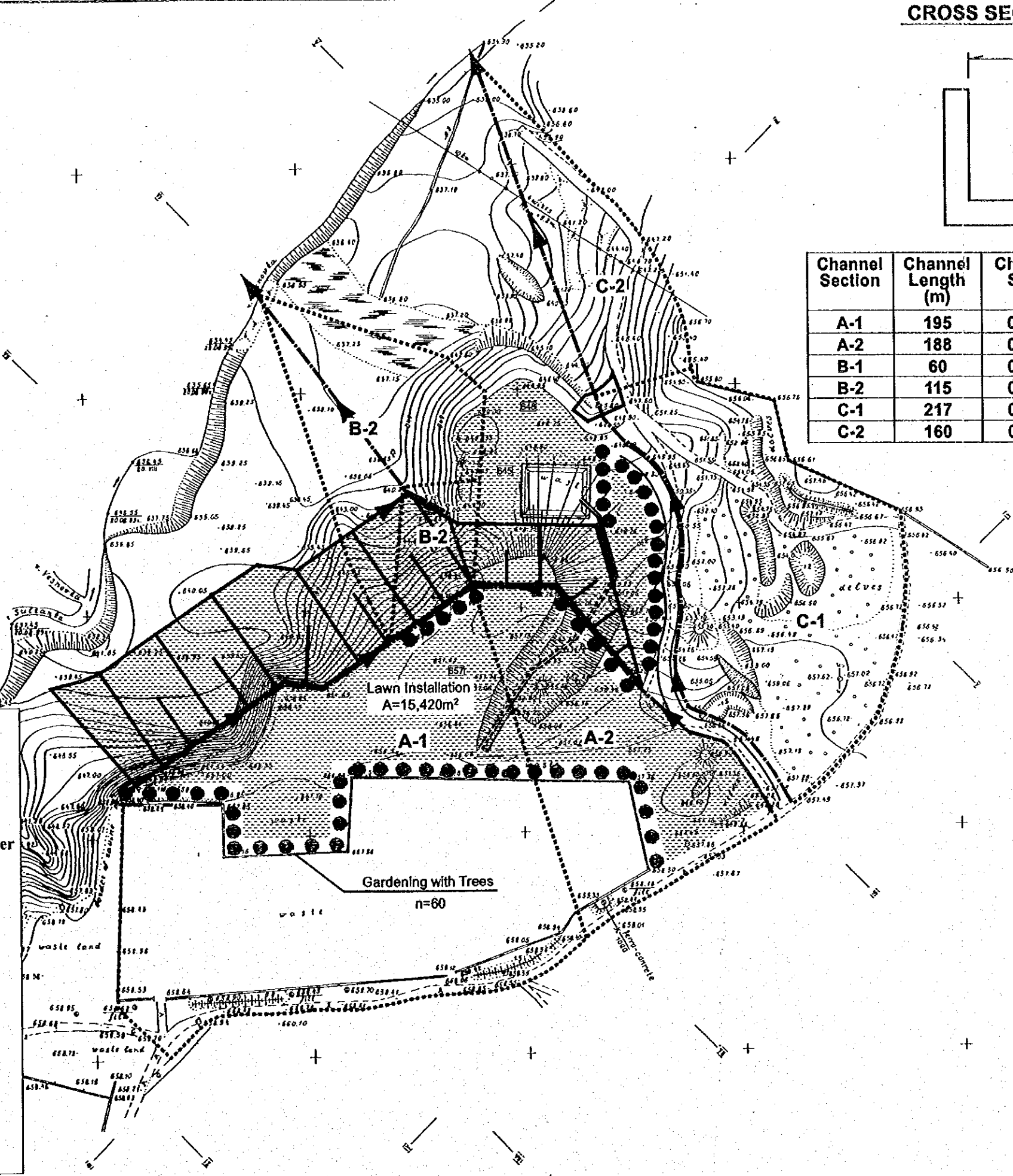
CROSS SECTION OF GUTTER



Channel Section	Channel Length (m)	Channel Slope	Drainage Area (ha)	w (mm)	d (mm)
A-1	195	0.006	2.950	450	450
A-2	188	0.027	1.060	300	300
B-1	60	0.265	0.148	450	450
B-2	115	0.013	0.971	450	450
C-1	217	0.041	1.670	300	300
C-2	160	0.081	0.580	350	350

LEGEND

- Leachate Collection and Drainage Main (TYPE D)
- Rainwater Collection Gutter
- Gas Exhaust Equipment
- Drainage Area
- Direction of Water Flow
- Design Finished Shape of Reclamation
- Design Reclamation Elevation, ex. 860m
- Gardening with Trees
- Lawn Installation



THE REPUBLIC OF KAZAKHSTAN
 MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT PROTECTION
 ALMATY CITY GOVERNMENT

THE STUDY ON SOLID WASTE MANAGEMENT FOR ALMATY CITY IN THE REPUBLIC OF KAZAKHSTAN

Figure 6.1.4
 Layout Plan of Rain Water Collection Gutter and Landscaping of the Model Reclamation Project for Spasskaya

SCALE	1 : 2000
-------	----------

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA