

GOVERNMENT OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)


STATE OF ERITREA
MINISTRY OF LAND, WATER AND ENVIRONMENT

STUDY
ON
GROUNDWATER DEVELOPMENT AND WATER SUPPLY
FOR
SEVEN TOWNS IN SOUTHERN REGION
OF
ERITREA

FINAL REPORT

SENAFE

VOLUME III DRAWINGS

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JANUARY 1999

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GOVERNMENT OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
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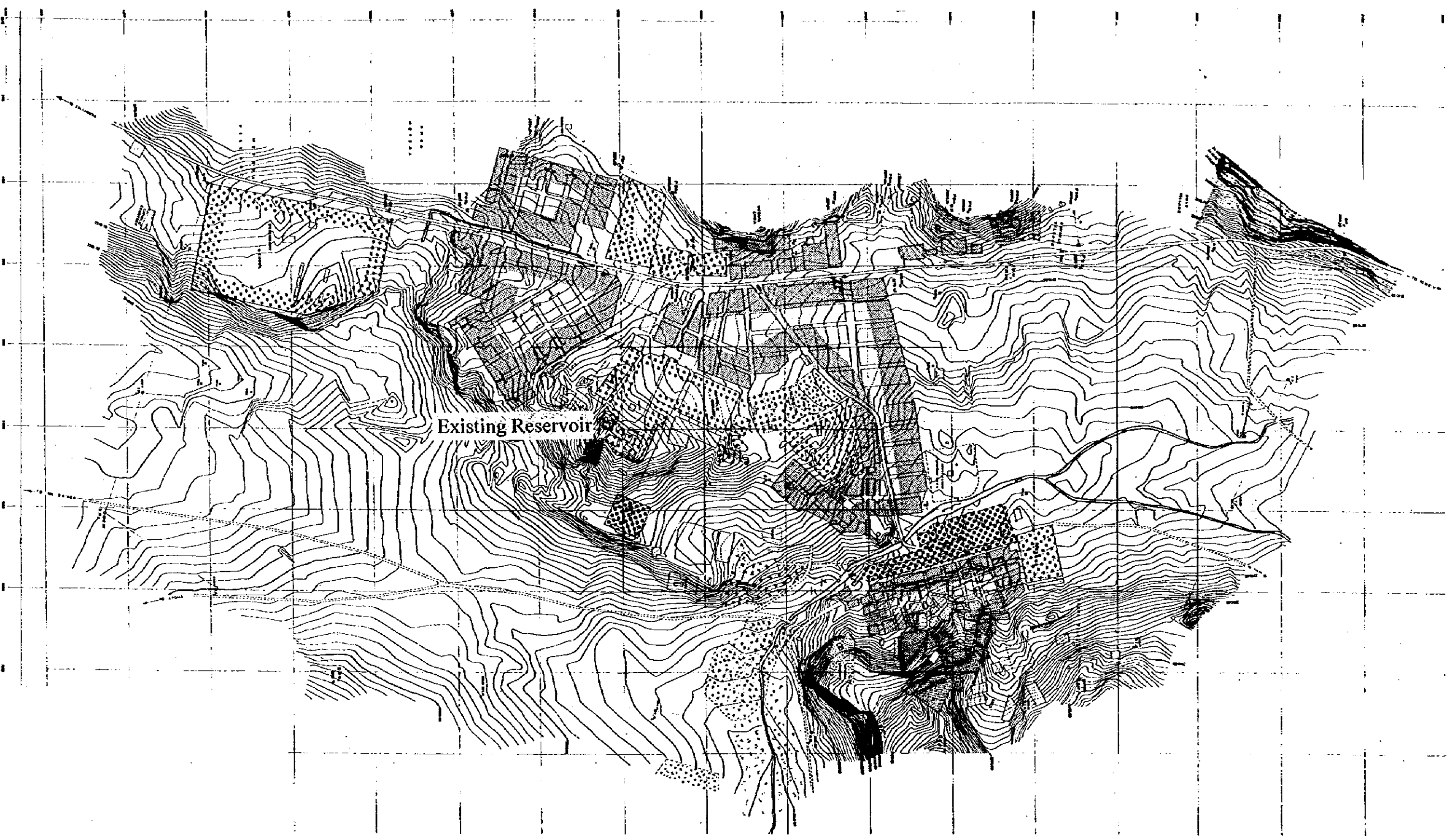
Operation and Maintenance Manual for Water Supply Facility

Hygiene Education Manual

Training Manual for Staff of WSA

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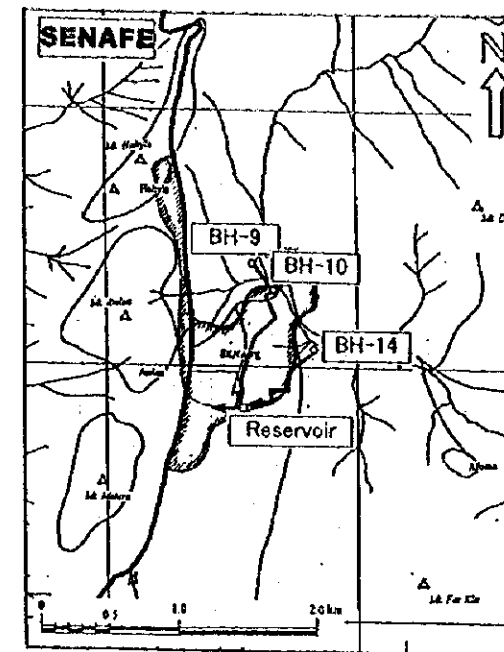
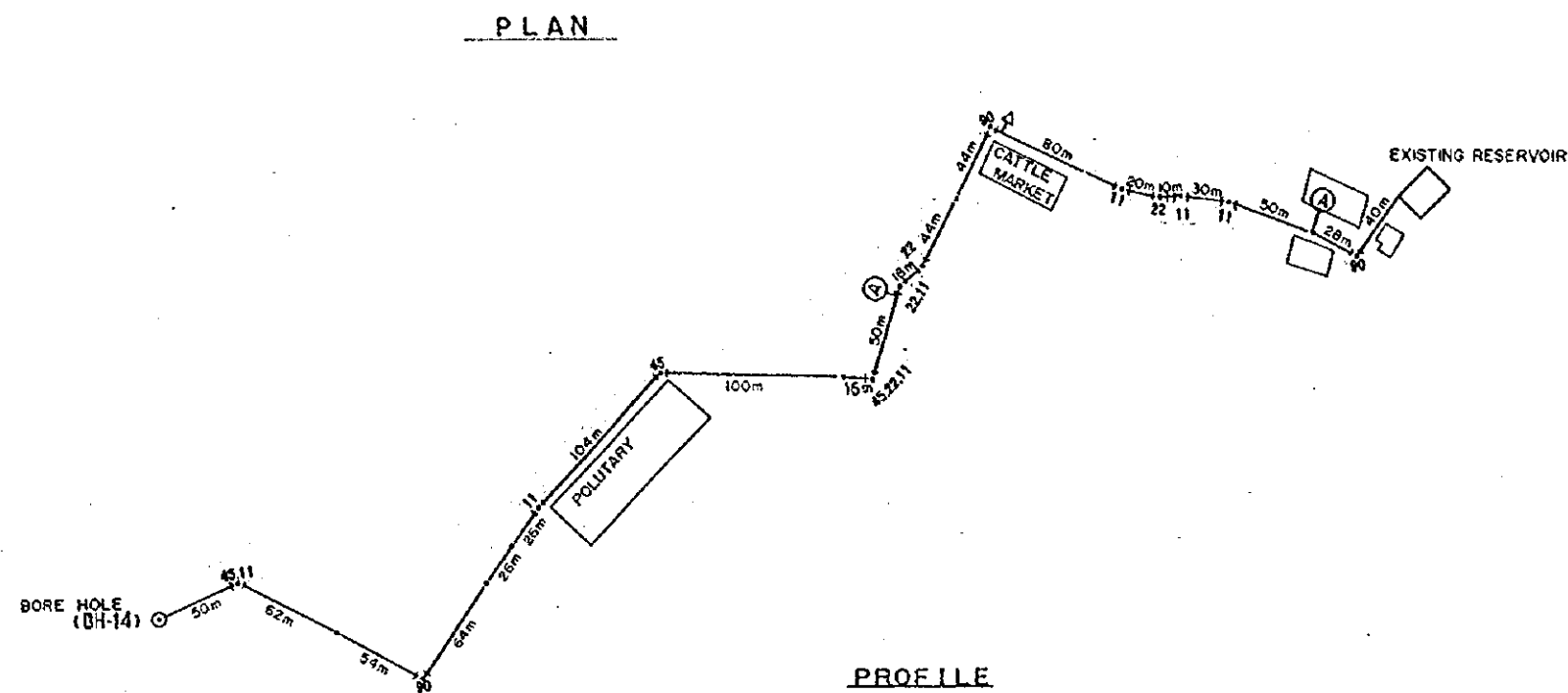


Existing Reservoir

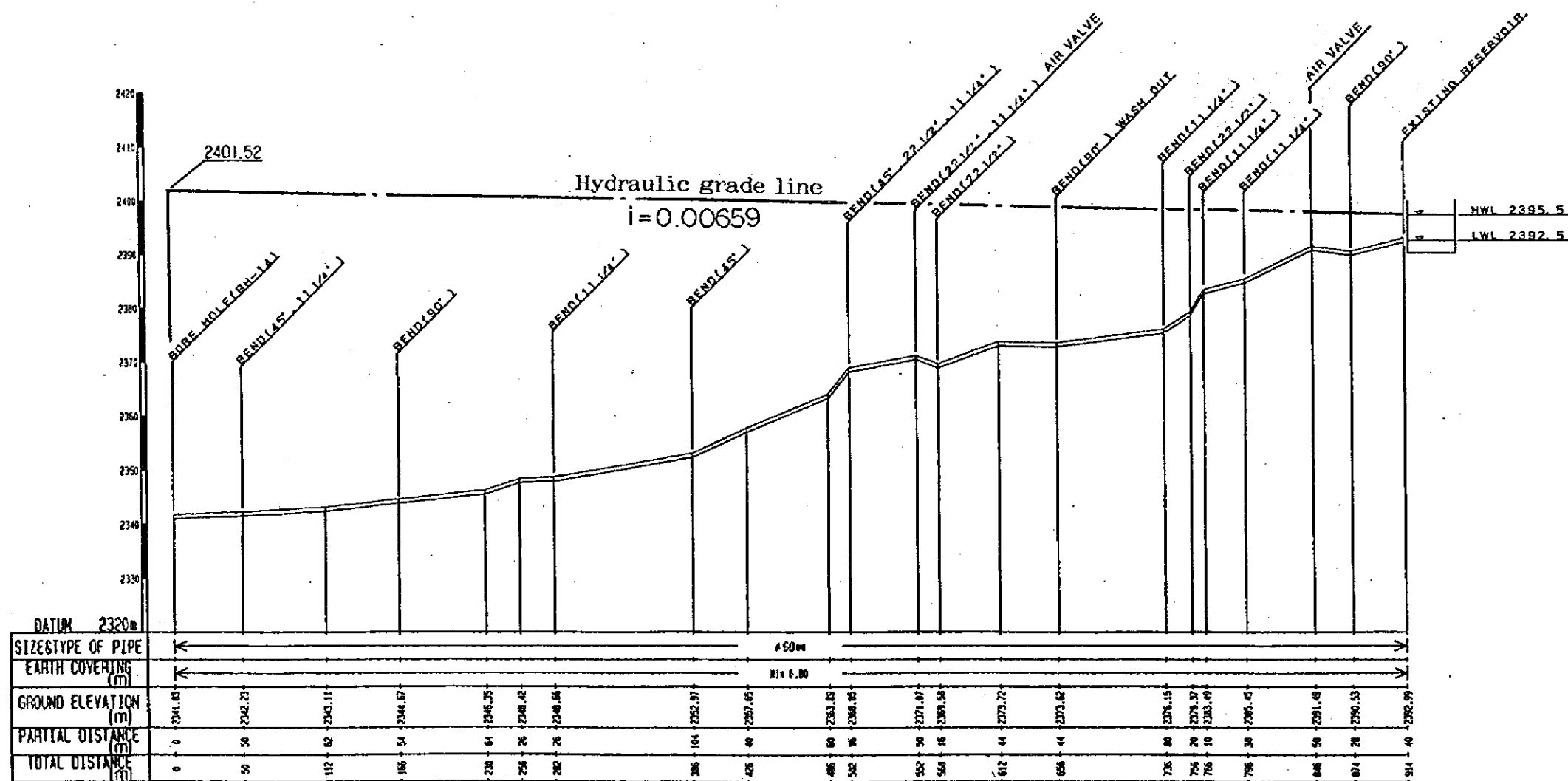
LEGEND	
	Boundary
	Commercial Area
	Administration Area
	Residential Area
	Industrial Area

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
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STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
Land Use and Zone Boundary SENAFE (2010)	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA) SANTU CONSULTANTS INC. JAPAN, 1993	Drawing No. 1 / 16



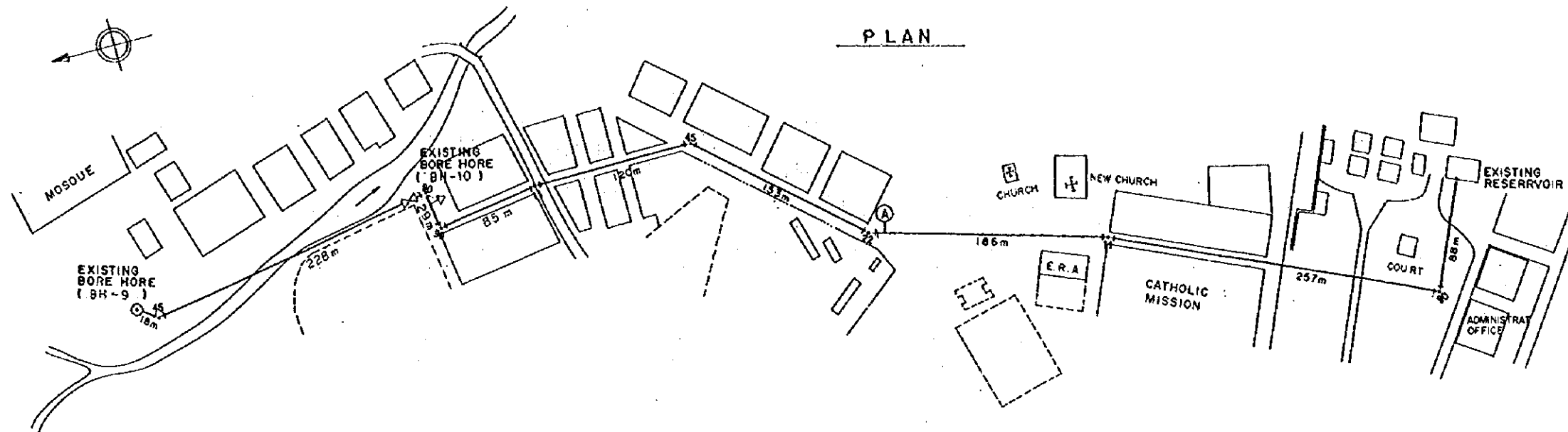


LEGEND	
	BEND 90°
	BEND 45°
	BEND 22 1/2°
	BEND 11 1/4°
	TEE
	WASH OUT
	AIR VALVE
	STOP VALVE



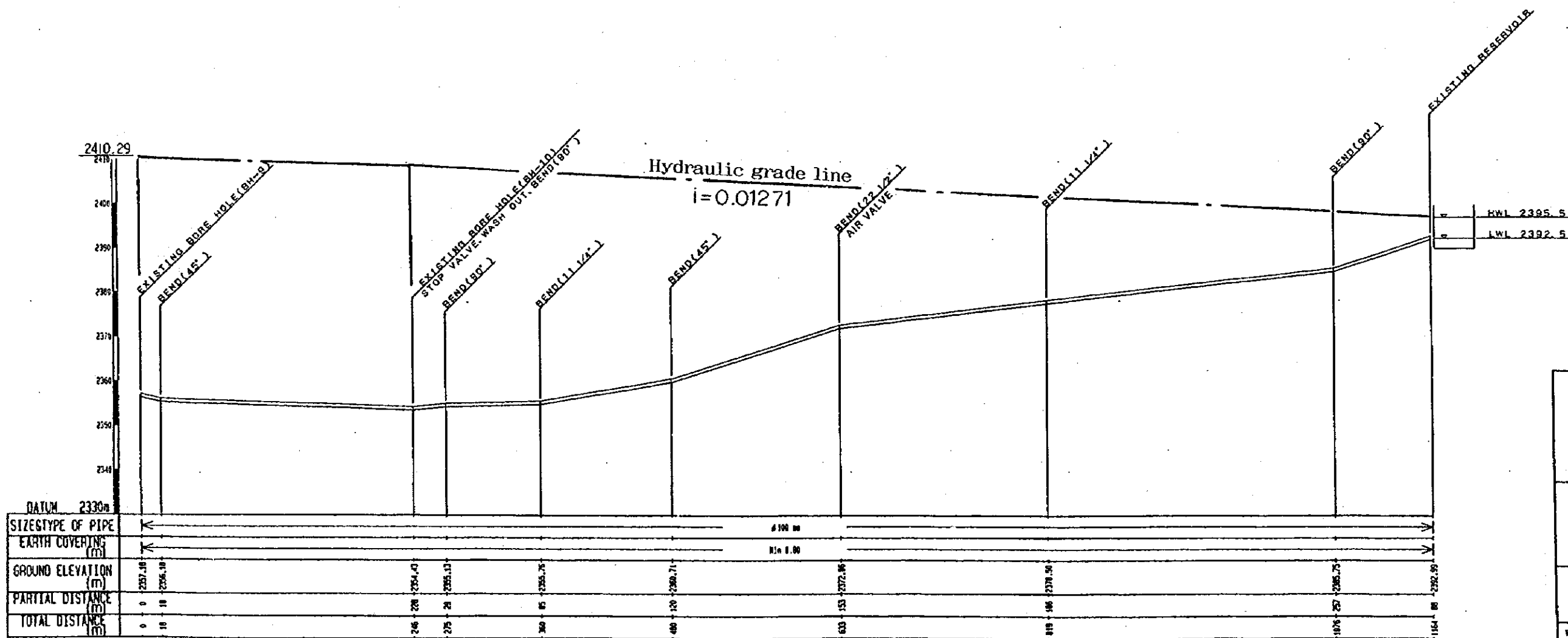
Note: Water hammer analysis will be required and its countermeasure will be taken, if necessary

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
JAPAN INTERNATIONAL COOPERATION AGENCY	
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Plan & Profile for Transmission Pipeline (2005) SENAFE	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA) SANTU CONSULTANTS INC. (JAPAN) 1999	Drawing No. 2 / 16



LEGEND	
	BEND 90°
	BEND 45°
	BEND 22 1/2°
	BEND 11 1/4°
	TEE
	WASH OUT
	AIR VALVE
	STOP VALVE

PROFILE



STATE OF ERITREA
MINISTRY OF LAND, WATER & ENVIRONMENT

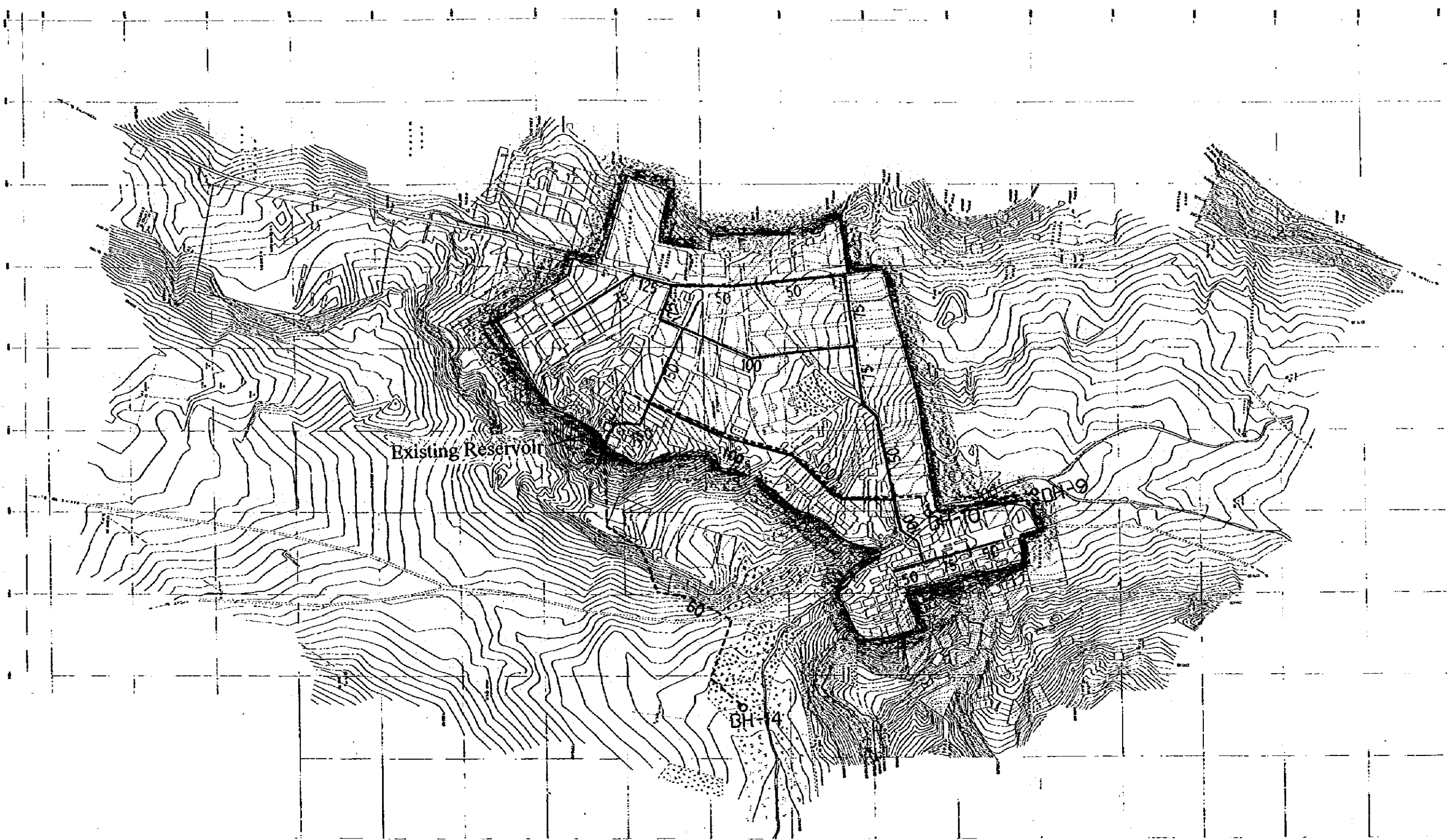
JAPAN INTERNATIONAL COOPERATION AGENCY

STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION

Plan & Profile for Transmission Pipeline (2005)
BENAFE

WATER RESOURCES DEPARTMENT (ASMARA, ERITREA)
BANTU CONSULTANTS INC. (JAPAN) 1999

Drawing No. 3/16

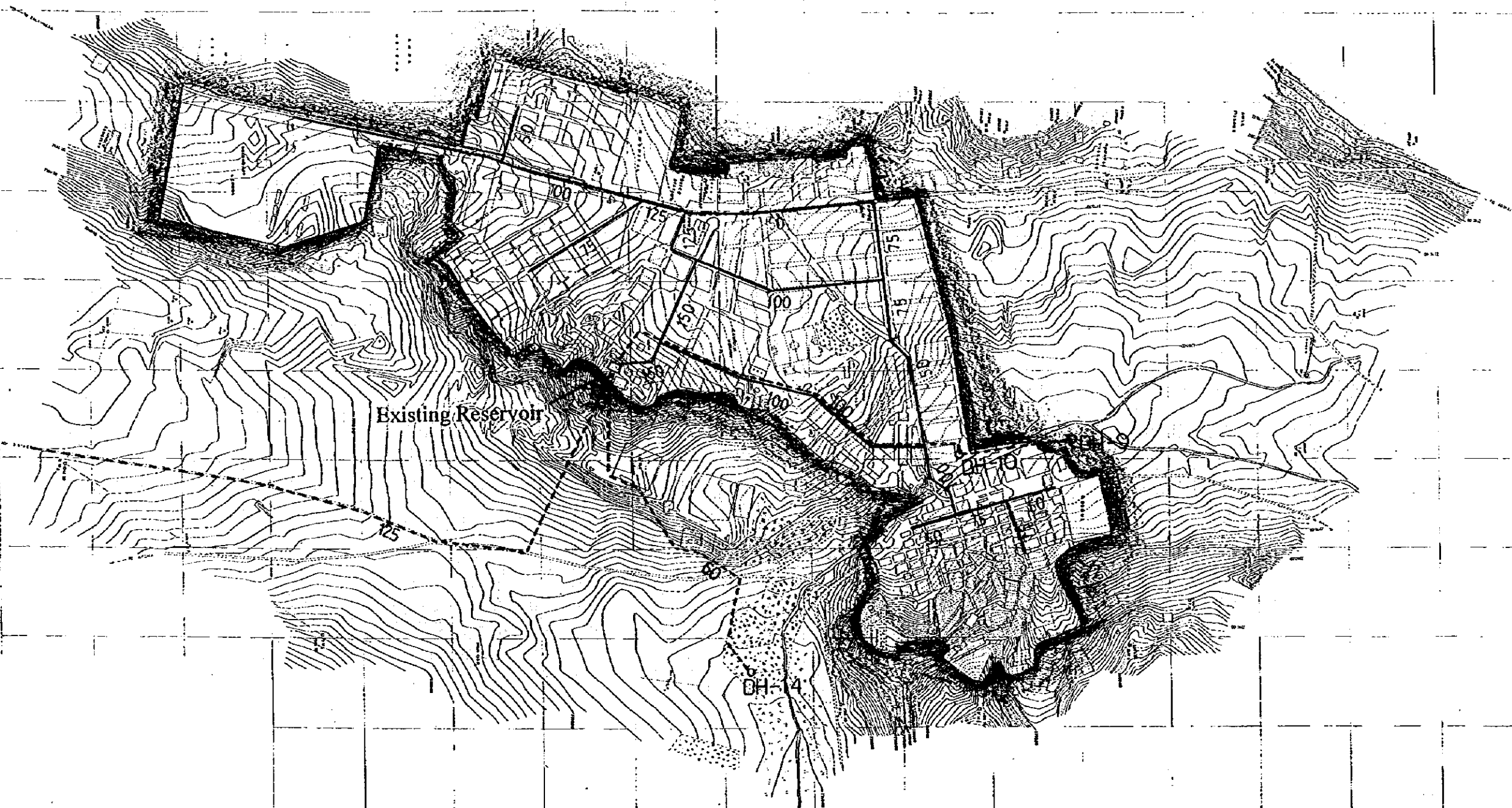


- Legend**
- 100 — Distribution pipeline
Pipe Diameter (mm)
 - - - - - Transmission pipeline
 - Well
 - Reservoir

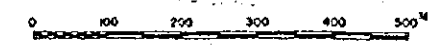


Plan of Distribution Pipeline (2005)

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JAPAN INTERNATIONAL COOPERATION AGENCY	
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PLAN OF DISTRIBUTION PIPELINE (2005)	
SENAFE	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA)	Drawing No.
BANYU CONSULTANTS INC. (JAPAN) 1999	4 / 16

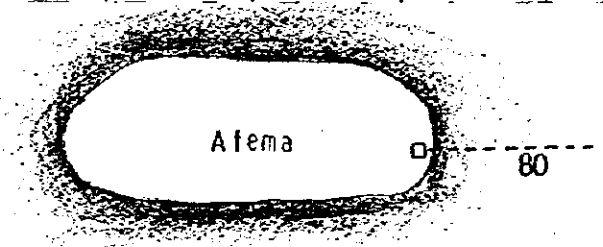
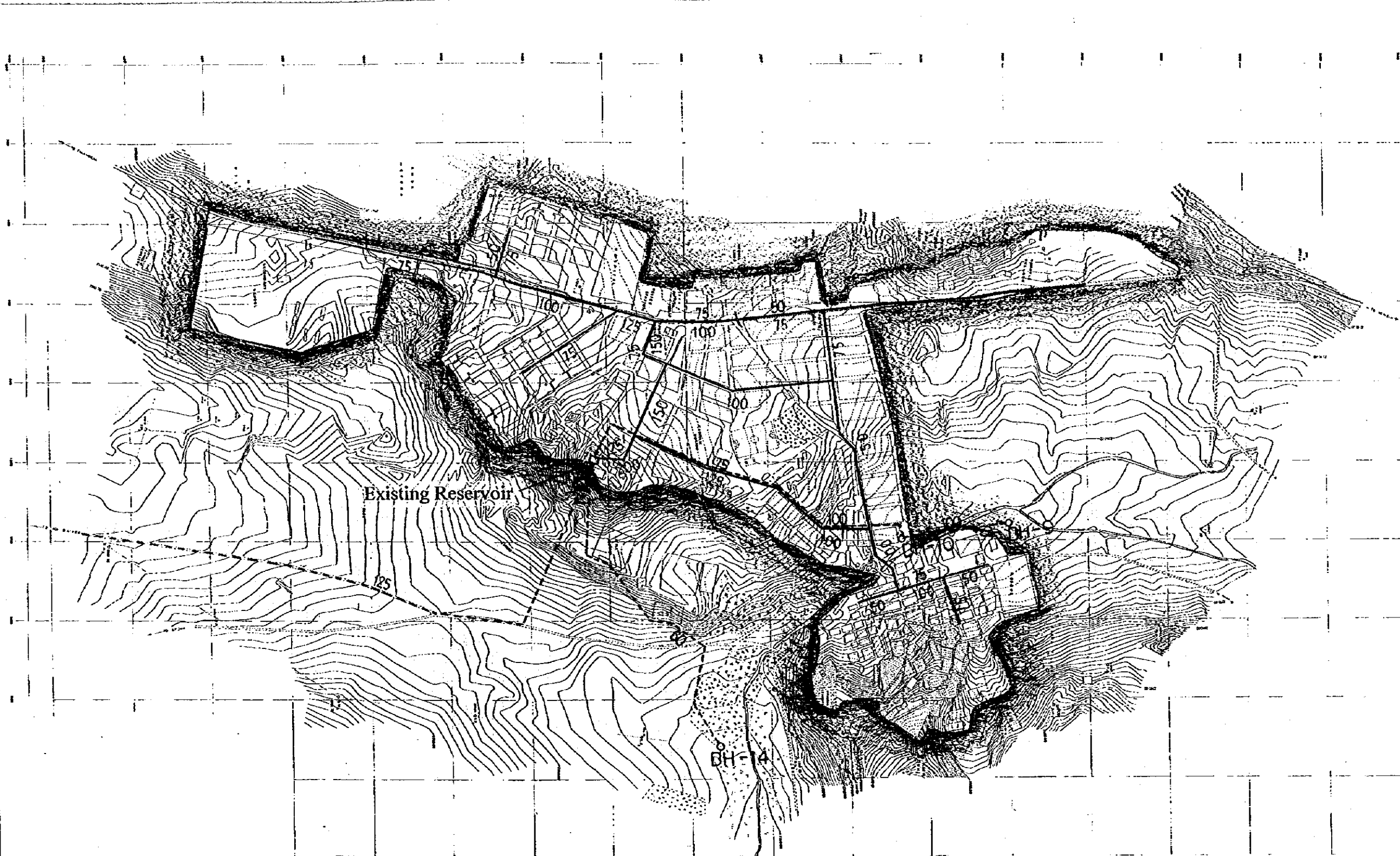


- Legend**
- 100 — Distribution pipeline
Pipe Diameter (mm)
 - - - - - Transmission pipeline
 - Well
 - Reservoir



Plan of Distribution Pipeline (2010)

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
JAPAN INTERNATIONAL COOPERATION AGENCY	
STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
PLAN OF DISTRIBUTION PIPELINE (2010)	
SENAFE	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA)	Drawing No.
SANYU CONSULTANTS INC. (JAPAN) 1999	5 / 16

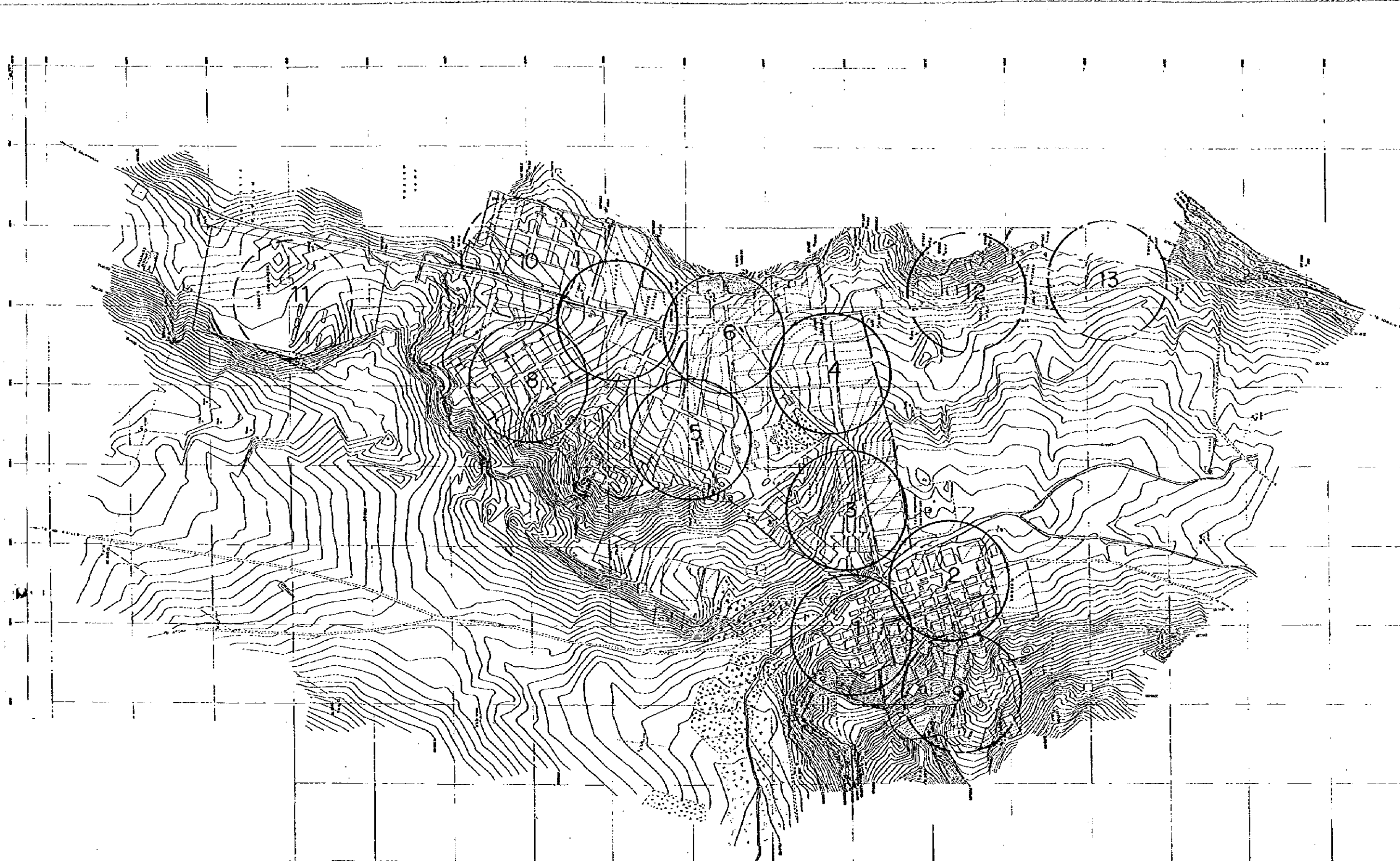


- Legend**
- 100 — Distribution pipeline
 - - - - - Pipe Diameter (mm)
 - - - - - Transmission pipeline
 - Well
 - Reservoir



Plan of Distribution Pipeline (2015)

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
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PLAN OF DISTRIBUTION PIPELINE (2015) SENAFE	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA) SANYU CONSULTANTS INC. JAPAN 1999	Drawing No. 6 / 16

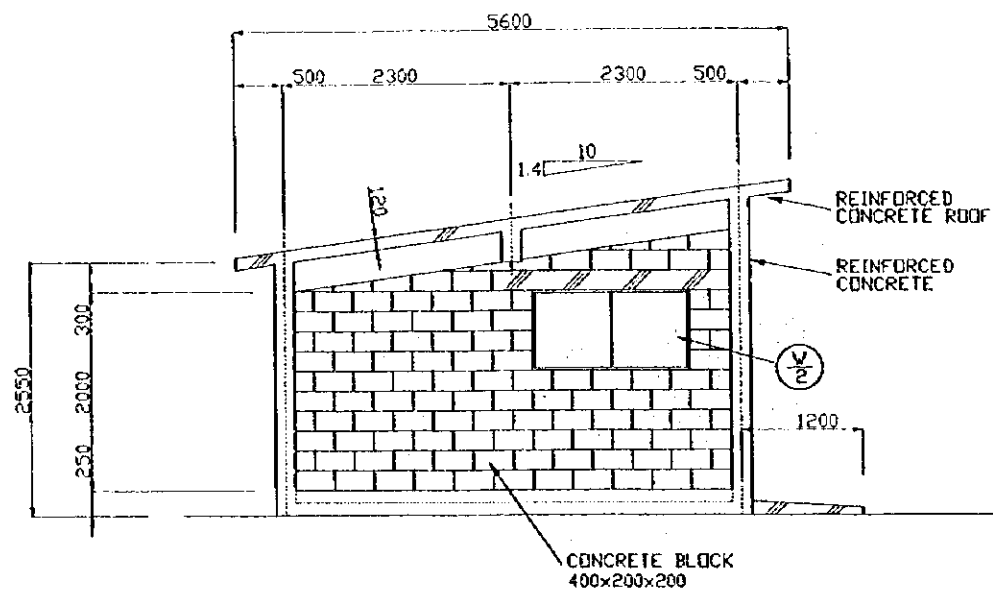


- Legend**
- Communal water points for 2005 (No. 1 - 8)
 - Communal water points for 2010 (No. 9 - 11)
 - Communal water points for 2015 (No. 12 - 13)
 - 2 c.w.p will be added for 1 village in 2015.

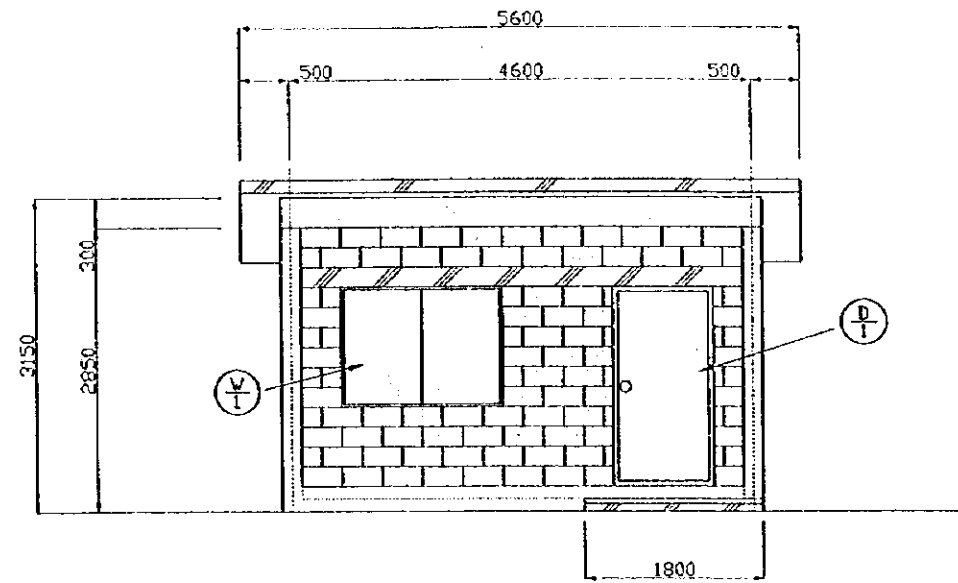
Location of Proposed Communal Water Point



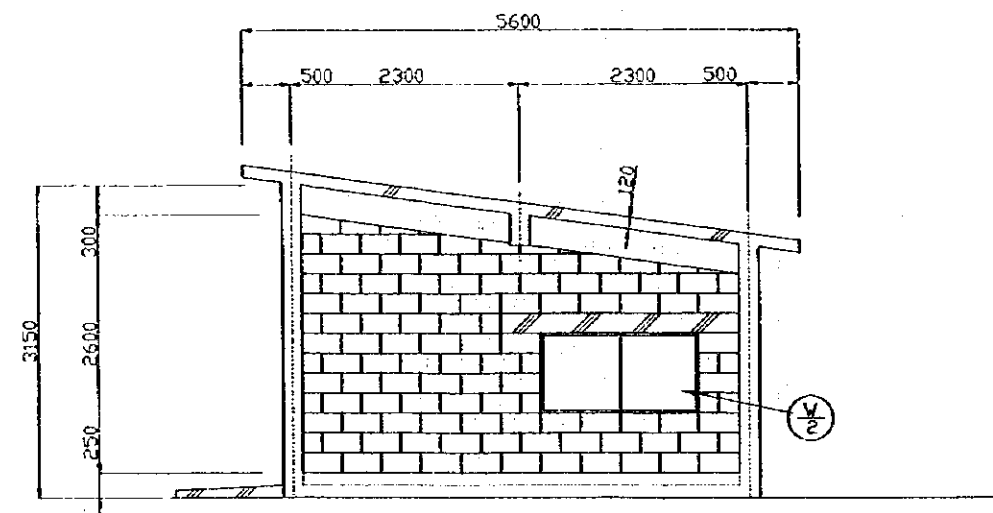
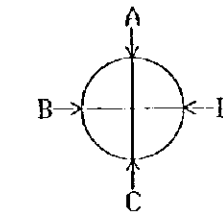
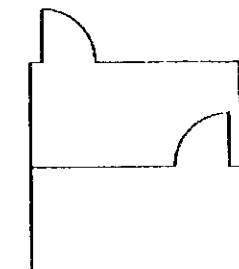
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JAPAN INTERNATIONAL COOPERATION AGENCY	
STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
LOCATION OF PROPOSED COMMUNAL WATER POINT SENAFE	
WATER RESOURCES DEPARTMENT (ASMARA, ERITREA) SANYU CONSULTANTS INC. (JAPAN) 1999	Drawing No 7 / 16



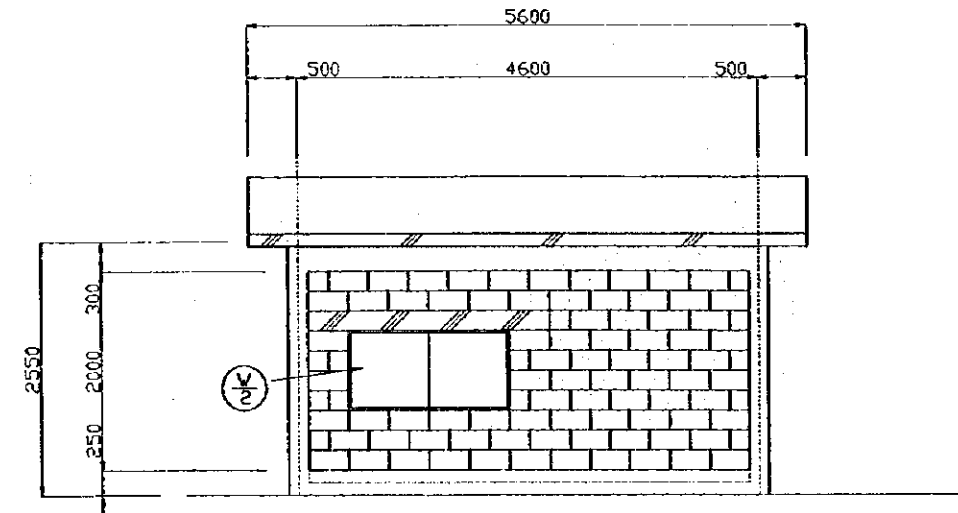
D-ELEVATION



A-ELEVATION



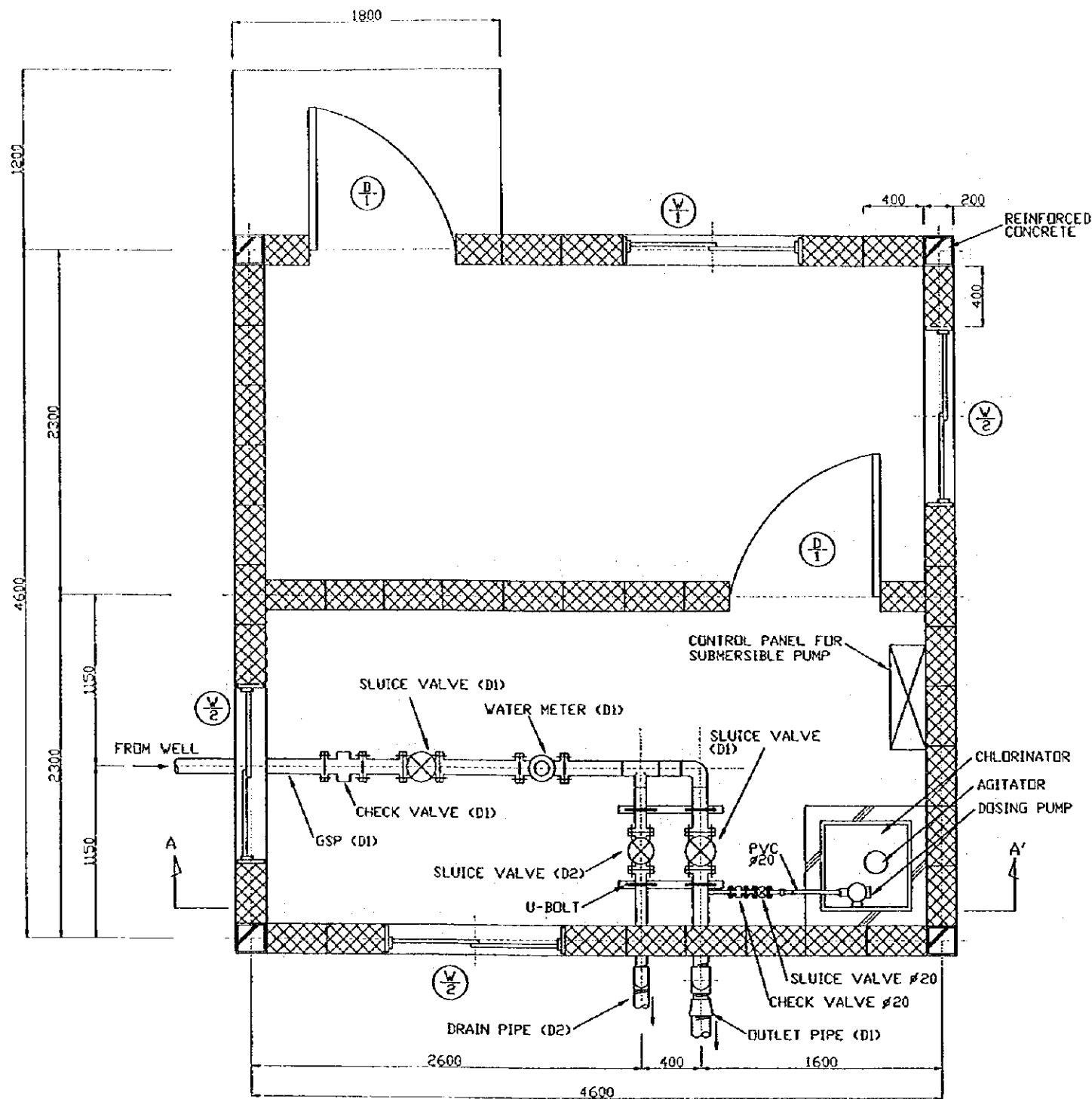
B-ELEVATION



C-ELEVATION

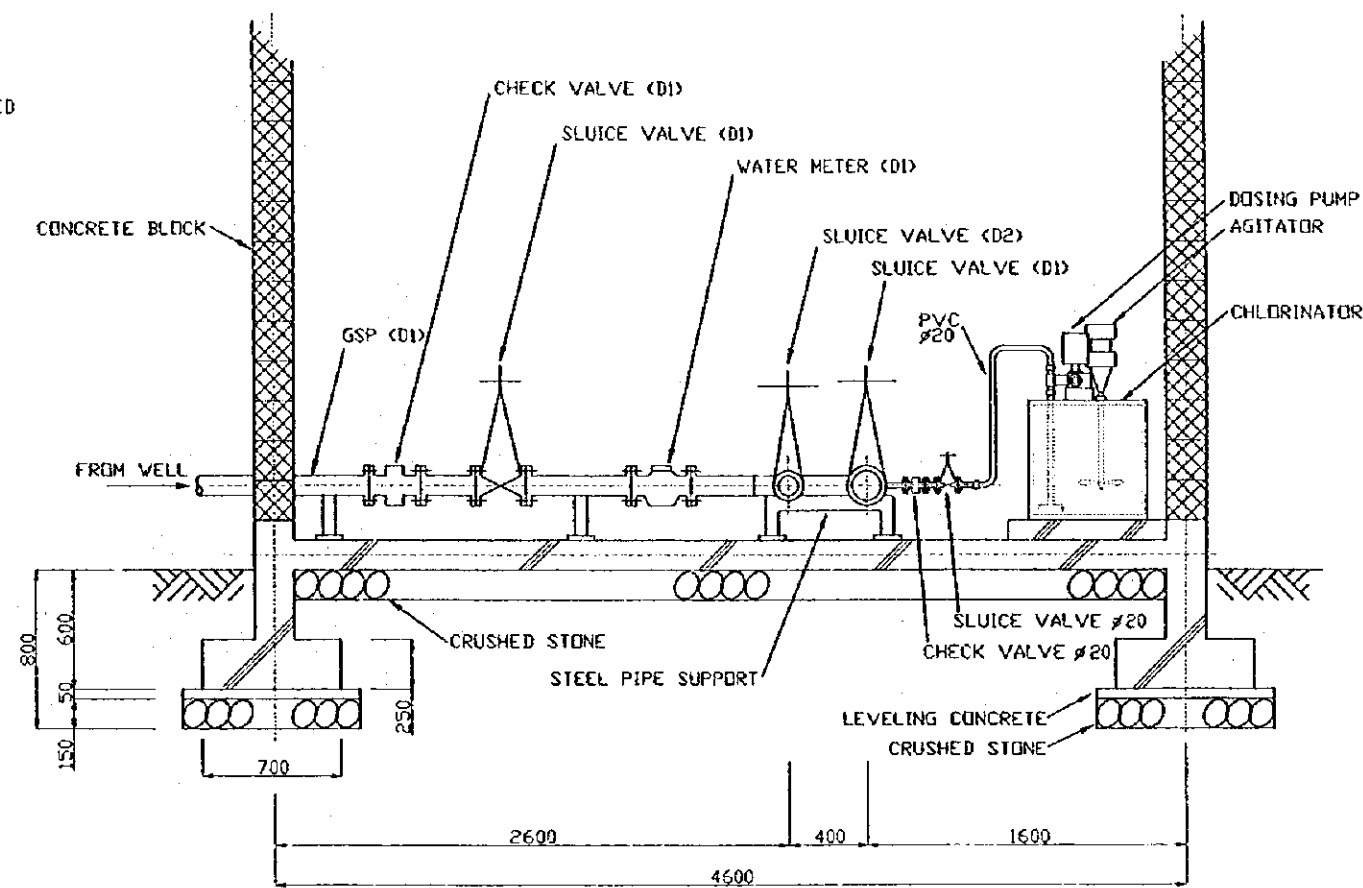
	W	H	ea
⊕	800	1,900	2
⊕	900	900	1
⊕	900	600	3

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
JAPAN INTERNATIONAL COOPERATION AGENCY	
STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
STRUCTURE OF BOREHOLE PUMP STATION SENAFE	
WATER RESOURCES DEPARTMENT SANYU CONSULTANTS INC. (JAPAN) 1999	Drawing No 8/16



PLAN

	V	H	ea
		800 X 1,900 X 2	
		900 X 900 X 1	
		900 X 600 X 3	



SECTION A-A'

Water Source	D1	D2
BH-9	80	50
BH-10	65	50
BH-14	65	50

STATE OF ERITREA
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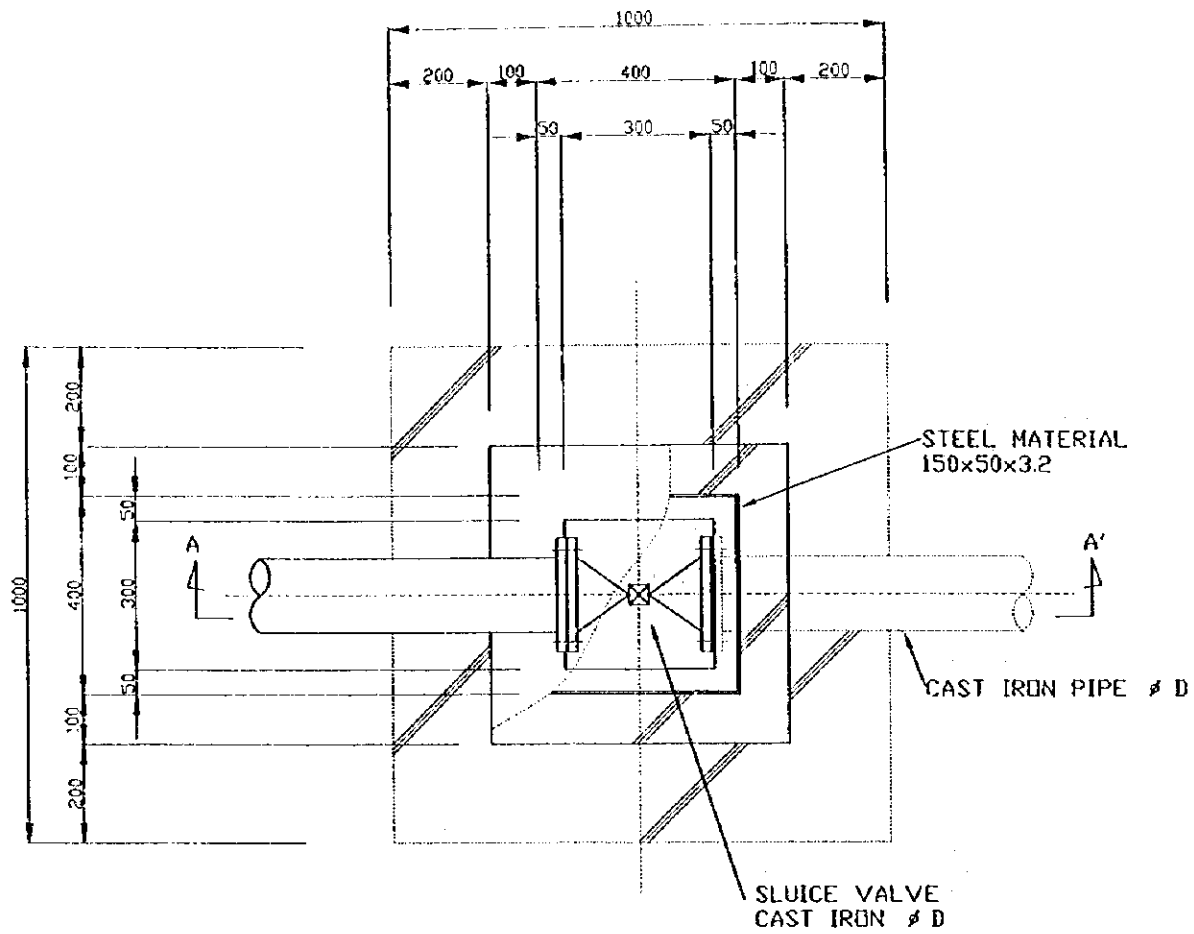
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COOPERATION AGENCY

STUDY ON GROUNDWATER
DEVELOPMENT & WATER SUPPLY
FOR
SEVEN TOWNS IN SOUTHERN REGION

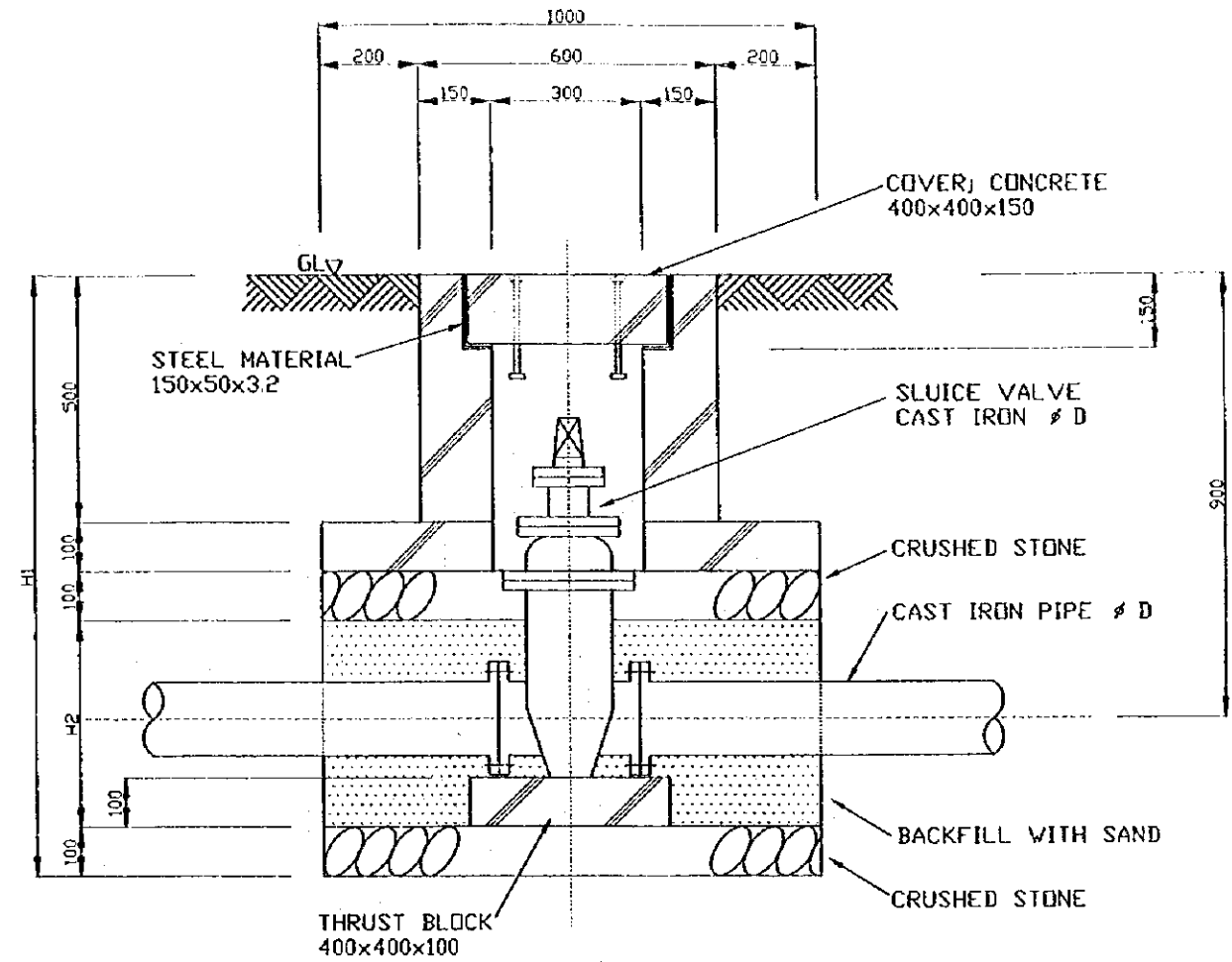
BOREHOLE PUMP STATION
SENAFE

WATER RESOURCES DEPARTMENT
SANYU CONSULTANTS INC.
(JAPAN) 1999

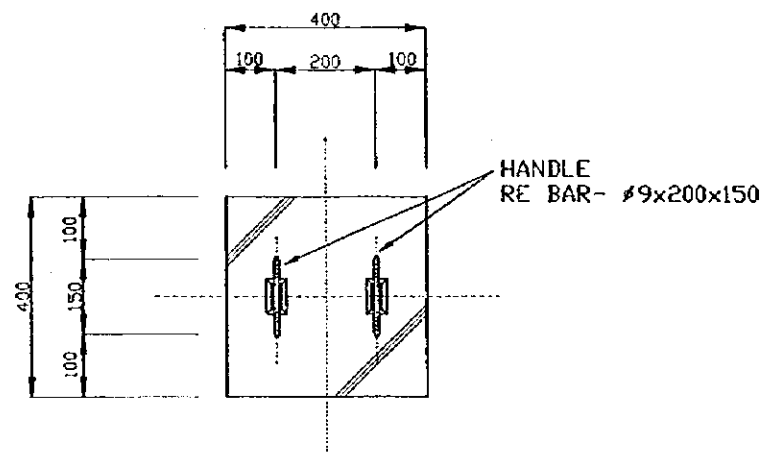
Drawing No.
9/16



PLAN



SECTION A-A'



COVER

ϕ D	H1	H2
50	1180	380
80	1200	400
100	1220	420
125	1250	450
150	1280	480
200	1330	530

STATE OF ERITREA
MINISTRY OF LAND, WATER &
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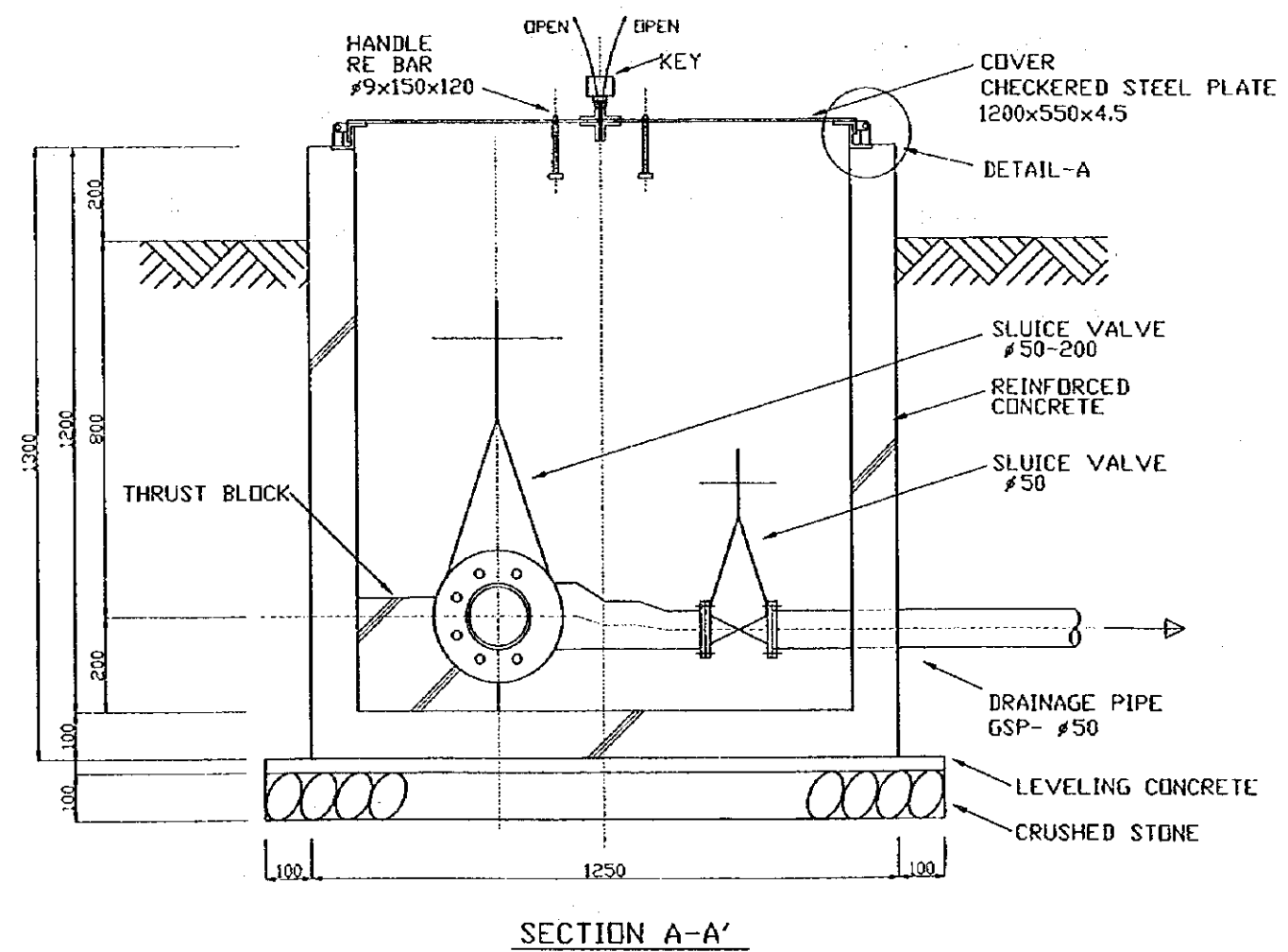
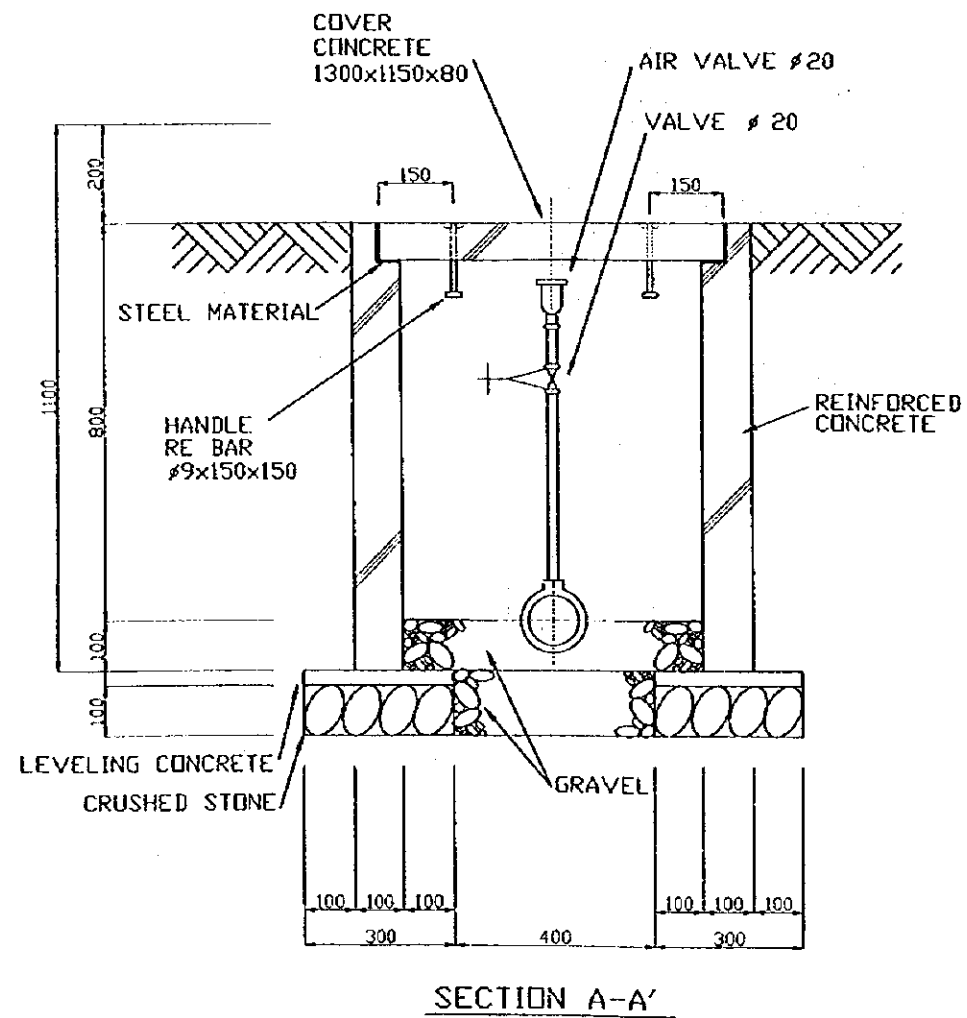
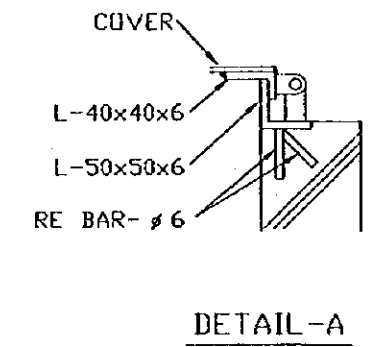
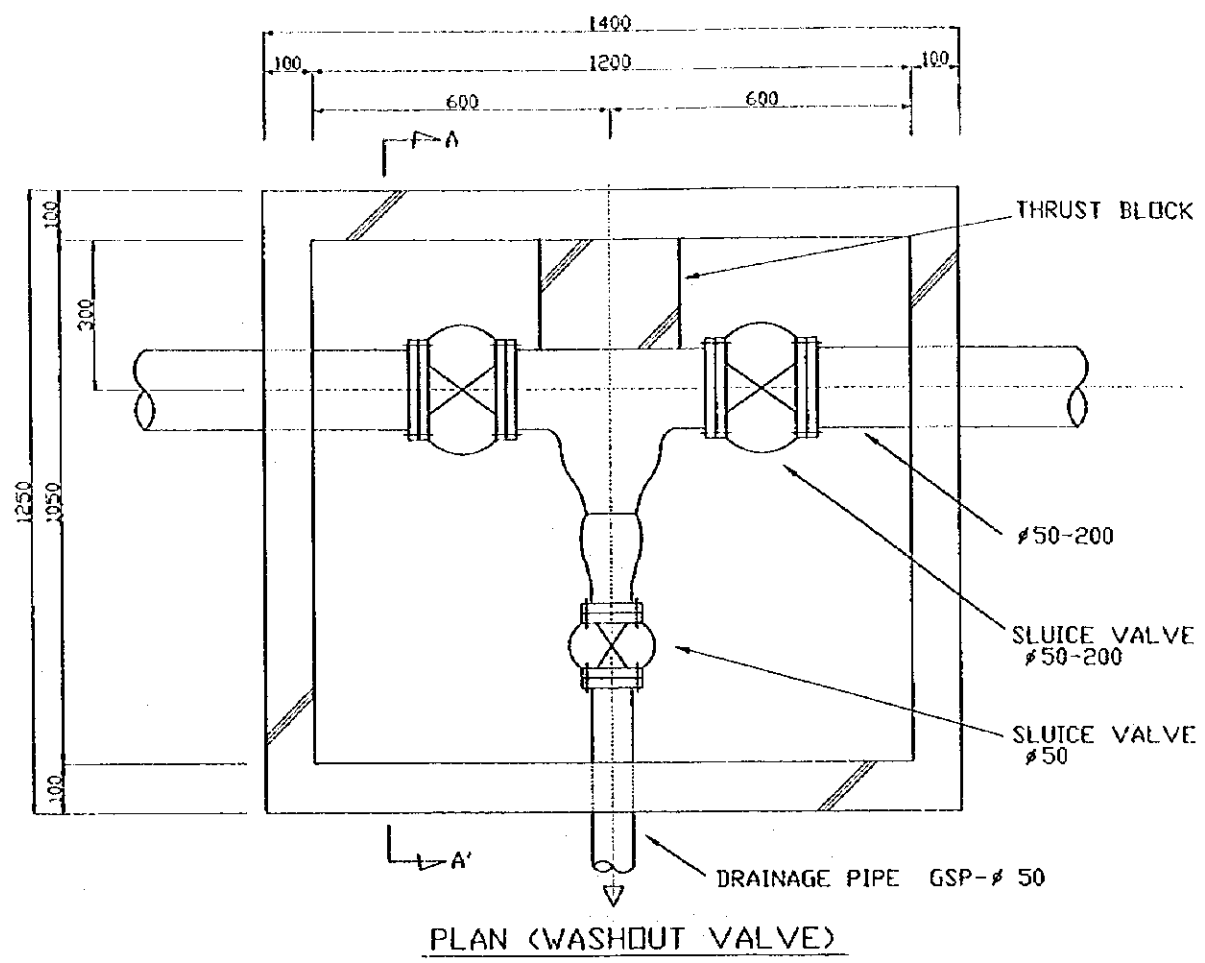
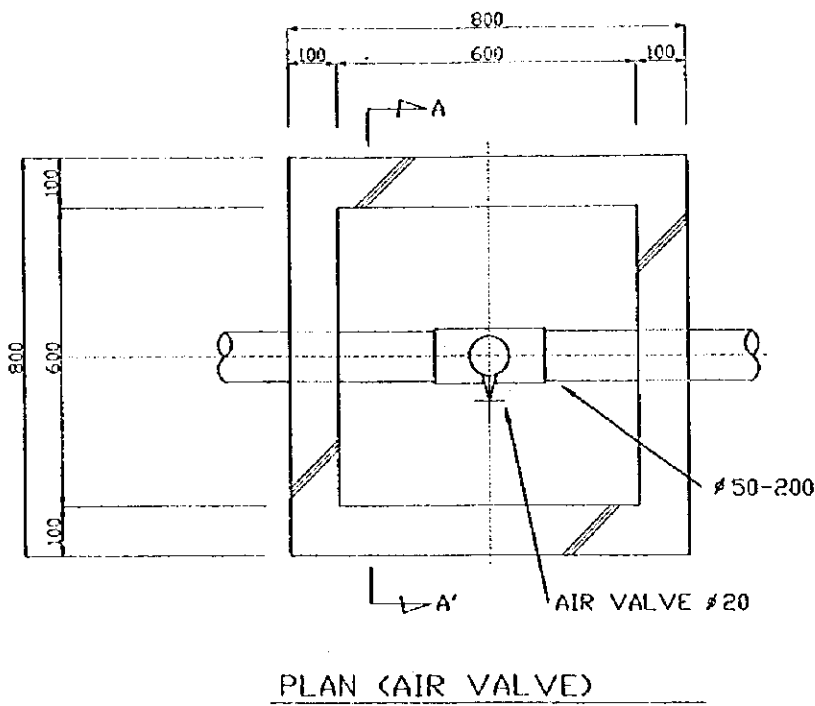
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STUDY ON GROUNDWATER
DEVELOPMENT & WATER SUPPLY
FOR
SEVEN TOWNS IN SOUTHERN REGION

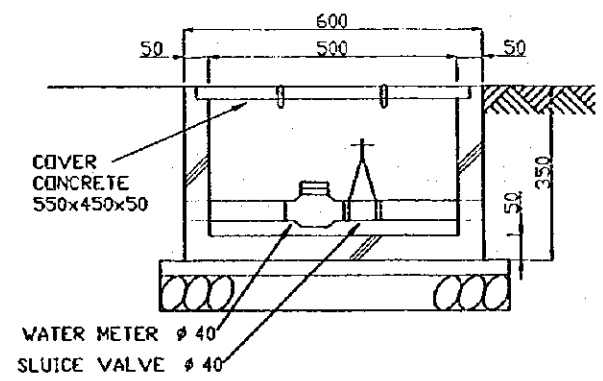
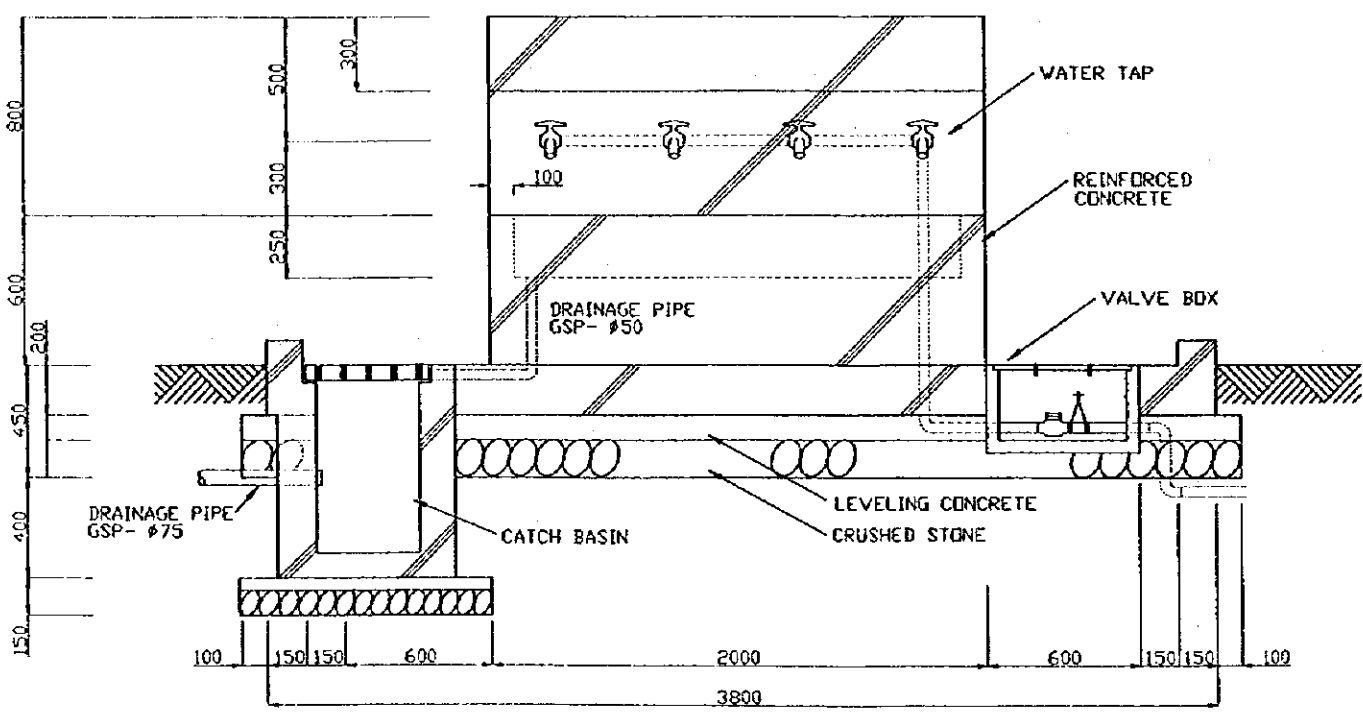
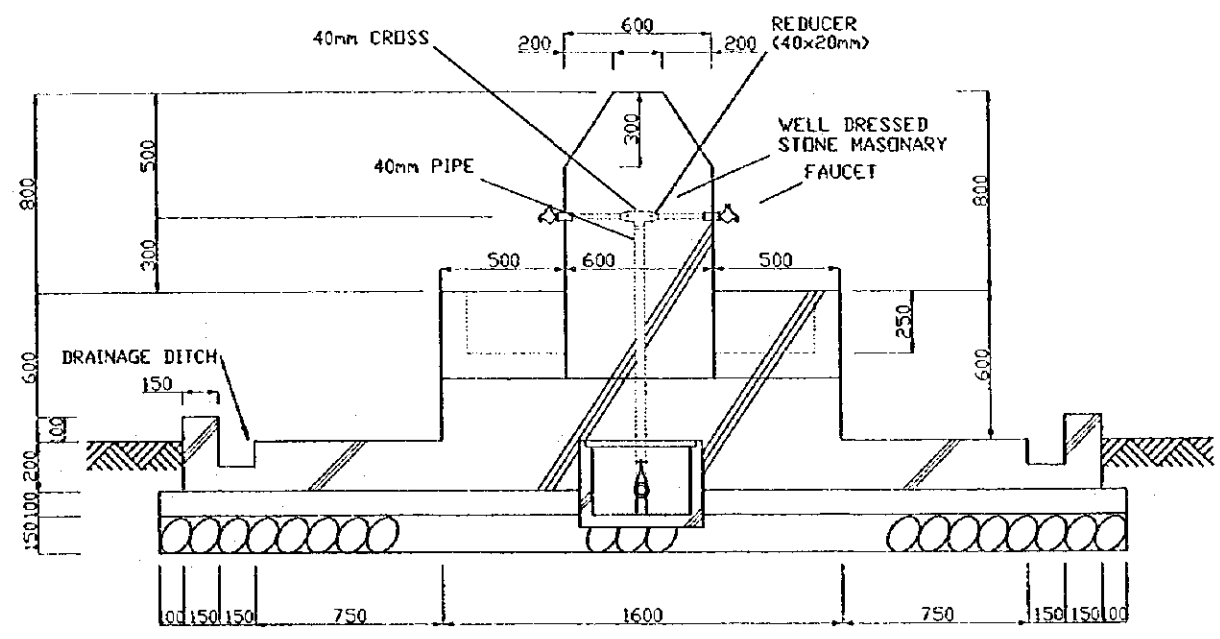
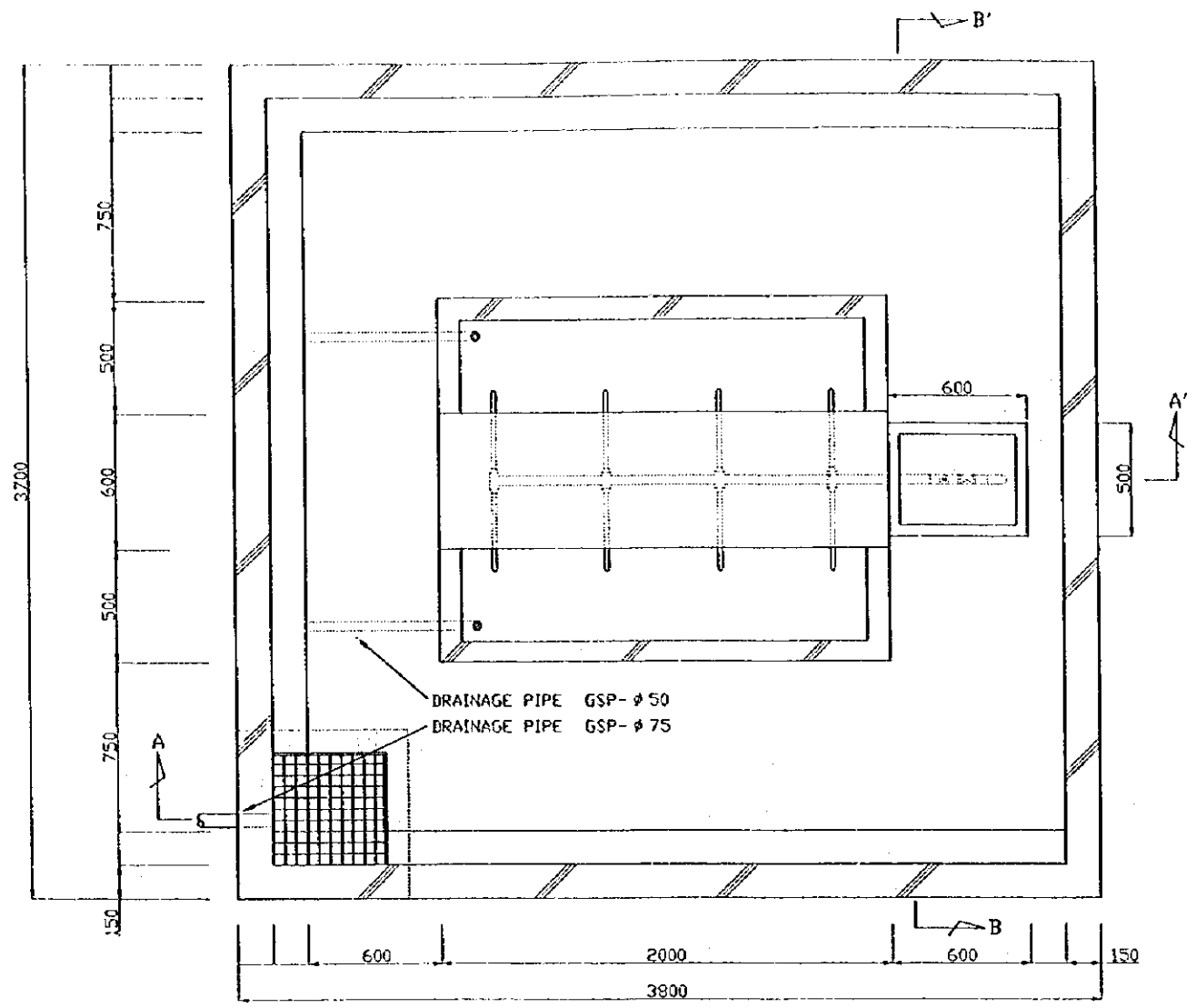
TYPICAL VALVE BOX

WATER RESOURCES DEPARTMENT
SANYU CONSULTANTS INC.
(JAPAN) 1999

Drawing No
10/16



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JAPAN INTERNATIONAL COOPERATION AGENCY	
STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
TYPICAL AIR VALVE AND WASHOUT VALVE	
WATER RESOURCES DEPARTMENT SANYU CONSULTANTS INC. (JAPAN) 1999	Drawing No 11/16



STATE OF ERITREA
 MINISTRY OF LAND, WATER & ENVIRONMENT

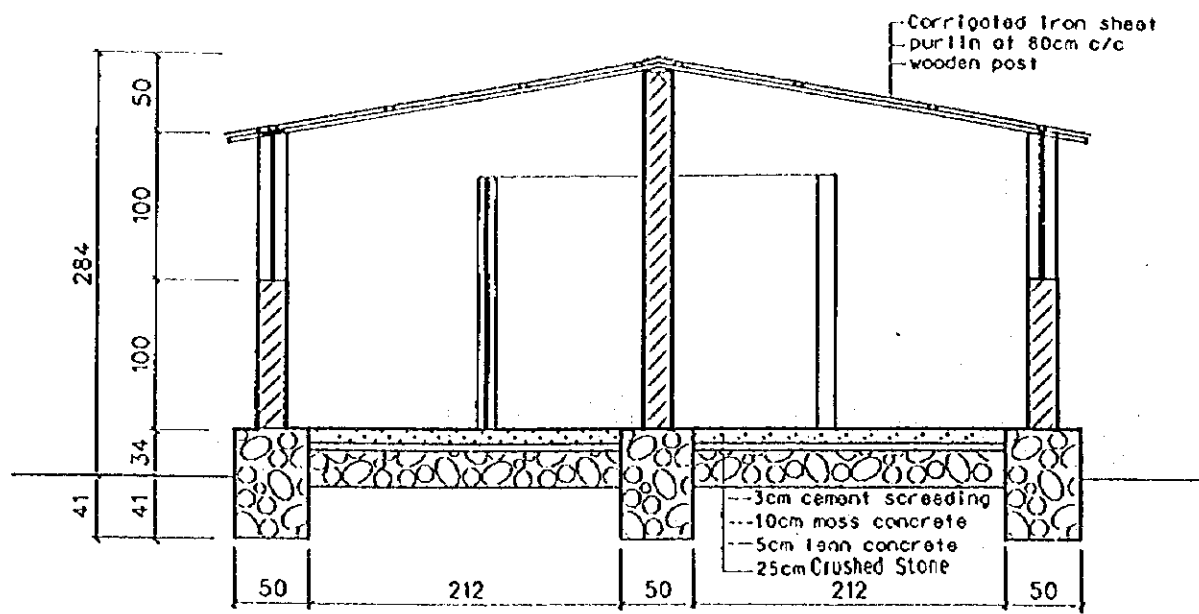
JAPAN INTERNATIONAL COOPERATION AGENCY

STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION

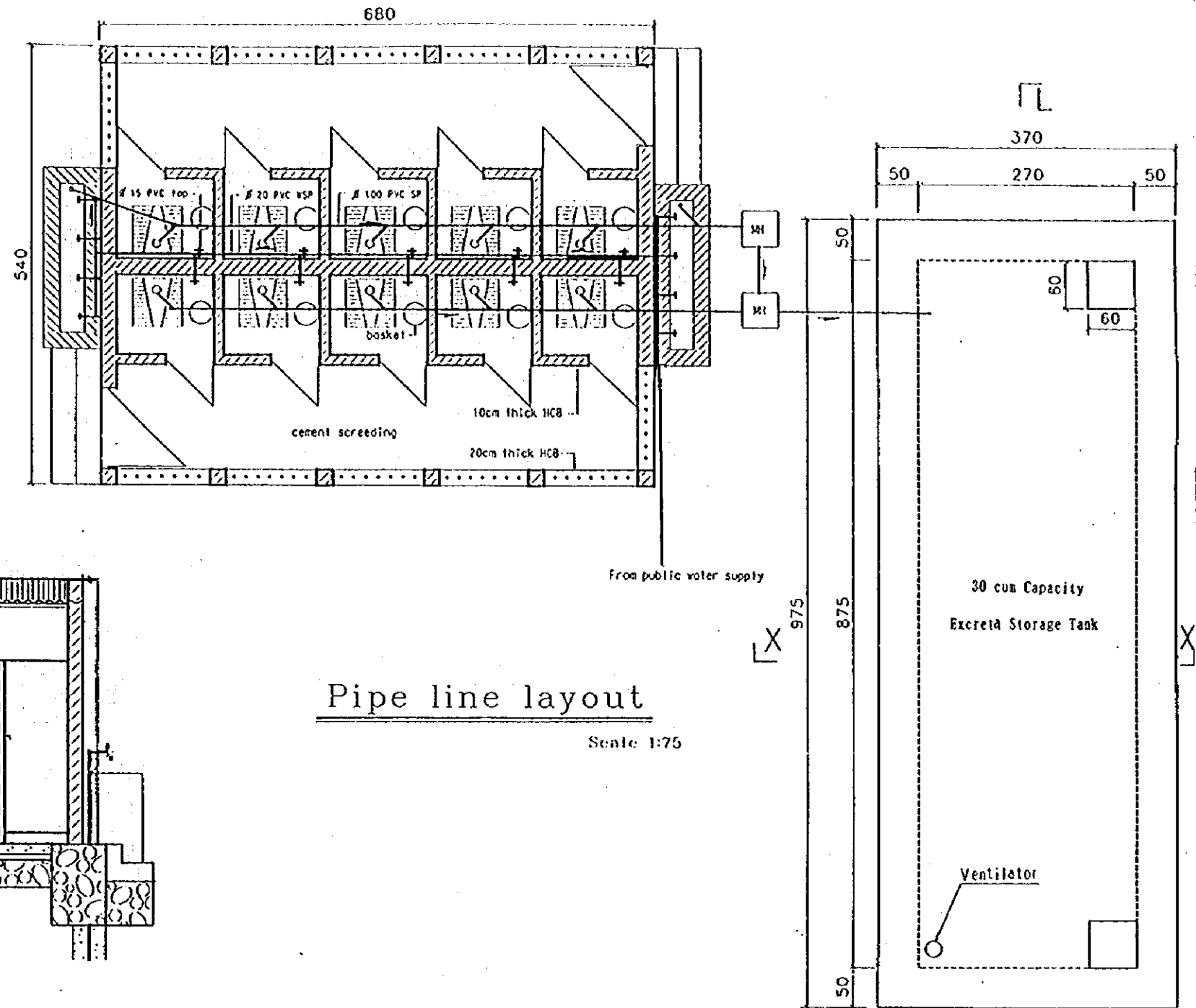
PUBLIC FAUCET

WATER RESOURCES DEPARTMENT SANYU CONSULTANTS INC. (JAPAN) 1999

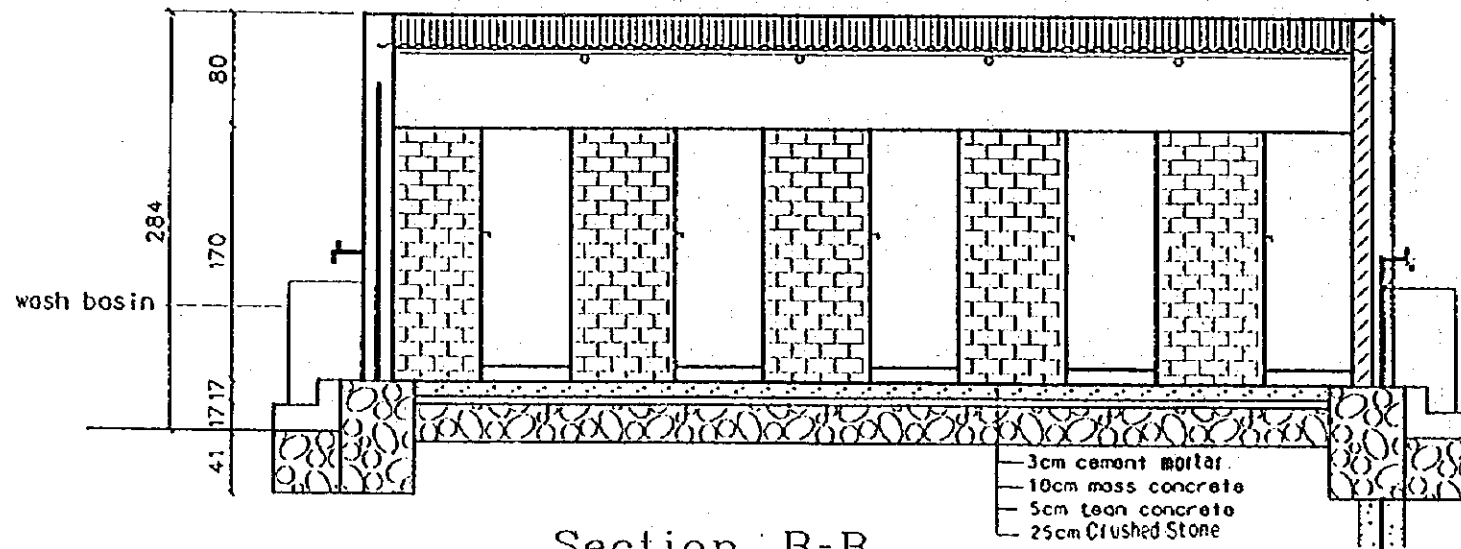
Drawing No 13/16



Section A-A
Scale 1:50

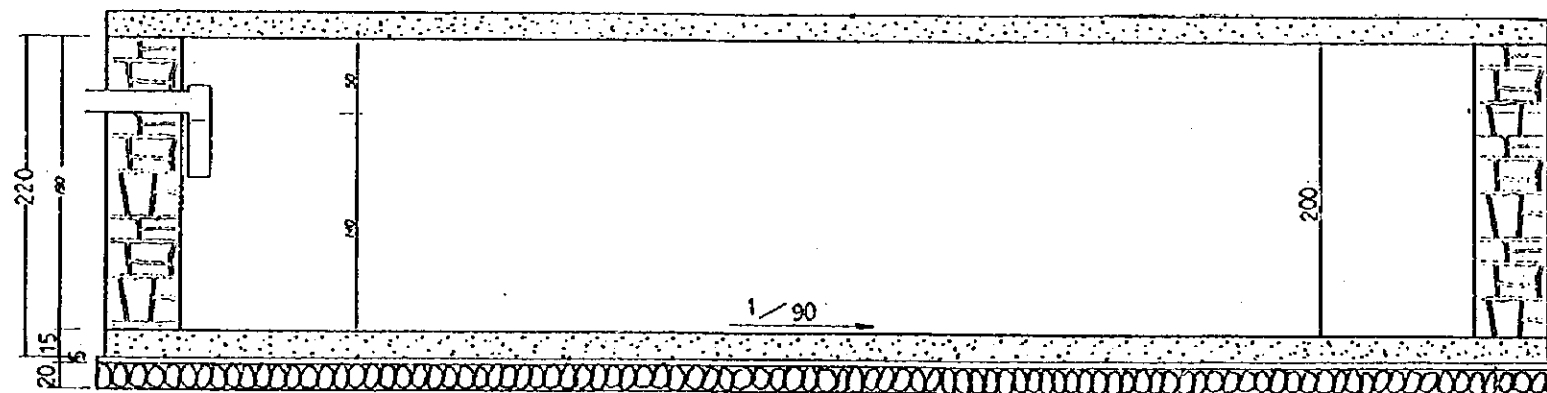


Pipe line layout
Scale 1:75

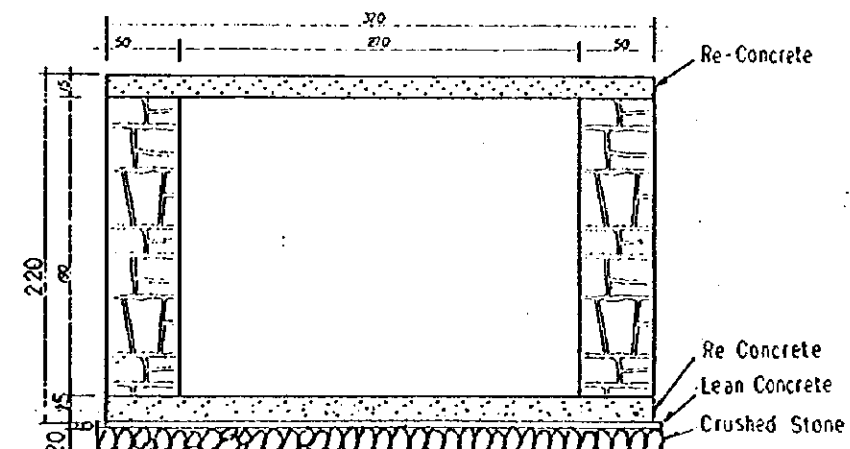


Section B-B
Scale 1:50

30 cum Capacity Excreta Storage Tank



Section L-L



Section X-X

STATE OF ERITREA MINISTRY OF LAND, WATER & ENVIRONMENT	
JAPAN INTERNATIONAL COOPERATION AGENCY	
STUDY ON GROUNDWATER DEVELOPMENT & WATER SUPPLY FOR SEVEN TOWNS IN SOUTHERN REGION	
School Latrine (2/2)	
WATER RESOURCES DEPARTMENT (ASNGARA, ERITREA) BANYU CONSULTANTS INC. (JAPAN) 1999	Drawing No. 15/16

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