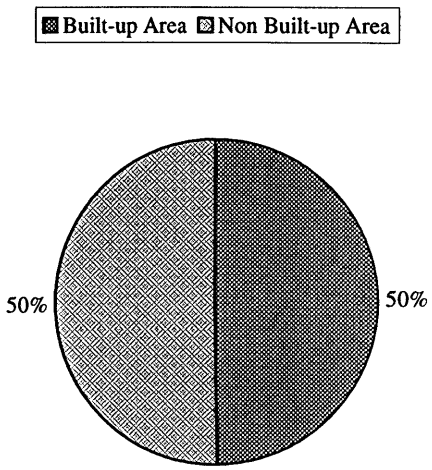
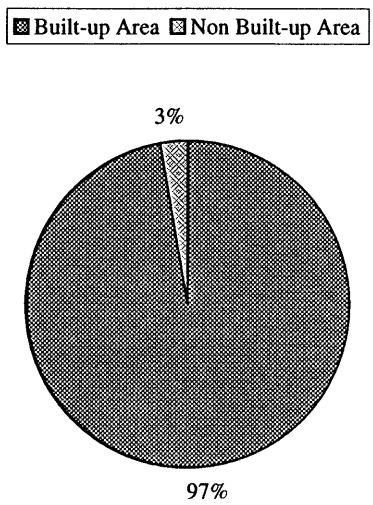
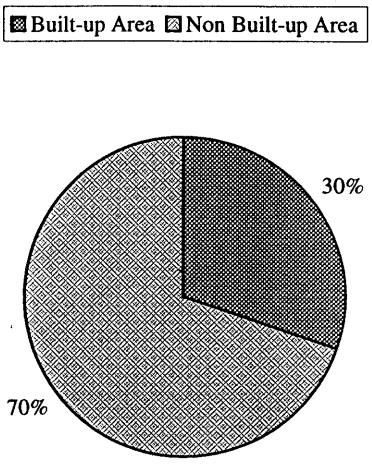
Sg.Petani (Present Land Use)



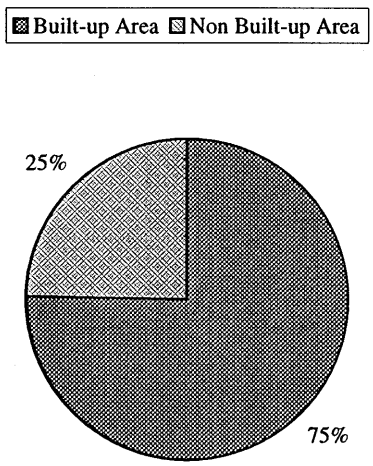
Sg.Petani (Future Land Use)



Melaka (Present Land Use)



Melaka (Future Land Use)



THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	**Fig. 4-2** **Occupancy Rate of Built-up Area in Present and Future Land Use**
JAPAN INTERNATIONAL COOPERATION AGENCY	

Note

Alternative 1: without Detention Pond (D.P), Alternative 2: with D.P in 50 % Coverage, Alternative 3: with D.P in 50 % Coverage & Storage in Public Space (S.P.S) & Storage at House Lot (S.H.L), Alternative 4: with D.P in 80 % Coverage, Alternative 5: with D.P in 80 % Coverage & S.P.S, Alternative 6: with D.P in 80 % Coverage & S.P.S & S.H.L

Qpresent: Peak Discharge of Sub-basin under Present Conditions in 1998, Qdesign: Peak Discharge of Sub-basin under Future Conditions in 2020

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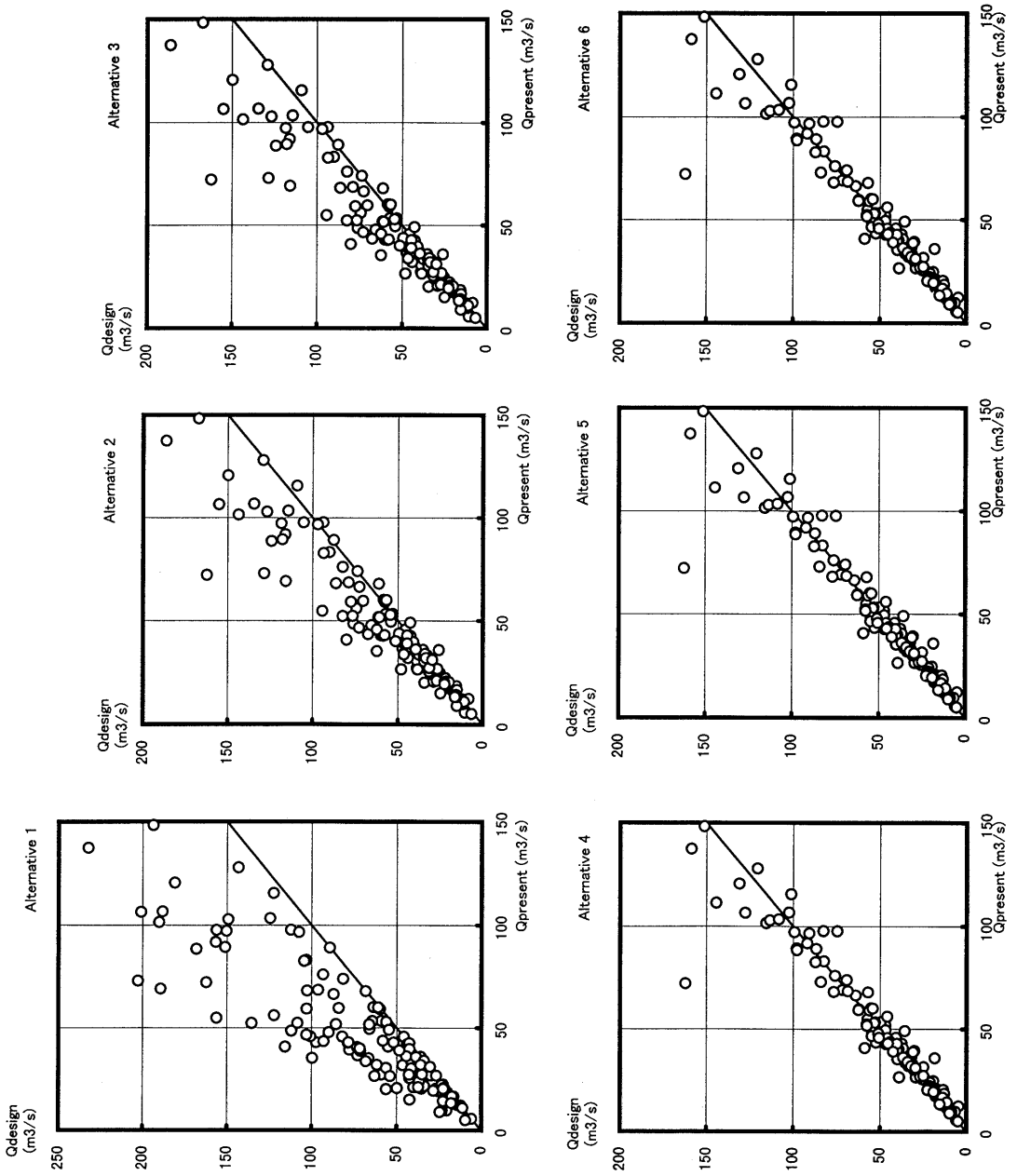
Fig. 4-3
Comparison of Flood Control Effects among Alternatives in 5-year Flood



Note

Alternative 1: without Detention Pond (D.P), Alternative 2: with D.P in 50 % Coverage, Alternative 3: with D.P in 50 % Coverage & Storage in Public Space (S.P.S) & Storage at House Lot (S.H.L), Alternative 4: with D.P in 80 % Coverage, Alternative 5: with D.P in 80 % Coverage & S.P.S, Alternative 6: with D.P in 80 % Coverage & S.P.S & S.H.L

Qpresent: Peak Discharge of Sub-basin under Present Conditions in 1998, Qdesign: Peak Discharge of Sub-basin under Future Conditions in 2020

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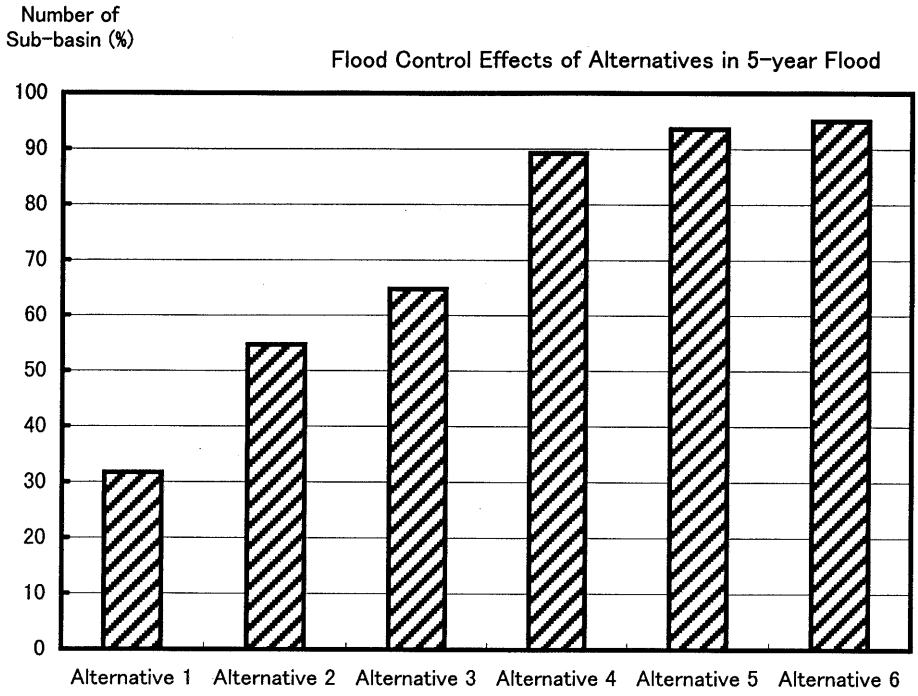
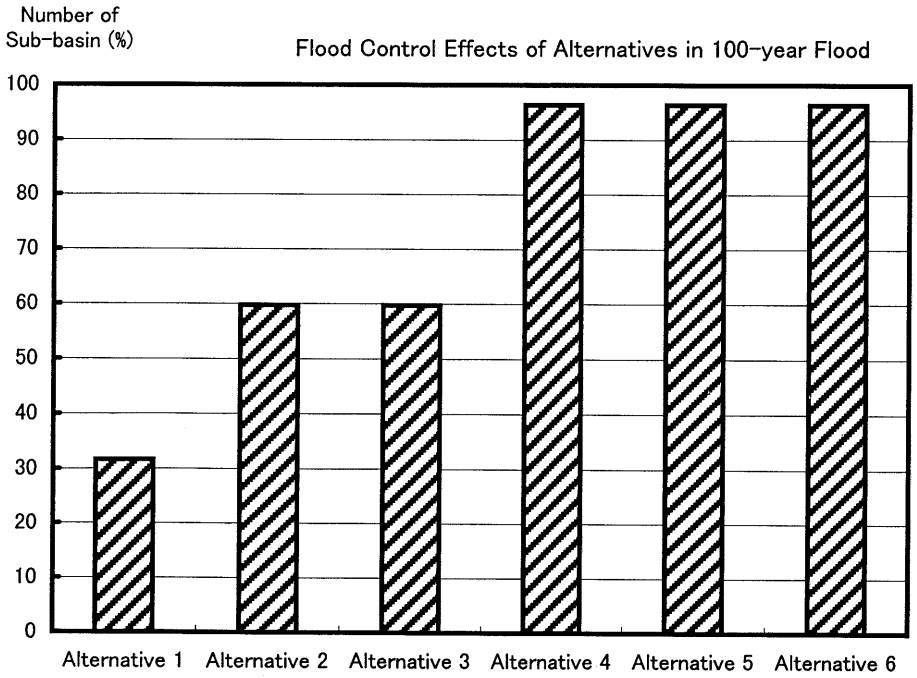
Fig. 4-4
Comparison of Flood Control Effects among Alternatives in 100-year Flood

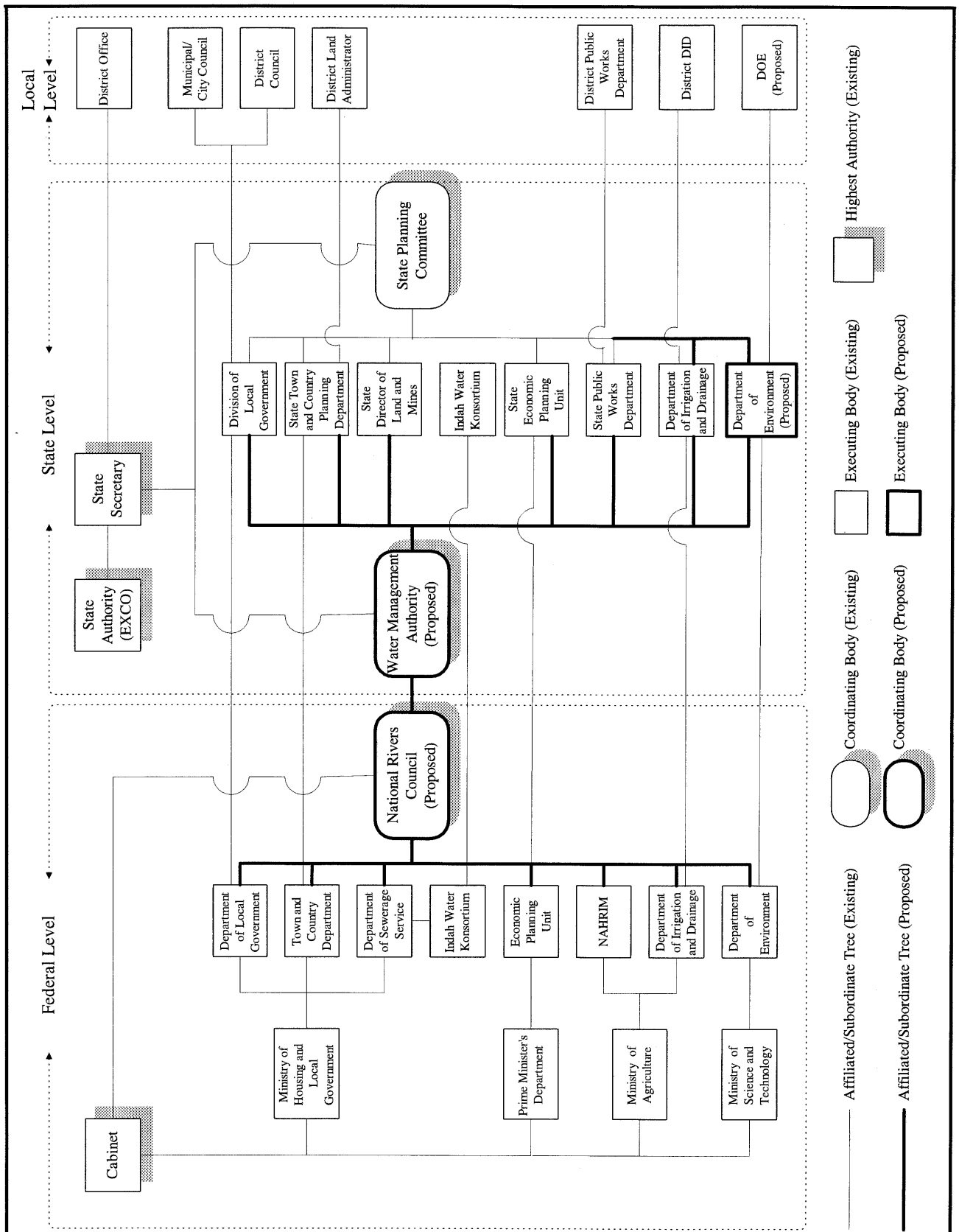




Note 1. Alternative 1: without Detention Pond (D.P), Alternative 2: with D.P in 50 % Coverage, Alternative 3: with D.P in 50 % Coverage & Storage in Public Space (S.P.S)& Storage at House Lot (S.H.L), Alternative 4: with D.P in 80 % Coverage, Alternative 5: with D.P in 80 % Coverage & S.P.S, Alternative 6: with D.P in 80 % Coverage & S.P.S & S.H.L

2. The axis of ordinates indicates the number of sub-basin in percentage of which peak discharge under future conditions in 2020 is regulated nearly equal to or below peak discharge under present conditions in 1998.

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. 4-5** **Flood Control Effects of Alternatives**



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FOR MELAKA AND SUNGAI PETANI IN MALAYSIA

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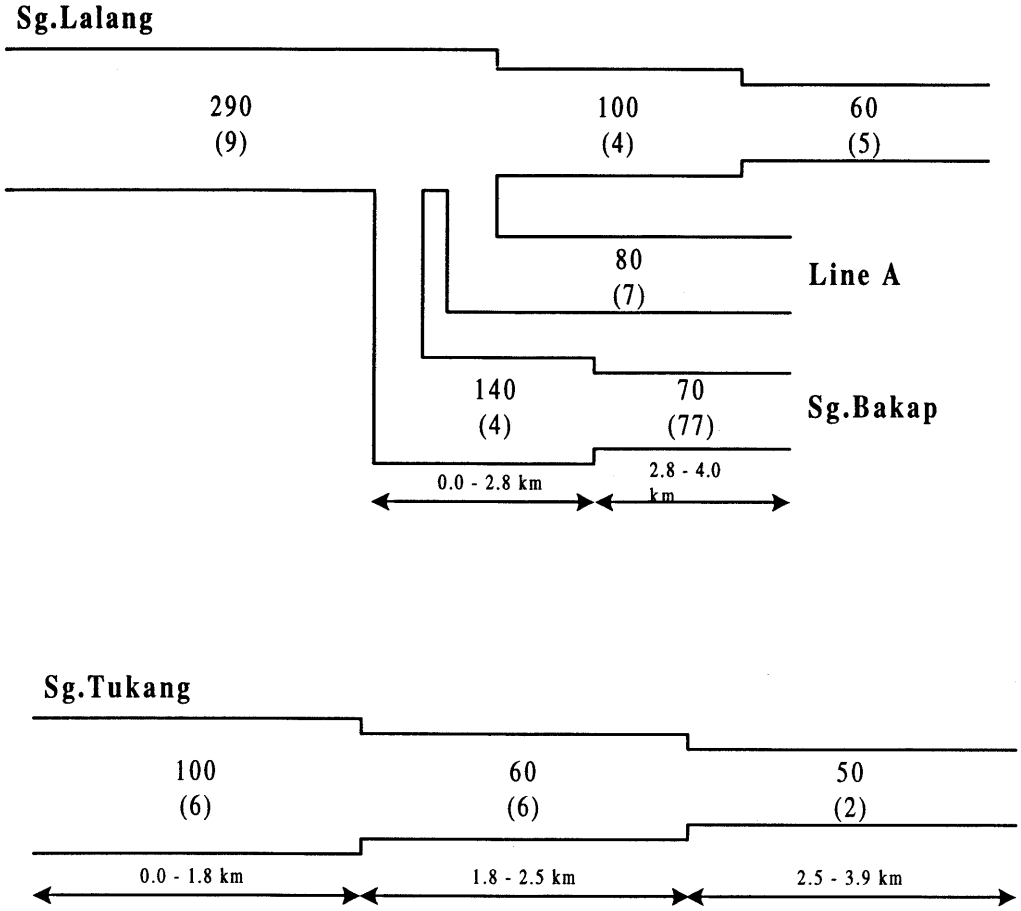
Fig. 4-6
Proposed Institutional Organization Setup for Integrated Urban Drainage Improvement

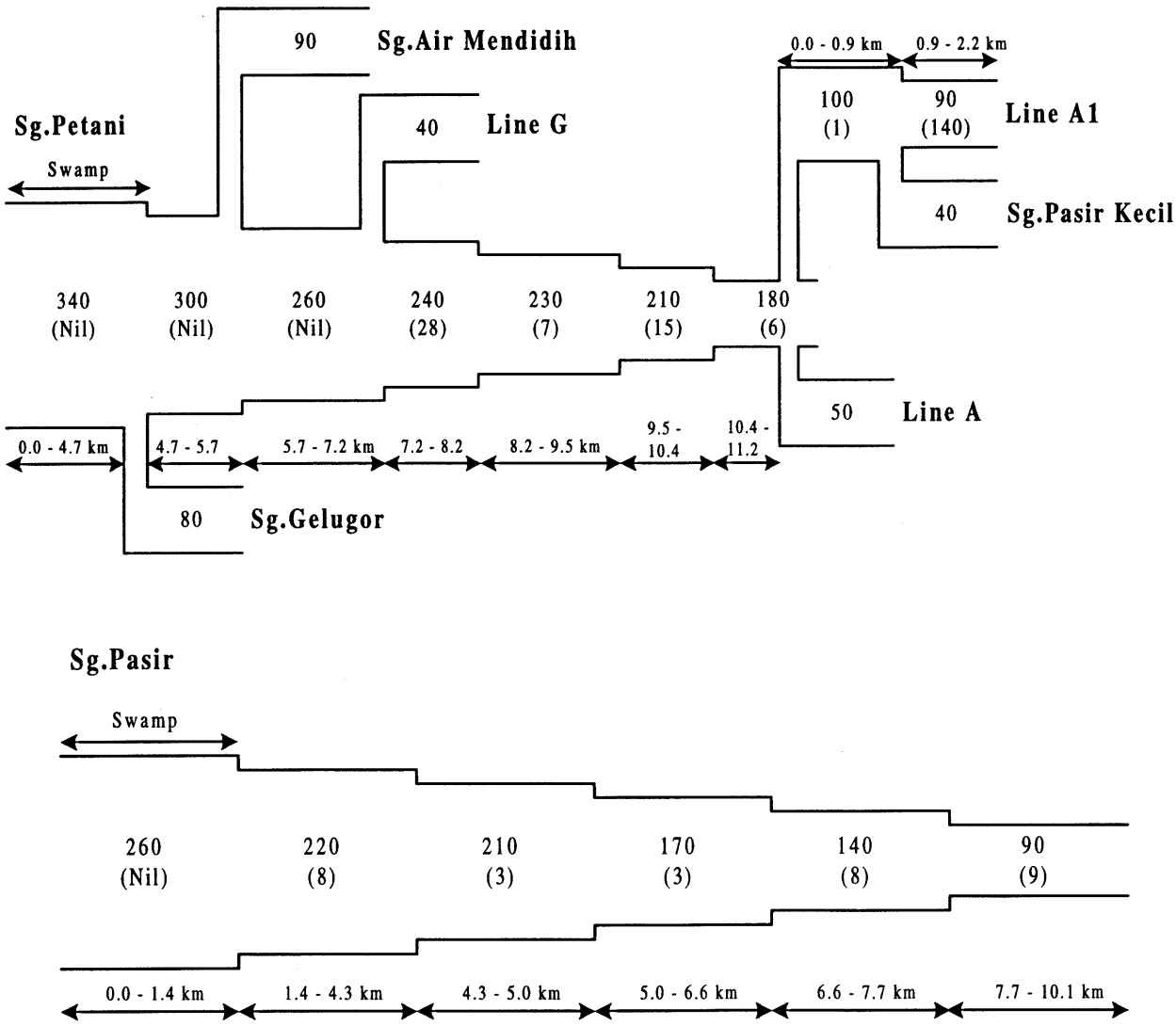


Note:

(1) Figures out of parenthesis are the standard design discharge of 100 year return period. The standard design discharge is herein defied as the target maximum design discharge for river channel improvement, which could be reduced by the regulation effect of flood storage facilities such as retarding basin and flood control dam.

(2) Figures in parenthesis are the present channel flow capacity.

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	Fig. 4-7(1/4) **Standard Design Flood and Present River Flow Capacity**
JAPAN INTERNATIONAL COOPERATION AGENCY	**(Sg. Lalang, Sg. Tukang)**

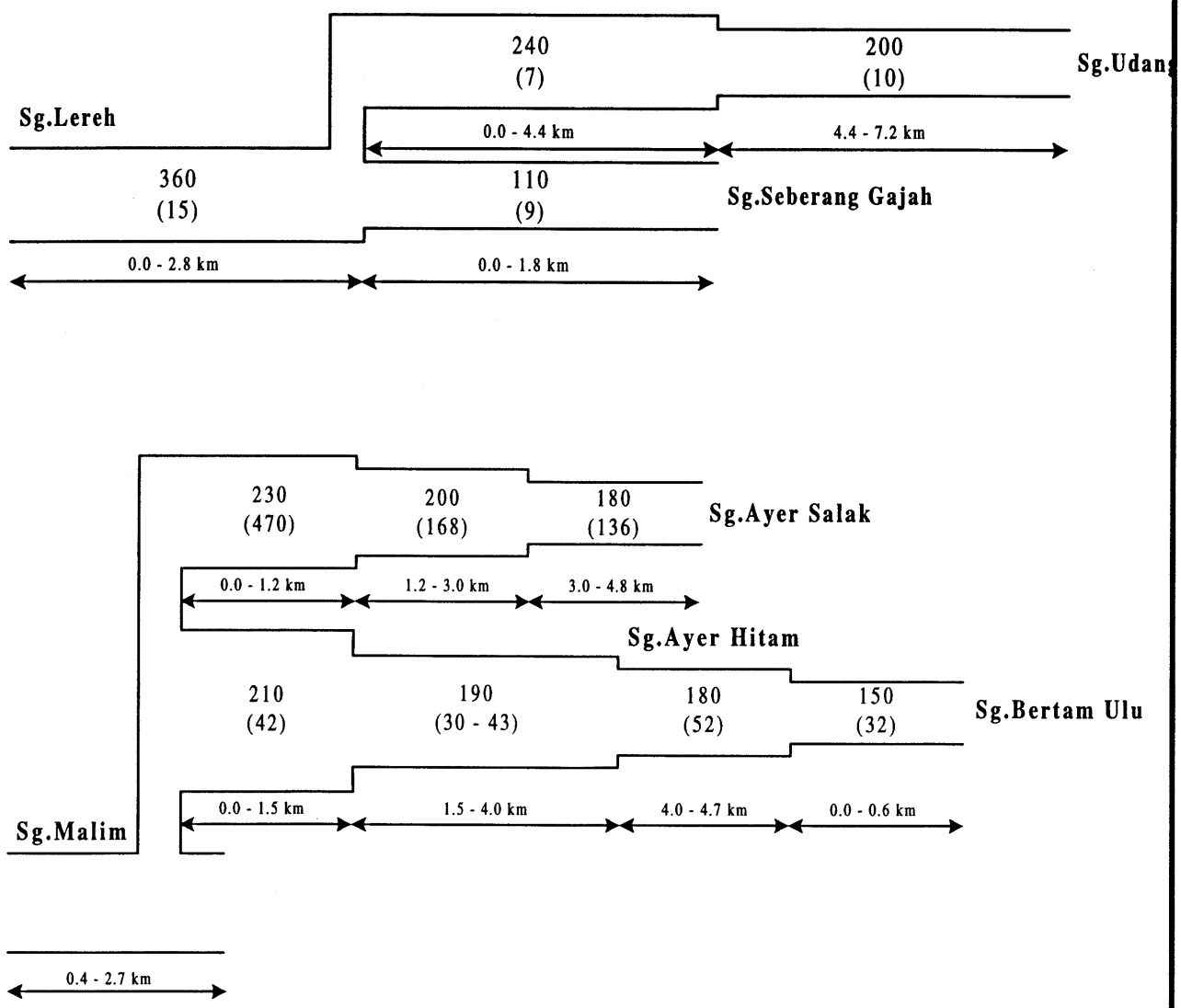


Note:

(1) Figures out of parenthesis are the standard design discharge of 100 year return period. The standard design discharge is herein defied as the target maximum design discharge for river channel improvement, which could be reduced by the regulation effect of flood storage facilities such as retarding basin and flood control dam.

(2) Figures in parenthesis are the present channel flow capacity.

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	Fig. 4-7(2/4) **Standard Design Flood and Present River Flow Capacity (Sg. Petani, Sg. Pasir)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

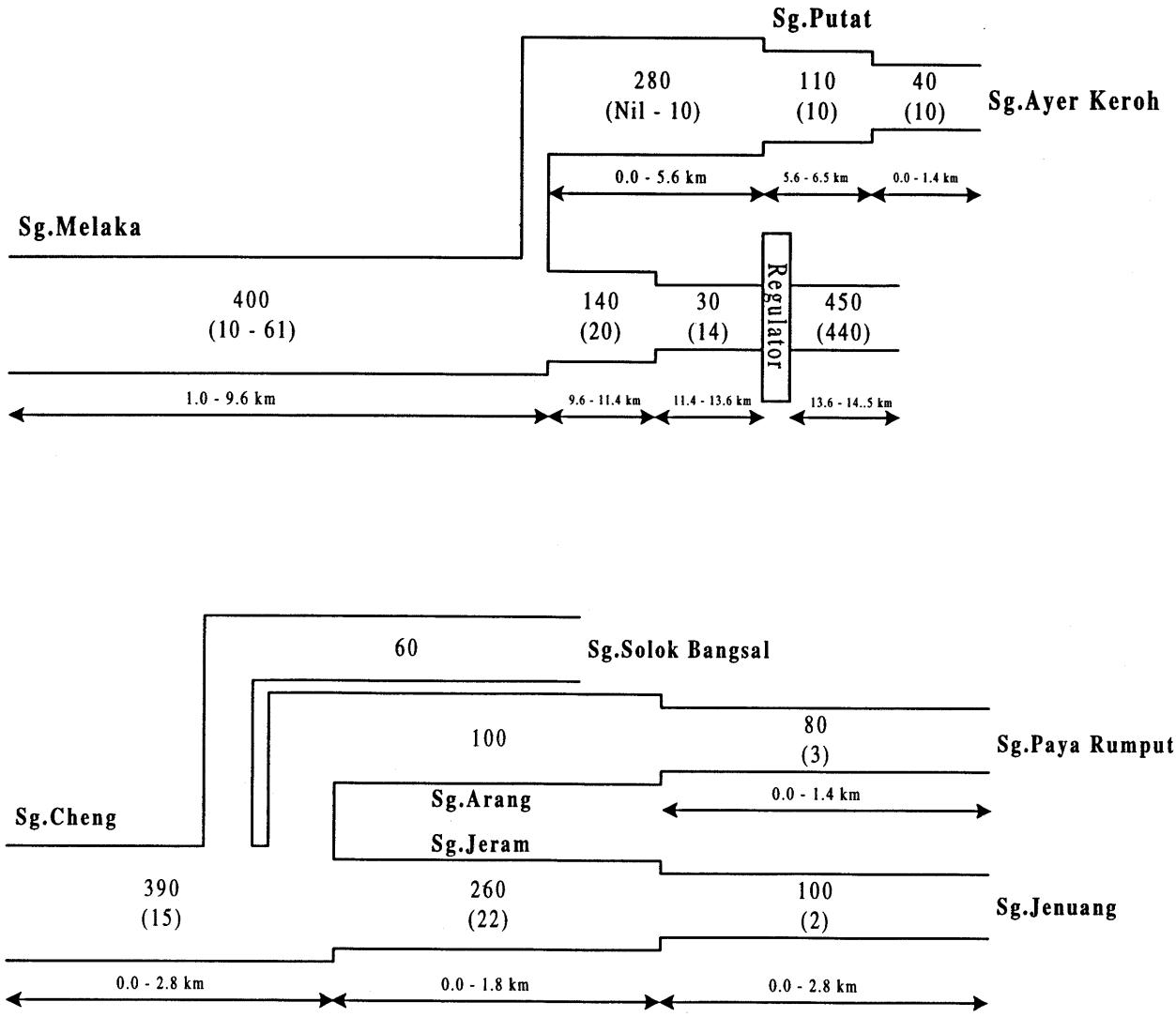


Note:

(1) Figures out of parenthesis are the standard design discharge of 100 year return period. The standard design discharge is herein defied as the target maximum design discharge for river channel improvement, which could be reduced by the regulation effect of flood storage facilities such as retarding basin and flood control dam.

(2) Figures in parenthesis are the present channel flow capacity.

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	Fig. 4-7(3/4) **Standard Design Flood and Present River Flow Capacity**
JAPAN INTERNATIONAL COOPERATION AGENCY	**(Sg. Lereh, Sg. Malim)**

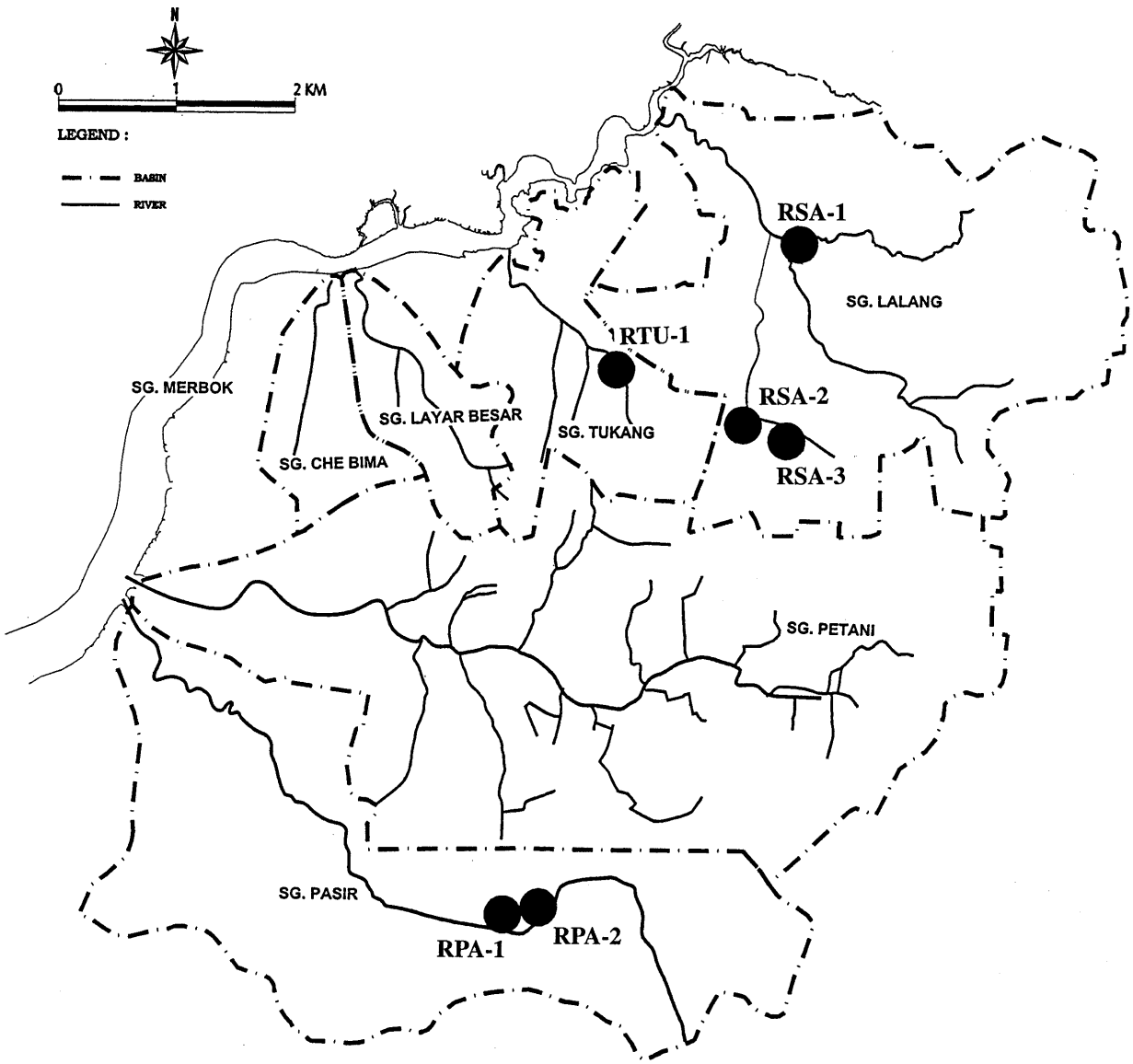


Note:

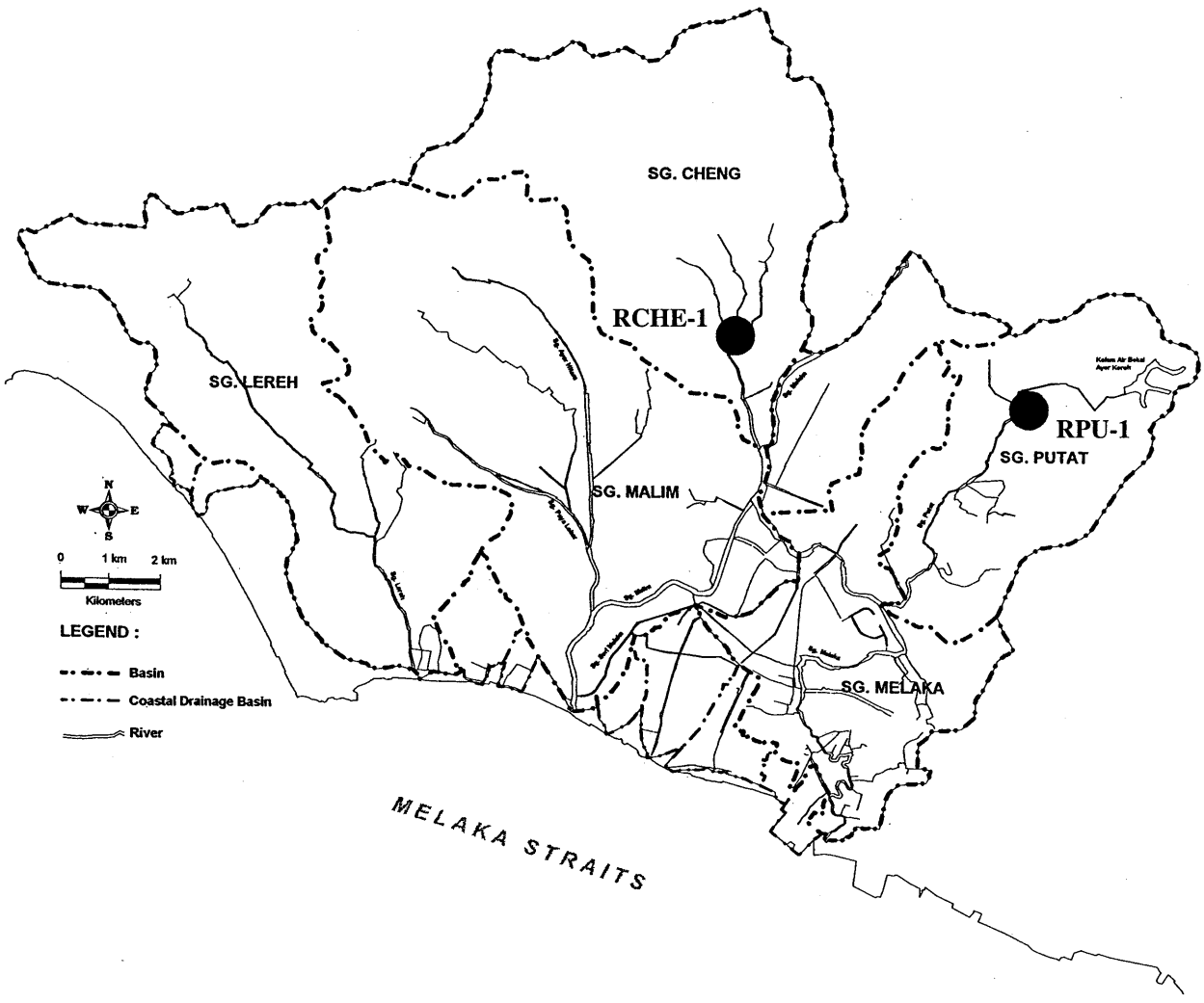
(1) Figures out of parenthesis are the standard design discharge of 100 year return period. The standard design discharge is herein defied as the target maximum design discharge for river channel improvement, which could be reduced by the regulation effect of flood storage facilities such as retarding basin and flood control dam.

(2) Figures in parenthesis are the present channel flow capacity.

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	Fig. 4-7(4/4) **Standard Design Flood and Present River Flow Capacity (Sg. Melaka, Sg. Cheng)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-8(1/2) **Possible Site for Flood Retarding Basin (Sungai Petani)**

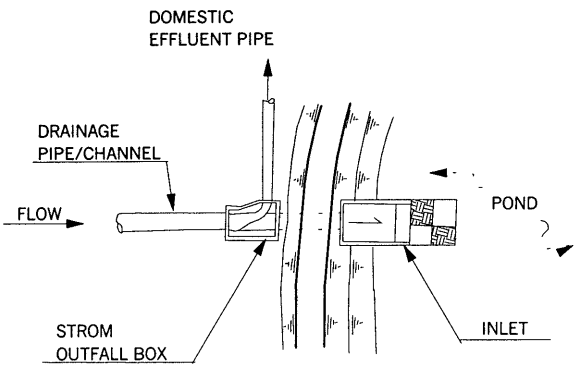


● : Identified site as retarding basin

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA	Fig. 4-8(2/2) **Possible Site for Flood Retarding Basin (Melaka)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

STORM OUTFALL BOX

GENERAL PLAN



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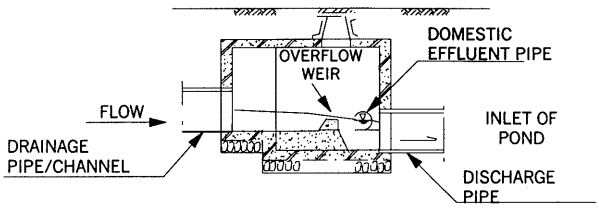
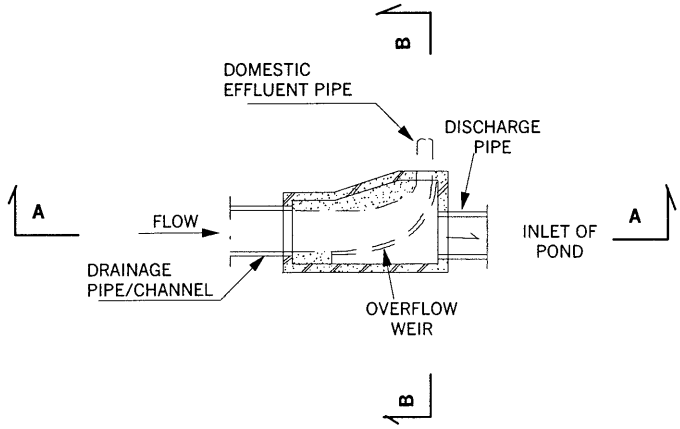
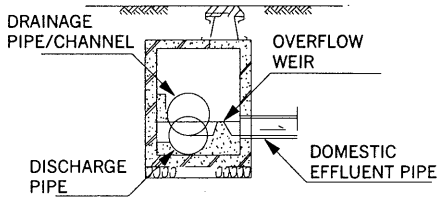


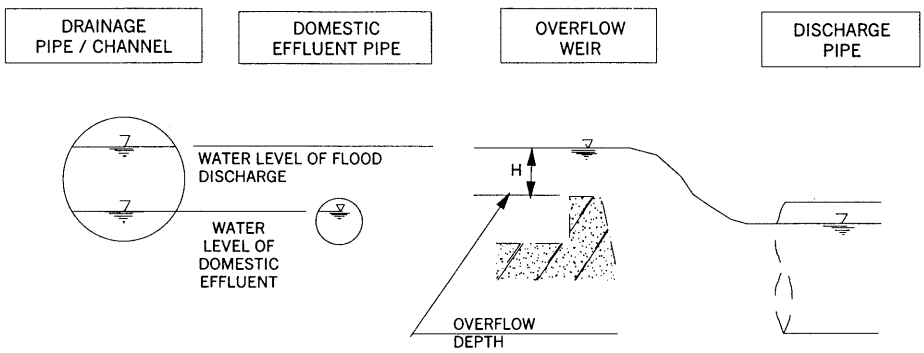
PLAN OF STORM OUTFALL BOX



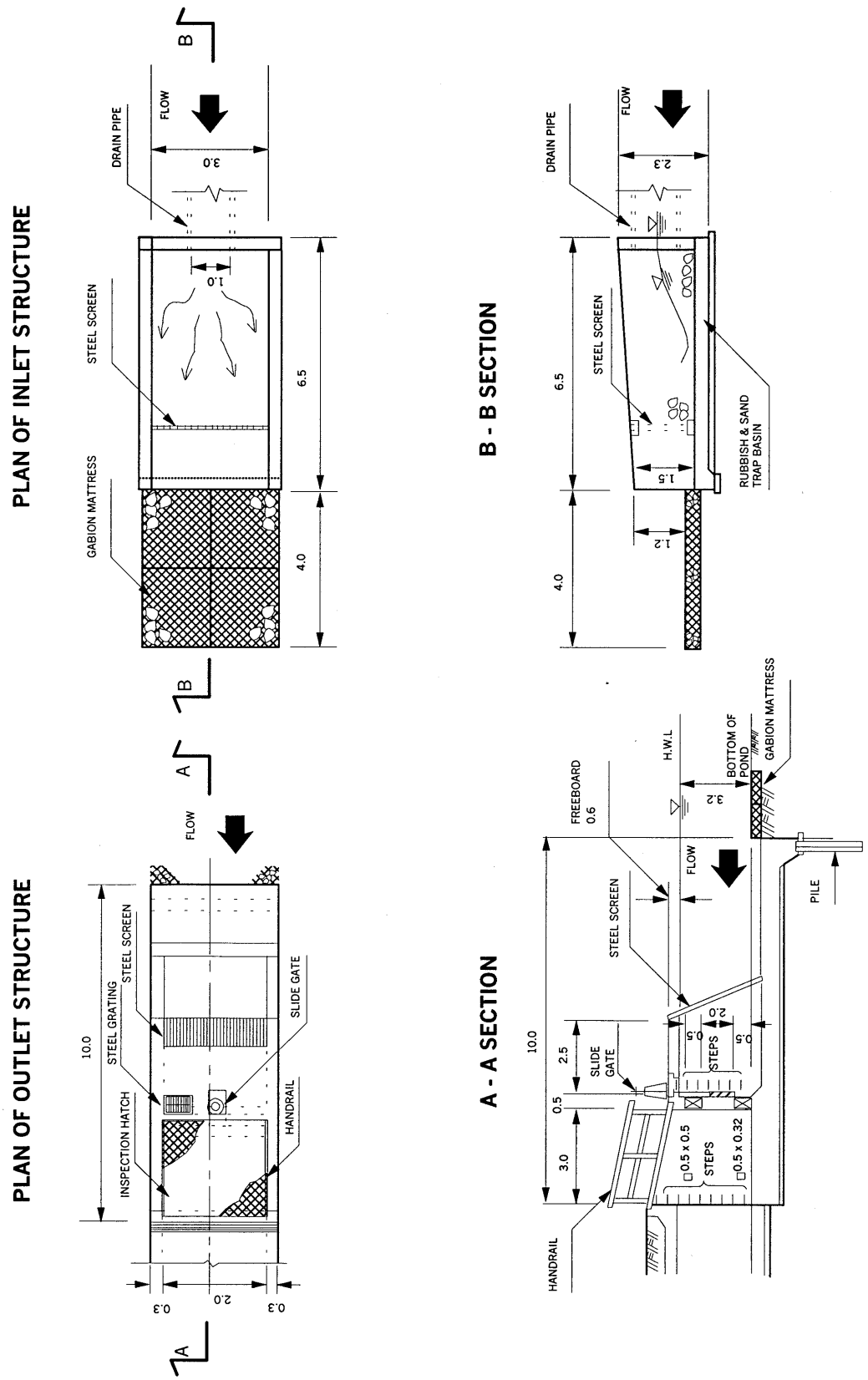
B - B SECTION



STRUCTURAL CONDITION OF STORM OUTFALL

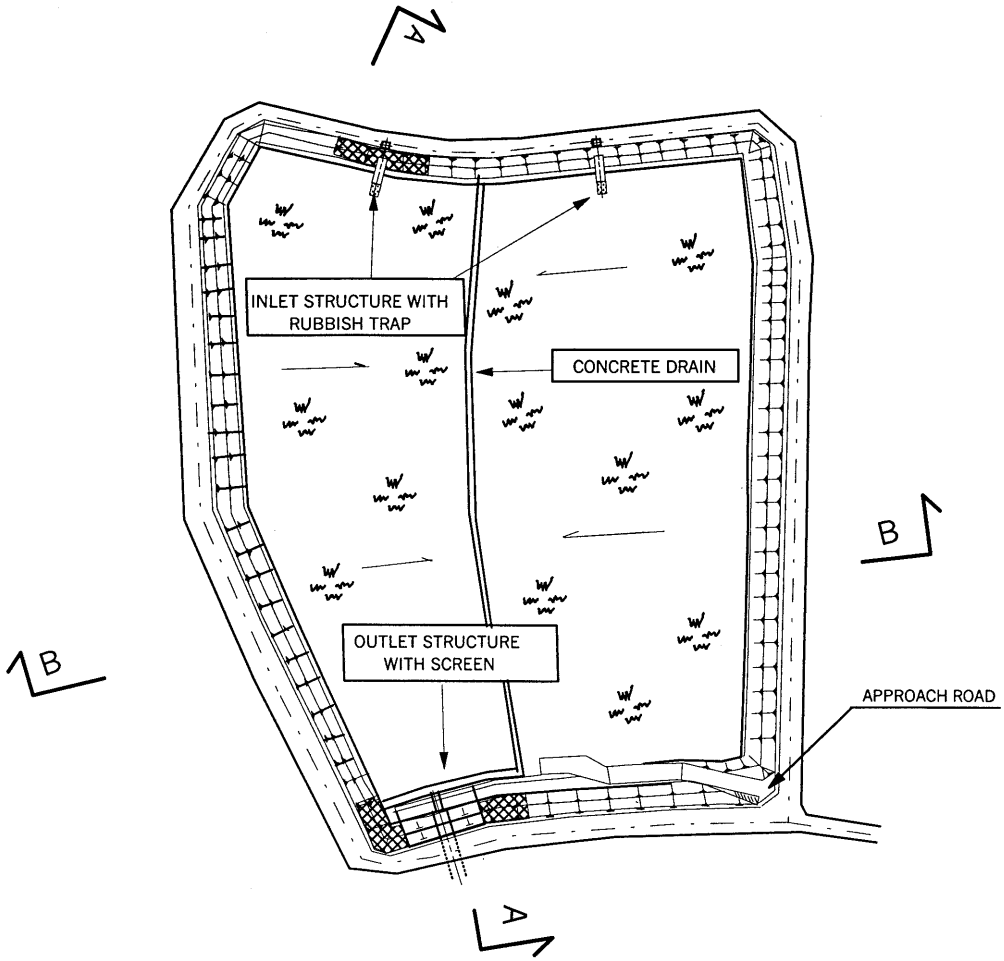


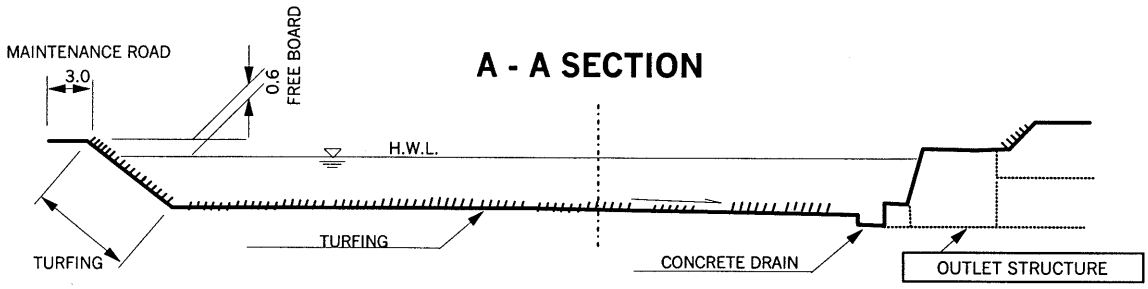
THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-9 **Outline of Storm Outfall Structure**



THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-10 **Typical In / Outlet Structures for Detention Pond**

PLAN OF DETENTION POND





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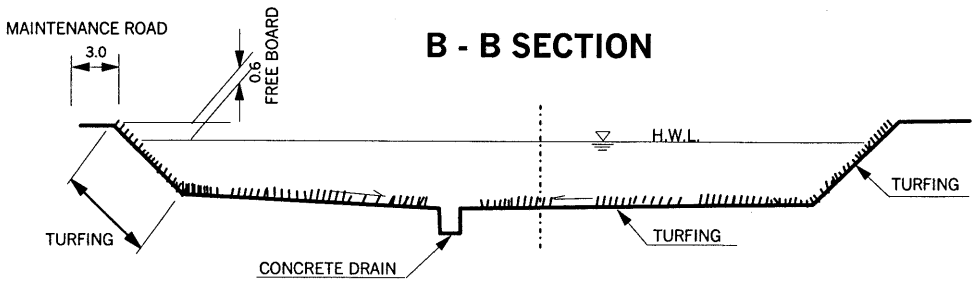
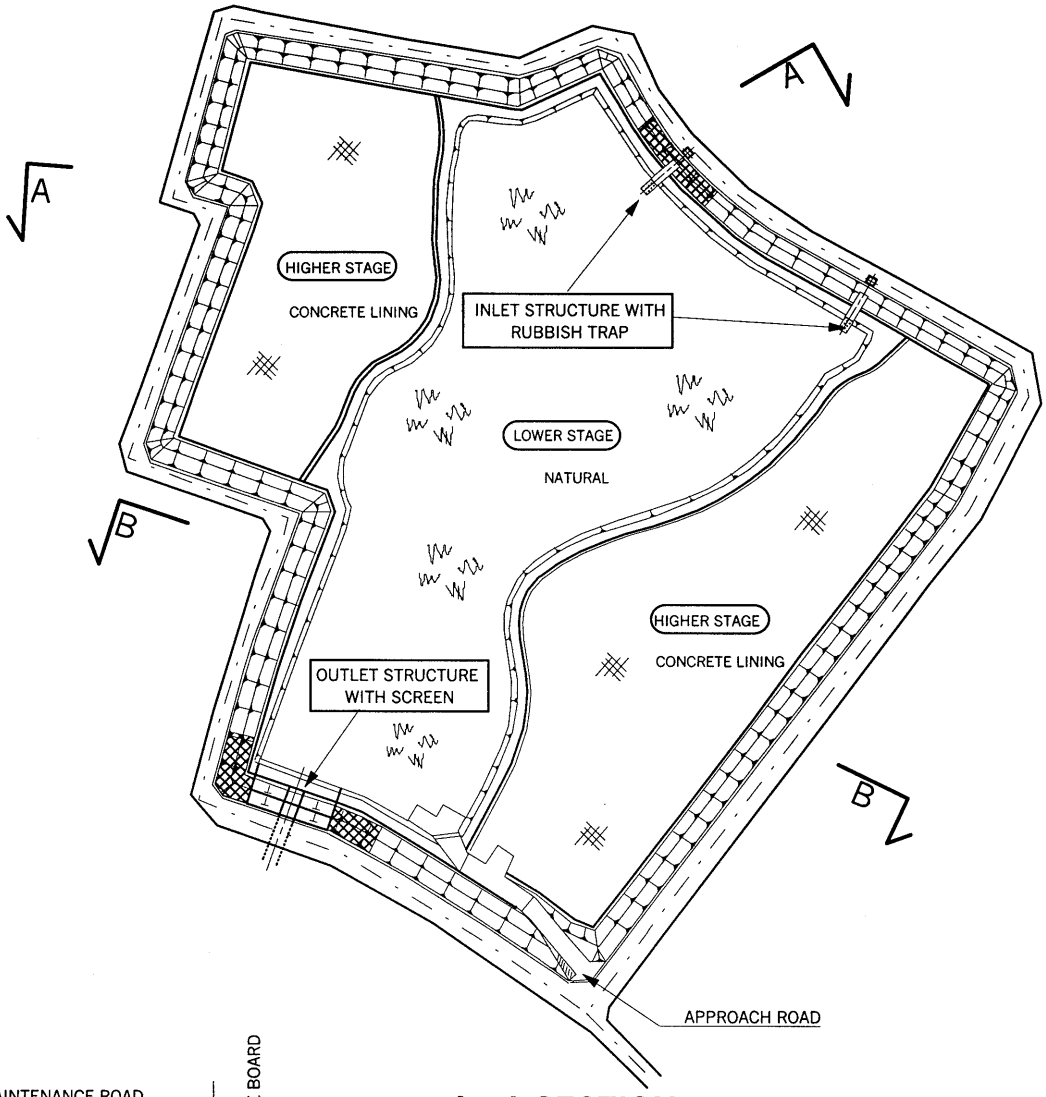


B - B SECTION

THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-11 General Layout of Dry Pond

PLAN OF DETENTION POND



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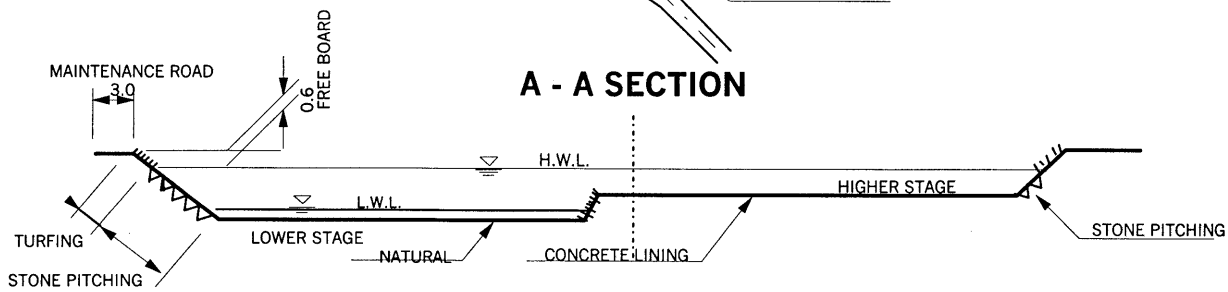

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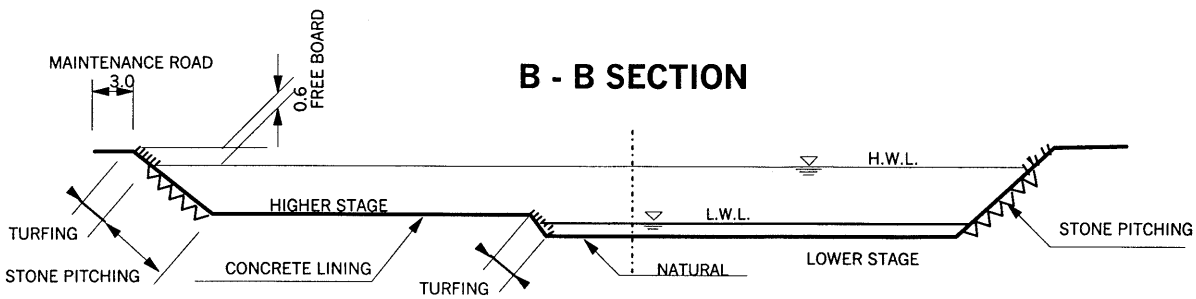

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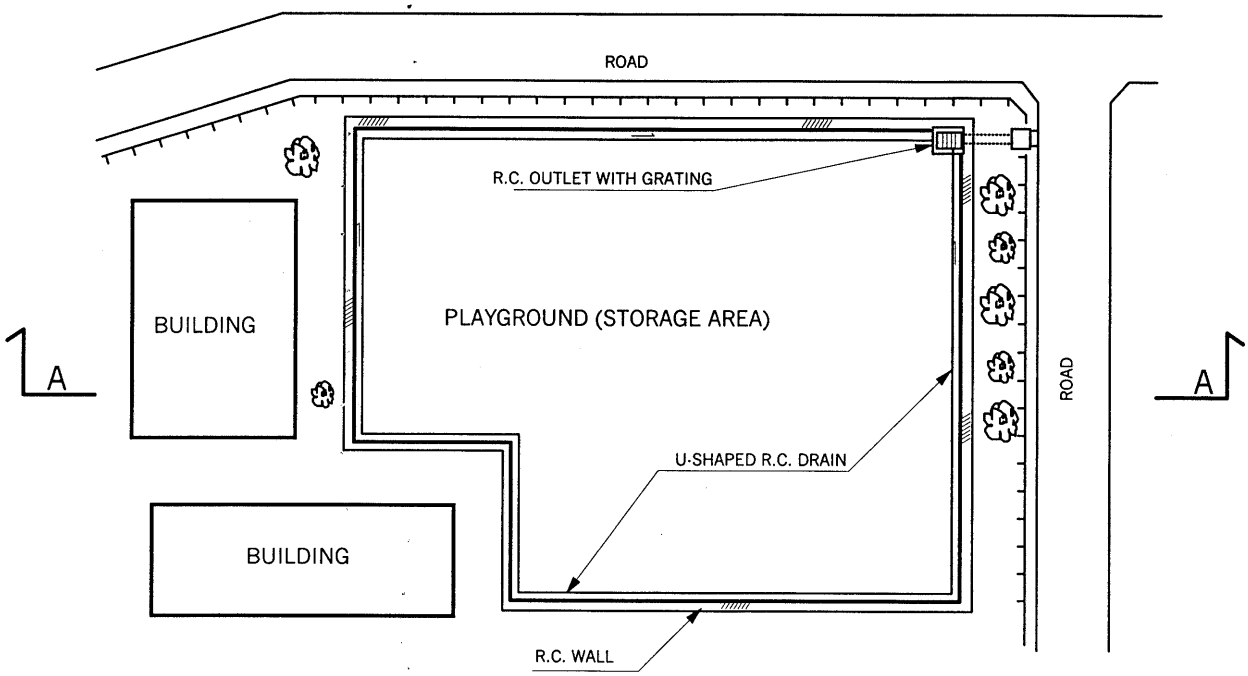
Fig. 4-12
General Layout of Wet Pond with Amenity Space

PLAN OF STORAGE IN PUBLIC SPACE



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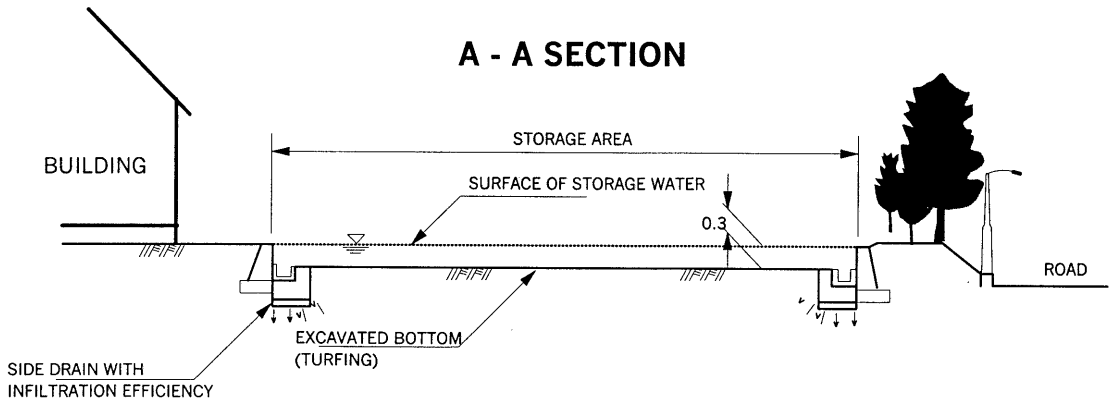
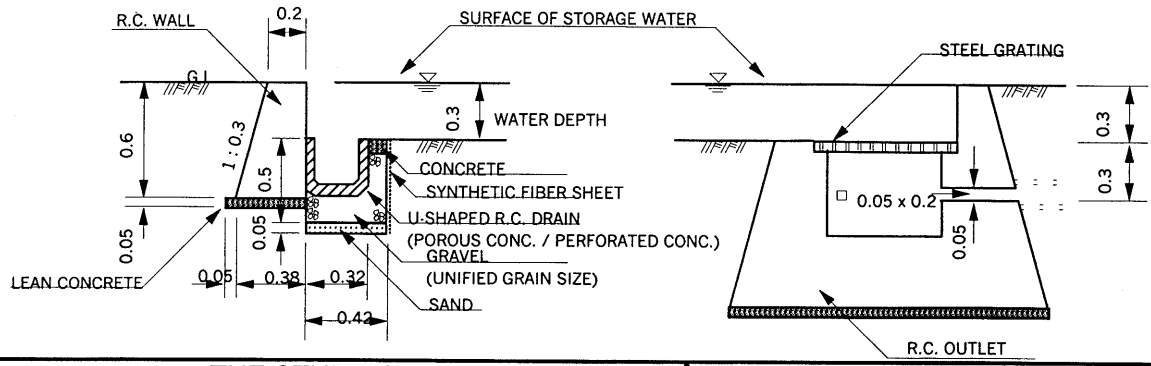
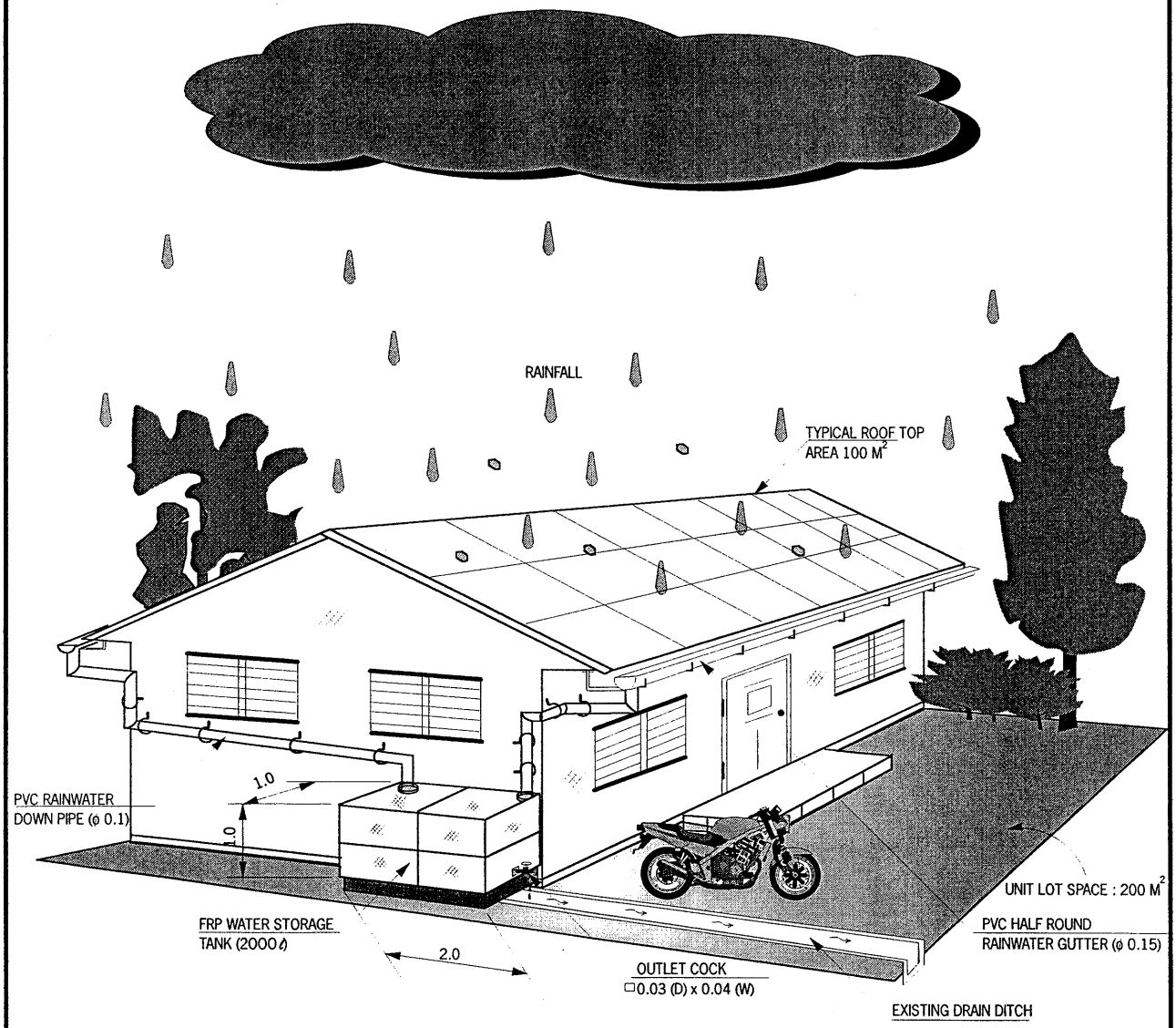


TYPICAL SECTIONS OF R.C. WALL W/ DRAIN AND R.C. OUTLET



THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-13 General Layout of Storage System in Public Open Space



THE STUDY ON INTEGRATED URBAN DRAINAGE IMPROVEMENT FOR MELAKA AND SUNGAI PETANI IN MALAYSIA JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 4-14 General Layout of Storage Tank in a House Lot