(6) Construction Schedule

1) Content of Works

Project of South Bali Area Water Supply Project consists of 3 systems which is shown in the Table-K.34. Contents of work consist of the construction of intake facility and water treatment plant and water pipe construction. (Central system is none water pipe.)

Table-K.34 Contents of Works for South Bali Area Water Supply Project

Facility Name	Intake River	Content of Works	Remark
West System	Penet river	1.New Water Treatment Facilities (300 liter/sec)	
		2.Waterline Pipeφ600 8.8 km	
East System	Petanu River	1.New Water Treatment Facilities (300 liter/sec)	
		2.Waterline Pipeφ600 31.0 km	
Central system	Ayung River	1.New Water Treatment Facilities (1800 liter/sec)	・Existing Water Treatment Plant
		2.Waterline Pipe non	・Capacity: 1000 liter/sec

2) Construction Site

Work contents of South Bali Area Water Supply Project or South Bali Area is shown to Table-K.35 and construction site is shown in Figure-K.3 to Figure-K.5.

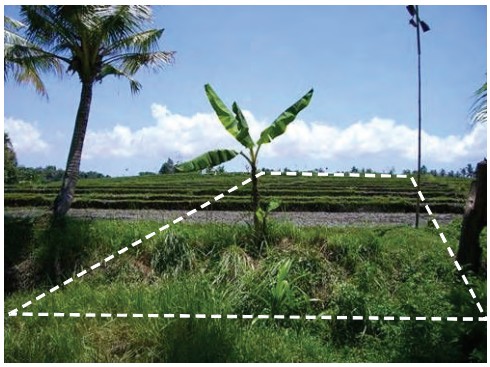
Table-K.35 Construction Site of each Water Treatment Plant System

Facility Name	Construction Site	Site Area
West System	The Facility is located on the left side on the upper reach from the mouth of Penet River about 2km.	About 5,000m^2
East System	The Facility is located on the right side on the upper reach from the mouth of Petanu River about 1km.	About 5,000m^2
Central system	The Facility adjoins existing Ayung Water Treatment Plant on the upper reach from the Mouth of Ayung River about 10km, and it is located in the right bank side .	About 30,000m^2

West System (River Penet Water Treatment Plant)

Outline of Work

1 Water Treatment Plant (300 liter/s)
2 Distribution Pipe φ 600 8.8km



Site for New Water Treatment Plant (Penet River)

Surrounding Landuse (Terraced Rice field)

Figure-K.3 Outline of West System and Site

Central System (River Ayung) Water Treatment Plant

Outline of Work

1 Water Treatment Plant (1800 liter/s)

Existing Water Treatment Plant (1000 liter/s)

Existent Facilities

Site for New Water Treatment Plant (Ayung River)

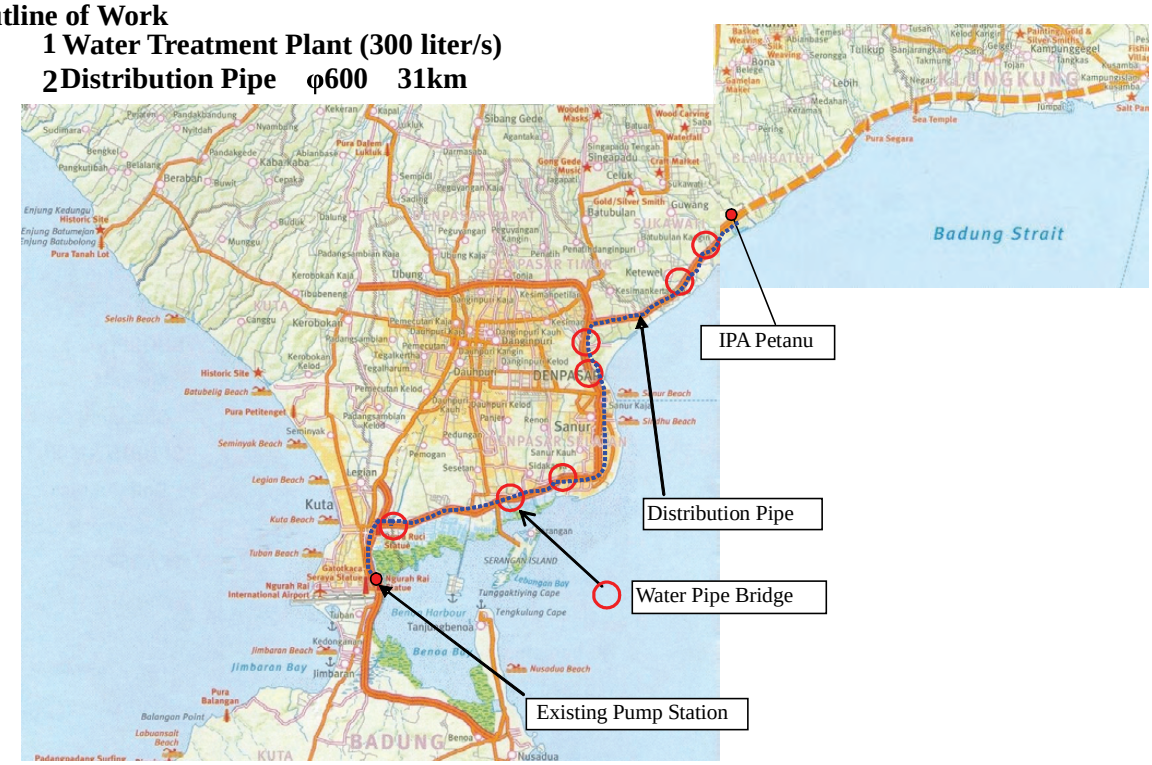
Figure-K.4 Outline of Central System and Site

East System (River Petanu Water Treatment Plant)

Outline of Work

1 Water Treatment Plant (300 liter/s)

2 Distribution Pipe φ600 31km



Distribution Pipe Rout
(Sanur Kusumba Bypass)

Site for New Water Treatment Plant
(Petanu River)

Figure-K.5 Outline of East System and Site

3) Construction Method

Construction method is shown in the Table-K.36.

Table-K.36 Construction Method of Main Facility

Facility	Construction Method or Construction Sequence	Remark
1) Intake Weir	・ Because it becomes work inside the river, it is done in dry season (in May, - October). ・ Execution is done with method of the half-river deadline.	Intake weir of the central system should be constructed in the final scale (1.8m ^{3}/s).
2) Water Treatment Plant	・ It is planned by a grade-like execution along water-demand. ・Western system does for 1 year and eastern system does for 2-3 years next. ・As for the central system of big capacity(1800 liters/sec), it is divided in the facility of the water ability of 600 lit./sec, and constructed.	
3) Water Pipe	・Adjustment with the road administrator is necessary before the execution. ・The construction of water pipe is presumed at the 60m/ day. ・ The execution of the western system is done for six months(8,800m/60m/25day/month). ・ The execution of the eastern system is done for six months(3,100m/60m/25day/month).	

4) Construction Schedule

Construction schedule based on the construction plan is shown in the following. The water system of the western system, the eastern system is completed in four years, and it goes into the execution of the central system from the fifth year.

Construction Schedule of the water system is shown in the Table-K.37.

Table-K.37 Construction Schedule of Water Supply System

System Name	Main Quantity			1year		2year		3year		4year		5year		6-8year		9year		10-12year		13year	
River Name	Works Description	Unit	Quantity	D	W	D	W	D	W	D	W	D	W	D	W	D	W	D	W	D	W
West System	Intake weir	Ls	1																		
Penet river	Treatment Plant	Ls	1																		
Water Supply Capacity(liter/sec)	Waterline Pipe φ600	km	8.8																		
Intake weir	Water Pipe Bridge	site	5																		
East System	Intake weir	Ls	1																		
Petanu River	Treatment Plant	Ls	1																		
Water Supply Capacity(liter/sec)	Waterline Pipe φ600	km	31.0																		
Intake weir	Water Pipe Bridge	site	5																		
Central System	Intake weir	Ls	1																		
Ayung River	Treatment Plant	Ls	1																		

Dry Season (May-October) : D , Wet Season (November-April) : W

K-3.4 River Improvement Cost for Flood Control Project (Badung and Mati River)

River improvement of Flood Control Project is as the following.

・Badung River: L= 5.7km to the Buagan weir on the lower reach from Maruti Street.

・Mati River : L= 2.1km to the Ulumtanjung dam on the lower reach from the Uma Duwi Weir.

(1) Methods of Estimation for Project Cost

A calculated cost and an estimate cost from the local construction execution dealer were used.

(2) Unit Price used for Project Cost

Unit Price was used it which showed in Table-K.26～Table-K.29

(3) Main Quantity

The main quantity of the river improvement is shown in the Table-K.38 and the breakdown list of the construction quantity is shown in the Table-K.39.

Table-K.38 Main Quantity of River Improvement

River Name	Description	Work Item	Parameters ・Quantities
Badung River (River Improvement Work Length 5.7 km)	River Structure	New Grand Sill	W20m×L25m×H2m
		Revetment for Low Flow Channel Works	H=1.6m
		Parapet Wall Works	(H=0.3 - 1.7m)
	River Bed Excavation	River bed Excavation Works	L=5,680m
	Foot Bridge JL. B.Tunggal (Dismantle and Construction)	Removal for Existing Foot Bridge Works	Steel Bridge(W3.5m×L27m)
		Placement New Bridge Works	〃
		Widening Works	
		Revetment	
	Buagan Weir Improvement	Improvement of Flushing Gate Foundation (1m)	Foundation of Gate Foundation(2sites)
Mati River (River Improvement Work Length 2.1 km)	River Structure	Removal Existing Weir	H2.5m×W9m
		（Uluntanjung Weir）	
		Revetment Work（H=5.5m)	L=2,110m
	River Bed Excavation	Riverbed Excavation Work	L=2,110m

Table-K.39 Analysis Sheet of River Improvement Works

Item	Description		Work Item	Unit	Quantities
Budung River Improvement Works	River Facilities	New Grand sill	Earth Works (Excavation)	m^3	100
		W=20m, L=28m	Concrete work	m^3	1,000
			Bed Protection Works(Block)	m^3	200
			Bed Protection Works (Flood Wall)	m^3	1,000
		Revetment for Low Flow Channel	Concrete work	m^3	7,130
		L＝5,680m, H=1.6m			
		Parapet Wall Works	Concrete work	m^3	1,190
		L=3410m, H=0.3 - 1.7m	Sub total		
		River bed Excavation	Excavation	m^3	147,030
		L＝5,680m	(rock)		
	Replacement for Bridges (At near JL. B.Tunggal)	Removal for Existing Bridge	Steel	m^2	100
		Placement New Bridge	Steel	m^2	120
		Widening	Excavation	m^3	500
		Revetment	Concrete work	m^3	900
	Buagan Weir Improvement	Improvement of Flushing Gate Foundation		LS	1
Mati River Improvement Works	River Facilities	Removal	Concrete work	m^3	200
		(Uluntanjung Weir)			
		Revetment	Concrete work	m^3	19,200
		(H=5.5m, L=2,109m)			
	Riverbed Excavation	Excavation Work	Earth Works (Excavartion)	m^3	62,500
		Enbankment Work	Earth Works (Enbankment)	m^3	37,000

General plan of flood prevention project for Badung River and Mati River is shown in Figure-K.6 and Figure-K.7.