PART-D FORMULATION OF MASTER PLAN

PART-D FORMULATION OF MASTER PLAN

D1 General Considerations

D1.1 Improvement Targets

Targeted items for improvement by the implementation of sewerage and sanitation projects to be proposed in the New M/P and the coverage ratios for each target are as follows in view of the implementation plan by the Ministry of Public Works and the view point of securing the water sources for water supply services in the future.

Table SMR-D1-1 Improvement Targets and Development of Coverage Ratio

Improvement Target		Unit	Short-term plan (2012 – 2020)			Medium-term plan (2021 – 2030)		Long-term plan (2031 – 2050)			
			Y2012	Y2014	Y2020	Y2025	Y2030	Y2035	Y2040	Y2045	Y2050
Design Population		**1,000 person**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**
Administration Population		**1,000 person**	**10,035**	**10,361**	**11,284**	**11,994**	**12,665**	**12,665**	**12,665**	**12,665**	**12,665**
Off-site (sewerage)	**Facility Coverage Ratio*[1]**	**%**	**2**	**7**	**20**	**30**	**40**	**50**	**65**	**75**	**80**
	Service Coverage Ratio*[2]	**%**	**2**	**4**	**15**	**25**	**35**	**45**	**55**	**70**	**80**
	Wastewater Flow[3]*	*1,000m^3/day*	*34*	*77*	*337*	*577*	*896*	*1,133*	*1,404*	*1,692*	*2,011*
	Served Population for Off-site	*1,000 person*	*168*	*387*	*1,685*	*2,884*	*4,478*	*5,775*	*7,130*	*8,572*	*10,166*
On-site (sanitation facility)	**On-site Defecation Ratio**	**%**	**85**	**96**	**85**	**75**	**65**	**55**	**45**	**30**	**20**
	CST Coverage Ratio	*%*	*83*	*81*	*64*	*47*	*32*	*20*	*11*	*4*	*0*
	MST Coverage Ratio	*%*	*2*	*15*	*21*	*28*	*32*	*34*	*33*	*28*	*20*
	Served Population for On-site[4]*	*1,000 person*	*8,567*	*9,974*	*9,599*	*9,110*	*8,188*	*6,890*	*5,535*	*4,093*	*2,500*
	Conversion Ratio from CST to MST	*%*	*2*	*16*	*25*	*38*	*50*	*63*	*75*	*88*	*100*
	Regular Desludging Ration	*%*	*0*	*20*	*50*	*64*	*75*	*86*	*94*	*98*	*100*
Slum areas	**Open Defecation Ratio**	**%**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Open Defecation Population	*1,000 person*	*1,300*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Reduction Ratio of BOD		**%**	**0**	**11**	**46**	**52**	**61**	**66**	**72**	**77**	**84**
River Water Quality (BOD)[5]*		*mg/L*	*61*	*54*	*33*	*29*	*24*	*21*	*17*	*14*	*10*

D2 Proposed Sewerage Zones

D2.1 Selection of WWTP Sites

(1) Future Process and Suggestions

1) Priority Project Areas (Zone No. 1 and Zone No. 6)

The proposed lands for WWTPs are public land and belong to DKI Jakarta Government. In order to secure the lands for WWTPs, the following remaining Issues should be solved.

(a) Internal Land Demarcation in DKI Jakarta

The internal land demarcation in DKI Jakarta is necessary. To solve this issue, direct involvement from the related parties/agencies is essential, thus the most effective solution is by establishing an Implementation Committee (IC) with the member comes from:

The main task of IC will be to resolve the issue of demarcation of land for plan layout of WWTP in Zone No. 1 and Zone No. 6. After resolving the issue, the letter or M/M shall be delivered to the related agencies.

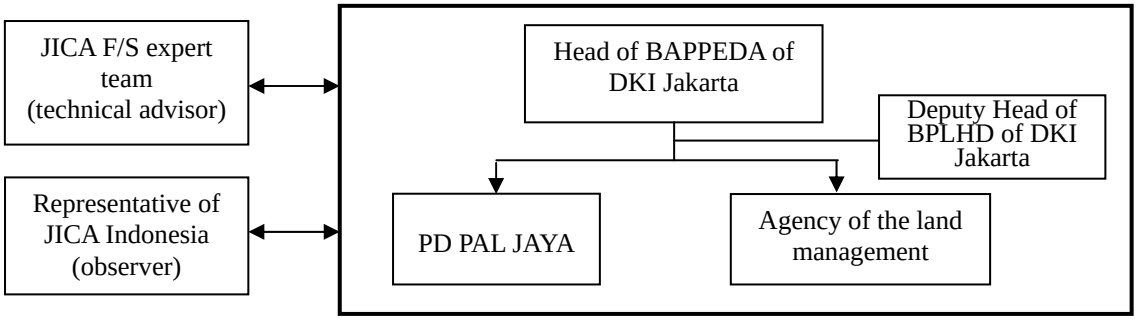


Figure SMR-D2-1 Organization of Implementation Committee (IC)

(b) Record in the Detailed Spatial Plan (RDTR), DKI Jakarta

DKI Jakarta Government should designate these lands for WWTPs in the Detailed Spatial Plan (RDTR), DKI Jakarta.

It is recommended to set milestones and monitor the demarcation of land for WWTPs and recording in the Detailed Spatial Plan (RDTR), DKI Jakarta by DGHS and JICA.

2) Other Areas (Remaining 12 Zones)

The proposed WWTP candidate sites in other areas are also public land and belong to DKI Jakarta The proposed WWTP candidate sites in other areas are also public land and belong to DKI Jakarta Government. WWTP sites in Zone No. 12, 14 and 15 are to be made available under the pond planning development project of Water Resource DPU of DKI Jakarta before the commencement of wastewater projects.

In order to secure the lands for WWTPs, the following remaining Issues should be solved.

(a) Internal Land Demarcation in DKI Jakarta

BAPPEDA of DKI Jakarta should obtain the approval of the New MP from the Governor of DKI Jakarta at the earliest after it is submitted from the Japanese side to the Indonesian side. After the decree of the Governor of DKI Jakarta is issued for the implementation of the new M/P, BAPPEDA should form an IC similar to as suggested for the priority project areas of Zone 1 and Zone 6 to demarcate lands for WWTPs. Sites which are related to other projects should be grouped up separately for speedy demarcation and recording in the Detailed Spatial Plan (RDTR), DKI Jakarta.

(b) Record in the Detailed Spatial Plan (RDTR), DKI Jakarta

Same as for the priority project areas (zone 1 and zone 6), it is recommended to set milestones and monitor the demarcation of land for WWTPs and recording in the Detailed Spatial Plan (RDTR), DKI Jakarta by DGHS and JICA.

In the future because of the situation change, if private land is to be acquired DKI Jakarta should acquire the land following Law No. 2 Year 2012, Provision of Land for the Development of Public Interest.

D2.2 Formation of Sewerage Zones

(1) Sewerage Zones and Candidate Sites for WWTP

Based on the above policy, 14 sewerage zones and sites for WWTP have been determined as shown in Figure SMR-D2-2 and the list of WWTP sites are shown in Table SMR-D2-1.

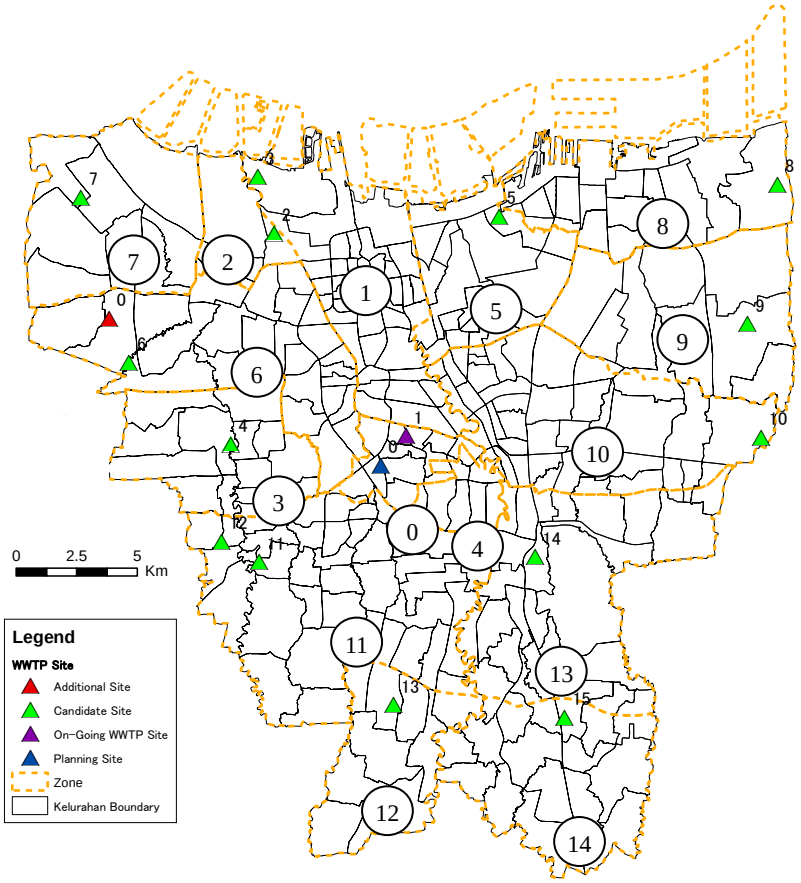


Figure SMR-D2-2 Sewerage Zones and WWTP Sites

Table SMR-D2-1 WWTP Sites and Required Area

Zone No.	Site No.	Site Name	Required Area (ha)
⓪	0	Krukut	On-going
	1	Setiabudi Pond	On-going
①	2	Pejagalan	**6.9**
②	3	Muara Angke	**0.8**
③	4	Srengseng City Forest Park	**4.0**
④		Transfer to Zone 10 WWTP	**1.6**
⑤	5	Sunter Pond	**4.6**
⑥	6	STP Duri Kosambi	**8.2**
⑦	7	Kamal - Pegadungan	**3.9**
⑧	8	Marunda	**6.0**
⑨	9	Rorotan	**2.9**
⑩	10	STP Pulo Gebang	**8.7**
⑪	11	Bendi Park	**3.0**

Table SMR-D2-1 WWTP Sites and Required Area

Zone No.	Site No.	Site Name	Required Area (ha)
	12	Waduk Ulujami (Pond Planning)	**5.9**
⑫	13	Ragunan Land	**3.1**
⑬	14	Waduk Kp. Dukuh (Pond Planning)	**5.7**
⑭	15	Waduk Ceger RW 05 (Pond Planning)	**3.6**

D2.3 Sewerage Zones

D2.3.1 Population Density of Each Sewerage Zone

The population density of each sewerage zone is as shown in Table SMR-D2-2. As seen in the table, it is found that the maximum density in 2030 is 252PE/ha for Zone No. 1 and the minimum is 100PE/ha for Zone No.9.

Table SMR-D2-2 Population Density of Each Sewerage Zone

Sewerage Zone	2020 (Short-Term)			2030/2050 (Mid & Long-Terms)		
	Population (PE)	Area (ha)	Pop. Density (PE/ha)	Population (PE)	Area (ha)	Pop. Density (PE/ha)
0	194,589	1,220	160	211,865	1,220	173.7
1	1,137,853	4,901	232	1,236,736	4,901	252.3
2	140,610	1,376	102	149,042	1,376	108.3
3	628,092	3,563	176	721,501	3,563	202.5
4	266,901	935	286	290,796	935	311.1
5	696,849	3,375	207	795,109	3,375	235.6
6	1,275,209	5,874	217	1,465,718	5,874	249.5
7	610,146	4,544	134	692,649	4,544	152.4
8	974,636	4,702	207	1,100,137	4,702	233.9
9	451,714	5,389	84	537,477	5,389	99.7
10	1,450,797	6,289	231	1,549,252	6,289	246.4
11	1,458,528	8,246	177	1,578,573	8,246	191.4
12	464,932	3,172	147	555,385	3,172	175.1
13	971,754	6,433	151	1,053,724	6,433	163.8
14	561,551	4,605	122	617,269	4,605	134.1
Reclamated Area	0	2,573	0	110,049	5,146	21.4
Total	11,284,161	67,196	168	12,665,282	69,769	181.5

D2.4 Priority of Sewerage Zones

D2.4.1 Factors for Determining Priority of Sewerage Zones

The priority of sewerage zones for implementation of sewerage development shall be determined after examination by eight (8) factors shown in Table SMR-D2-3.

Table SMR-D2-3 Evaluation Factors for Determining Priority of Sewerage Zones

No.	Factor	Remark
1	Population density is high.	Pollutant load is high.
2	WWTP site shall be secured inside the sewerage zone.	Construction and O&M cost are low.
3	Sewer trunk lines are shorter and river crossings should be avoided as much as possible.	Construction and O&M cost are low.
4	There are many commercial establishments who can afford to pay wastewater charge after the proposed project is implemented.	Easier to collect wastewater charge in the future.
5	There are the existing sewerage systems.	Easier to collect wastewater charge in the future.
6	Socio-economic conditions are not good.	Water borne disease ratio and pollutant load are high

Table SMR-D2-3 Evaluation Factors for Determining Priority of Sewerage Zones

No.	Factor	Remark
7	River water quality is not good (BOD is high).	Pollutant load is high.
8	Groundwater quality is not good (E-coli is high).	Possibility of contamination by domestic wastewater is high.

D2.4.2 Priority of Sewerage Zones and Determination of Prioritized Project Areas

According to the evaluation for each indicator, priority for sewerage zones has been determined as shown in Table SMR-D2-4. The highest priority is put on No.1 and No. 6. Therefore, Zone No.1 and No.6 have been selected as the prioritized project areas.

Table SMR-D2-4 Evaluation Result for Prioritized Project Areas

Zone No.	Factor Number								Total	Rank
	1	2	3	4	5	6	7	8		
1	**13**	**14**	**13**	**14**	**1**	**3**	**11**	**10**	**79**	**1**
2	2	3	13	1	1	1	11	11	43	14
3	8	14	13	4	1	2	11	2	55	11
4	14	14	14	11	1	4	2	6	66	6
5	10	14	13	13	1	5	6	13	75	4
6	**12**	**14**	**13**	**12**	**1**	**8**	**11**	**7**	**78**	**2**
7	4	14	13	12	1	12	4	12	62	8
8	9	14	13	5	1	9	3	14	68	5
9	1	14	13	3	1	11	14	9	66	6
10	11	14	13	8	1	7	14	8	76	3
11	7	3	13	10	1	13	11	4	62	8
12	6	14	13	6	1	10	2	1	53	13
13	5	3	13	9	1	6	14	3	54	12
14	3	14	13	7	1	14	5	5	62	8

D2.4.3 Priority Rank for Sewerage Zones in Target Development Years

Based on the rank for priority, sewerage zones for each target development year has been determined as shown in Table SMR-D2-5 and Figure SMR-D2-3

Table SMR-D2-5 Sewerage Zones for Each Target Development Year

Priority	Zone No.	Target Development Year
1	**1**	Short-Term Plan: Year 2012 to 2020
2	**6**	
3	**10**	Medium-term Plan: Year 2021 to 2030
4	**5**	
5	**8**	
6	**4**	
7	**9**	Long-Term Plan: 2031 to 2050
8	**7**	
9	**11**	
10	**14**	
11	**3**	
12	**13**	
13	**12**	
14	**2**	

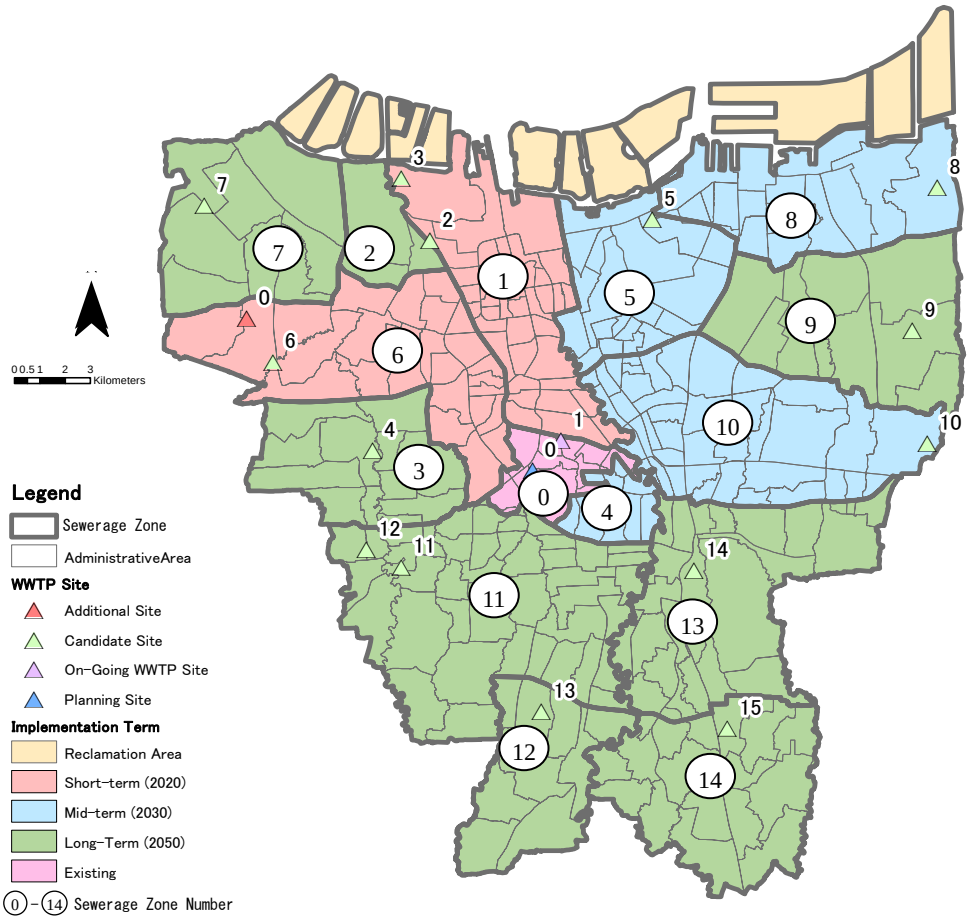


Figure SMR-D2-3 Sewerage Zones for Each Target Development Year

D3 Wastewater Quantities & Qualities and Pollution Loads

D3.1 Wastewater Generation

Unit wastewater volume is usually obtained in the following equation:

Wastewater Generation ＝ Water Consumption

D3.2 Estimated Water Consumption Rates

Data for water consumption in year 2010 obtained from PAM JAYA (water supply system of PAM JAYA and existing wells) are as shown in Table SMR-D3-1.

Table SMR-D3-1 Water Consumption for PAM JAYA System and Existing Well (2010)

Item	Water Consumption by Household	Water Consumption by Non-Household (Commercial, Public and Industry)	Total
PAM JAYA	130	83	213
Existing Wells	179	12	191
Average	**154**	**45**	**199**

On the other hand, the estimated water consumption in the future (year 2010 and further) made in the Old M/P is shown in Table SMR-D3-2.

Table SMR-D3-2 Estimated Unit Wastewater Volume in the Old M/P 1991 (from Year 2010 Downward)

City	Population	Unit Wastewater Volume (m^3/day)					
		① Household	Unit Wastewater for ①（LCD）	②Non-Household	③Industry	②＋③Unit Wastewater (LCD)	Unit Wastewater
South Jakarta	3,157,600	468,354	148	87,205	2,328	28	177
East Jakarta	3,292,400	495,461	150	93,891	79,194	53	203
Central Jakarta	1,730,600	253,756	147	121,227	3,906	72	219
West Jakarta	2,716,600	398,882	147	86,312	35,718	45	192
North Jakarta	1,902,800	266,233	140	60,298	135,485	103	243
Total	**12,800,000**	**1,882,686**	**147**	**448,933**	**256,631**	**55**	**202**

Note: Wastewater = water consumption

Based on the data collected, in the New M/P, the values in Table SMR-D3-3 are applied as the unit wastewater at present and in the future.

Table SMR-D3-3 Water Consumption Applied in the New M/P

Item	Water Consumption for Household	Water Consumption for Non-Household (Commercial, Public and Industry)	Total Water Consumption（LCD）
Actual in 2010	154	47	201
Estimation in the Old M/P	147	55	202
Average	150.5	51.0	201.5
Applied in the New M/P	**150**	**50**	**200**

Therefore, unit wastewater generation in the New M/P is as shown in Table SMR-D3-4.

Table SMR-D3-4 Wastewater Generation for the New M/P

Item	Wastewater Generation for Household	Water Consumption by Non-Household (Commercial, Public and Industry)	Total of Wastewater Generation（LCD）
Unit Wastewater Generation in the New M/P	**150**	**50**	**200**

D3.3 Pollution Loads

Design wastewater volume in the New M/P for the target development years of 2020, 2030 and 2050 is calculated by multiplying the unit wastewater generation by the design population (administrative population x sewerage service ratio 80%). The calculation result is as shown in Table SMR-D3-5.

Design Wastewater Volume ＝ Design Population x Unit Wastewater Generation

Table SMR-D3-5 Design Wastewater Volume for Each Sewerage Zone in DKI Jakarta

Zone No.	Administ. Population (2030)	Sewerage Service Ratio (%)	Design Population (2030)	Unit Wastewater Generation (LCD)	Design Wastewater Volume
0	211,865	100.00	211,865	200	42,373
1	1,236,736	80.00	989,389	200	197,878
2	149,042	80.00	119,234	200	23,847
3	721,501	80.00	577,201	200	115,440
4	290,796	80.00	232,637	200	46,527
5	795,109	80.00	636,087	200	127,217
6	1,465,718	80.00	1,172,574	200	234,515
7	692,649	80.00	554,119	200	110,824
8	1,100,137	80.00	880,110	200	176,022
9	537,477	80.00	429,982	200	85,996
10	1,549,252	80.00	1,239,402	200	247,880
11	1,578,573	80.00	1,262,858	200	252,572
12	555,385	80.00	444,308	200	88,862
13	1,053,724	80.00	842,979	200	168,596
14	617,269	80.00	493,815	200	98,763
Total	12,445,184		9,976,510	200	1,995,302

Note: Excluding Seribu Islands and the reclamated area.

The existing Zone No.0 is for the existing sewerage service area and the sewerage service ratio has been set as 100% since it has already been known that in comparison with other zones there is little slum area in the zone.

D4 Mass Balance of Wastewater

D4.1 Setting Basic Units

Table SMR-D4-1 shows generated wastewater amounts and water quality for general wastewater, black water (BW), and gray water (GW), in Indonesia, which were determined based on established values and other data of the existing master plan and Governor Decree, No.122-2005.

Table SMR-D4-1 Design Set Up : Unit Wastewater Quantity and Quality

Item		Wastewater (Total)		Black Water		Gray water	
		(g/PE/day)	(mg/L)	(g/PE/day)	(mg/L)	(g/PE/day)	(mg/L)
Quantity	(g/PE/d)	150		25		125	
Quality	BOD	30.0	200	12.5	500	17.5	140
	SS	30.0	200	12.5	500	17.5	140

D4.2 Setting Design Conditions of Each Facility and Setting Current Conditions

D4.2.1 Septic Tanks

Currently, in DKI Jakarta, desludging is limited to on-call operations that are provided only in emergencies. For ordinary households having BW septic tanks, this problem is limited to times when, for example, a toilet cannot be drained due to the accumulation of sediment or other matter in the septic tank. Table SMR-D4-2 shows the conventional design conditions and the results when current-situation operating conditions are established for a BW septic tank based on the situation described above.

Table SMR-D4-2 Current Situation of Septic Tank

Item	Black water			Black water +Gray water		
Design Basis						
Quantity	25L/PE・day			150L/PE・day		
Tank Volume	225L/PE			300L/PE		
Sedimentation Volume Rate	75%			50%		
HRT	9days			2days（48h）		
Sedimentation Rate	20%			20%		
Reduction Rate	40%			30%		
Sedimentation Concentration	2%			2%		
Frequency of Desludging	1time/3.7years			1time/2.7years		
Water Quality						
Items	Influent	Effluent	Removal Rate	Influent	Effluent	Removal Rate
BOD	500	200	60%	200	100	50%
SS	500	200	60%	200	100	50%
CODcr	1000	400	60%	400	200	50%
T-N	180	153	15%	35	30	15%
T-P	25	21	15%	8	7	15%

D4.2.2 ITP

For ITP of an establishment such as office buildings and commercial buildings, the extended aeration method was set as the standard ITP design because this method is the one typically used for such facilities. Current situation of operation could not be set up because almost no information was available concerning the operation conditions of reactors (MLSS, etc.). Treated water was set based on the results of the ITP survey mentioned in B4.2 of Main Report. However, these results indicated that desludging took place about once a year, and the amount of excess sludge reported was extremely low. Consequently, actual treated water concentration was estimated to be even higher since most of sludge is considered to be carried over into treated water.

Table SMR-D4-3 Current Situation of ITP

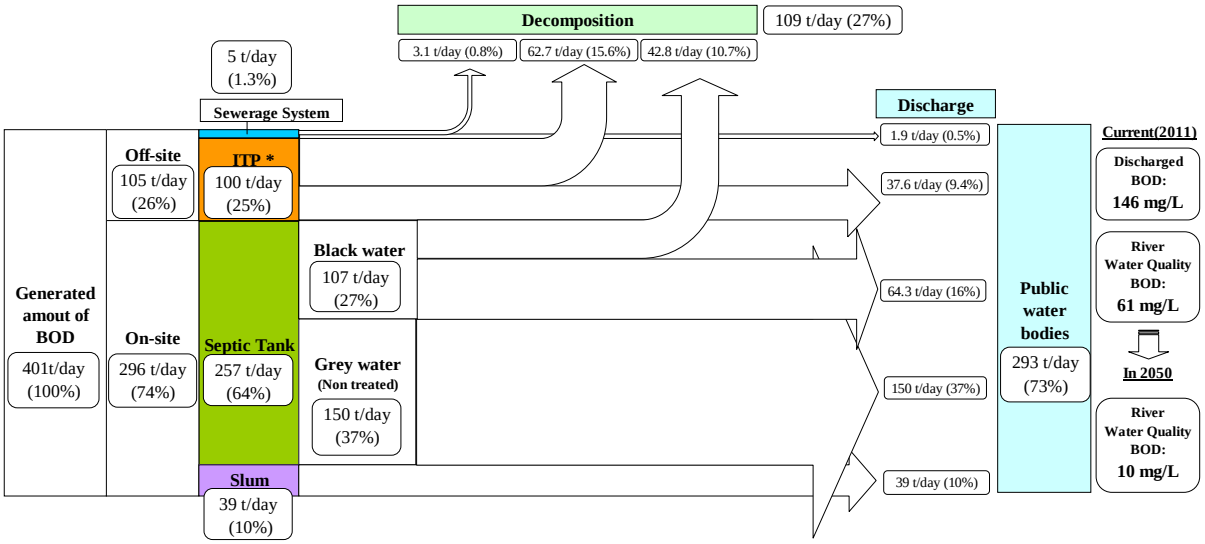
Items		Design Standard			Current Situation		
Design Basis	Quantity	50L/PE・day			Unknown		
	HRT	24h			Unknown		
	Excess Sludge Rate	75%of Removed SS			Unknown		
	Sludge Concentration	2%			Unknown		
	Desludging Frequency	1 time/40days（4t Honey Truck / 300PE ITP）			1 time/year		
Quality	Items	Influent	Effluent	Removal Rate	Influent	Effluent	Removal Rate
	BOD	200	20	90%	200	75	62.5%
	SS	200	20	90%	200	75	62.5%

D4.3 BOD and SS Mass Balance in DKI Jakarta

Figure SMR-D4-1 and Figure SMR-D4-2 show the results of calculation of BOD and SS mass balance for wastewater treatment in DKI Jakarta in the current situation (2012). This calculation was based on the design models set above as well as an actual operation-situation model.

Approximately 70% or more of the generated amount of BOD flows to public water bodies (including groundwater). It is clear that this situation is harming river environments in DKI Jakarta as well as worsening groundwater quality. Meanwhile, approximately 70% or more of the generated amount of SS is likewise flowing to public water bodies.

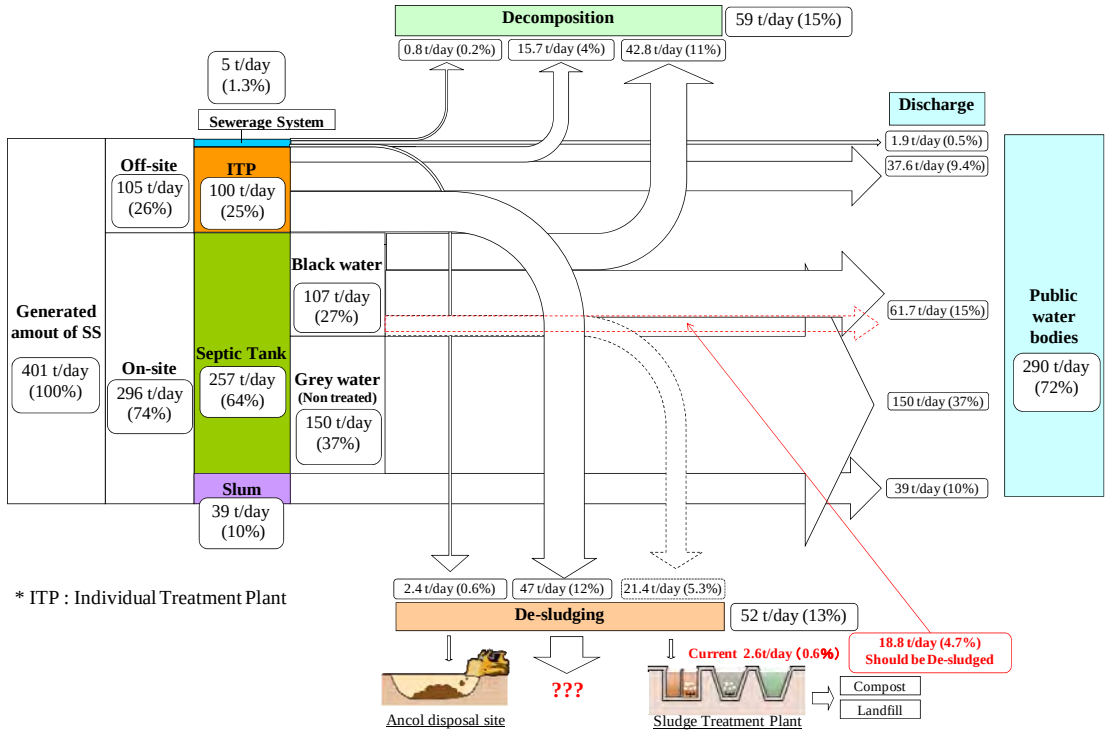
Mass Balance Diagram of Wastewater in DKI Jakarta (BOD-based) (Current:2012)



* ITP : Individual Treatment Plant

Figure SMR-D4-1 BOD Mass Balance (M/B) of Wastewater Treatment in DKI Jakarta (2012)

Mass Balance Diagram of Wastewater in DKI Jakarta (Suspended Solids (SS)-based) (Current:2012)



* ITP : Individual Treatment Plant

Figure SMR-D4-2 SS Mass Balance (M/B) of Wastewater Treatment in DKI Jakarta (2012)

D4.4 Setting Short-term, Medium-term and Long-term Targets and BOD/SS Mass Balance

D4.4.1 Current Situation of River BOD and Target Setting

The results of the above studies were used to establish short-term, medium-term, and long-term off-site and on-site measures as well as their targets.

The BOD of rivers within DKI Jakarta for 2012 was set at 61 mg/L based on the average of actual measured values in 2010. The long-term target of this Master Plan was set at lowering river BOD to

around 10 mg/L, which would make it comparably easy to use rivers as a water source, by 2050. The short-term and medium-term targets were set at 45 mg/L and 30 mg/L, respectively.

The source of BOD load in rivers is not only within DKI Jakarta but also includes BOD influent from neighboring cities located upstream from DKI Jakarta. Consequently, the self-purification effect of rivers (diluting effect) was set at 3.0 times based on the relationship between wastewater BOD currently discharged into rivers (146 mg/L) and river BOD (61 mg/L), with consideration given to the average of upstream river BOD near the administrative border of DKI Jakarta of 18 m/L (average of actual measured values in 2010).

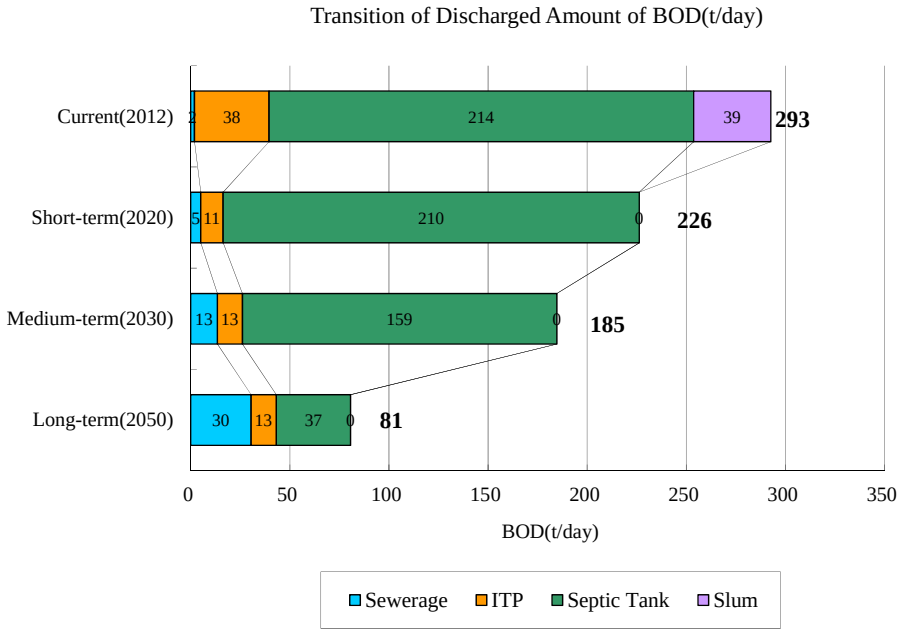
D4.4.2 General Overview of the Target Development Years

Table SMR-D4-4 provides a schedule for each target year. Figure SMR-D4-3 provides predictions of BOD discharged into rivers and removed SS. Action plans for each on-site and off-site measure will be formulated based on these schedules.

Table SMR-D4-4 Targets for Each Stage and Amount of BOD/SS

Items			Current			Short-term			Medium-term			Long-term		
Year			2012			2020			2030			2050		
Population (person*10^3)			10,035			11,284			12,665			12,665		
The unit amount of wastewater (L/day/per)			150			150			150			150		
Population for Wastewater Treatment (including floating population) (person*10^3)			(13,379)			(15,046)			(16,887)			(16,887)		
Break-down	Sewerage System		168			1,685			4,478			10,166		
	ITP for business		(3,345)			(3,761)			(4,222)			(4,222)		
	Septic Tank		8,567			9,599			8,288			2,500		
	Slum		1,300			0			0			0		
Amount of BOD or SS(t/day)			G BOD	D SS	E BOD	G BOD	D SS	E BOD	G BOD	D SS	E BOD	G BOD	D SS	E BOD
	Sewerage System		5	2	2	51	34	5	134	91	13	305	206	30
	ITP for business		100	47	38	113	76	11	127	85	13	127	85	13
	Septic Tank (Black water)		107	3	64	120	13	63	102	16	51	31	6	16
	Septic Tank (Gray water)		150	0	150	168	8	147	143	16	107	44	9	22
	Slum		39	0	39	0	0	0	0	0	0	0	0	0
	Total (t/day)		401	52	293	451	132	226	507	206	185	507	306	81
Load of BOD (g/per/day)			40.0	-	21.9	40.0	-	15.0	40.0	-	10.9	40.0	-	4.8
Concentration of BOD (mg/l)			267	-	146	267	-	100	267	-	73	267	-	32
Dilution rate			3.0			3.0			3.0			3.0		
River Water Quality(BOD)			61*			33			24			10		
Target	Target of River Water Quality(BOD)		-			45			30			10		
	Served Population for Off-Site		2%			15%			35%			80%		
	On-site	Regular Desludging	-			50%			75%			100%		
		Change CST to MST	-			25%			50%			100%		
	Slum	Open Defecation dissolution Ratio	-			100%			100%			100%		

Notes:
1. Average value of river water quality inside Jakarta measured in 2010
2. G=Generated, D=Desludging, E=Effluent



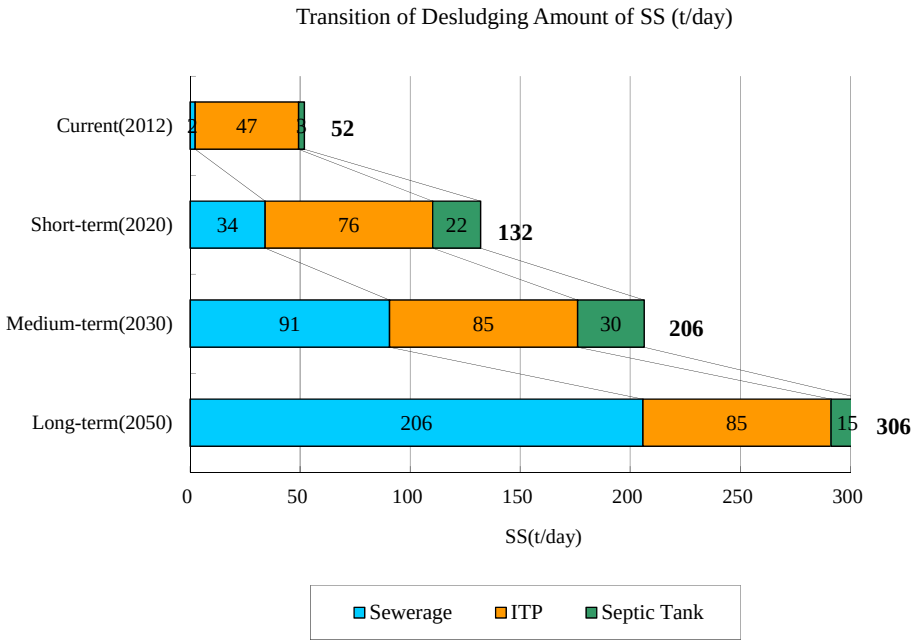


Figure SMR-D4-3 Transition of the Amount of Discharged BOD and Desludging SS

D5 Introduction of Regular Desludging

D5.1 Basic Consideration on Domestic On-site Treatment System in DKI Jakarta

The on-site plan included in the master plan proposes the improvement of the structure and maintenance of septic tanks and, particularly, the introduction of regular desludging while focusing on the minimization of problems the tanks have until they are replaced with connections with the sewage system.

D5.2 Proposals in the New M/P for Introduction of Regular Desludging

The following table summarizes the proposals for provisions which need to be stipulated in the sludge control regulations and guidelines in order to launch a regular desludging system.

Table SMR-D5-1 Regular Desludge Proposals

Proposal	Description of the proposal	Regulations and guidelines
Structures of septic tanks and their installation	A septic tank certification system should be stipulated.	DKI sludge control regulations
	Checking septic tanks should be stipulated as part of the building check or completion inspection.	DKI sludge control regulations
	Septic tanks should be installed in places which are easily accessible for maintenance.	Guidelines
Cleaning	It should be stipulated that owners of septic tanks are responsible for cleaning the septic tanks.	DKI sludge control regulations
Desludging	Regular sludge extraction should be made compulsory and it should be made clear who is responsible for the sludge extraction.	DKI sludge control regulations
	The structures of septic tanks should be designed to allow smooth sludge extraction.	Guidelines
Training workers	Training and licensing system for the desludging operators and the maintenance vendors for ITP should be established. Training institution should be established.	Guidelines
Other desirable measures	• Commendation system for workers with good practices • Penal provisions	Guidelines

D5.2.1 Regular Desludging Introduction Plan

The introduction of the full scale regular desludging system will start in 2014. A trial introduction will be conducted and a set of DKI Jakarta sludge control regulations will be established by 2014. Table SMR-D5-2 shows the implementation schedule for the full-scale regular desludging.

Table SMR-D5-2 Planned Schedule for the Full-scale Introduction of Regular Desludging

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Trial introduction of regular desludging	⇔	⇔							
Development of draft DKI sludge control regulations	⇔	⇔	⇔						
Establishment of DKI sludge control regulations			⇔						
Full-scale implementation of regular desludging			⇔	⇔	⇔	⇔	⇔	⇔	⇔
Implementation of the septic tank (ST) certification system	⇔	⇔							
Registration of ST cleaners (including training and exams)		⇔	⇔	⇔	⇔	⇔			
Registration of ST desludging workers (including training and exams)		⇔	⇔	⇔	⇔	⇔			
Development of a regular ST desludging plan		⇔	⇔						

D6 Design Criteria

D6.1 Off-Site System

D6.1.1 Hydraulic Conditions

Recommended hydraulic considerations are listed in the following table.

Table SMR-D6-1 Recommended Hydraulic Considerations

Type of Pipe	Item	Condition
Gravity pipes	Manning's formula	$V = 1/n\ R^{2/3}S^{1/2}$
	Roughness factor	RCC n = 0.013 new pipe, PVC n = 0.010 new pipe
	Minimum velocity	0.60 m/s average flow, 0.80 m/s ultimate flow
	Maximum velocity	3.00 m/s
	Maximum depth	d/D = 0.8 at ultimate peak flow
Pressure pipes	Hazen William's formula	$V = 0.85\ CR^{0.63}\ S^{0.54}$
	Roughness factor	C = 100 for cast iron pipe, C = 110 for PVC pipe
	Minimum velocity	0.8 m/s
	Maximum velocity	3.0 m/s

D6.1.2 Sewers and Manholes

Recommended design criteria for sewers and manholes are listed in the following table.

Table SMR-D6-2 Recommended Design Criteria for Sewers and Manholes

No	Item	Design Criteria
1	Peaking factor (PF) (Typical Factors)	$PF = 4.02*(0.0864*Q)^{-0.154}$
2	Minimum Pipe Diameter	200 mm
3	Minimum Cover Over Top of Pipe	1.0 m
4	Potential Gravity Flow Pipe Materials Diameter < 350 mm Diameter > 350 mm	 RCC, PVC, HDPE, FRP/GRP RCC, PVC, HDPE, Brick, FRP/GRP
5	Manhole Size Pipe Diameter < 450 mm Pipe Diameter > 450 mm Pipe Diameter > 900 mm to = 1350 mm Pipe Diameter > 1350 mm	 Manhole Diameter = 1.22 m Manhole Diameter = 1.52 m Manhole Diameter = 1.83 m Special Design
6	Maximum Manhole Spacing Pipe Diameter < 200 mm Pipe Diameter = 200 mm to < 500 mm Pipe Diameter = 500 mm to < 1,000 mm Pipe Diameter > 1,000 mm	 50 m to 100 m 100 m to 125 m 125 m to 150 m 150 m to 200 m
7	Potential Manhole Materials 0 to 4 m Deep > 4 m Deep	 Brick, RCC, HDPE RCC, HDPE

D6.1.3 Load Factors for WWTPs

Treatment capacity of WWTPs is determined by the daily maximum wastewater volume. The daily maximum wastewater volume is calculated as dividing the daily average wastewater volume by the load factor. Load factor is the ratio of the daily average wastewater volume to the daily maximum wastewater volume, and generally is 0.7 to 0.8.

In the Spatial Plan 2030, the daily variation coefficient for water supply is set as 1.2, however, its calculation basis is unknown. Considering the lifestyle in Indonesia, the seasonal change is small, but the volume of water use would be largely change through a year because there are many various religious events (especially the period of Ramadan). Therefore, load factor is determined as 0.75 which is the reciprocal of the daily variation coefficient with margin of safety ratio 10%.

However, in the F/S stage, daily variation coefficient should be examined in detail using the latest data and information and the most practicable load factor suitable for DKI Jakarta shall be adopted.

Load factor = Daily average wastewater volume / Daily maximum wastewater volume = 0.7 to 0.8
Daily maximum wastewater volume = Daily average wastewater volume / Load factor (= 0.75)

D6.1.4 Pumping Facilities

Recommended design criteria for pumping facilities are listed in the following table.

Table SMR-D6-3 Recommended Design Criteria for Pumping Facilities

No	Item	Design Criteria
1	Peak Factor	2.0 for large stations
2	Maximum Wet Well Detention Time	30 minutes at Average Flow
3	Minimum Detention Time	5 minutes at Peak Flow
4	Pumps	All pumps of the same capacity at peak flow. Standby capacity at least 50% of duty capacity
5	Screening	Screening Chamber Required
6	Pumping Station Piping	Ductile Iron (DI) or Cast Iron (CI)
7	Rising Mains Alternative Materials	DI, PVC, HDPE, CI
8	Rising Main Flow Velocities	Minimum Velocity = 0.6 mps Maximum Velocity = 2.4 mps

D6.1.5 WWTPs

(1) Design Influent Quality

Based on these information and additional information on the quality of gray and black wastewater estimated by the JICA Expert Team, the design influent quality in this MP was adopted as 200 mg/L as BOD and 200 mg/L as SS.

Design influent quality: BOD 200 mg/L SS 200 mg/L

(2) Design Effluent Quality

The JICA Expert Team would adopt effluent discharge standards for BOD and TSS initially at 20 mg/L (daily average).

Design effluent quality: BOD 20 mg/L TSS 20 mg/L

(3) Selection of Treatment Technology

1) Technology Selection Criteria

The following table shows the considerations for the selection of technology for WWTP.

Table SMR-D6-4 Technology Selection Consideration

No.	Considerations	Goal
1	Treated wastewater quality	The technology must consistently meet the standards as required.
2	Power requirement	The process choice should consider minimizing power requirements
3	Land required	Minimize land requirement
4	Capital cost of plant	Process should allow optimum utilization of capital
5	Operation & Maintenance costs	Process design should be conducive to attaining lower running cost
6	Maintenance requirement	Simplicity and reliability
7	Operator attention	Easy to understand procedures
8	Load fluctuations	Plant is able to withstand organic and hydraulic load fluctuations
9	Reliability	Deliver the desired quality on a consistent basis
10	Resource recovery	Ability to minimize operational costs.
11	Sustainability	Process should be ultimately sustainable

2) Design Matrix for Selection of Technology

In order to select the treatment technology, the key parameters are evaluated as the following table. The matrix attributes are ranked as “Very Good”, “Good”, “Average”, or “Poor” recognizing that differences between technologies are relative, and often, the result of commonly accepted observations.

Table SMR-D6-5 Matrix for Selection of Wastewater Treatment Technology

Process	Effluent Quality	Coli forms removal	Nitrification-Denitrification	Phosphorous removal	Process Reliability	Land Use	Ease of Operation	Ease of Maintenance	Electrical Demand	Capital Cost	Track Record
Conventional Activated Sludge Process (ASP)	G	G	P	P	VG	G	VG	VG	AV	G	VG
Anaerobic Anoxic Oxic Process (A_2O)	VG	G	VG	VG	VG	G	G	G	AV	G	VG
Step-feed biological nitrogen removal process	VG	G	VG	VG	VG	G	G	G	AV	G	VG
Sequencing Batch Reactor (SBR)	VG	G	VG	VG	G	G	G	G	AV	G	G
Moving-Bed Biofilm Reactor	G	G	P	P	G	G	G	G	AV	G	G
Membrane Biological Nitrogen Removal Reactor (MBR)	VG	VG	VG	P	VG	VG	P	P	P	AV	AV
UASB + ASP	G	G	P	P	AV	AV	AV	VG	VG	VG	G
Extended Aeration	G	G	P	P	G	P	G	VG	P	VG	G
Aerated Lagoon	G	G	P	P	AV	P	AV	AV	P	VG	G
Stabilization Pond	AV	P	P	P	P	P	G	VG	VG	VG	AV

Note: VG: Very Good, G: Good, AV: Average, P: Poor

Based on the above examination, the following six technologies have been screened for large flow WWTP to select the most appropriate technology under the New M/P:

Type-1 Conventional Activated Sludge Process: ASP
Type-2 Anaerobic Anoxic Oxic Process: A2O
Type-3 Step-feed Biological Nitrogen Removal Process
Type-4 Membrane Biological Nitrogen Removal Reactor: MBR
Type-5 Sequencing Batch Reactor: SBR
Type-6 Upflow Anaerobic Sludge Blanket + Activated Sludge Process: UASB + ASP

3) Comparison Examination of Selected Treatment Technology

Table SMR-D6-6 shows the comparison of above selected technologies for WWTP with a capacity around 200,000 m^3/day based on basic design conditions. For construction of WWTPs, it is the most important that DKI Jakarta should secure the necessary land. Consequently, WWTPs should be O&M focus type. For appropriate operation of activated sludge treatment process, the comprehensive knowledge and experiences on the biological treatment are required. However, DKI Jakarta has very little potential for such knowledge and experiences.

Therefore, in Table SMR-D6-6 conditions for facility focus type treatment process are indicated as much as possible. As a biological reactor, the processes and hydraulic retention time to which flexible measures can be taken for O&M for the time being and more severe regulations for water quality in the future are set up.

Table SMR-D6-6 Comparison of Selected Technologies

Items		Type-1	Type-2	Type-3	Type-4	Type-5	Type-6
Water Quality	BOD	○	○	○	◎	○	○
	SS	○	○	○	◎	○	○
	Nitrogen	×	○	○	○	○	×
Hydraulic Retention Time (h)	Regulating Tank	0.0	0.0	0.0	4.0	4.0	0.0
	Primary Settling Tank	1.5	1.5	1.5	0.0	0.0	0.0
	Bio-Reactor	6.0	10.0	9.0	6.0	24.0	8.0+4.0
	Final Settling Tank	5.0	5.0	5.0	0.0	0.0	5.0
	Total	12.5	16.5	15.5	10.0	28.0	17.0
Air volume	Oxygen Ratio (%)	100	170	170	224	211	55
Sludge	Yield Ratio (%)	100	91	91	98	76	72
Required Land Area	Area Ratio (%)	100	132	124	80	224	134

Note: All the figures in this table are subject to change in the further F/S

For the selection of treatment process, it is recommendable that flexible treatment process should be selected taking into account more severe regulations of water quality in the future and demand for recycled water.

Moreover, for DKI Jakarta where it is very difficult to secure WWTP lands, MBR will be one of options as space-saving process. Stable operation of MBR will require O&M technology based on the experiences for proper flow control, flushing technology for protecting clogging of membrane, etc. Therefore, when it is introduced in DKI Jakarta without the experience of MBR operation, it is more desirable to conduct O&M under the contract with private company of such experiences.

Based on the above, at the further stage of F/S to be conducted in each sewerage zone, it is proposed that treatment process and its design conditions should be examined in detail and determined, bearing in mind of advanced treatment process such as Type-2, Type-3 and Type-4.

(4) Required Land for WWTP

JICA Expert Team underwent several times negotiation with DKI Jakarta for the required land for WWTPs. After having several discussions with DKI Jakarta we proposed the required land based on value of 0.5 m^2 per m^3/d of an average wastewater flow. That too was not acceptable to DKI Jakarta and required us to further reduce the land requirement for WWTPs. This is a fact that there is serious constraint of available land in DKI Jakarta and old M/P did not proceed as planned because of land matter only. To avoid similar situation to occur again with the New M/P, we studied several variants of ASP and space saving innovations. Then we proposed the required land based on value of 0.35 m^2 per m^3/d of an average wastewater flow. We reduced the required land to about 30%, and BAPPEDA accepted the required land area and sites for WWTPs (refer to MM of 21st October 2011). The following table shows required land area for WWTPs. There are 15 WWTP sites. The required land area ranges from 8.7 hectares for zone 10 WWTP (Pulo Gebang) to 0.8 hectare for zone 2 WWTP (Muara Angke). The total land required for WWTPs for the short (15.1 hectares), medium (18.8 hectares) and long term (35.0 hectares) is 68.9 hectares.

Table SMR-D6-7 Required Land for WWTPs

Site No.	Candidate Land	Location	Zone Coverag	Zone Area (Ha)	Location Municipality	Population (People)	Coverage Population (80% People	Percentage	Flow Rate (m3/d)	Land Required
2	Pejagalan (Taman Kota Penjaringan)	Pejagalan	1	4,901	Central Jakarta	1,236,736	989,389	7.81%	197,878	6.9
3	Muara Angke	Muara Angke	2	1,376	North Jakarta	149,042	119,234	0.94%	23,847	0.8
4	Srengseng City Forest Park	Srengseng	3	3,563	West Jakarta	721,501	577,201	4.56%	115,440	4
	To Be Transferred to Pulo Gebang		4	935	South Jakarta	290,796	232,637	1.84%	46,527	1.6
5	City Forest North Sunter Pond	Sunter	5	3,375	North Jakarta	795,109	636,087	5.02%	127,217	4.6
6	WWTP Duri Kosambi	Duri Kosambi	6	5,874	West Jakarta	1,465,718	1,172,574	9.26%	234,515	8.2
7	Kamal - Pegadungan	Kamal, Pegadungan	7	4,544	West Jakarta	692,649	554,119	4.38%	110,824	3.9
8	Marunda	Marunda	8	4,702	North Jakarta	1,100,137	880,110	6.95%	176,022	6
9	Rorotan	Rorotan	9	5,389	East Jakarta	537,477	429,982	3.39%	85,996	2.9
10	WWTP Pulo Gebang	Pulo Gebang	10	6,289	East Jakarta	1,549,252	1,239,402	9.79%	247,880	8.7
11	Bendi Park	Taman Bendi	11	8,246	South Jakarta	1,578,573	1,262,858	9.97%	252,572	3
12	Ulujami Pond (Pond Planning)	Pesanggrahan			South Jakarta					5.9
13	Ragunan Land	Ragunan	12	3,172	South Jakarta	555,385	444,308	3.51%	88,862	3.1
14	Waduk Kp. Dukuh (Pond Planning)	Halim Perdana Kusuma/Kramat Jati	13	6,433	East Jakarta	1,053,724	842,979	6.66%	168,596	5.7
15	Waduk Ceger RW 05 (Pond Planning)	Cipayung	14	4,605	East Jakarta	617,269	493,815	3.90%	98,763	3.6
Reclamation Area			WWTP to be prepared by the Developers			110,049	110,049	0.86%	-	Planning
1	Existing System and On-going project (Casablanca Sewerage System)	Setiabudi Pond	0	1,220	South Jakarta	211,865	211,865	1.67%	-	On-Going
0		Krukut PS							-	Planning
Grand Total						12,665,282	10,196,608	80.50%	1974939*	

Note: This table excludes the existing sewerage service area and the future reclamation areas. And the percentage of population shows the ratio of the design population to the total population in DKI. In total, around 80% of total population is the target population finally.

D7 Facility Plan of Main Facility in Priority Project Areas

D7.1 Outline of Prioritized Project Areas

Among 14 zones, Zone No. 1 and Zone No. 6 are selected as the prioritized project areas. The outline of these areas is shown in Table SMR-D7-1.

Table SMR-D7-1 Outline of Priority Project Areas

Priority Project Area	Wilayah	Kecamatan	Kelurahan
ZoneNo.1 [Design Population] 989,389 [Design Average Wastewater Volume] 198,000m^3/day	Central Jakarta	Gambir, Sawah Besar, Senen, Menteng, Tanah Abang	Cideng, Petojo Utara, Kebon Kelapa, Gambir, Petojo Selatan, Duri Pulo, Mangga Dua Selatan, Karang Anyar, Kartini, Senen, Kenari, Kebon Sirih, Gondangdia, Cikini, Menteng, Pegangsaan, Kampung Bali, Kebon Kacang, Kebon Melati, Petamburan, Bendungan Hilir
	East Jakarta	Matraman	Kebon Manggis
	West Jakarta	Grogol Petamburan, Taman Sari, Tambora	Grobol, Tomang, Jelambar Baru, Pinangsia, Glodok, Mangga Besar, Tangki, Keagungan, Krukut, Taman Sari, Maphar, Pekojan, Roa Malaka, Krendang, Tambora, Jembatan Lima, Duri Utara, Tanah Sereal, Angke, Jembatan Besi, Kali Anyar, Duri Selatan
	South Jakarta	Setia Budi	Pasar Manggis
	North Jakarta	Penjaringan	Penjaringan, Pejagalan, Kapuk Muara, Pluit
ZoneNo.6 [Design Population] 1,172,574 [Design Average Wastewater Volume] 235,000m^3/day	Central Jakarta	Gambir, Tanah Abang	Cideng, Kampung Bali, Kebon Kacang, Kebon Melati, Petamburan, Karet Tengsin, Bendungan Hilir, Gelora
	West Jakarta	Cengkareng, Grogol Petamburan, Kebon Jeruk, Kalideres, Palmerah, Kembangan, Tambora	Kapuk, Kedaung Kali Angke, Duri Kosambi, Rawa Buaya, Grogol, Jelambar, Tanjung Duren Utara, Tomang, Jelambar Baru, Wijaya Kusuma, Tanjung Duren Selatan, Kedoya Utara, Duri Kepa, Kedoya Selatan, Semanan, Jatipulo, Kota Bambu Utara, Slipi, Palmerah, Kemanggisan, Kota Bambu Selatan, Kembangan Selatan, Kembangan Utara, Angke
	South Jakarta	Kebayoran Lama	Grogol Utara
	North Jakarta	Penjaringan	Pejagalan

D7.1.1 Facility Plan for Sewer age Facilities

(1) WWTP

The design daily average and maximum wastewater flows of proposed WWTPs per development year are shown in Table SMR-D7-2.

Table SMR-D7-2 Design Wastewater Flow for Proposed WWTPs per Development Plan

Development Plan	Sewerage Zone	Daily Average (m^3/day)	Daily Maximum (m^3/day)
Short-term	1	198,000	264,000
	6	235,000	313,000
Medium-term	4, 5, 8 & 10	47,000～249,000	62,000～331,000
Long-term	2, 3, 7, 9, 11, 12, 13 & 14	24,000～250,000	32,000～337,000
Total		1,999,000	2,665,000

(2) Sewer Facilities

Main sewer facilities in each sewerage zone per development plan are shown in Table SMR-D7-3 and the general layout of main sewerage facilities are shown in Figure SMR-D7-1

Table SMR-D7-3 Main Sewer Facilities in Each Sewerage Zone per Development Plan

Sewerage Zone	Area (ha)	Lateral Pipe (Nos)	Sewer Pipeline (m)					No. Relay Pump Station
			Secondary/ Tertiary Sewer	Sewer Main	Sewer Trunk	Sewer Line	Total	
[Short Term Development plan:2012～2020]								
1	4,901	101,952	656,638	86,069	5,263	10,269	758,238	-
6	5,874	130,956	829,313	154,809	11,532	12,426	1,008,080	1
1 & 6	10,775	232,908	1,485,951	240,878	16,795	22,694	1,766,318	1
[Medium-term Development plan:2021～2030]								
4, 5, 8 & 10	15,301	326,877	2,043,273	470,962	20,942	15,442	2,550.619	3
[Long Term Development plan:2031～2050]								
2, 3, 7, 9, 11, 12, 13 & 14	37,328	1,324,671	4,741,416	1,203,205	63,917	18,078	6,026,616	9
Total	63,404	1,324,671	8,270,641	1,915,044	101,654	56,214	10,343,553	13

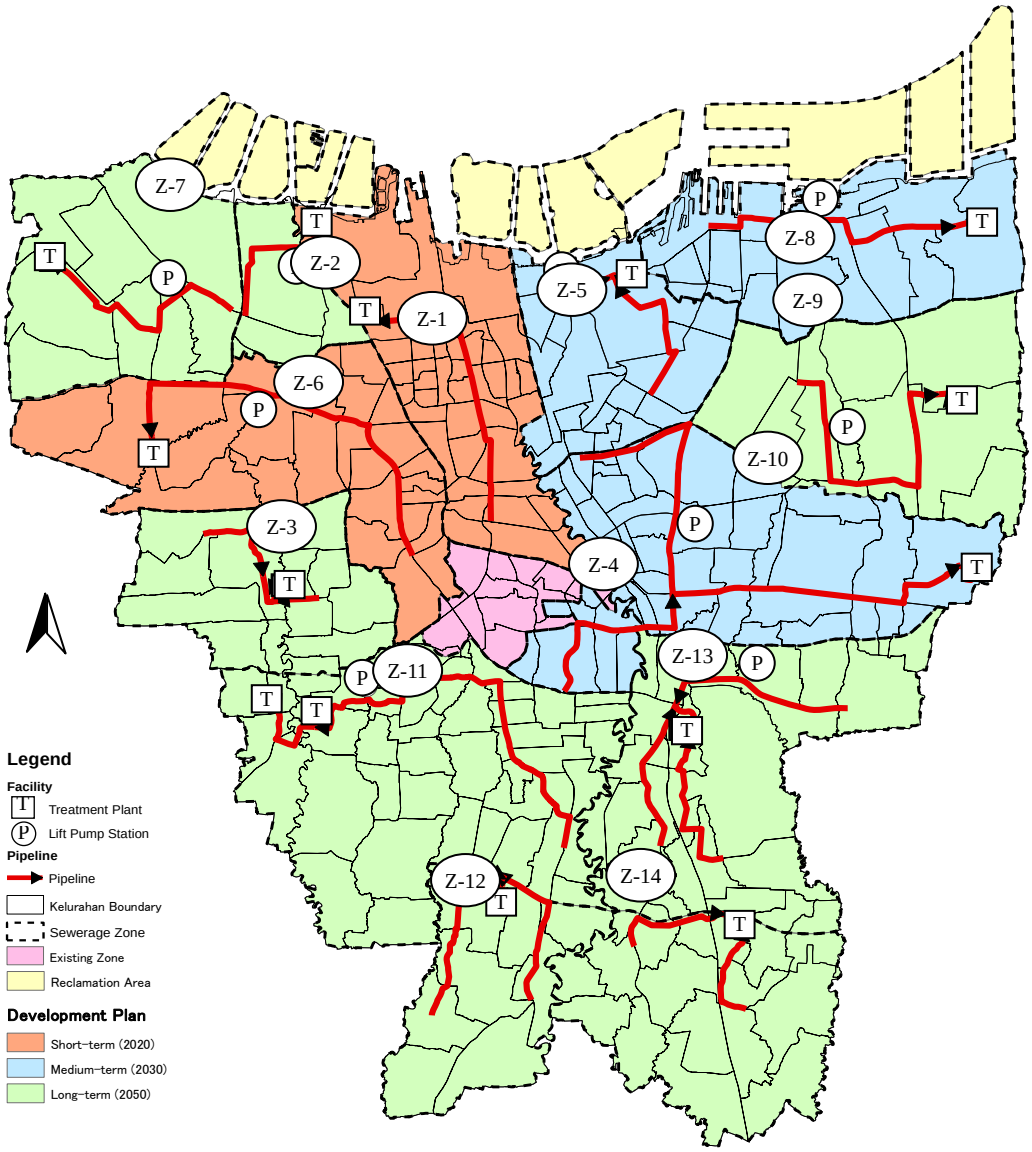


Figure SMR-D7-1 Layout Plan for Main Sewerage Facilities in Each Sewerage Zone

(3) Facility Plan of Sewer Facility under Priority Projects (Short Term Development Plan)

1) Pipeline Route Map in Sewerage Zone No. 1

Short-term Development Plan: 2012 – 2020 Sewerage Zone No. 1 and No. 6

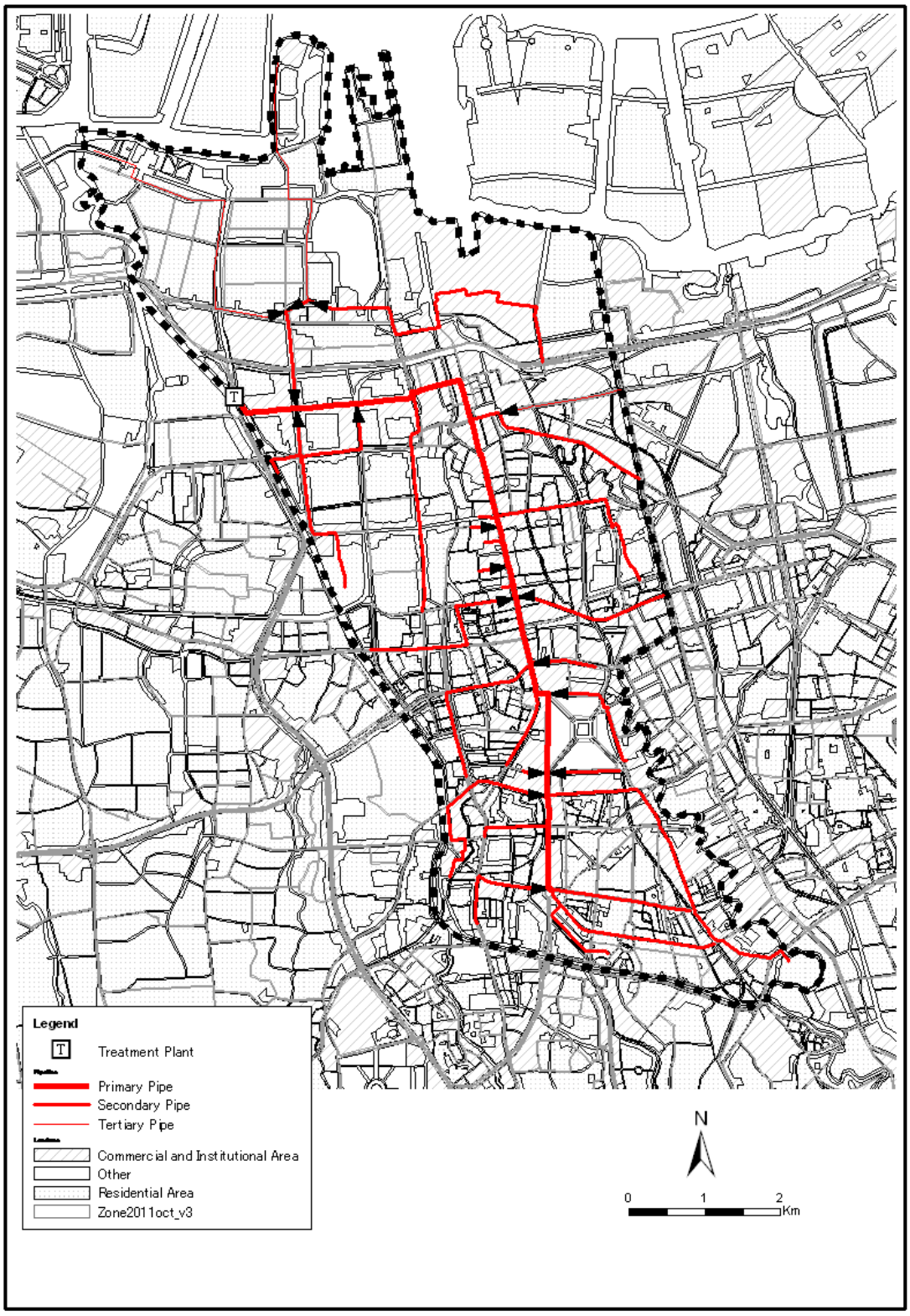


Figure SMR-D7-2 Facility Plan of Sewerage Zone No. 1

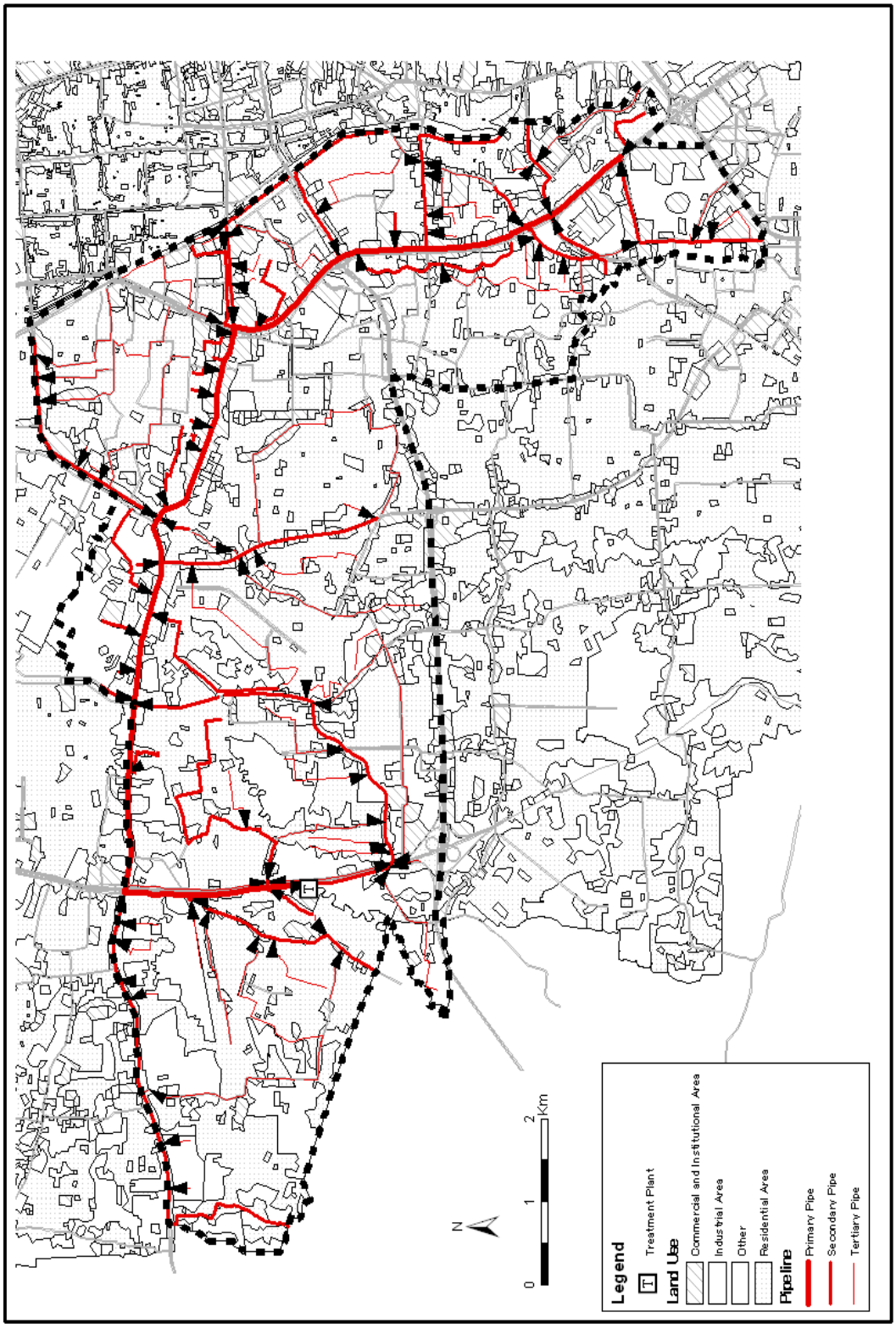


Figure SMR-D7-3 Facility Plan of Sewerage Zone No. 6

D7.1.2 Facility Plan for WWTP

(1) Wastewater Treatment Capacity in Priority Project Areas

Wastewater treatment capacity is set based on the daily maximum wastewater volume as mentioned in D6.1.3. The daily maximum wastewater volume is calculated from the daily average wastewater volume devided by the load factor. The following table shows the calculation results of wastewater

treatment capacity in the priority project areas.

However, as explained in the previous section (D-53, D6.1.3), the load factor shall be reviewed at F/S stage. Therefore, the daily maximum volumes shown in the table are subject to change in F/S.

Table SMR-D7-4 Wastewater Treatment Capacity in Priority Project Areas

Zone No.	WWTP No.	Site	Site Area (ha)	Wastewater Inflow Volume (daily average volume) (m^3/day)	Treatment Capacity (daily maximum volume) (m^3/day)
1	2	Pejagalan	6.9	198,000	264,000
6	6	Duri Kosambi	8.2	235,000	313,000

(2) Facility Plan for WWTP (as One Example for Advanced Treatment Process)

1) Process

For the advanced treatment processes shown in Table SMR-D7-5, as an example, facility plan for step-feed biological nitrogen removal process is presented.

2) Facility Structure

The following table shows principles of facility structure for facility plan of WWTPs.

Table SMR-D7-5 Principles for Facility Plan of WWTPs.

Item		Principle
Structure of facilities		• The depth of bio-rector tank is usually 5 to 6m because of considering economic efficiency of civil engineering and electric efficiency of blower. However, in the area of metropolis with high population density, deep bio-rector with depth of 10 m and two-storied primary and final settling tanks can be installed simultaneously. • As acquiring land area is the most important and prioritized issue and has many limitations in DKI, the deep bio-reactor should be examined.
Wastewater Treatment Facility	Grit chamber	• The dumped screenings like plastic bag can be seen at everywhere of drainage in DKI and causes so many accidents of screenings collector in each pump station for rain drainage. In the separated sewerage system, it is expected that the amount of floating screenings become smaller, but sufficient capacity and function of the facility is required to enable easier O&M of the facilities afterwards.
	Primary settling tank	• Two-storied type is examined because of land area limitation. If there is room, conventional type is better because of easy maintenance of screenings and scum production.
	Bio-reactor	• It can be examimend that depth of Bio-reactor is set up as 10 m. In the case that in future membrane filtration is set up and operated as MBR for waste water re-use, it is possible to consider that bio-reactor can be divided into two stories, lower tank for anoxic tank and upper tank for oxic tank.
	Final settling tank	• Final settling tank should be working well as not only in routine operation but also in the worst case of no operation of activated sludge as a primary treatment. So, the surface loading should be less than 25m3/m2/d and in case of no limitation of land area, 15m3/m2/d.
	Rapid filtration	• It can be examined that treated water by rapid filtration is reused for cleansing of dewatering facilities and other equipment in WWTP.
Sludge Treatment Facility	Sludge thickener	• Sludge thickener facility should be used not only for thickening and storing excess sludge but also for receiving on-site desludging sludge. • In Zone No. 6, it is necessary to integrate with the existing sludge treatment function. It is required to keep the function of sludge receiving, thickness and storage during the construction.
	Sludge digester	• In the case that land area is not limited, Sludge digester should be installed in the future not only for decreasing excess sludge but also for storage of sludge in

Table SMR-D7-5 Principles for Facility Plan of WWTPs.

Item		Principle
		emergency and treatment of on-site desludging sludge. Moreover, the sludge can generate power through biogas production which will help in reducing in global warming. The sludge digestion facility has not been considered in the New M/P. In the long term when there is sufficient capability build up of PD PAL JAYA to operate and maintain the proposed sewerage system, sludge digestion facility may be installed at the same WWTP if land is still available or elsewhere.
	Dewatering facility	• The capacity of dewatering machine is designed based on digested sludge volume generated from daytime operation. • In case that no digester is equipped or on-site desludging sludge is received, one measure should be taken such as capacity of the facility is increased or operation time a day is extended. • In Zone No. 6, it is necessary to integrate with the existing sludge treatment function. It is required to keep the dewatering function during the construction.
Sludge Disposal		Dewatered sludge is transferred to the final disposal site for landfill, etc.

Based on the above principles, the outline design for Zone No.1 and No.6 was prepared. Main design parameters are shown in Table SMR-D7-6. Treatment flow and layout of each zone are shown from Figure SMR-D7-4 to Figure SMR-D7-7 respectively. As a result, it has been found that, as presented by one example, an advanced treatment process can be designed within the boundary of the secured land area for the priority projects in Zone No.1 and No.6.

Table SMR-D7-6 Main Design Parameters for WWTPs in Zone No.1 and No.6 (Example)

Item		Parameter
Process		• Wastewater treatment: Step influent multistage denitrification- nitrification process (excluding returning water load) • Sludge Treatment: gravity thickening + dewatering (excluding the treatment of sludge from on-site system)
Wastewater Treatment Facility	Grit chamber	• Surface loading: 1,800m^3/m^2/day
	Primary settling tank	• 2 channels / 1 train x 10 trains (2 layers) • Surface loading: 65m^3/m^2/day • Retention time: 1.5h
	Bio-reactor	• Step influent multistage denitrification- nitrification process (deep tank) • Step-feed ratio: 0.5 : 0.5 with 2 stages • Water temperature: 20˚C(or more depending on actual data) • HRT: 8.52h
	Final settling tank	• 2 channels / 1 train x 10 trains (2 layers) • Surface loading: 25m^3/m^2/day (15 to 25 m^3/m^2/day) • Retention time: 3.5h (3 to 4h)
	Rapid filtration	• High-speed fiber filter • Filtration speed: 1000m/day
	Chlorine sterilization pond	• HRT: 15 min
Sludge Treatment Facility	Sludge thickener	• Gravity thickening tank • Primary settling sludge thickening tank: 2 tanks, Excess sludge thickening tank: 3 tanks
	Sludge digester	• None (future option)
	Dewatering facility	• Pressure screw press • Operation time: 9hours x 7 days/week

Note: Values in ( ) shows the design guideline values.

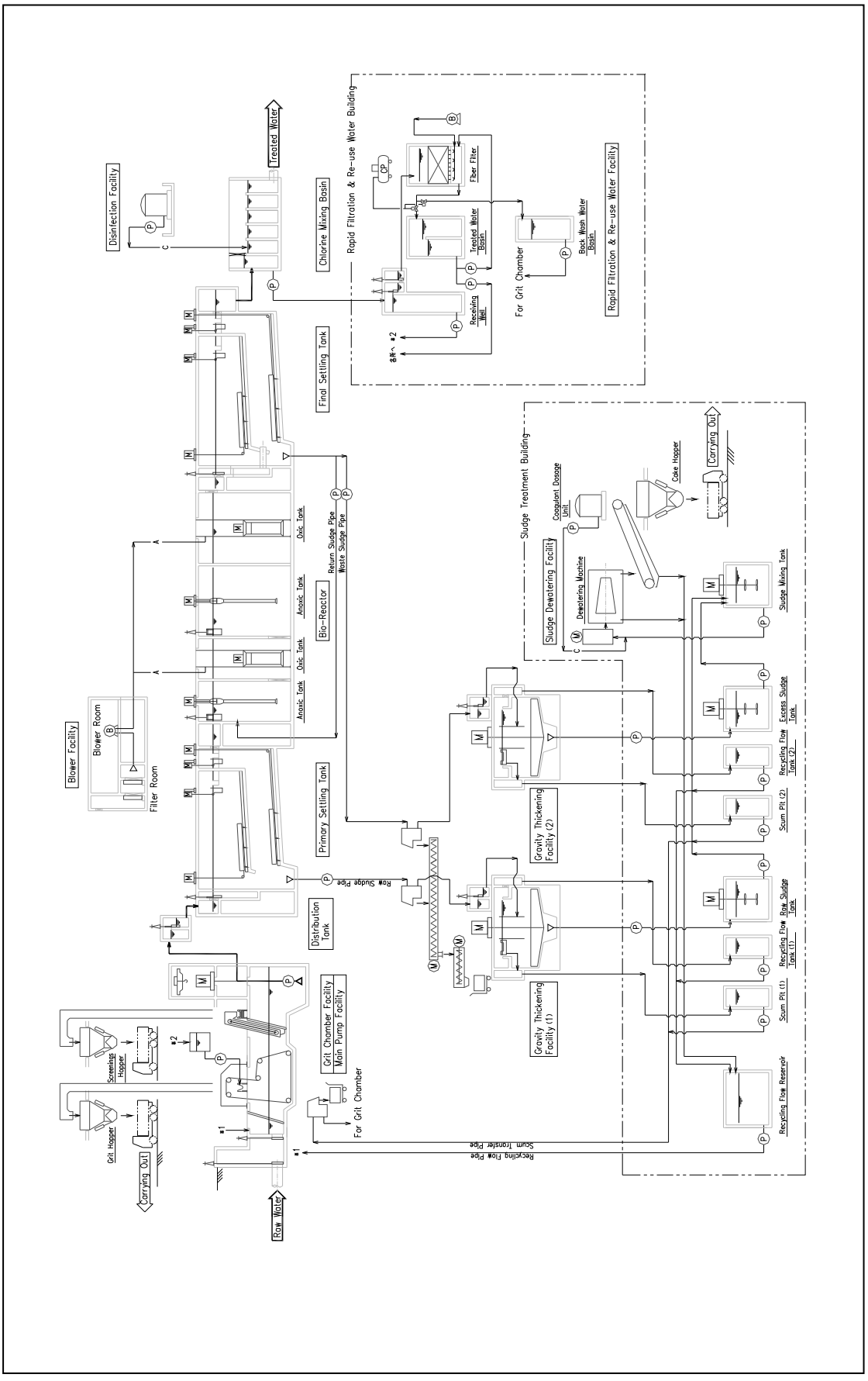


Figure SMR-D7-4 Treatment Flow of WWTP in Zone No. 1 (Pejagalan) (Example)

Notes:

1. The land area required for Zone 1 WWTP is 6.9 Ha
2. New M/P proposed policy to integrate the WWTP facility area with non-facility area (called as green area)

Figure SMR-D7-5 Layout of WWTP in Zone No. 1 (Pejagalan) (Example)

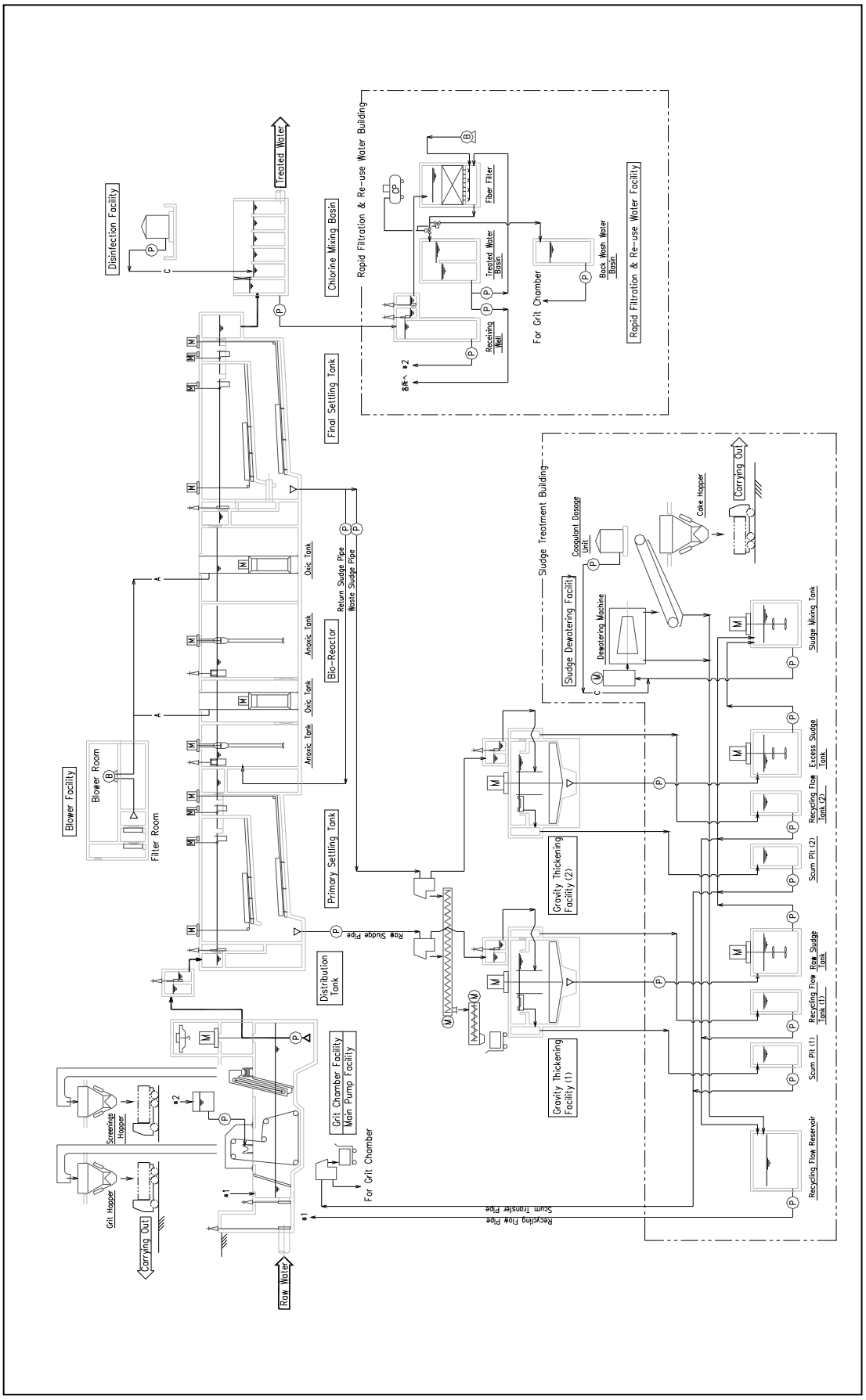


Figure SMR-D7-6 Treatment Flow of WWTP in Zone No. 6 (Duri Kosambi) (Example)

Notes:

1. The land area required for Zone 6 WWTP is 8.2 Ha
2. Layout of the Existing STP is covered in 4 -5 Ha land area
3. New M/P combined the function of the Existing STP with WWTP

Figure SMR-D7-7 Layout of WWTP in Zone No. 1 (Duri Kosambi) (Example)

D7.1.3 Construction Cost and O&M cost of Off-site Development Plan.

The construction cost and annual O&M cost related to Off-site development plan, which the summary is mentioned.

Table SMR-D7-7 Construction Cost and Annual O&M Cost Related to On-site Development Plan

Unit: Million IDR

development contents			Construction cost			Annual O&M cost (Maximum)	Remarks
			Initial construction cost	Facilities replacement cost (2013-2050)	Total		
A. Short-term development plan							
(1)	Zone No.1	Development of sewerage system	5,192,315	1,079,250	6,271,565	124,945	Replacement period; after 2025
(2)	Zone No.6	Development of sewerage system	7,110,408	1,357,898	8,468,307	153,535	Replacement period; after 2026
		Total of Short-term plan	12,302,723	2,437,148	14,739,871	278,480	
B. Medium-term development plan							
(1)	Zone No.4	Development of sewerage network	636,325	0	636,325	29,148	
(2)	Zone No.5	Development of sewerage system	3,586,678	570,552	4,157,230	81,514	Replacement period; after 2033
(3)	Zone No.8	Development of sewerage system	4,856,836	794,711	5,651,547	112,733	Replacement period; after 2035
(4)	Zone No.10	Development of sewerage system	7,639,771	1,322,893	8,962,664	159,289	Replacement period; after 2034
		Total of Medium-term plan	16,719,610	2,688,156	19,407,766	382,684	
C. long-term development plan							
(1)	Zone No.2	Development of sewerage system	1,158,206	0	1,158,206	17,082	Replacement period; after 2051
(2)	Zone No.3	Development of sewerage system	3,701,406	24,508	3,725,914	74,939	Replacement period; after 2049
(3)	Zone No.7	Development of sewerage system	3,967,381	23,963	3,991,345	73,248	Replacement period; after 2044
(4)	Zone No.9	Development of sewerage system	4,333,679	18,550	4,352,229	59,821	Replacement period; after 2042
(5)	Zone No.11	Development of sewerage system	8,643,992	56,387	8,700,380	167,885	Replacement period; after 2047
(6)	Zone No.12	Development of sewerage system	3,253,732	0	3,253,732	58,309	Replacement period; after 2051
(7)	Zone No.13	Development of sewerage system	5,624,321	0	5,624,321	110,360	Replacement period; after 2051
(8)	Zone No.14	Development of sewerage system	3,674,569	21,449	3,696,018	65,689	Replacement period; after 2046
		Total of Long-term plan	34,357,286	144,858	34,502,144	627,332	
		Grand total	63,379,619	5,270,162	68,649,781	1,288,496	

D8 On-site Sanitation System Planning, Design and O&M

D8.1 Basic Policies for the Plan for Improving On-site Treatment Systems

In DKI Jakarta, 90% of the domestic wastewater relies on on-site treatment, mainly septic tanks. They are used widely but have issues to be addressed; for example, most of them are of a soil penetration type that causes environmental pollution. A typical environmental pollution problem caused by the septic tank is groundwater contamination, which results in well and tap water pollution. This problem is expected to cause damage to health, such as water-derived infectious diseases.

Basic policies for improving the on-site treatment system include switching to sewage works (discontinuance of septic tanks) and changing the conventional septic tank to the modified one to improve its functions.

D8.2 Plan for Improvement of Septic Tanks

The structures of single (conventional type) and combined (new type) septic tanks were standardized in 2002 and 2005, respectively. However, both standards are just guidelines and do not define tank capacity. As a result, it is said that many tanks installed actually may not work well because of insufficient capacity. If a modified septic tank does not have sufficient capacity, the treatment function degrades considerably. Therefore, it is necessary to review the structural standards and to introduce a performance evaluation system.

Obligation to install modified septic tanks in a newly developed area is the most effective way to switch from the conventional type to the modified type, but many developers install the former in each

house at their own discretion. The introduction of a distributed wastewater treatment system (as opposed to house-by-house treatment) that collects and treats wastewater from multiple houses in each block is advantageous from a cost point of view, but it is hardly employed. As one measure in a newly developed area, the government shall strengthen its administrative functions and oblige the developers to install modified septic tanks or to select collective treatment.

D8.3 Sludge Treatment Plant

D8.3.1 Sludge Treatment Methods

(1) Forecasting the (Throughput) Generation of Sludge

Table SMR-D8-1 and Figure SMR-D8-1 show the estimated sludge generation rates of conventional septic tanks (CST), modified septic tanks (MST), and individual wastewater treatment plants (ITP) for commercial buildings.

Table SMR-D8-1 Estimated Sludge Generation Rate (m^3/day)

Year	2012	2014	2015	2020	2025	2030	2035	2040	2045	2050
CST	257	307	354	544	495	403	298	183	77	0
MST	0	620	679	960	1,366	1,638	1,723	1,660	1,433	1,000
ITP	0	457	530	866	1,418	1,847	1,731	1,385	808	0
Sludge(total)	257	1,385	1,564	2,370	3,279	3,887	3,752	3,229	2,317	1,000
Capacity	600	450	1,050	1,050	600	600	600	600	600	600
Co-treatment	0	934	514	1,320	2,679	3,287	3,152	2,329	1,717	400

Note: Capacity represents the throughput of dedicated sludge treatment facilities.
Co-treatment means joint treatment with sewage treatment plants.

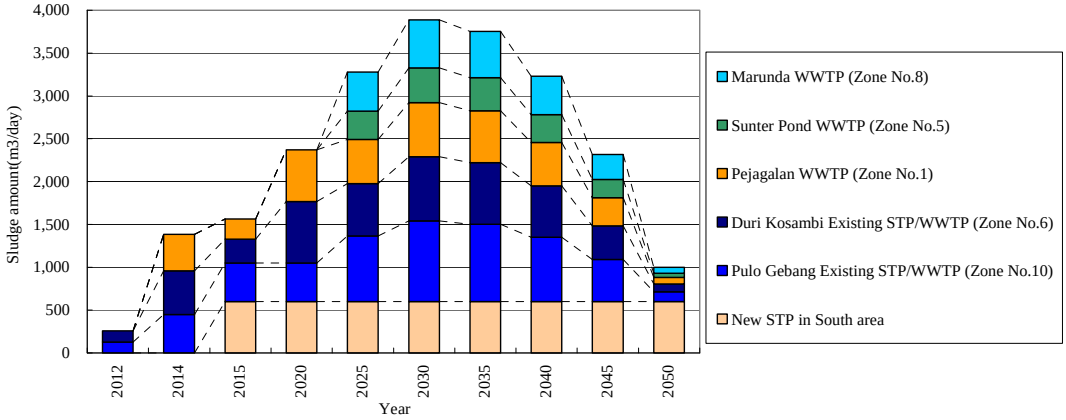


Figure SMR-D8-1 Estimated Sludge Generation Rate

(2) Characteristics of Sludge

Table SMR-D8-2 shows the SS concentration of sludge generated in CST, MST, and ITP.

Table SMR-D8-2 SS Concentration of Sludge

Type	SS (%)
CST	1.5
MST	1.5
ITP	1.5

(3) Sludge Treatment System

This system consists of three elements: collection and transportation, treatment, and disposal. The following describes these elements from a technical point of view. Note that the DKI Jakarta Cleansing Department is responsible for the collection and treatment of sludge from the existing septic tanks.

a) Dedicated Treatment Facility

This facility receives sludge generated in conventional and modified septic tanks, as well as excess

sludge in individual wastewater treatment plants. The sludge has common characteristics: liquefied and dense organic waste, high corrosiveness, and offensive odor, so sanitary treatment is necessary. Figure SMR-D8-2 shows the basic sludge treatment, which includes solid-liquid separation in the first stage and the biological treatment of the resultant wastewater.

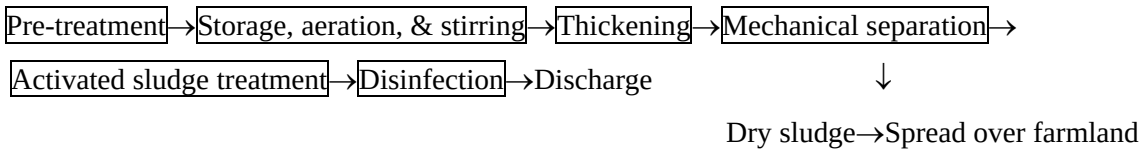


Figure SMR-D8-2 Flowchart of Basic Sludge Treatment

b) Delivery to Sewage Treatment Plants

This plant is equipped with a unit for treating sludge generated in the wastewater treatment process. Sludge generated in sewers will be first condensed and then treated with the sludge dehydrator. Figure SMR-D8-3 shows the flowchart.

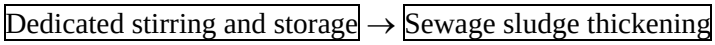


Figure SMR-D8-3 Flowchart of the Delivery of Sludge to a Sewage Treatment Plant

D8.3.2 Facility Plan of Sludge Treatment Plant (STP)

(1) Basic Plan for Sludge Treatment Plant

a) In principle, the sludge generated from the on-site system, in conjunction with the sludge generated from the processing off-site system and process mixture of sludge and sewage sludge in the sludge treatment facilities of sewage treatment facilities.

b) Two existing sludge treatment facilities will be integrated into the sludge treatment facilities The sewage treatment facilities are developed into new

c) Sludge treatment facilities to new development in the district of South Jakarta is the development of sewage treatment facility is not expected during the short and medium-term plan, to facilitate introduction of periodic sludge withdrawal the same district.

(2) Development Plan Sludge Treatment Facilities

Development plan sludge treatment facilities are the following.

Table SMR-D8-3 Outline of Short-term Plan for STPs

Facility name and place	Outline of the plan
A. Existing sludge treatment facilities Pulo Gebang Sludge Treatment Plant (East Jakarta) Duri Kosambi Sludge Treatment Plant (West Jakarta)	<Pulo Gebang Sluge Treatment Facility> [Short-term plan] • Mechanization: Reduces unsanitary working conditions and overwork by using machines for taking out grit and extracting sludge. • Increased throughput by mechanization: 300 m^3/day → 450 m^3/day • Necessary area for addition: 500 m^2 • Period: 2013 (1 year) [Medium-term plan] • The sludge treatment function is integrated into a new sewage treatment plant to be constructed at the same site. • Throughput: Up to 940 m^3/day • Period: 2021 to 2022 (2 years) <Duri Kosambi Sluge Treatment Facility> • The existing facility is discontinued after commissioning of new sewage

Table SMR-D8-3 Outline of Short-term Plan for STPs

Facility name and place	Outline of the plan
	treatment plant and the septic sludge treatment function is integrated into a new sewage treatment plant to be constructed at the same site. • Throughput: Up to 930 m^3/day • Period: 2013 (1 year)
B. Constructing a new facility called Waduk Uljami This facility will be constructed in the Jakarta South.	• Throughput: 600 m^3/day • Treatment system: Solid-liquid separation and activated sludge treatment • Necessary site area: 1.5 ha • Period: 2013 to 2014 (2 years) (It will be integrated into a new sewage treatment plant to be constructed in the southern part of Jakarta during the long-term plan when the latter will be completed.)
C. Delivering on-site sludge to sewage treatment plants	• Off-site sewage treatment plants to be constructed according to the short- and medium-term plans receive and treat sludge from on-site facilities. [Receiving WWTP] • Pejagalan WWTP (Zone No.1): Up to 790 m^3/day • Suntar Pond WWTP (Zone No.5): Up to 410 m^3/day • Marunda WWTP (Zone No.8): Up to 570 m^3/day

Note) The requirements new sludge treatment facility
(1) Land area required
1.5ha (Fro facility : 0.4ha, For parking and green area: 1.1ha)

(2) The requirements land selection
1) To support efficient periodic sludge withdrawal, STP will be located in a new convenient location in the transport of sludge was collected from each district the South Jakarta area. Sludge that has been collected from center and north and west and east Jakarta to be processed in a sewage
2) That there are no effects of floods, landslides does not occur, in the sunny land, good topography, good geological conditions
3) Land acquisition is easy that no environmental. (Aesthetic standpoint, Stink side)
Source: JICA expert team

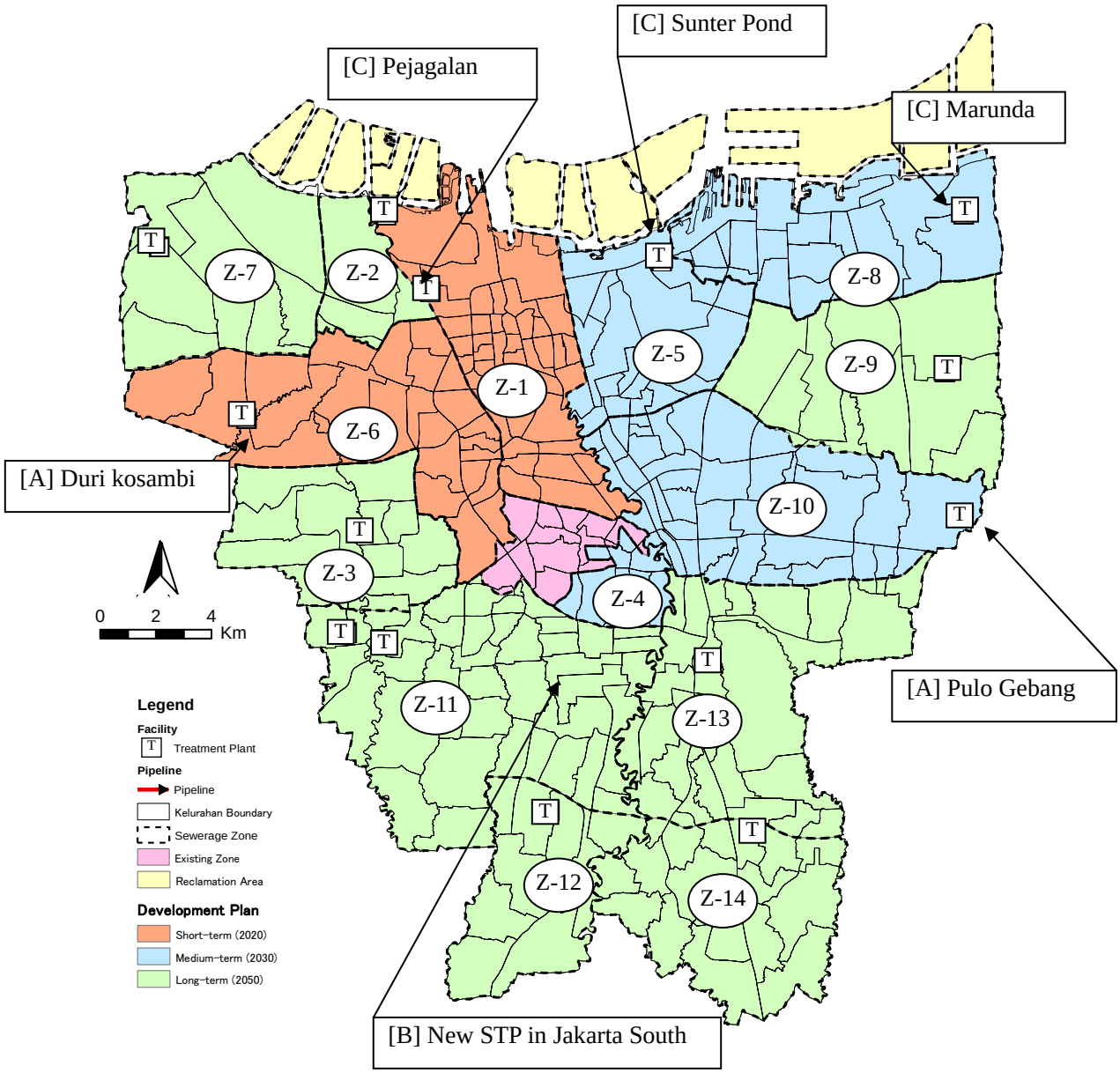


Figure SMR-D8-4 Sites of Existing STP and New STP

(3) Construction Cost and O&M cost of On-site STPs development plan.

The construction cost and O&M cost related to On-site STPs development plan, which the summary is mentioned Table SMR-D8-3, are as given in Table SMR-D8-4.

Table SMR-D8-4 Construction Cost and O&M Cost Related to On-site STPs Development Plan

Unit: Million IDR

development contents	Term	Construction cost			Annual O&M cost (maximum)
		Initial construction cost	Facilities replacement cost (2013-2050)	Total	
A. Improvement of existing STPs					
Pulo Gebang STP					
Rehabilitation and expansion of Pulo Gebang STP	Short-term	24,390	0	247,257	3,298
Integration Pulo Gebang STP with newly constructed WWTP	Medium-term	156,949	65,919		6,889
Duri Kosambi STP					
Integration Duri Kosambi STP with newly constructed WWTP	Short-term	155,279	80,745	236,025	6,816
Sub-total		336,618	146,664	483,282	17,004
B. Construction of a new STP in south area					
Construction of a new STP in south area	Short-term	42,100	20,275	62,375	12,934
Sub-total		42,100	20,275	62,375	12,934
C. Co-treatment of On-site sludge at WWTPs					
Pejagalan WWTP (Zone No.1)	Short-term	131,904	68,590	200,494	5,790
Sumtar Pond WWTP (Zone No.5)	Medium-term	68,457	28,752	97,208	3,005
Marunda WWTP (Zone No.8)	Medium-term	95,171	39,972	135,143	4,178
Sub-total		295,532	137,314	432,846	12,973
Total		674,250	304,252	978,503	42,910

(4) Plan for Modifying Existing sludge Treatment Facilities

The following shows a proposal for modifying the existing sludge treatment facility for effective use. Note that the target quality of collected sludge and treated water is set as follows:

Collected sludge: 1,000-2,000 mg/L (BOD) and 15,000 mg/L (SS)
Treated water: 30 mg/L (BOD) and 30 mg/L (SS)

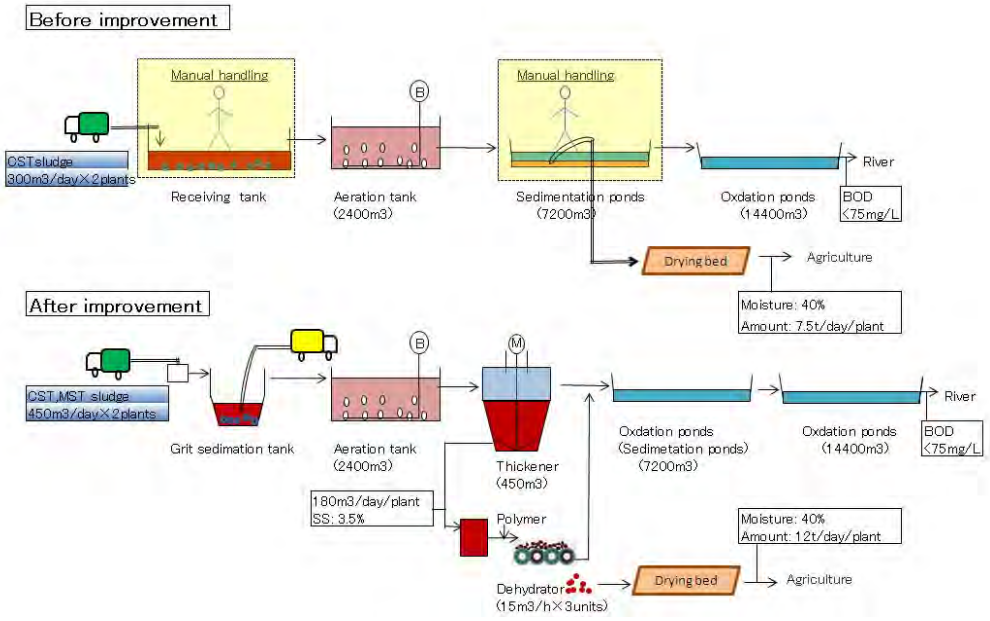


Figure SMR-D8-5 Flowchart of Modifying an Existing Sludge Treatment Facility

(5) Plan for Constructing a New Sludge Treatment Facility

The throughput of the new sludge treatment facility shall be defined appropriately in consideration of the enhancement of the existing facility and the amount of sludge to be delivered to the wastewater treatment plant. It should be 600 m^3/day, so that the total throughput including that of the existing facility after modification (450 m^3/day) becomes 1,050 m^3/day.

Figure SMR-D8-6 shows the flowchart of this facility.

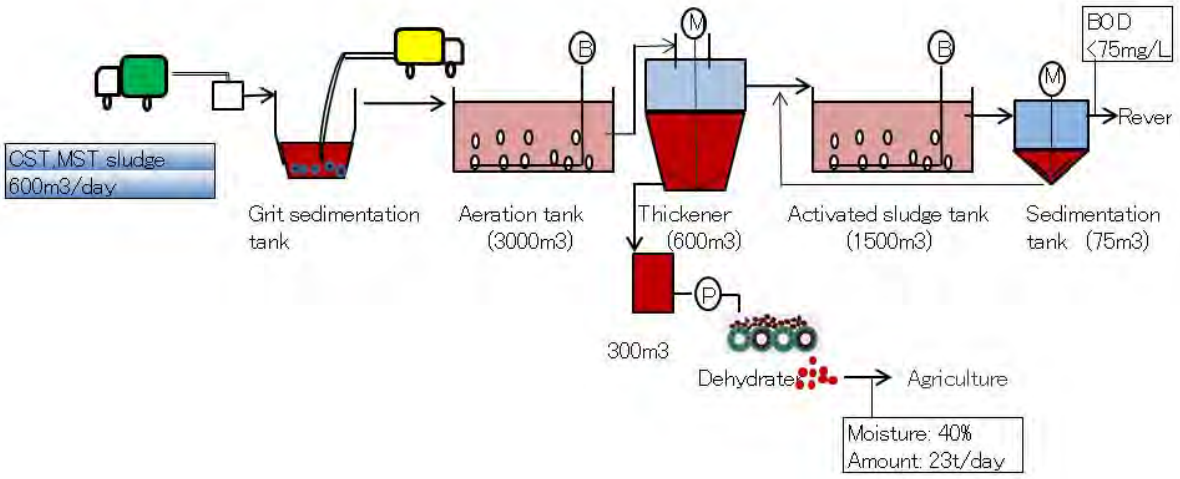


Figure SMR-D8-6 Flowchart of the New Sludge Treatment Facility

D9 Implementation Programme

D9.1 Construction and Running Costs

D9.1.1 Off-site (Sewerage System)

(1) Estimation of Construction Cost

The approximate cost developing the sewerage system has been calculated in the following expense items. For the process of WWTP, the cost estimate has been done on the assumption that modified activated sludge process with advanced treatment functions is applied. In case the applied process is changed in the F/S stage, the cost will also be changed.

1) Direct Construction Cost

The direct construction cost of sewerage system pipe connection, sewerage system piping, pumping station construction, wastewater treatment facilities construction and sewerage system facilities replacement (up to 2050) has been calculated as initial phase cost.

2) Indirect Construction Cost and Other Costs

The indirect construction cost and other costs have been calculated based on the condition in the following table.

Table SMR-D9-1 Approximate Conditions of Indirect Construction Cost and Other Costs

Items	Applied value	Remarks
Indirect construction cost	13% of direct construction cost.	Including expenses for common temporary works, expense for site management and other general items in the construction contracts other than the direct construction cost.
Engineering cost	7% of direct construction cost	Physical contingency to cover uncertainties that can not be expected at the time of the survey
Physical contingency	5% of construction cost	
Land use cost	Assuming the sites of wastewater treatment plants and pumping stations are owned by public, the land use cost does not occur.	In case that the sites are private land, the cost of land acquisition needs to be incorporated separately.
Value added tax	10%	Apply to all costs

(2) Estimation of Running Cost (O&M Cost)

The approximate running cost (O&M cost) of sewerage facilities has been calculated based on the condition in the following table.

Table SMR-D9-2 Items and Applied Value Related to the O&M Cost of Sewerage System

Items	Applied value	Remarks
O&M cost of WWTP	Labor cost, electricity consumption cost, chemicals cost and other utilities costs, facilities repair cost, sludge disposal cost, water quality analysis cost and other inspection costs, cleaning and yard maintenance cost, and physical contingency cost and overhead cost (excluding inflation)	
O&M cost of sewer	0.3% of direct sewer construction cost	
O&M cost of pumping station	3% of pumping station direct construction cost	
Value added tax	10%	Apply to all costs

D9.1.2 On-site

(1) Estimation of Construction Cost

The approximate cost for developing the on-site STP (sludge treatment plant) has been calculated in the following expense items..

1) Direct Construction Cost:

On-site STP development plans are categorized into 3 projects: (1) Development of new on-site STP in South area, (2) Rehabilitation and expansion of existing STP, and integration with newly constructed WWTPs, and (3) Development of On-site sludge treatment facilities added to newly constructed WWTPs.

The approximate cost of construction and replacement (up to 2050) of the above mentioned facilities has been calculated.

2) Indirect Construction Cost and Other Costs

The indirect construction cost and other costs have been calculated based on the condition in Table SMR-D9-1, in the same way as off-site.

(2) Estimation of Running Cost (O&M Cost)

The approximate running cost (O&M cost) of on-site STP has been calculated based on the condition in the following table.

Table SMR-D9-3 Items and Applied Value Related to the O&M Cost of On-site STP

Items	Applied value	Remarks
O&M cost of on-site STP	Unit O&M cost ◆ Existing STPs which are rehabilitated and expanded, and STPs which are integrated with WWTPs : 170 JPY/m^3(18,255 IDR/ m^3) ◆ New STP: 500 JPY/ m^3(53,690 IDR/ m^3)	
Value added tax	10%	Apply to all costs

D9.1.3 Total Cost of Construction and O&M of Off-site and On-site

Total cost of construction and annual O&M of off-site and on-site is as given in Table SMR-D9-4.

Table SMR-D9-4 Total Cost of Construction and Annual O&M for Off-site and On-site System Development

Unit: Million IDR

development contents			Construction cost			Annual O&M cost (Maximum)	Remarks
			Initial construction cost	Facilities replacement cost (2013-2050)	Total		
A. Short-term plan							
(1)	Zone No.1	Development of sewerage system	5,192,315	1,079,250	6,271,565	124,945	Replacement period; after 2025
		On-site sludge treatment facilities	131,904	68,590	200,494	5,790	Co-treatment of On-site sludge
		Sub-total	5,324,219	1,147,840	6,472,059	130,735	
(2)	Zone No.6	Development of sewerage system	7,110,408	1,357,898	8,468,307	153,535	Replacement period; after 2026
		Integration Duri Kosambi STP with newly constructed WWTP	155,279	80,745	236,025	6,816	Co-treatment of On-site sludge
		Sub-total	7,265,688	1,438,644	8,704,331	160,351	
(3)	Rehabilitation and expansion of Pulo Gebang STP		24,390	0	24,390	3,298	
(4)	Construction of a new STP in south area		42,100	20,275	62,375	12,934	
	Total of Short-term plan		12,656,397	2,606,758	15,263,155	307,319	
B. Medium-term plan							
(1)	Zone No.4	Development of sewerage network	636,325	0	636,325	29,148	
(2)	Zone No.5	Development of sewerage system	3,586,678	570,552	4,157,230	81,514	Replacement period; after 2033
		On-site sludge treatment facilities	68,457	28,752	97,208	3,005	Co-treatment of On-site sludge
		Sub-total	3,655,134	599,304	4,254,438	84,519	
(3)	Zone No.8	Development of sewerage system	4,856,836	794,711	5,651,547	112,733	Replacement period; after 2035
		On-site sludge treatment facilities	95,171	39,972	135,143	4,178	Co-treatment of On-site sludge
		Sub-total	4,952,008	834,683	5,786,691	116,910	
(4)	Zone No.10	Development of sewerage system	7,639,771	1,322,893	8,962,664	159,289	Replacement period; after 2034
		Integration Pulo Gebang STP with newly constructed WWTP	156,949	65,919	222,868	6,889	
		Sub-total	7,796,720	1,388,812	9,185,531	166,178	
	Total of Medium-term plan		17,040,187	2,822,798	19,862,985	396,756	
C. long-term plan							
(1)	Zone No.2	Development of sewerage system	1,158,206	0	1,158,206	17,082	Replacement period; after 2051
(2)	Zone No.3	Development of sewerage system	3,701,406	24,508	3,725,914	74,939	Replacement period; after 2049
(3)	Zone No.7	Development of sewerage system	3,967,381	23,963	3,991,345	73,248	Replacement period; after 2044
(4)	Zone No.9	Development of sewerage system	4,333,679	18,550	4,352,229	59,821	Replacement period; after 2042
(5)	Zone No.11	Development of sewerage system	8,643,992	56,387	8,700,380	167,885	Replacement period; after 2047
(6)	Zone No.12	Development of sewerage system	3,253,732	0	3,253,732	58,309	Replacement period; after 2051
(7)	Zone No.13	Development of sewerage system	5,624,321	0	5,624,321	110,360	Replacement period; after 2051
(8)	Zone No.14	Development of sewerage system	3,674,569	21,449	3,696,018	65,689	Replacement period; after 2046
	Total of Long-term plan		34,357,286	144,858	34,502,144	627,332	
	Grand total		64,053,869	5,574,415	69,628,284	1,331,406	

D9.2 Priority Consideration

D9.2.1 Off-Site System

There are 14 sewerage zones (zone 1 to 14) and there is an existing zone named “Zone 0” where there is existing, on-going and planned sewerage works, operated and maintained by PD PAL JAYA. Priority sequences for implementation from zone 1 to zone 14 are determined in previous chapter. The highest priority is given to Zone No.1 and No. 6 (short-term) followed by Zone No. 5, No.10, No.4 and No. 8 (medium-term) and Zone No.2, No.3, No.9, No. 10, No.11, No.12, No.13 and No.14, (long-term) All the proposed sewerage development projects will be completed by 2050. The implementation programme is proposed based on this project priority sequences as shown in D9.4.1.

D9.2.2 On-Site System

The priority works for on-site system are structure improvement of the conventional septic tanks, introduction of regular desludging system, and development of sludge treatment capacity. These works should be included in the short-term plan. Regarding to the improvement and newly construction of the sludge treatment facility, it should be prioritized that sludge from the areas, where the sewerage system will be developed after 20 years (Zone No.2, No.3, No.9, No. 10, No.11, No.12, No.13 and No.14), should be collected and treated effectively.

D9.3 Capital Investment Considerations

From 2013 when construction is expected to start for short, medium and long-term sewerage development projects and on-site sludge treatment plants development projects, the approximate total construction cost that must be capital-invested and financed by 2050, which is the long-term development year, is as given in Table SMR-D9-5 and Table SMR-D9-6.

Table SMR-D9-5 Total Capital Investment Cost Required for Short, Medium and Long-term Sewerage Development Projects

<Initial Construction Cost>

Unit : Million IDR

Items			Cost		
			Local currency	Foreign currency	Total
A. Construction Cost			41,185,186	10,631,889	51,817,074
	a. Direct Construction Cost		36,447,067	9,408,751	45,855,818
	(1)House Connection Cost		4,694,090	0	4,694,090
	(2)Collection Sewer Line	Tertiary and Secondary	10,144,598	0	10,144,598
		Main	9,990,725	0	9,990,725
		Trunk	1,273,268	1,273,268	2,546,535
		Conveyance	603,690	2,414,758	3,018,448
		Sub-total	22,012,280	3,688,026	25,700,306
	(3)Lift Pump Station	Civil/Architect Works	233,930	0	233,930
		Mecanical Facility	37,429	149,714	187,143
		Electrical Facility	23,391	23,391	46,781
		Sub-total	294,749	173,105	467,854
	(4)Wastewater Treatmment Plant	Civil/Architect Works	7,496,784	0	7,496,784
		Mecanical Facility	1,199,485	4,797,942	5,997,427
		Electrical Facility	749,678	749,678	1,499,357
		Sub-total	9,445,948	5,547,620	14,993,568
	b. Indirect Construction Cost	13% of Direct Construction Cost	4,738,119	1,223,138	5,961,256
B. Engineering Cost		7% of Direct Construction Cost	2,551,295	658,613	3,209,907
C. Physical Contingency		5% of the sum of Direct Construction Cost and Indirect Construction Cost	2,059,259	531,594	2,590,854
D. Land Use Cost			0	0	0
Total			**45,795,740**	**11,822,096**	**57,617,835**
E. Value Added Tax		10%	4,579,574	1,182,210	5,761,784
Grand Total			**50,375,314**	**13,004,305**	**63,379,619**

<Facility Re placement (2013-2050)>

Unit : Million IDR

Items			Cost		
			Local currency	Foreign currency	Total
A. Construction Cost			1,192,197	3,116,512	4,308,710
	a. Facilities Replacement Cost (Direct Construction Cost) (from 2013 to 2050)	Mecanical Facility	567,645	2,270,578	2,838,223
		Electrical Facility	487,397	487,397	974,795
		Sub-total	1,055,042	2,757,976	3,813,018
	b. Indirect Construction Cost	13% of Direct Construction Cost	137,155	358,537	495,692
B. Engineering Cost		7% of Direct Construction Cost	73,853	193,058	266,911
C. Physical Contingency		5% of the sum of Direct Construction Cost and Indirect Construction Cost	59,610	155,826	215,435
Total			**1,325,660**	**3,465,396**	**4,791,057**
D. Value Added Tax		10%	132,566	346,540	479,106
Grand Total			**1,458,226**	**3,811,936**	**5,270,162**

Table SMR-D9-6 Total Capital Investment Cost Required for Short, Medium and Long-term On-site Sludge Treatment Plants Development Projects

<Initial Construction Cost>

Unit : Million IDR

Items		Cost		
		Local currency	Foreign currency	Total
A. Construction Cost		343,172	208,073	551,245
a. Direct Construction Cost		303,692	184,135	487,827
(1) Civil and Building works		242,393	0	242,393
(2) Mechanical facilities		16,812	184,135	200,948
(3) Electrical facilities		44,486	0	44,486
b. Indirect Construction Cost	13% of Direct Construction Cost	39,480	23,938	63,418
B. Engineering Cost	7% of Direct Construction Cost	21,258	12,889	34,148
C. Physical Contingency	5% of the sum of Direct Construction Cost and Indirect Construction Cost	17,159	10,404	27,562
D. Land Use Cost		0	0	0
Total		**381,589**	**231,366**	**612,955**
F. Value Added Tax	10%	38,159	23,137	61,295
Grand Total		**419,748**	**254,503**	**674,250**

<Facility Re placement (2013-2050)>

Unit : Million IDR

Items			Cost		
			Local currency	Foreign currency	Total
A. Construction Cost			71,018	177,728	248,747
a. Facilities Replacement Cost (from 2013 to 2050)		Mecanical Facility	14,360	157,282	171,642
		Electrical Facility	48,488	0	48,488
		Sub-total	62,848	157,282	220,130
b. Indirect Construction Cost	13% of Direct Construction Cost		8,170	20,447	28,617
B. Engineering Cost	7% of Direct Construction Cost		4,399	11,010	15,409
C. Physical Contingency	5% of the sum of Direct Construction Cost and Indirect Construction Cost		3,551	8,886	12,437
Total			**78,969**	**197,624**	**276,593**
D. Value Added Tax	10%		7,897	19,762	27,659
Grand Total			**86,865**	**217,387**	**304,252**

D9.4 Implementation Schedule

D9.4.1 Sewerage Development Project (Off-site)

(1) Implementation Schedule for Sewerage Development Project

Sewerage system development is divided into short-term projects to be implemented between 2013 and 2020, medium-term projects to be implemented between 2021 and 2030, and long-term projects to be implemented between 2031 and 2050; work is to be carried out by the zone according to the priority ranking of the various zones.

Basically, the wastewater treatment plant is to be built first, and the wastewater treatment plant and sewage pipeline are to be opened when the construction is complete or 1 to 2 years after the star of construction. Replacement of machinery and electrical equipment thought to have reached the service life is scheduled to be completed by 2050; some electrical equipment (especially equipment equipped with measuring instruments) is scheduled to be replaced 10 years after construction, and some machinery and electrical equipment is scheduled to be replaced 20 and 30 years after construction.

Construction for short-term projects is scheduled to begin in 2013, with feasibility studies (F/S) and

design conducted in 2012.

In order to achieve "15% sewerage service coverage ratio by 2020," which is the goal of the short-term project, the system will be developed in zones No.1 and No.6 simultaneously from 2013 to 2020. It is necessary to perform the work in a concentrated and swift manner.

In addition, in the actual planning of particular investment in the particular zone like F/S, considering the policy priority, budget allocation, implementation capacity, etc., such adjustment of the size of investment would be made as the phased implementation of the investment, so that the size of investment would be realistic from the view point of the availability of DKI Jakarta's local budget in particular.

The sewerage development project schedule is given in Table SMR-D9-7.

(2) Construction Costs by Stage (Off-site)

Construction cost for each term is given in Table SMR-D9-8. Detailed construction cost for each zone is as given in F/R Part-D:D9.4.

The estimated construction costs required for short, medium and long-term plans are approximately 12.0 trillion IDR (111.8 billion JPY), 16.7 trillion IDR (155.5 billion JPY) and 40.0 trillion IDR (372.5 billion JPY) respectively. The total is 68.6 trillion IDR (638.8 billion JPY).

(3) Running Costs by Stage (Off-site)

O&M cost for each year and term is given in Table SMR-D9-9. Detailed O&M cost for each zone is as given in F/R Part-D:D9.4.

The annual O&M costs are estimated to be the maximum of 195 billion IDR/year (1.8 billion JPY/year) in the short-term development plan(by 2020), to be the maximum of 536 billion IDR/year (5.0 billion JPY/year) in the medium-term development plan(by 2030) and to be the maximum of 1.3 trillion IDR/year (11.8 billion JPY/year) in the long-term development plan(by 2050). Unlike construction cost, which is a temporary cost, O&M cost is and increases year by year as sewerage system development progresses.

Table SMR-D9-7 Sewerage Development Project Schedule

Term	Zone	Population in 2030 Persons	Wastewater Flow m^3/day	WWTP Capacity m^3/day	Development Priority	Items	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Short-term (2012-2020)	Zone 1	989,389	198,000	264,000	1	WWTP		*		*		*								▽					
						Sewer		*	*	*	*	*	*	*											
						H/C			*	*	*	*	*	*	*	*	*	*							
						O&M																			
	Zone 6	1,172,574	235,000	313,000	2	WWTP		*		*		*		*							▽				
						Sewer		*	*	*	*	*	*	*	*										
						H/C			*	*	*	*	*	*	*	*	*	*							
						O&M																			
Medium-term (2021-2030)	Zone 4	232,637	(47,000)*	(62,000)*	6	WWTP																			
			* Wastewater in Zone 4 is treated at WWTP of Zone 10. Therefore there is no WWTP for Zone 4.			Sewer																*	*		
						H/C																	*	*	*
						O&M																			
	Zone 5	636,087	127,000	170,000	4	WWTP											*			*					
						Sewer												*	*	*	*				
						H/C													*	*	*	*	*	*	*
						O&M																			
	Zone 8	880,110	176,000	235,000	5	WWTP												*			*				
						Sewer													*	*	*	*	*	*	
						H/C														*	*	*	*	*	*
						O&M																			
	Zone 10	1,239,402	295,000	393,000	3	WWTP										*				*					
			* WWTP of Zone 10 handles wastewater including Zone 4.			Sewer											*	*	*	*	*	*	*	*	
						H/C												*	*	*	*	*	*	*	*
						O&M																			
Long-term (2031-2050)	Zone 2	119,234	24,000	32,000	14	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 3	577,201	115,000	154,000	11	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 7	554,119	111,000	148,000	8	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 9	429,982	86,000	115,000	6	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 11	1,262,858	253,000	337,000	8	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 12	444,308	89,000	118,000	13	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 13	842,979	169,000	225,000	12	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Zone 14	493,815	99,000	132,000	8	WWTP																			
						Sewer																			
						H/C																			
						O&M																			
	Total	9,874,694	1,977,000	2,636,000		Remarks : * ; Construction ▪▪▪▪▪ ; O & M ▼ ; Mecanical Facility replacement ▽ ; Electrical Facility replacement																			

Term	Zone	Population in 2030 Persons	Wastewater Flow m^3/day	WWTP Capacity m^3/day	Development Priority	Items	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Short-term (2012-2020)	Zone 1	989,389	198,000	264,000	1	WWTP					▼	▽									▼	▽				
						Sewer																				
						H/C																				
						O&M																				
	Zone 6	1,172,574	235,000	313,000	2	WWTP						▼	▽									▼	▽			
						Sewer																				
						H/C																				
						O&M																				
Medium-term (2021-2030)	Zone 4	232,637	(47,000)*	(62,000)*	6	WWTP							▽										▼	▽		
			* Wastewater in Zone 4 is treated at WWTP of Zone 10. Therefore there is no WWTP for Zone 4.			Sewer																				
						H/C																				
						O&M																				
	Zone 5	636,087	127,000	170,000	4	WWTP			▽										▼	▽						
						Sewer																				
						H/C	*	*																		
						O&M																				
	Zone 8	880,110	176,000	235,000	5	WWTP					▽										▼	▽				
						Sewer																				
						H/C	*	*	*																	
						O&M																				
	Zone 10	1,239,402	295,000	393,000	3	WWTP				▽										▼	▽					
			* WWTP of Zone 10 handles wastewater including Zone 4.			Sewer																				
						H/C	*	*	*	*																
						O&M																				
Long-term (2031-2050)	Zone 2	119,234	24,000	32,000	14	WWTP																			*	
						Sewer																				*
						H/C																				*
						O&M																				
	Zone 3	577,201	115,000	154,000	11	WWTP								*			*							▽		
						Sewer									*	*	*	*								
						H/C										*	*	*	*	*	*	*	*			
						O&M																				
	Zone 7	554,119	111,000	148,000	8	WWTP			*			*								▽						
						Sewer				*	*	*	*													
						H/C					*	*	*	*	*	*	*									
						O&M																				
	Zone 9	429,982	86,000	115,000	6	WWTP	*		*										▽							
						Sewer		*	*	*																
						H/C			*	*	*	*	*													
						O&M																				
	Zone 11	1,262,858	253,000	337,000	8	WWTP				*			*			*							▽			
						Sewer					*	*	*	*	*	*	*	*	*							
						H/C						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
						O&M																				
	Zone 12	444,308	89,000	118,000	13	WWTP															*		*			
						Sewer																*	*	*		
						H/C																	*	*	*	*
						O&M																				
	Zone 13	842,979	169,000	225,000	12	WWTP											*			*						
						Sewer												*	*	*	*	*	*			
						H/C													*	*	*	*	*	*	*	*
						O&M																				
	Zone 14	493,815	99,000	132,000	8	WWTP				*			*									▽				
						Sewer						*	*	*	*												
						H/C							*	*	*	*	*	*	*								
						O&M																				
	Total	9,874,694	1,977,000	2,636,000		Remarks : * ; Construction ▪▪▪▪▪ ; O & M ▼ ; Mecanical Facility replacement ▽ ; Electrical Facility replacement																			

Table SMR-D9-8 Construction Cost by Stage

Unit: Million IDR

Items	Term	Short-term	Medium-term	Long-term
	Total	2013-2020	2021-2030	2031-2050
A. Construction Cost	56,125,784	9,778,512	13,649,783	32,697,489
a. Direct Construction Cost	49,668,836	8,653,550	12,079,454	28,935,831
Short-term	10,664,451	8,653,550	315,418	1,695,483
Medium-term	14,041,722	0	11,764,036	2,277,686
Long-term	24,962,662	0	0	24,962,662
b. Indirect Construction Cost	6,456,949	1,124,962	1,570,329	3,761,658
B. Engineering Cost	3,476,818	605,749	845,562	2,025,508
C. Physical Contingency	2,806,289	488,926	682,489	1,634,874
D. Land Use Cost	0	0	0	0
Total (excluding Value Added Tax)	62,408,892	**10,873,186**	**15,177,834**	**36,357,872**
F. Value Added Tax	6,240,889	1,087,319	1,517,783	3,635,787
Grand Total	**68,649,781**	**11,960,505**	**16,695,618**	**39,993,659**

Table SMR-D9-9 Operation Cost by Stage

Unit: Million IDR

Items	Term	Short-term	Medium-term	Long-term
	Total	2013-2020	2021-2030	2031-2050
A. O&M Cost	20,272,175	708,859	3,344,251	16,219,065
Short-term	8,227,832	708,859	2,455,691	5,063,281
Medium-term	7,286,166	0	888,560	6,397,606
Long-term	4,758,178	0	0	4,758,178
Total (excluding Value Added Tax)	20,272,175	**708,859**	**3,344,251**	**16,219,065**
F. Value Added Tax	2,027,218	70,886	334,425	1,621,906
Grand Total	**22,299,393**	**779,745**	**3,678,676**	**17,840,971**

D9.4.2 On-site STP Development Plan

(1) Implementation Schedule for On-site STP Development Plan

On-site STP development plans are categorized into 3 projects: (1) Development of new on-site STP in South area, (2) Rehabilitation and expansion of existing STP, and integration with newly constructed WWTPs, and (3) Development of On-site sludge treatment facilities added to newly constructed WWTPs.

During the short-term plan, development of new STPs will be mainly invested. Additional investment will be made in on-site sludge treatment facilities added to WWTPs during the medium-term plan, and investment in replacement of these facilities will be required during the long-term plan.

Schedule of on-site STP development plan is given in Table SMR-D9-10

(2) Construction Cost by Stage (On-site)

Construction cost for each year and plan is given in Table SMR-D9-11. Detailed construction cost is as given in F/R Part-D:D9.4.

The estimated construction costs required for short, medium and long-term plans are approximately 354 billion IDR (3.3 billion JPY), 326 billion IDR (3.0 billion JPY) and 298 billion IDR (2.8 billion JPY) respectively. The total is 979 billion IDR (9.1 billion JPY).

(3) Running Cost by Stage (On-site)

O&M cost for each year and term is given in Table SMR-D9-12. Detailed O&M cost is as given in F/R Part-D:D9.4.

The annual O&M costs are estimated to be the maximum of 37 billion IDR/year (340 million JPY/year) at 2030 of the time when a regular sludge extraction systems will be promoted, and reach a peak of the sludge amount should be treated in on-site STPs, thereafter, are decreased to 16 billion IDR/year (150 million JPY/year) at 2050, owing to advance a switching to sewerage.

Table SMR-D9-10 Schedule of On-site STP Developing Plan

Items		Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1. On-site Sludge Treatment Plant Development Plan																					
Construction of a new STP in South area	Sludge amount	m^3/day	0	0	0	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
STP's capacity = 600 m^3/day	STP	-		*	*										▽						
	Acceptance of sludge	-				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2. Integration Plan for Off-site WWTP and On-site STP																					
(1) Duri Kosambi WWTP integrated with existing On-site STP (WWTP site No. 6 / Zone No.6)	Sludge amount	m^3/day	128	140	507	279	372	462	550	635	716	825	930	752	692	611	645	677	704	728	749
	WWTP with STP	-		*		*		*		*				▽							
STP's capacity = 930 m^3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-			▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(2) Pulo Gebang WWTP expanded and integrated with existing On-site STP (WWTP site No. 10 / Zone No.10)	Sludge amount	m^3/day	128	140	450	450	450	450	450	450	450	450	450	944	869	767	810	850	883	913	940
	WWTP with STP	-		* Expanded								*			*		*		*		
STP's capacity =(2014 - 2022) 450 m^3/day (2023 - 2050) 940 m^3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-												▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
3. Co-treatment Plan of On-site sludgeat Off-site WWTPs																					
(1) Pejagalan WWTP (site No. 2 / Zone No.1)	Sludge amount	m^3/day	0	0	427	235	313	390	463	535	604	695	783	634	583	514	543	571	593	613	631
	WWTP with STP	-		*	*	*										▽					
STP's capacity = 790 m^3/day	Acceptance of sludge	-			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-			▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(2) Sunter Pond WWTP (site No. 5 / Zone No.5)	Sludge amount	m^3/day	0	0	0	0	0	0	0	0	0	0	0	0	374	330	349	366	380	393	405
	WWTP with STP	-											*			*					
STP's capacity = 410 m^3/day	Acceptance of sludge	-													+	+	+	+	+	+	+
	WWTP O&M	-													▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(3) Marunda WWTP (site No. 8 / Zone No.8)	Sludge amount	m^3/day	0	0	0	0	0	0	0	0	0	0	0	0	0	457	483	507	527	545	561
	WWTP with STP	-												*			*		*		
STP's capacity = 570 m^3/day	Acceptance of sludge	-														+	+	+	+	+	+
	WWTP O&M	-														▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
Total de-sludging amount(sludge concentration=1.5%)		m^3/day	257	281	1,385	1,564	1,735	1,902	2,063	2,219	2,370	2,569	2,763	2,930	3,118	3,279	3,430	3,572	3,687	3,792	3,887

Remarks : * ; Construction + ; Acceptance of sludge into WWTP or STP ▪▪▪▪▪ ; O&M of WWTP or STP ▼ ; Mecanical Facility replacemen ▽ ; Electrical Facility replacement

Items		Unit	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
1. On-site Sludge Treatment Plant Development Plan																						
Construction of a new STP in South area	Sludge amount	m^3/day	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
STP's capacity = 600 m3/day	STP	-				▼▽										▼▽						
	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2. Integration Plan for Off-site WWTP and On-site STP																						
(1) Duri Kosambi WWTP integrated with existing On-site STP (WWTP site No. 6 / Zone No.6)	Sludge amount	m^3/day	743	739	731	725	718	703	679	658	633	599	562	528	482	438	391	342	286	228	167	91
	WWTP with STP	-			▼▽										▼▽							
STP's capacity = 930 m3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	O&M	-	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(2) Pulo Gebang WWTP expanded and integrated with existing On-site STP (WWTP site No. 10 / Zone No.10)	Sludge amount	m^3/day	932	928	917	911	902	882	852	825	795	752	705	662	605	550	491	429	360	286	209	114
	WWTP with STP	-		▽										▼▽								
STP's capacity =(2014 - 2022) 450 m3/day (2023 - 2050) 940 m3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
3. Co-treatment Plan of On-site sludgeat Off-site WWTPs																						
(1) Pejagalan WWTP (site No. 2 / Zone No.1)	Sludge amount	m^3/day	626	623	616	611	605	592	572	554	533	505	473	444	406	369	330	288	241	192	140	77
	WWTP with STP	-					▼▽										▼▽					
STP's capacity = 790 m3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(2) Sunter Pond WWTP (site No. 5 / Zone No.5)	Sludge amount	m^3/day	401	399	395	392	388	380	367	355	342	324	304	285	260	237	212	185	155	123	90	49
	WWTP with STP	-			▽										▼▽							
STP's capacity = 410 m3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
(3) Marunda WWTP (site No. 8 / Zone No.8)	Sludge amount	m^3/day	556	553	547	543	538	526	508	492	474	449	421	395	361	328	293	256	214	171	125	68
	WWTP with STP	-					▽										▼▽					
STP's capacity = 570 m3/day	Acceptance of sludge	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	WWTP O&M	-	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪▪
Total de-sludging amount(sludge concentration=1.5%)		m^3/day	3,858	3,842	3,806	3,782	3,752	3,683	3,578	3,485	3,377	3,229	3,065	2,915	2,713	2,522	2,317	2,099	1,856	1,600	1,331	1,000

Remarks : * ; Construction + ; Acceptance of sludge into WWTP or STP ▪▪▪▪▪ ; O&M of WWTP or STP ▼ ; Mecanical Facility replacemen ▽ ; Electrical Facility replacement

Table SMR-D9-11 Construction Cost of On-site STP by Stage

Unit: Million IDR

Items	Term	Short-term	Medium-term	Long-term
	Total	2013-2020	2021-2030	2031-2050
A. Construction Cost	799,991	289,152	266,857	243,983
a. Direct Construction Cost	707,957	255,886	236,156	215,914
1. On-site STP Development Plan	45,129	30,460	60	14,609
2. Integration Plan for Off-site WWTP and On-site STP	349,660	129,992	115,801	103,866
3. Co-treatment Plan of On-site sludge at Off-site WWTPs	313,168	95,434	120,295	97,439
b. Indirect Construction Cost	92,034	33,265	30,700	28,069
B. Engineering Cost	49,557	17,912	16,531	15,114
C. Physical Contingency	40,000	14,458	13,343	12,199
D. Land Use Cost	0	0	0	0
Total (excluding Value Added Tax)	889,548	**321,521**	**296,730**	**271,296**
F. Value Added Tax	88,955	32,152	29,673	27,130
Grand Total	**978,503**	**353,673**	**326,403**	**298,426**

Table SMR-D9-12 Operational Cost of On-site STP by Stage

Unit: Million IDR

Items	Term	Short-term	Medium-term	Long-term
	Total	2013-2020	2021-2030	2031-2050
A. O&M Cost	976,404	138,349	297,655	540,400
New STP in South area	423,292	70,549	117,581	235,162
Duri Kosambi WWTP	143,544	25,253	48,717	69,574
Pulo Gebang WWTP	162,598	22,780	52,481	87,338
Sludge treatment by Off-site WWTPs	246,969	19,768	78,876	148,326
Total (excluding Value Added Tax)	976,404	**138,349**	**297,655**	**540,400**
F. Value Added Tax	97,640	13,835	29,765	54,040
Grand Total	**1,074,044**	**152,184**	**327,420**	**594,440**

(4) Subsidy to the On-site Projects for which Indirect Support from the Public Sector is Required

As for the on-site projects for which indirect support from the public sector is required, it is conceivable that there are the project for regular desludging from septic tanks and the project for replacing Conventional Septic Tank (CST) by Modified Septic Tank (MST).

It is especially difficult for private citizens to bear the cost of replacing CST by MST, so it is necessary to provide them with an incentive to replace. It is therefore probably necessary to establish a system to provide financial assistance for replacing to MST. Local governments must consider providing financial assistance for replacing to MST as the cost of the replacement promotion project.

As the project for regular desludging from septic tanks should be basically carried out by strengthen

regulation, the financial assistance by public sectors such as DKI Jakarta or central government is limited to construction costs and O&M costs of sludge treatment plants.

When public sectors assist private citizens to replace CST by MST, the amount of funding should be estimated depending on the number of MST being subsided, the construction cost of MST per unit, and the subsidy rate.

Assuming public sectors give subsidy of 40% (the same rate for Joukasou in Japan) of the construction cost of MST, the required amount of funding can be estimated as following table;

Table SMR- D9-13 Required Amount of Funding for Promoting the Replacement CST by MST

Name of subsidy project	Subsidy for the promotion of replacing CST by MST
Subsidy rate	40 % of the construction cost of MST, which is 4,000,000 IDR per unit
Required amount of funding(estimated) during the period from 2013 to 2020	583,619 million IDR (about 55 billion JPY) as the total amount is needed during the period from 2013 to 2020 as a budgetary measure, which is 72,952 million IDR (about 700 million JPY) per year. The calculation is made as follows; * 9,599 thousand peoples (on-site population in 2020) / 5 peoples per household × 19% (replacing rate from 2012 to 2020) × 4,000,000 IDR/unit of MST × 40% = 583,619 million IDR * 583,619 million IDR / 8 years (2013-2020) = 72,952 million IDR (700 million JPY) per year

PART-E ECONOMIC AND FINANCIAL EVALUATION

PART-E ECONOMIC AND FINANCIAL EVALUATION

E1 Methodological Background

The project is evaluated by two methods of analysis: economic and financial analysis.

Economic analysis is conducted for short and medium term development plans of the Master Plan (M/P) from the standpoint of being able to quantitatively evaluate the economic effect on the community where off-site and on-site projects are implemented.

Financial analysis is conducted for the M/P and priority projects (short-term plans) from the standpoint of evaluating the sustainability of a more specific project.

On-site priority projects implemented during the short-term plans (development of new STP and improvement of existing STPs) are excluded from financial analysis because the revenue earning cannot be expected due to characteristics of the facilities.

E2 Economic Evaluation

Whether the projects of the M/P have optimal distribution of resources from the standpoint of the national economy or not is verified by calculation of Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Economic Internal Rate of Return (EIRR).

E2.1 Targets of Economic Analysis

The targets of economic analysis are sewerage (off-site) plans and on-site plans of short-term (2012 - 2020) and medium-term (2021 - 2030).

Concretely, as for off-site, projects of zones No.1, No.6, No.4, No.5, No.8 and No.10 are set as target of the analysis. As for on-site, development of new on-site sludge treatment plant in South area, rehabilitation and expansion of existing STP, and integration with newly constructed WWTPs, and co-treatment for on-site sludge at off-site WWTPs are set as the targets. The overview of the projects is provided in the Table SMR-E2-1.

Table SMR-E2-1 Overview of the Priority Project for which Economic Analysis is Conducted

<Off-site development plan>

Term	Zone No.	Area (ha)	Population for Sewerage	Wastewater Flow (m^3/day)	Capacity of WWTP (m^3/day)	Length of Pipes (m)
Short-term (2013-2020)	No.1	4,901	989,389	198,000	264,000	758,000
	No.6	5,874	1,172,574	235,000	313,000	1,008,000
Medium-term (2021-2030)	No.4	935	232,637	(47,000)	(flow into Zone No.10)	165,000
	No.5	3,375	636,087	127,000	170,000	557,000
	No.8	4,702	880,110	176,000	235,000	744,000
	No.10	6,289	1,239,402	295,000	393,000	1,085,000
Total		26,076	5,150,199	1,031,000	1,375,000	4,317,000

<On-site sludge treatment plant development plan>

Plan	Development term	Development type	Facilities name	STP's capacity (maximum) (m^3/day)
On-site STP development plan	Short term : 2013-2014	New construction	New STP in south area	600
Integration plan for off-site WWTP and on-site STP	Short term : 2013	Abolition of existing facilities and integrated	Duri Kosanbi WWTP (Zone 6)	930
		Renewal and expansion of existing facilities	Pulo Gebang STP (existing) (Zone 10)	450
	Medium term : 2021-2024	Abolition of existing facilities and integrated	Pulo Gebang WWTP (Zone 10)	940
Co-treatment plan of on-site sludge at off-site WWTPs	Short term : 2014(start acceptance)	Co-treatment	Pejagalan WWTP (Zone 1)	790
	Medium term : 2024 (start acceptance)	Co-treatment	Sunter Pond WWTP (Zone 5)	410
	Medium term : 2025 (start acceptance)	Co-treatment	Marunda WWTP (Zone 8)	570

E2.2 Project Life (Analysis Term) and Discount Rate

The term during which project analysis is conducted (project life) is from 2013 when construction is to start for a short-term project, and by 2050, which is the operation term of 2021 where sewerage system of a medium-term project is to start being used plus 30 years.

*Project life: 38 years (2013 – 2050)
*Discount rate: 12%

E2.3 Economic Evaluation

E2.3.1 Cost and Benefit Calculation Results

Pro forma calculation of cost and benefit for 38 years from 2013 to 2050 for off-site and on-site development projects in which relevant facilities are scheduled to be developed by 2030, which is the medium term plan target year, has been conducted. The results are provided in Table SMR-E2-3.

As a result of pro forma calculation, cost converted to Net Present Value (NPV) was 18,984 billion IDR, benefit was 20,219 billion IDR, with benefit outweighing cost.

Table SMR-E2-2 Calculation Results of Costs and Benefits (2013-2050)

Unit : Million IDR

	Items	Future Value	Present Value
Cost	**1. Off-site**		
	(1) Sewerage Development Plan		
	Construction Cost for Sewerage Development Plan	32,029,287	12,379,150
	O&M Cost for Sewerage Development Plan	15,513,998	1,809,361
	Sub-total	47,543,285	14,188,511
	2. On-site		
	(1) On-site Sludge Treatment Plants(STPs) Development Plans		
	Construction Cost for On-site STPs Development Plans	932,447	454,237
	O&M Cost for On-site STPs Development Plans	1,107,451	195,977
	Sub-total	2,039,898	650,214
	(2) Intoroduction of regular de-sludging system		
	Cost of regular de-sludging from septic tanks	10,840,733	1,842,135
	(3) Intoroduction of appropriate O&M for ITP		
	Cost of regular de-sludging from ITP	1,790,272	267,602
	(4) Improvement of the structure of septic tank		
	Cost of upgrading CST to MST	3,503,800	2,035,886
	Cost (total)	**65,717,987**	**18,984,347**
Benefit	**1. Effect of reduction in wastewater treatment cost**		
	(1) Reduced cost of regular de-sludging from septic tanks	2,473,234	245,586
	(2) Reduced cost of upgrading to modified septic tank	2,862,290	376,940
	(3) Reduced O&M cost of ITP	3,843,878	484,291
	(4) Reduced construction cost and O&M cost of sludge treatment	4,056,640	772,892
	Sub-total	13,236,042	1,879,711
	2. Effect of improvement in public sanitation		
	(1) Reduced medical treatment cost by reducing the number of patients suffering from waterborne disease	1,126,077	144,632
	(2) Increased benefit by reduction of absence from work due to waterborne disease	331,619	42,593
	(3) Increasd economic value by saving deaths from waterborne	54,078,945	6,945,846
	Sub-total	55,536,642	7,133,071
	3. Effect on improvement of the living environment		
	(1) Reduced cost of covering small and medium-sized open channels	2,256,131	923,223
	(2) Reduced cost of dredging open channels	3,442,805	462,628
	Sub-total	5,698,935	1,385,851
	4. Effect on improvement in quality of public waters		
	Reduced cost of purifying water at waterworks facilities	28,046,538	3,053,862
	5. Effect of rise in land value		
	Increased value of land	15,393,191	6,651,256
	6. Effect of tourism recuperation		
	(1) Increased tourism income by improving hotel occupancy	814,175	109,405
	(2) Increased tourist expenditure by decreasing rate of water borne disease	46,676	5,995
	Sub-total	860,851	115,400
	Benefit (total)	**118,772,199**	**20,219,151**

E2.3.2 NPV, B/C ratio and EIRR

As a result of economic analysis, NPV, B/C and EIRR were as given in Table SMR-E2-3.

Table SMR-E2-3 Results of Economic Analysis

Cost/benefit ratio (B/C ratio)	1.07
*Net Present Value (NPV)	1,234,803 million IDR
Economic Internal Rate of Return (EIRR)	13.9 %

*Discount rate of project = 12%

From the preceding table, B/C ratio exceeds "1" and NPV exceeds zero. Also, because EIRR was 13.9%, which excess 12% established as opportunity cost of capital that indicates limited profitability related to capital for public construction, the project is determined to be economically feasible.

E3 Financial Evaluation

Financial analysis is conducted to evaluate whether or not the project established by the Master Plan (M/P) is financially feasible. The results of financial analysis are evaluated by calculating Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Financial Internal Rate of Return (FIRR).

E3.1 Targets of Financial Analysis

Sewerage projects (off-site) are targets of financial analysis.

Zones No.1 and No.6, which are priority projects of the M/P, are targets of financial analysis; analysis is conducted for the two zones respectively.

E3.2 Project Targets

Priority projects of zones No.1 and No.6 where facilities are scheduled for development by 2020, the target year for short-term projects, are targets of financial analysis. The overview of the projects is provided in Table SMR-E3-1.

Table SMR-E3-1 Overview of the Priority Project for Financial Analysis

Term	Zone No.	Area (ha)	**Population for Sewerage**	Wastewater Flow (m^3/day)	Capacity of WWTP (m^3/day)	Length of Pipes (m)
Short-term (2013-2020)	No.1	4,901	989,389	198,000	264,000	758,000
	No.6	5,874	1,172,574	235,000	313,000	1,008,000
Total		10,775	2,161,963	433,000	577,000	1,766,000

E3.3 Project life (Analysis Term) and Discount Rate

The term during which project analysis is conducted (project life) is 33 years: sum of 3 years of construction period from 2013 when construction is to start, to 2015 when the sewerage system is to begin being used, and 30 years of operation period.

*Project life: 33 years (2013 – 2045)
*Discount rate: 1.15%
*Inflation rate: Inflation rate is not taken into account here and the constant 2012 price is used.

E3.4 Financing

E3.4.1 Financing of Construction Cost

The implementation of the sewerage project requires the financial assistance from the central government or the long-term, low-interest loan from the financial institutions including international financial institutions.

Taking into consideration the above, the financial analysis is conducted assuming that the loan from the international financial institution is mobilized for financing the construction cost.

As an example of financing by an international financial institution, with yen loans from JICA, "Fixed-Percentage Financing Criteria" is adopted, and a credit ceiling is established for loans by multiplying the total cost of the project by a fixed percentage. The upper limit of Japan's ODA loan financing is 85% for Indonesia. In keeping with this, the upper limit of the coverage of the loan from

international financial institutions is set to 85% for the financial analysis described herein as well.

In Indonesia, foreign currency loans are borrowed by the central government and on-lent to the implementing institutions such as local governments.

On the other hand, in the case of sanitation project where the central government provides a local government with financial assistance, it is the principle that the percentage of the total cost of the project borne by the central government and the local government is based on the basic concept of "matching grants," which is 1-to-1 for the central government and the local government.

Invoking the above principle, 50% of the cost of construction is assumed to be provided by the central government to the DKI Jakarta as a grant.

This means that it is assumed that once the central government receives financing of 85% of the cost of construction from international financial institutions, 50% of the construction cost must be paid back to the international financial institution by the central government, and the central government on-lends the remaining 35% to the DKI Jakarta, which the DKI Jakarta in turn is obligated to pay back.

It is assumed that the remaining 15% of the cost of construction is self-financed by the DKI Jakarta.

Table SMR-E3-2 gives percentages of financing assumed for financial analysis.

Table SMR-E3-2 Percentages of Financing for Construction Cost

No	Financing for construction cost		Funding allocation ratio	Debtor
1	Foreign currency loan	Grant from Central Gov. funded by foreign currency loan	50%	Central Gov.
2		On-lending of Foreign currency loan from Central Gov. to DKI Jakarta	35%	DKI Jakarta
3	Own funds	Budget of DKI Jakarta (APBD)	15%	-
4		Own funds of PD PAL JAYA	0%	-

E3.4.2 Financing O&M Cost

As a rule, the cost of operation and maintenance (O&M) should be borne by the beneficiary. Therefore, the financial analysis is conducted assuming that all the cost of O&M is financed by the income from sewerage charge.

E3.5 Calculation of Benefit

The benefit posted by financial analysis is sewerage charge revenue.

E3.5.1 Sewerage Charge Revenue Unit Value per Wastewater Volume

Sewerage charge is based on the sewerage charge stipulated in the order of the governor of DKI in 2011, and is the pro forma calculation of sewerage charge unit value per floor area and per volume of wastewater from the 2009 results of the sewerage works currently carried out by PD PAL JAYA. The pro forma calculation results are given in Table SMR-E3-3. For the detail calculation is given in S/R Part-E: E3.

Table SMR-E3-3 Sewerage Charge Unit Value per Floor Space Unit Area and per Wastewater Volume (from FY 2009 Results)

Category of customer	Unit charge per floor area (IDR/m^2/month)	Unit charge per wastewater flow (IDR/m^3)
Household	97	471
Non-household	529	4,557
Average unit charge	517	4,357

Pro forma calculation of project income is conducted with the sewerage charge revenue unit price as shown in the above Table SMR-E3-3 as the sewerage charge revenue unit price at the time the project

starts.

E3.5.2 Increase of Sewerage Charge

(1) Sewerage Charge Revenue Unit Price Estimate

As for PD PAL JAYA customer makeup, as of 2009, 99.5% are "non-household" (commercial buildings, etc.) at the charge revenue base. Sewerage charge revenue unit price per wastewater volume unit is the unit value near "non-household" with high charge revenue unit value (4,357 IDR / m^3); the revenue unit value can be regarded as extremely high. On the other hand, after increasing use of the sewerage system in the future, it is clear that the number of "household" customers would increase relatively in comparison to "non-household" customers. According to the results of pro forma calculation of sewerage charge revenue unit price per wastewater volume unit up to 2030 at the existing charge levels, sewerage charge revenue unit price per unit wastewater volume is expected to decrease one-third from 4,357 IDR / m^3 in 2010 to 1,457 IDR / m^3 in 2030.

Consequently, in order to make sewerage projects sustainable by compensating the decrease in sewerage charge revenue unit price, raising sewerage charge should probably not be avoided.

(2) Setting of the Case for the Seewerage Charge Increase

With financial analysis, pro forma calculation of case 1, where you want to maintain the existing sewerage charge level, and case 2, where you want to gradually increase sewerage charge in stages, is conducted.

Table SMR-E3-4 indicates the concept of financial analysis case setting concerning sewerage charge increase. Table SMR-E3-5 gives the rate at which sewerage tariff fee is raised in case 2 and the sewerage tariff revenue unit price.

Table SMR-E3-4 Financial Analysis Case Setting Concerning Sewerage Charge Increase

Case	Concept
Case 1	Sewerage charge is not raised; the current level is maintained.
Case 2	Sewerage tariff is raised by 30% every 3 years from 2016, and eventually to be raised up to 3 times level of the current level in stages through the 4 times revisions by 2025. * Household: - Sewerage tariff revenue unit price per wastewater unit volume; 471 → 1,345 IDR/m^3 (approx. 3 times level) (Sewerage tariff revenue unit price per floor unit area; 97 → 277 IDR/m^2/month) * Non-household: - Sewerage tariff revenue unit price per wastewater unit volume; 4,557 → 13,015 IDR/m^3 (approx. 3 times level) (Sewerage tariff revenue unit price per floor unit area; 529 → 1,511 IDR/m^2/month)

Table SMR-E3-5 Case 2 Rate of Sewerage Tariff Increase and Sewerage Tariff Revenue Unit Price per Wastewater Unit Volume

Unit : IDR/m^3

Year		2011	2016	2019	2022	2025	2028
Increase rate	Household	0%	30%	30%	30%	30%	0%
	Non-household	0%	30%	30%	30%	30%	0%
Tariff	Household	471	612	796	1,035	1,345	1,345
	Non-household	4,557	5,924	7,701	10,012	13,015	13,015

E3.5.3 Charge Collection Ratio

Charge collection ratio set based on willingness to pay according to the results of the social survey and current charge collection ratio results is as given in Table SMR-E3-6.

Table SMR-E3-6 Setting of Sewerage Charge Collection Ratio

Category of Customer	2016	2020	2025	2030 - 2045
Household	60%	64%	70%	75%
Non-household	90%	90%	90%	90%

E3.5.4 Financial Evaluation (Summary)

Table SMR-E3-7gives results of financial analysis for zones No.1 and No.6, which are priority projects, in the case of "Case 1: Case where existing sewerage charge level is maintained," and "Case 2: Case where sewerage tariff is raised by 30% every 3 years from 2016, and eventually to be raised up to 3 times level of the current level in stages through the 4 times revisions by 2025".

Table SMR-E3-7 Results of Financial Analysis (Summary)

Evaluation Items	Unit	Zone No.1		Zone No.6		Zone No.1 and Zone No.6		Evaluation Criteria
		Case1	Case2	Case1	Case2	Case1	Case2	
B/C Ratio	-	0.71	1.83	0.40	1.03	0.54	1.38	B/C Ratio>1
	Evaluation	N.F.F.	F.F.	N.F.F.	F.F.	N.F.F.	F.F.	
NPV	Mill. IDR	-1,397,280	4,028,732	-3,677,844	175,741	-5,075,124	4,204,473	NPV>0
	Evaluation	N.F.F.	F.F.	N.F.F.	F.F.	N.F.F.	F.F.	
FIRR	%	No solution	9.66%	No solution	1.57%	No solution	5.79%	FIRR>r
	Evaluation	N.F.F.	F.F.	N.F.F.	F.F.	N.F.F.	F.F.	r=1.15%
Financial Evaluation		**N.F.F.**	**F.F.**	**N.F.F.**	**F.F.**	**N.F.F.**	**F.F.**	

Note: F.F. = Financially Feasible, N.F.F. = Not Financially Feasible

The results of financial analysis show that all projects of zone No.1 and zone No.6 require gradual increase of sewerage tariff, and that sewerage system project profitability can be secured by raising the tariff by 30% every 3 years from 2016, and eventually raising up approximately to 3 times level of the current level in stages through the 4 times revisions by 2025 (case 2).

In addition, the results, which were analyzed together Zone No.1 and Zone No.6 as a single business, were as given in Table SMR-E3-7. The results show that FIRR can be secured 5.79% if sewerage charge is increased.

E3.6 Funding Source

E3.6.1 Target of Funding

Sort-term projects requiring government investment are shown in Table SMR-E3-8. Considerations on funding and loan repayment plan of each project are as follows:

Table SMR-E3-8 Short-term Projects Requiring Government Investment and the initial Construction Costs

Category	District	Outline of project	Initial construction cost of project (Million IDR)
Off-site priority project	Zone No.1 (Penjagalan)	• Design population: 989,389 people • Design flow: (daily average) 198,000 m^3/day (daily maximum) 264,000 m^3/day • Start of construction / service：2013/2014	5,192,315
	Zone No.6 (Duri Kosambi)	• Design population: 1,172,574people • Design flow: (daily average) 235,000 m^3/day (daily maximum) 313,000 m^3/day • Start of construction / service: 2013/2014	7,110,408
		Off-site priority project Sub-total	12,302,723
On-site priority project	Construction of a newly STP in South area	• Capacity：600m^3/day • Treatment method: Solid-liquid separation-Activated sludge process • Construction term: 2013-2014（2years）	42,100
	Rehabilitation and Extension of eastern existing STP (Pulo	• Automation: Improve the poor sanitary condition and overwork for labors by introducing automated removal mechanism of grid and sludge.	24,390

Table SMR-E3-8 Short-term Projects Requiring Government Investment and the initial Construction Costs

Category	District	Outline of project	Initial construction cost of project (Million IDR)
	Gebang)	Increased capacity due to automation: 300m^3/day → 450m^3/day • Construction term: 2013（1 year）	
	Integration On-site sludge treatment plant(Duri Kosambi) with WWTP of Zone No.6	• Abolish existing STP(Duri Kosambi) ,and then integrate the function of STP with newly constructed WWTP of Zone No.6. • Capacity: 930m^3/day (maximum) • Construction term：2013	155,279
	Co-treatment of on-site sludge at WWTP of Zone No.1 (Penjagalan)	• Add on-site sludge treatment facilities to newly constructed WWTP of Zone No.1(Penjagalan) • Capacity: 790m^3/day (maximum) • Construction term：2013	131,904
		On-site priority project Sub-total	353,673
		Total	12,656,396

E3.6.2 Possible Funding Source

The financial evaluation of the priority sewerage projects (Zone-1 and Zone-6) in E3 was conducted assuming that the main funding source is JICA's ODA loan which covers 85% of the total construction cost of the project based on the "Fixed-Percentage Financing Criteria", and is borrowed by the central government and the portion equivalent to 50% of the total construction cost of the project is provided to DKI as a grant from the central government and the portion equivalent to 35% of the total construction cost of the project is on-lent to DKI Jakarta and the remaining portion equivalent to 15% of the total construction cost of the project is self-financed by DKI Jakarta according to the basic concept of 'Matching Grant' set forth by BAPPENAS.

The funding sources, however, may not be limited to JICA ODA's loan. Other possible funding sources would be as follows.

(1) APBN(National Income and Expenditure Budget)

(2) APBD(Regional Income and Expenditure Budget)

(3) Loan

(4) Grant

(5) Private funding (PPP)

E3.6.3 Sharing of funding between Central Government and DKI Jakarta

According to DKI Jakarta, the amount of sharing proportion depends on the agreement between Central Government and Regional Government DKI Jakarta and could vary for each project. DKI points out that the Law No. 29 year 2007 about DKI Jakarta Province as the capital of the State of Republic Indonesia stipulates that the funding in implementation the governmental special matters will be budgeted on APBN (National Income and Expenditure Budget).

E3.6.4 PPP for Water and Sewerage Projects in Developing Countries

The schemes of PPP that have performed well in developing countries' water supply sectors are "concession", BOT", "management contract", "lease (affermage)", etc.

In addition to the four typical PPP schemes as described above which have evolved in the water supply and sewerage sector in the developing countries, there is a 'services sold to the public sector' type in which a part of the function of the public entity, not the whole management of the public entity, is

outsourced to private enterprise.

E3.6.5 Possible PPP Option for the Sewerage Projects in DKI Jakarta

(1) Appropriate PPP Option for Sewerage Works

When considering introduction of PPP, the area to be covered by PPP needs to be confined to the portion for which the private sector can assume the risk.

The BOT model, in which the private operator is responsible for the construction and operation of the WWTPs and the public sectors is responsible for the construction and maintenance of the piping system, and the public sector pays the bulk sewage treatment fee to the private operator, would be one of the realistic PPP option for the sewerage system.

(2) The Fiscal Support by the Public Sector for the PPP

If the BOT model for the WWTPs is applied, the public sector will pay the bulk sewage treatment fee to the private operator. Since the financial viability of the sewerage works is low, it is envisaged that the sewage charge revenue from the users would not be enough to cover the bulk sewage treatment fee to be paid to the private operator. Therefore, it is necessary for DKI Jakarta to allocate a budget for payment of the bulk sewage treatment fee separately.

For example, such contractual arrangement will be absolutely necessary as the private operator would be paid the certain amount of the sewage treatment fee, even in case that the operation ratio of the WWTP remains low due to the delay of the house connection.

(3) PPP for the Capacity Development for the Management of the Sewerage Works

The BOT model can be applicable for WWTPs established in such zone where much commercial building and higher financial viability is envisaged. On the other hand, the public sector remains responsible for the WWTPs in the Zones with lower financial viability and for the entire piping system. It may be difficult at first for the public sector, which lacks the experience of managing a substantial sewerage system, to acquire the knowhow required for the efficient management of the sewerage works.

As the measure to improve the capacity of the public sector , which lacks the experience of managing a substantial sewerage system, in managing the sewerage works, the technical cooperation project by JICA would be an option.

On the other hand, the introduction of the Management Contract model as a PPP arrangement as presented in the previous section, in which the management of the sewerage facilities developed by the public sector is entrusted to a private operator for a certain period, during which managerial knowhow is transferred, would also be the most realistic option.

The JICA Survey Team proposes considering these two options in the forthcoming JICA Feasibility Study for the short term plan.

E4 Sewerage Charge and Collection

E4.1 Suggestions for Sewage Charges and Collection

E4.1.1 Sewage Charges

As is shown by the results of the financial analysis presented in PART-E, future declines in the sewage unit charge against the number of customers are unavoidable. This is because the number of ordinary household customers, who pay low sewage charges, will increase as the sewerage system diffusion rate rises.

This means that establishing sustainable sewerage projects will require more than just higher management efficiency through use of the Private Sector. It will also make future increases in sewage charges inevitable. Indonesia is currently enjoying steady development with a real GDP growth rate of 6% or more per year. Thus, it will be necessary to study increasing sewage charges to keep pace with rising national income in the future.

E4.1.2 Sewage Charge System

Under the current sewage charge system, unit charges are set on the basis of established building areas for individual customer categories. Moreover, ordinary households are classified into four groups based on their contract power consumption even with the same building areas, with higher unit charges set for those households with higher contracted power consumption. In other words, the current charge system is comprised of three elements: customer category, building area, and contracted power consumption.

When viewed in terms of efficient sewerage facility management, it is desirable to set the total volume of wastewater requiring treatment based on actual measurement of generated wastewater volume, floor area, household population, etc. for each customer at the time of contract. However, given current circumstances in DKI Jakarta where the water supply diffusion rate is less than 60% and many households and commercial facilities use groundwater obtained from their own wells, water consumption data, which is ideal data for setting sewerage charge, is hard to be applied for DKI Jakarta effectively.

In view of the above, it can be said that the current building area-based sewage charge system is appropriate given current conditions in DKI Jakarta.

When, in the future, progress is made toward raising the water supply diffusion rate, and reducing dependency on use of private wells according to restriction on use of groundwater etc., switching from the current building area-based charge system to a water use volume-based charge system should be considered.

Moreover, in consideration of switching to volume-based charge system for sewerage charge, it will be required to grasp actual usage volume of groundwater from wells because well water are supposed to be kept being used to some extent even after water supply system spreads.

However, measuring actual volume of pumping water or actual electricity used for pumping is assumed difficult. Coping with this problem, it is recommendable to investigate actual usage of well including scale of pumping facilities and their operating hours for business customers that are typically charged high sewerage charge, as a first step, and to obligate business customers that use quite a lot of well water to install integrating flow meters for their private well and to report their usage volume, which should be reflected to the sewerage charge.

E4.1.3 Sewage Charge Collection Methods

As concerns the sewerage charge collection methods that PD PAL JAYA currently applies, a challenge for the future will be how to secure and raise collection rates as the number of ordinary household customers rises.

If the current charge collection methods were to be continued, the “collection through individual visits” method would become unrealistic unless a large number of new charge collectors were hired. Moreover, given that “payment at a PD PAL JAYA payment office” currently accounts for a low share of collection (10%), it is unlikely to become the main collection method.

On the other hand, the “collection and payment by community representative” currently maintains a high collection rate of 75%. Thus, it is thought that using public campaigns at the community level would be effective as a means of raising the collection rate.

At the same time, it is worth considering the collection method being studied in Bali Province, whereby customers independently pay their charges to the Local Development Bank once a month. This method is similar to that employed for electricity projects (PLN) and water-supply projects (PDAM), and therefore it would likely have comparatively high receptivity among residents.

Furthermore, as progress is made toward raising the water supply diffusion rate, measuring water use volumes for each customer, and reducing dependency on use of private wells, it will become possible to switch from the current building area-based charge system to a water use volume-based charge system. When this condition is met, integrated collection of water charges and sewage charges will be the method that best contributes to a higher charge collection rate.

PART-F EVALUATION BY ENVIRONMENTAL SOCIAL CONSIDERATION

PART-F EVALUATION BY ENVIRONMENTAL SOCIAL CONSIDERATION

F1 Evaluation of Alternative Plans based on Natural and Social Environmental Impacts

Main projects which are proposed in the New M/P are as follows;

- Off-site system: Construction of WWTP and sewers
- On-site system: Promotion to establish regulations related to on-site sanitation facilities (change from the soak type septic tanks to the modified type septic tanks, newly construction and/or addition of ITP for communities and business facilities, etc.), Construction of sludge treatment plants, Establishment of regular desludging system

The following table shows the main positive and negative environmental impacts by the suggested projects in the New M/P.

Table SMR-F1-1 Main Positive and Negative Environment Impacts by the Suggested Projects in the New M/P

Project		Positive	Negative
Off-site system	Construction of WWTP and sewers	Expansion of surface (river) water pollution will be protected.	It is difficult to spread rapidly because of the financial and geological reasons.
		Expansion of groundwater pollution will be protected because the soak type septic tanks will not be used.	People should pay the fee for sewerage use periodically.
		Sanitation situation will be improved because wastewater will not directly flow into the surface water, and generation of odor and insects will be prevented.	It is necessary to secure the land for WWTP.
		Groundwater cultivation will be promoted and advance of ground subsidence will be prevented because the surface water will be utilized as drinking water source in the future after WWTP improves the surface water quality.	Under the construction of sewers, traffic jam can be worse than the present situation.
		Treatment water will be returned to the surface water and utilized as water for living.	
		Maintenance of septic tanks will be unnecessary.	
On-site system	promotion to establish regulations related to on-site sanitation facilities	Expansion of groundwater pollution will be prevented.	Each household, community and business entity should maintain their septic tanks by themselves.
		Sanitation situation will be improved because wastewater will not directly flow into the surface water, and generation of odor and insects will be prevented.	
	Construction of sludge treatment plants and Establishment of regular desludging system	Function of septic tank can be shown properly and it can contribute to the prevention of sludge outflow, odor and groundwater pollution.	It is necessary to secure the land for the plants.
		It will be contributed to protection of functional problems such as blockage in tanks and difficulty of discharge at kitchen and bathroom.	People should pay the fee for regular desludging periodically.
		It will be contributed to environmental improvement because illegal dumping of sludge will be decreased.	Traffic jam can be worse than the present situation because of the increase of vacuum cars.

This M/P study follows “Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (April 2004)” (hereinafter referred to as “2004 JICA Guideline for ES”). This guideline requires examining alternative options including “zero-option”, which means not to

implement the suggested Project, therefore, the zero-option and the necessity of the Project are examined here. Among the positive and negative environment impacts by the suggested Projects in the New M/P, the following impacts can be estimated in case of the zero-option.

- Expansion of sludge outflow, odor and groundwater pollution cannot be prevented because the soak type septic tanks will be used continuously.
- Surface (river) water pollution will go worse because business entities will continue to use ITPs, and the current inappropriate O&M will be continued.
- Sanitation situation cannot be improved because wastewater will directly flow into the surface water, and odor and insects will generate continuously.
- Groundwater cultivation cannot be promoted and advance of ground subsidence cannot be prevented because the surface water quality will be inappropriate for water use.
- Illegal dumping of sludge cannot be improved.

Consequently, pollution of surface water and groundwater is one of the quite urgent issues for the present DKI Jakarta, and the necessity of the Project in the New M/P is very high. Considering the effectiveness, it is better to construct off-site system in all over DKI Jakarta. However, it is difficult to apply off-site system only because of the natural and social environmental restriction, such as dotting slum areas, lack of available land, etc. Therefore, it is preferable to apply both off-site and on-site systems based on the natural and social environmental evaluation. And there are not any significant differences among the alternatives shown in Chapter D from the viewpoint of natural and social environmental consideration. And involuntary resettlement and land acquisition are not necessary because all planned sites are public lands.

F2 Initial Environmental Evaluation (IEE)

Table SMR-F2-1 and Table SMR-F2-2 show the estimated environmental and social impacts in each stage of the suggested projects for off-site and on-site respectively in the New M/P.

Table SMR-F2-1 Scoping for Off-Site Project (Construction of WWTP and Sewer)

	Item	Rating (preparation and construction)	Rating (operation)
Social Environment	Involuntary Resettlement	**D**	**D**
	Local Economy such as Employment and Livelihood, etc.	**C**	**D**
	Land Use and Utilization of Local Resources	**B**	**D**
	Social Institutions such as Social Infrastructure and Local Decision - making Institutions	**D**	**D**
	Existing Social Infrastructures and Services	**B**	**D**
	The Poor, Indigenous and Ethnic people	**D**	**D**
	Misdistribution of Benefit and Damage	**D**	**D**
	Cultural heritage	**D**	**D**
	Local Conflicts of Interest	**D**	**D**
	Water Usage or Water Rights and Communal Rights	**D**	**D**
	Sanitation	**D**	**D**
	Hazards (risk) Infectious Diseases such as HIV/AIDS	**D**	**D**
Natural Environment	Topography and Geographical Features	**C**	**D**
	Soil Erosion	**D**	**D**
	Groundwater	**C**	**D**
	Hydrological Situation	**C**	**C**
	Coastal zone	**D**	**D**
	Flora, Fauna and Biodiversity	**D**	**D**
	Meteorology	**D**	**D**
	Landscape	**B**	**D**
	Global Warming	**D**	**D**
Pollution	Air Pollution	**B**	**D**
	Water Pollution	**B**	**D**
	Soil Contamination	**D**	**D**
	Waste	**B**	**B**
	Noise and Vibration	**B**	**B**
	Ground Subsidence	**D**	**D**
	Offensive Odor	**D**	**B**

Table SMR-F2-1 Scoping for Off-Site Project (Construction of WWTP and Sewer)

	Item	Rating (preparation and construction)	Rating (operation)
	Bottom Sediment	**D**	**D**
	Accidents	**B**	**D**

Rating **A** : serious impact is expected**, B** : some impact is expected **, C** : extent of impact unknown. Examination is needed. Impact may become clear as the study progresses, **D** : minimum or hardly any impact is expected.

Table SMR-F2-2 Scoping for On-Site Project (Expansion of Existing Sludge Treatment Plant, Construction of Sludge Treatment Plant, and Periodical Desludging)

	Item	Rating (preparation and construction)	Rating (operation)
Social Environment:	Involuntary Resettlement	**D**	**D**
	Local Economy such as Employment and Livelihood, etc.	**D**	**D**
	Land Use and Utilization of Local Resources	**D**	**D**
	Social Institutions such as Social Infrastructure and Local Decision - making Institutions	**D**	**B**
	Existing Social Infrastructures and Services	**D**	**D**
	The Poor, Indigenous and Ethnic people	**D**	**D**
	Misdistribution of Benefit and Damage	**D**	**D**
	Cultural heritage	**D**	**D**
	Local Conflicts of Interest	**D**	**D**
	Water Usage or Water Rights and Communal Rights	**D**	**D**
	Sanitation	**D**	**D**
	Hazards (risk) Infectious Diseases such as HIV/AIDS	**D**	**D**
Naturall Environment	Topography and Geographical Features	**C**	**D**
	Soil Erosion	**D**	**D**
	Groundwater	**C**	**D**
	Hydrological Situation	**D**	**D**
	Coastal zone	**D**	**D**
	Flora, Fauna and Biodiversity	**D**	**D**
	Meteorology	**D**	**D**
	Landscape	**D**	**D**
	Global Warming	**D**	**D**
Pollution	Air Pollution	**B**	**D**
	Water Pollution	**B**	**D**
	Soil Contamination	**D**	**D**
	Waste	**B**	**B**
	Noise and Vibration	**B**	**B**
	Ground Subsidence	**D**	**D**
	Offensive Odor	**D**	**B**
	Bottom Sediment	**D**	**D**
	Accidents	**B**	**B**

Rating **A** : serious impact is expected、**B** : some impact is expected、**C** : extent of impact unknown. Examination is needed. Impact may become clear as the study progresses、**D** : minimum or hardly any impact is expected.

F3 Necessary Minimization and/or Mitigation Methods

For the items rated as “A” and “B” in the scoping tables, it is necessary to examine mitigation and/or minimization methods as follows Table SMR-F3-1.

Table SMR-F3-1 Environmental and Social Impact Mitigation Methods

Item	Methods
Off-site System	
Local Economy such as Employment and Livelihood	Basically sewers would be constructed along the existing roads, however, there are small shops along the roads in several areas. In order to avoid the temporal and permanent resettlement, it is necessary to examine the route of sewers carefully with the discussion of related agencies.
Land Use and Utilization of Local Resources	There is a possibility to construct WWTP in the parks because of the lack of available land. It is possible that DKI requests to secure the green area. So it is required to select the site where cutting trees and other impacts are minimized. And it is also required to select the site in the

Table SMR-F3-1 Environmental and Social Impact Mitigation Methods

Item	Methods
	protection areas.
Existing Social Infrastructures and Service	It should be confirmed the existing public underground facility (electricity, gas, etc.) and private underground facility (cell phone line, etc.). In order to minimize the impacts, it is necessary to examine the route of sewers carefully with the discussion of DKI and related agencies.
Topography and Geographical Features	It is necessary to confirm topography and geographical features by topographical and boring surveys, depending on the WWTP sites and sewer routes. For some treatment methods, deep tanks will be installed. In this case, there is a possibility of larger impact on the surrounding foundation comparing to use of shallow tanks.
Groundwater	It is necessary to confirm topography and geographical features by topographical and boring surveys, depending on the WWTP sites and sewer routes. For some treatment methods, deep tanks will be installed. In this case, there is a possibility of larger impact on the groundwater comparing to use of shallow tanks.
Hydrological Situation	It is necessary to take countermeasures because some treatment methods cannot remove nitrogen substances so much.
Landscape	It is necessary to make design of WWTP suitable with surrounding landscape because some WWTPs can be constructed near the center of DKI Jakarta.
Air Pollution	Appropriate construction and working plans should be prepared in order to minimize the exhaust gas from the construction vehicles. Equipment including the construction vehicles should be maintained periodically. And instructions to follow appropriate construction and work plans should be necessary.
Water Pollution	There is a possibility of murky waters by the construction. Treatment facility for muddy water should be included in the construction plan. Also the existing situation of groundwater, surface water and wastewater should be confirmed for the selecting the treatment systems and evaluating the impact by these systems.
Waste	It is necessary to examine the appropriate treatment method and to investigate the present situation and related regulation for construction wastes under the construction and for sludge after the construction. And instructions for a contractor are necessary to prevent the scattering and falling of the waste during transportation.
Noise and Vibration	During construction, a construction plan should be prepared with consideration of mitigating noise and vibration. And equipment including the construction vehicles should be maintained periodically. During operation of WWTP, it is necessary to provide countermeasure for minimization of noise and vibration, such as to use equipment and vehicles with low noise and vibration and to install equipment on a rigid foundation in an enclosed room.
Offensive Odor	It is necessary to provide countermeasure against the offensive odor.
Accidents	Under the construction of sewers, there is a possibility of traffic accidents by open-cut excavation and jacking works. Traffic control and appropriate instructions are required. Regarding to construction vehicles, it is necessary to take an optimal route to prevent the accidents inside and outside the site, and to prepare an appropriate construction schedule to avoid peak traffic hours. And equipment including the construction vehicles should be maintained periodically.
On-site System	
Social Institutions such as Social Infrastructure and Local Decision - making Institutions	There is a possibility that the traffic jam will be severe because of increase of vacuum cars. It is necessary to take an optimal route and schedule to avoid peak traffic hours. And environmental education and public awareness activities should be examined because each household, community and business entity should maintain their septic tanks by themselves.
Topography and Geographical Features	It is necessary to confirm topography and geographical features by topographical and boring surveys, depending on the site for newly construction.
Groundwater	It is necessary to confirm topography and geographical features by topographical and boring surveys, depending on the site for newly construction.
Air Pollution	Appropriate construction and working plans should be prepared in order to minimize the exhaust gas from the construction vehicles. Equipment including the construction vehicles should be maintained periodically. And instructions to follow appropriate construction and work plans should be necessary.
Water Pollution	There is a possibility of murky waters by the construction. Treatment facility for muddy water should be included in the construction plan. Also the existing situation of groundwater, surface water and wastewater should be confirmed for the selecting the treatment systems and evaluating the impact by these systems.
Waste	It is necessary to examine the appropriate treatment method and to investigate the present situation and related regulation for sludge after the implementation. And instructions for a contractor are necessary to prevent scattering and falling during transportation
Noise and Vibration	During construction, a construction plan should be prepared with consideration of mitigating noise and vibration. And equipment including the construction vehicles should be maintained periodically. During operation of treatment plants, it is necessary to provide countermeasure for minimization

Table SMR-F3-1 Environmental and Social Impact Mitigation Methods

Item	Methods
	of noise and vibration, such as to use equipment and vehicles with low noise and vibration and to install equipment on a rigid foundation in an enclosed room.
Offensive Odor	It is necessary to provide countermeasure against the offensive odor.
Accidents	Regarding to construction vehicles, it is necessary to take an optimal route to prevent the accidents inside and outside the site, and to prepare an appropriate construction schedule to avoid peak traffic hours. And equipment including the construction vehicles should be maintained periodically. And there is a possibility that the traffic accidents will be increased because of increase of vacuum cars. It is necessary to take an optimal route and schedule to avoid peak traffic hours.

PART-G INSTITUTIONAL CONSIDERATIONS

PART-G INSTITUTIONAL CONSIDERATIONS

G1 Current Institutional Issues

G1.1 Subject of Wastewater Management

In DKI, on-site treatment using septic tanks is the most commonly used form of wastewater treatment. Thus, even as construction of the off-site sewerage system under this Master Plan progresses, it will be necessary to implement measures concerning awareness among Jakarta's residents and measures concerning wastewater management problems (see Table SMR-G1-1) during the transitional period for the sewerage system in order to promote improvement in water environments. Specifically, these measures are: 1) regular desludging of septic tanks, 2) improvement of existing underground seepage-type septic tanks, and switching to septic tanks that also treat grey water, 3) appropriate operation of wastewater treatment of establishments such as office buildings and commercial buildings, and 4) capacity development in sewage treatment technology.

Table SMR-G1-1 Current Issues Identified in DKI Jakarta

Issues	Issues Identified
Regular desludging	People take on-call desludging for granted, with little interest in what happens to the sludge afterward. - Regular desludging has not yet been introduced for any wastewater treatment facilities including ST.
Reform from CST to Appropriate System	People desire elimination of noxious odors from directly discharged grey water. - CST is for only black water - Appropriate System for BW&GW is required.
Appropriate operation of ITP	Who is responsible for operating the ITPs constructed by DPU? People expect high-rise buildings to have good WWTP. - There are no standards for ITP design.
Sewerage	People have been considering Setiabudi Pond for WWTP use for over 20 years. - PD PAL lacks experience of operating the standard WWTP.

ST: Septic tank, CST: Conventional septic tank, BW: Black water, GW: Grey water

G1.2 Subject of Institution of Wastewater Management

Table SMR-G1-2 shows current wastewater management and implementation organizations in DKI Jakarta as well as their scopes of responsibility and implementation capabilities in dealing with wastewater management issues. Issues here can be condensed into three main points.

(1) Although BPLHD is in charge of water environmental management and of supervision of each field, it lacks functions in many areas pertaining to "policy and regulation", "standards" and "inspection", in terms of both on-site and off-site treatment. (Line in blue)

(2) Looking forward, it is unclear which departments will take the lead in implementing regular desludging of septic tanks and ITP. (Line in green)

(3) It will be necessary to determine which departments will supervise and which will implement sewage treatment systems to be operated under the revised Master Plan, wastewater treatment improvement, and sludge treatment facilities that will produce sludge as a result of such improvement, and then to effect efficient reorganization accordingly. (Line in red)

Table SMR-G1-2 Matrix of Responsibility for Wastewater Management

		Supervision			Implementation		
		Policy & Regulation	Standards	Water Quality Inspection	Planning, DED & Construction	O&M	
						Facility	Sludge removal
Water Environment Management		BPLHD					
On-site	Septic Tank	BPLHD	BPLHD insufficient	None	Private	Private	Regular, None
On-site	Sludge Treatment Plant	None	None	None	None	DK; Only 2 plants	
On-site	MCK for Slum Area	None	None	None	Dinas Permahan	Community	
Off-site	Sewerage	None	None	None	None Budget & Land acquisition	PD PAL	DPU, Setiabudi Ponds
Off-site	ITP	BPLHD	None	BPLHD; Insufficient	Private	Private; Weak	Regular, None

G2 Institutional Framework

G2.1 Institutional Improvement Basis

Given the background and scope above, DKI's institutional framework for wastewater management should be reviewed and restructured based on the following principles.

(1) It is necessary to establish an institutional framework capable of overseeing the current and future water environment of DKI Jakarta overall, and of managing and supervising both wastewater and sludge treatment in an integrated manner.

(2) It is necessary to manage both off-site system and on-site system in an integrated manner so that the wastewater management budget is spent in the most efficient way by coordinating and modifying wastewater management planning as the sewerage system evolves.

(3) The anticipated framework must have authority and functions concerning budgets, preparation of legislation, planning, construction, operation, and preparation of regulations and guidelines that fit existing government institutions.

G2.2 Examination Matters of Institutional Improvement Plan

DKI Jakarta has fallen behind in sewerage development among major cities of Indonesia, although it is the capital with a population of no less than about nine million and the actual center of politics and economics of Indonesia. Considering this status, DKI Jakarta shall indicate clearly and widely its basic policy and directions for the management of wastewater and sludge, which is "Abolish septic tanks, instead, implement the comprehensive development plan of sewerage system for both black water and grey water steadily and rapidly" to Jakarta citizens and should improve restructure the current institution/organization.

As the idea of institutional improvement plan, it is considered the following four alternatives. It should be notes that alternative 3 and 4 are the instances of which either making the improved institutional framework a subordinate organization of the existing agencies (DPU, BPLHD, DK) or making it an independent organization by splitting one of the existing agencies in the case where DPU is placed on as the center of improvement of institutional framework.

(1) Alternative 1: Reinforce the management functions of each institution while maintaining the existing organizational structure.

(2) Alternative 2: Reinforce PD PAL's capability to manage both off-site and on-site treatment

(3) Alternative 3: Establish two bureaus a roads bureau and a water resources bureau in DPU and place off-site and on-site treatment under the jurisdiction of the water resources bureau.

(4) Alternative 4: Split DPU into an agency in charge of roads and an agency in charge of water resources, and place wastewater management under the jurisdiction of the agency in charge of water resources.

As a result, as an example of the improved institutional framework in DKI, JICA Expert Team presented the following reorganization plan (Figure SMR-G2-1) as a reference for future discussions in the DKI authorities.

Figure SMR-G2-1 shows an envisioned case as an example of the improved institutional framework.

Figure SMR-G2-1 presents the improved institutional framework as an independent entity in order to show the transfer of authority from the current wastewater management department. However, either making the improved institutional framework a subordinate organization of the existing agencies (DPU, BPLHD, DK) or making it an independent organization by splitting one of the existing agencies does not present a problem.

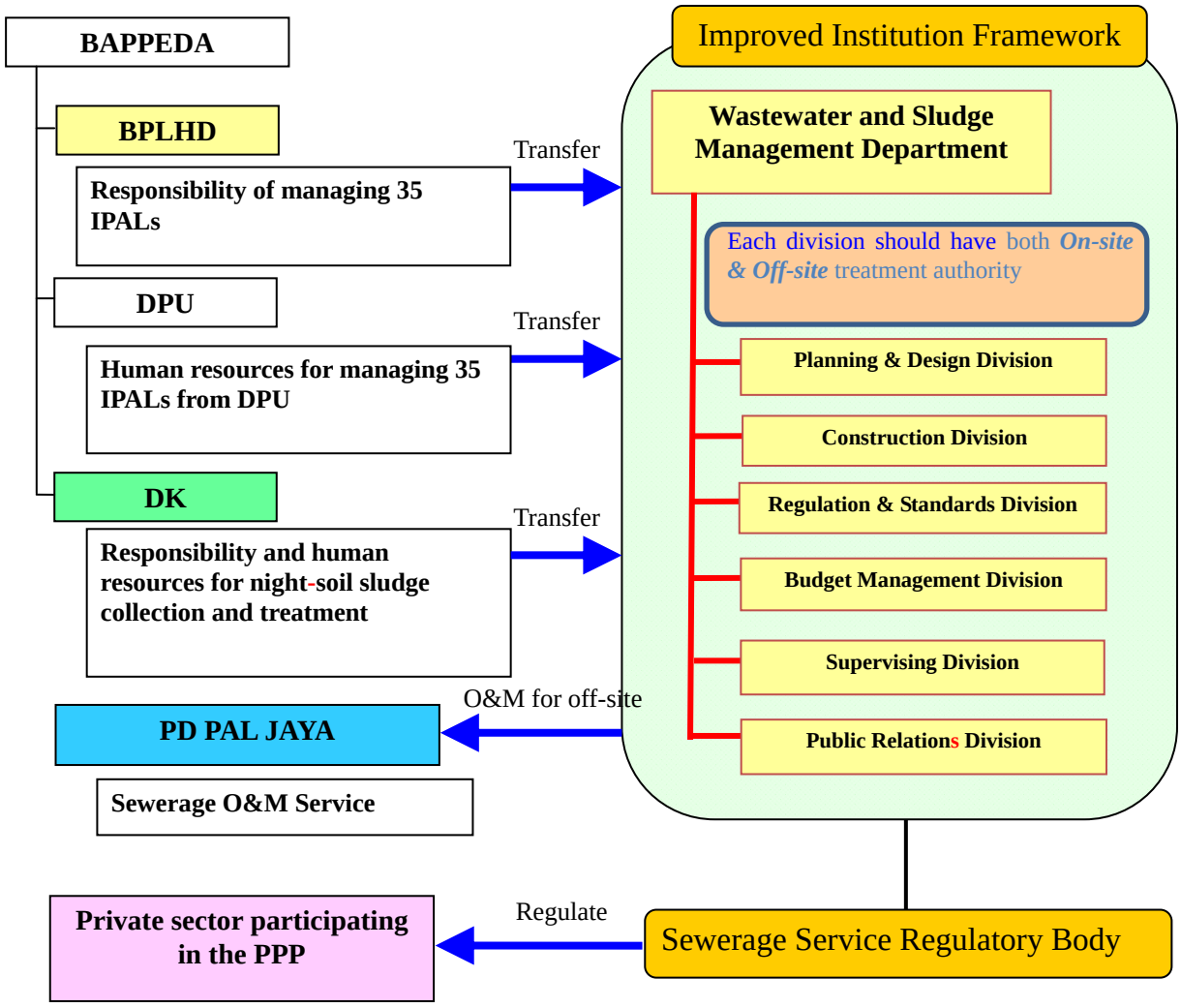


Figure SMR-G2-1 Example of Organization

G2.3 Preparation for the Establishment of the Improved Institutional Framework for Wastewater/Sludge Management

To improve the function and ability of the said institutional framework, DKI Jakarta should set up a preparatory committee consisting of transferees from institutions / agencies related to sewage and sludge treatment and have it make concrete discussion on the organization and the system according to

the sewerage system development plan. By the end of FY 2013 at the latest, DKI Jakarta should establish the administrative department/body of sewage management and start it working.

Action plans for Institutional Improvement is shown in Table SMR-G2-1.

Table SMR-G2-1 Action plan for Institutional Improvement (Proposed)

Action(s)	2012	2013	2014	2015		2020
(1) Setting up *"Preparation Committee for Institutional Reform"*						
1) Formulate basic policy for the improved institutional framework						
2) Establishment of project team (off-site team, on-site team)						
3) Study and determine the formation of division						
4) Study of scope of works, and coordinate with existing institutions						
5) Revise for provincial ordinance, and approval						
6) Personnel planning						
(2) Formulation of *"Preparatory Section for Wastewater and Sludge Management"*						
1) Employment of professional staff, human resource development						
2) Technical support from external agencies						
(3) Upgrading to *"Wastewater and Sludge Management Department"*						

G3 Laws and Regulations

DKI Jakarta shall indicate clearly and widely its philosophy and directions on management of wastewater and sludge to its citizens by establishing a basic law code on integrated management of wastewater and sludge. This body of law will enable DKI Jakarta to reorganize current institutions and review existing decrees and regulations so that the target of the New M/P will be achieved in the most efficient manner.

An example of a systematic structure of laws and ordinances concerning wastewater treatment are as given in G4.1 of PART-G in F/R.

G4 Management of Off-site and On-site Treatment

G4.1 Off-site Treatment and On-site Treatment

It will be necessary for the new wastewater management institution to be a body that supervises both on-site and off-site treatment and engages in comprehensive management that includes planning and budget administration.

On the other hand, it will be important to utilize the private sector in on-site and off-site treatment operations in order to ensure project efficiency based on the concept of a public project that is under the supervision of the new institution.

G4.2 Management of Off-site Treatment

In line with the implementation of phased sewerage projects based on this Master Plan, review the organization of PD PAL JAYA, which is the public sewerage company, incrementally reinforce its participation in sewerage construction projects and capabilities in operation and management, and improve its maintenance technologies.

G4.3 Management of On-site Treatment

The wastewater management administration should examine and implement qualitative and quantitative improvement measures for on-site treatment while monitoring the sewerage development plan and its progress based on environmental improvement targets for public water bodies. It should execute treatment of increasing amounts of sludge and planning and construction of treatment

facilities, while at the same time it should build the administrative system for desludging. When doing so, taking into consideration the income and expenditure situation of sewerage works, on balance, it is appropriate to set up subsidies that cover a reasonable portion of septic tank replacement expenses.

In desludging, transportation of sludge, and the operation of ITPs of establishments such as office buildings and commercial buildings, the maximum utilization of private-sector should be examined.

G4.4 Human Resource Development

Establishment and development of the institutional framework of G5 of PART-G in F/R above will require many human resources having administrative and technical expertise in water and environment preservation. To foster these human resources, recruitment of subsequent generations and the development of an education system from the long term view point is required.

G4.5 Systematic Development of Management Engineers

The top managers in the new institution should engage in capacity development in off-site treatment through on-the-job training by participating in each project from the feasibility study stage based on the Master Plan.

Moreover, when training working-level middle managers to be involved in design or operation & management, provide them with long-term hands-on training at treatment plants in Japan or other locations, setting the times when service for particular projects commences as a target.

For on-site treatment, train planning and construction engineers in Indonesia in such fields as upgrading and replacement of septic tank facilities so that, in essence, facilities become facility-oriented equipment rather than maintenance-oriented.

G4.6 Stabilization of Employment and Treatment Improvement

Give consideration to maintaining employment stability and compensation and to fixed employment of management operators and technical managers. For example, establish a qualification system based both on experience and testing, clarify the responsibilities of qualified persons, then arrange employment terms to give preferential treatment to such qualified persons.

G5 Private Sector Involvement

G5.1 Basic Policy

(1) Off-site (Sewerage)

The sewerage development in DKI requires huge financial resources. The short term plan alone, which needs to be developed before 2020, will cost IDR 11 trillion (about 100 billion yen), which is too big a sum to be covered entirely by public financial resources such as the budget of the central government, the DKI budget, and ODA funding. Therefore, it is desirable to mobilize private funding even for a part of the investment cost.

(2) On-site

For on-site, it is necessary to take advantage of private sectors for regular desludging and collection from septic tanks and ITP, and O&M of ITP.

G5.2 Regulation on PPP in Indonesia and Current Status

G5.2.1 Regulation on PPP in Indonesia

In Indonesia, Public-Private Partnerships are being issued from National Development Planning based on Presidential Regulation No. 13 of 2010 “Presidential Regulation of the Republic of Indonesia Number 67 of 2005 Regarding Cooperation between Government and Business Entities in Infrastructure Provision.”

G5.2.2 Basic PPP Form

Figure SMR-G5-1 presents a basic chart of PPP used in infrastructure development in Indonesia.

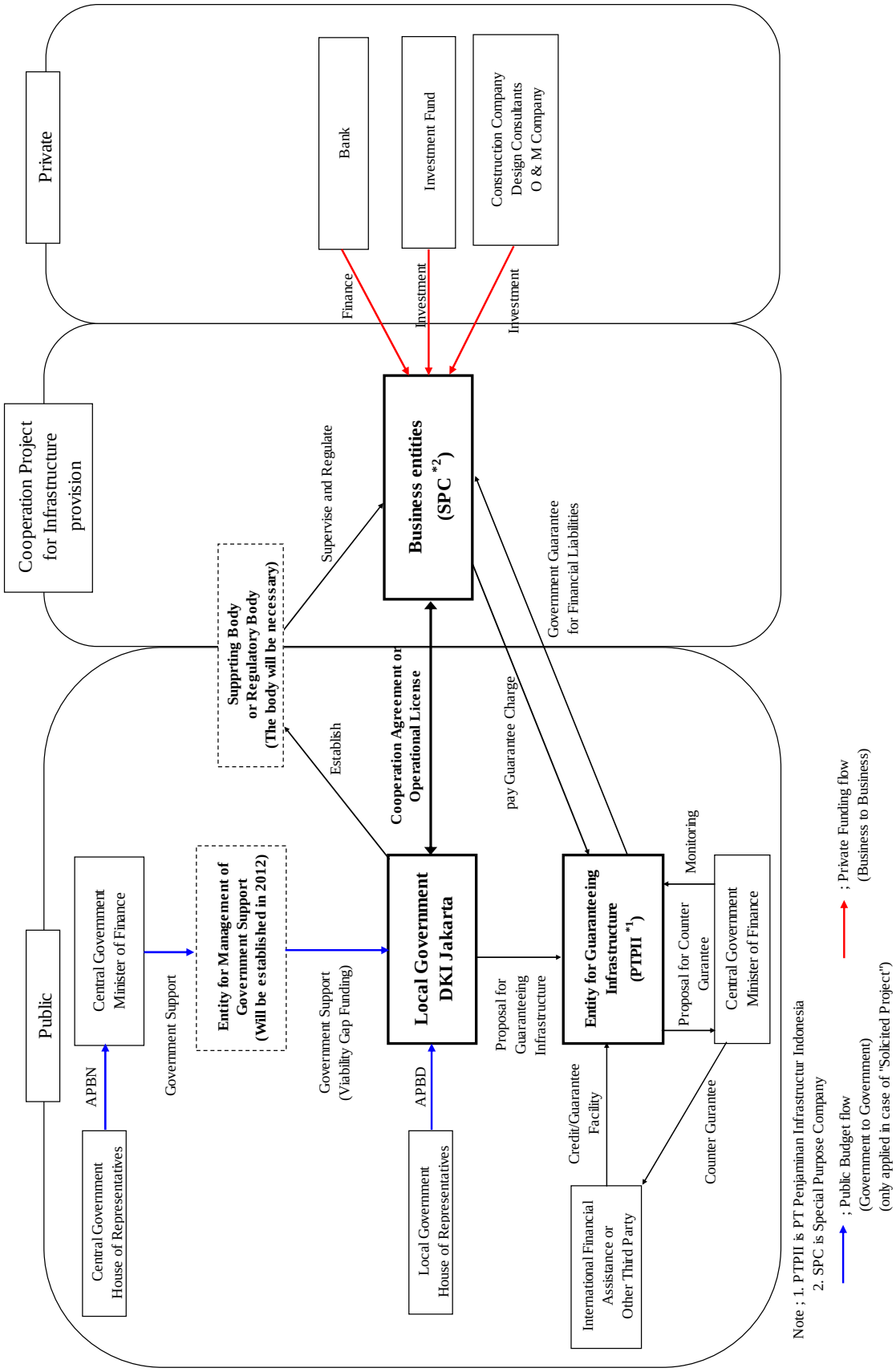


Figure SMR-G5-1 Basic Chart of PPP in Indonesia

G5.2.3 Errors and Problems Concerning Past Water Supply Projects

Specific examples of full-scale PPP introduction in water supply projects of Southeast Asia can be found in water supply projects of East and West Manila, the Philippines, and in water supply jakartas of East and West Jakarta, Indonesia.

In particular, the lack of success of the two water-supply PPP projects in Jakarta contains important lessons concerning actions not to take when introducing PPP into sewerage projects in Jakarta. Jakarta privatized its water-supply systems in 1997. Privatization was based on political considerations, did not involve bidding, and was done prior to the development of necessary administration for PPP. Consequently, concession contracts heavily favor private operators. The details of the concession contracts are not disclosed to the public, and they contain only five key performance indicators (KPI), which is an extremely small number for evaluation of water-supply project performance.

On the other hand, in the case of Manila's privatization of water-supply services, the regulatory institution was established with support from the World Bank prior to privatization. This regulatory institution selected private operators after conducting international bidding. Concession contracts for water-supply PPP in Manila include 26 KPI, which is sufficient to evaluate the performance of water-supply projects in developing countries. As a result, in the case of the Manila Water Company (East Manila), which has experienced good performance, water tariffs have been revised smoothly every five years.

Thus, it is important to learn the following lessons based on the failed water-supply PPP in Jakarta and successful water-supply PPP in Manila:

(1) Regulatory institutions are required from the PPP preparatory stage.

(2) Regulation and monitoring based on KPI are required.

(3) Public budgetary measures are required when all or a portion of tariff risk is transferred to Public, such as for BOT contracts with government guarantees.

G5.3 Issues and Measures Concerning Introduction of PPP in Sewerage Projects

G5.3.1 Identification of Risks and Implementation of thorough Measures to Counter them

The participating private enterprise and the government (central and local), which guarantees the scheme with public expenditure, must identify risks to the project wherever possible and clarify their scopes of risk responsibility.

Moving forward with PPP involves thorough implementation of the following steps: 1) conducting a feasibility study that presumes project implementation by a private enterprise; 2) identification of risks ("PPP test"); and 3) execution of countermeasures for each risk type.

G5.3.2 Contract Verification/regulatory Institution

In order to coordinate the interests of private enterprises, which seek profits, ordinary residents, who expect to receive the highest quality of service at the lowest possible cost, and governments (both central and local), which represents the interests of ordinary residents, it is important to create a strong regulatory framework. Contracts (concession contracts, etc.) signed by private operators and authorities exemplify this framework. It becomes the regulatory institution's task to monitor the implementation of such contracts.

G5.3.3 Establishment of Yardsticks for Evaluating Execution, Such as Performance Indicators in Contracts

It is important to clarify the importance of the contract verification/regulating institution as well as performance indicators and other yardsticks for measuring contract execution and to build a system that can evaluate projects appropriately and provide feedback.

Particularly when introducing PPP, it is important to establish a sufficient number of Key Performance Indicators (KPI) at the PPP introduction stage.

The KPIs to be applied on the actual PPP project varies greatly dependent on the type of PPP scheme. The concrete application of KPIs should be decided by the newly established Regulatory Organization, taking into consideration the type of PPP scheme to be applied and the actual case of the similar type of PPP in other countries, prior to the tender for the selection of the PPP operator.

Candidate KPI that should be studied for inclusion into sewerage projects in Jakarta is described in G7.4.6 of DF/R.

G5.3.4 Management Philosophy and Related Policies of Private Enterprises

As the contact points for provision of public capital, the Indonesian government and DKI Jakarta must coordinate the interests of private enterprises and service beneficiaries. They must recognize that social responsibility to service beneficiaries (the general public) the stakeholders who will judge decision-making by private enterprises is essential, and they must implement measures to raise awareness of this responsibility. On the other hand, they must carefully assess the appropriateness of private enterprises (which will be situated at the core of PPP) as partners and implement PPP based on full consideration of their advantages and disadvantages by considering the following points.

(1) Demonstration of corporate social responsibility

(2) Implementation of accountability

(3) Quantitative presentation of added value and service improvement

(4) Promotion of appropriate measures to improve management profitability

(5) Implementation of public education and other projects to reduce project risk

(6) Understanding and sufficient dialogue concerning national finances and administrative background

PART-H ENVIRONMENTAL EDUCATION AND PUBLIC CAMPAIGN ACTIVITIES FOR WASTEWATER SECTOR

PART-H ENVIRONMENTAL EDUCATION AND PUBLIC CAMPAIGN ACTIVITIES FOR WASTEWATER SECTOR

H1 Action Goal

The Indonesian government, including politicians, the managing staff of relevant agencies, and administrative officials in the metropolitan area of Jakarta, does not give priority to investment in the sanitation sector, so activities for raising their awareness are very important. Moreover, addressing problems in wastewater treatment in DKI Jakarta requires the New M/P activities for letting the persons concerned raise awareness of environmental improvement. The latter includes meetings with residents, public relations in mass media, enlightening documents, billboards, and school education. The environmental education and campaigns in this project shall be conducted with (while supporting) the above-mentioned PPSP project that has started in DKI Jakarta.

H2 Objectives

(1) Implementing the New M/P is effective in addressing problems in the wastewater treatment of DKI Jakarta, but the Indonesian government, the members of the DKI Jakarta assembly and the managing staff of relevant ministries and agencies do not understand an investment in "Sanitation." The first objective of the environmental education and campaigns is to raise their awareness.

(2) The second objective is to let the administrative officials of DKI Jakarta improve their ability to draw up a plan for addressing the wastewater treatment problems toward the implementation of the New M/P.

(3) Implementation of the New M/P will improve the quality of administrative services. The third objective is to educate the beneficiaries, such as companies and citizens, to raise their awareness of environmental improvement.

H3 Proposed Environmental Education and Public Campaign Activity

Proposed environmental education and public campaign activities are as follows:

- Supporting the PPSP Working Group (1st Objective)
- Training the Administrative Officials in Charge of DKI Wastewater Treatment (2nd Objective)
- Meeting with Residents (3rd Objective)
- Public Relations in Mass Media (3rd Objective)
- Producing a Motion Picture (2nd and 3rd Objectives)
- Developing Master Plan Related Documents (1st, 2nd, and 3rd Objectives)
- Billboards (1st, 2nd, and 3rd Objectives)
- School Education (3rd Objective)

H4 Implementing Schedule

Table SMR-H4-1 shows the schedule of the environmental education and campaigns to be conducted before the work starts (2012 and 2013) and after it (2014 and later). The PPSP working group ends its operation at the end of FY 2011, so a follow-up survey will be conducted in FY 2012 in place of the support of the working group. Administrative officials are trained once a year as JICA training in Japan. Meetings with residents, public relations in mass media, and the new M/P-related document creation are to be conducted at the right time by the end of FY 2014. Motion pictures and billboards are to be created in FY 2014 and later. School education is to be given annually from FY 2014, in which the project is to start practically.

Table SMR-H4-1 Schedule for Implementing the Environmental Education and Campaigns

Item	2012	2013	2014	2015	2016
Supporting the PPSP working group	⟷	⟷			
Training the administrative officials in charge of DKI wastewater treatment	⟷	⟷	⟷		
Meeting with residents	⟷	⟷	⟷		
Public relations in mass media	⟷	⟷	⟷		
Producing a motion picture			⟷	⟷	⟷
Developing the New M/P-related documents	⟷	⟷	⟷		
Billboards			⟷	⟷	⟷
School education			⟷	⟷	⟷

PART-I CAPACITY BUILDING FOR COUNTERPART ORGANIZATIONS

PART-I CAPACITY BUILDING FOR COUNTERPART ORGANIZATIONS

I1 Training in Japan

Training in Japan had 2 courses; managers' course and engineer leaders' course. The managers' course was implemented from 6th June, 2011 to 10th June, 2011, and had 5 trainees. The engineer leader' course was implemented from 20th June, 2011 to 7th July, 2011, and had 9 trainees.

I1.1 Managers' Course

The purposes of the managers' course are as follows;

Purpose of Managers' Course

(1) To understand the wastewater management policy and plan, related organization and regulation in Japan
(2) To understand the management and financial source for sewerage system in Japan
(3) To understand the research and public relations for sewerage system in Japan

The following table shows the main contents of this course (curriculum).

Table SMR-I1-1 Main Contents of Managers' Course

No.	Main Contents
1	Sewerage policy
2	Sewerage laws and standard regulations
3	Public relations strategy for sewerage
4	Administration for recycling water and water quality standards
5	Administration for water quality management
6	Administration for on-site system (johkasou)
7	Organizational and business management for sewerage
8	Contracting-out for sewerage
9	Practical training for bio-gas utilization
10	Practical training for membrane process

I1.2 Engineer Leaders' Course

The purposes of the engineer leaders' course are as follows;

Purpose of Engineer Leaders' Course is as follows:

(1) To hold a vision for the ideal wastewater treatment system, and to acquire the necessary management skills
(2) To understand the method to prepare sewerage master plans in the metropolitan cities in Japan, and the practical methods to implement these plans

The following table shows the main contents of this course (curriculum).

Table SMR-I1-2 Main Contents of Engineer Leaders' Course

No.	Main Contents
1	Sewerage policy
2	Sewerage laws and standard regulations
3	Public relations strategy for sewerage
4	Administration for recycling water and water quality standards
5	Sewerage planning
6	Technology for sewerage (sewer network and facility) and operation and maintenance
7	Contracting-out for sewerage
8	Practical training for wastewater purification
9	Preparation of action plans
10	Administration for water quality management and for on-site system (johkasou)

Table SMR-I1-2 Main Contents of Engineer Leaders' Course

No.	Main Contents
11	Basic plan for domestic wastewater treatment
12	Treatment technology for night soil, and operation and maintenance for the facility
13	Practical training for water quality analysis
14	Operation and maintenance for johkasou
15	Practical training for night soil treatment
16	Practical training for bio-gas utilization
17	Technology for water works
18	Appropriate technology in developing countries
19	Practical training for johkasou

I2 Working Groups

The implementation system of the Project is shown in Figure SMR-I2-1. C/P of this Project is DKI Jakarta.

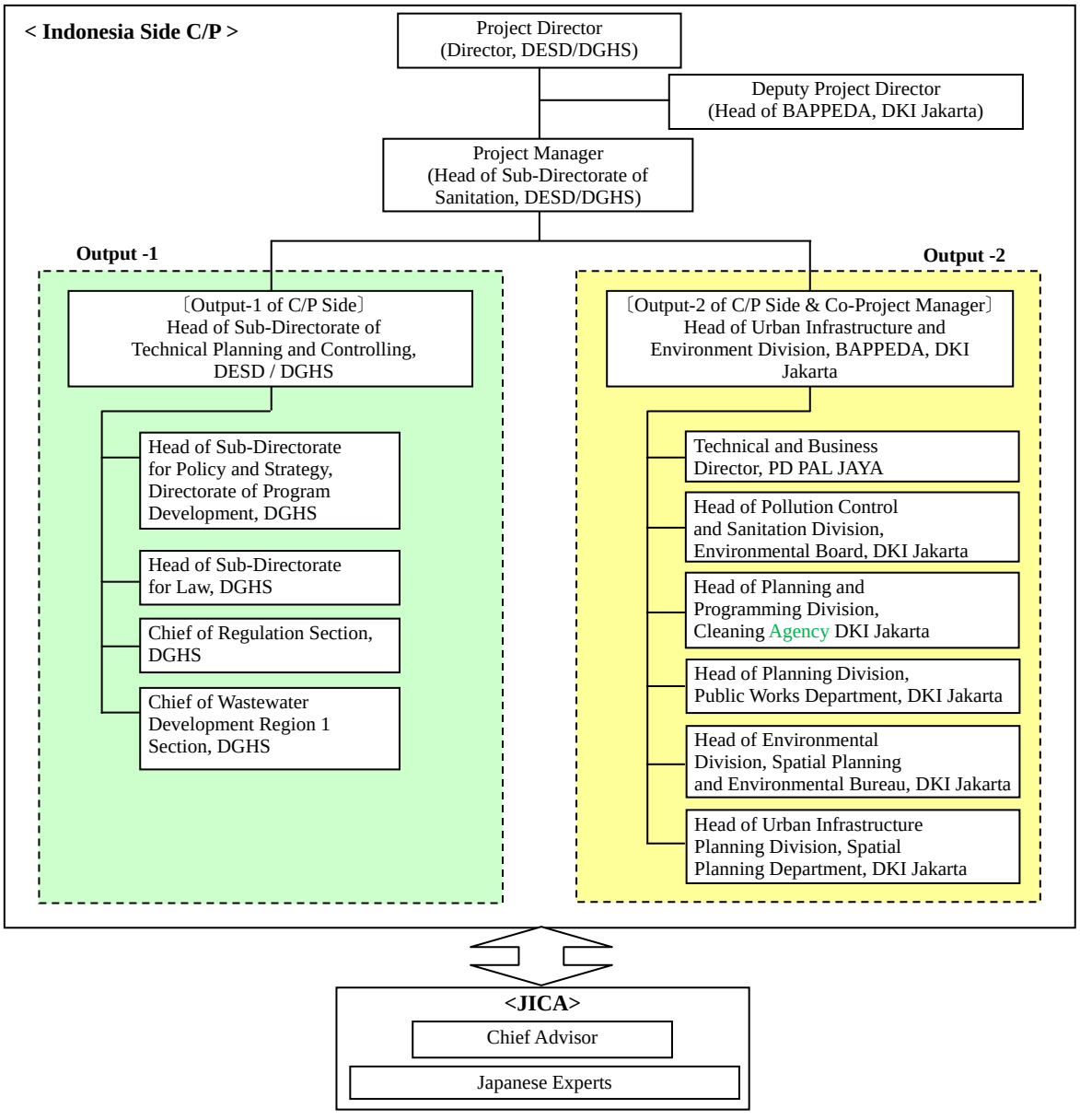


Figure SMR-I2-1 Project Implementation System for the Project

In order to conduct the Project activities smoothly, working group (hereinafter referred to as WG) was organized after 2 to 3 persons-in-charges of the Project were nominated from 7 directorates of DKI Jakarta. In principle, this WG meeting is held every two weeks (the meeting is not held only if there are not any progress,). In order to facilitate a capacity development of the C/P staff, the WG meeting is being operated in a style of mini-workshop. Attendants are mostly 20 persons in every meeting. Dates and contents of the WG meeting are as shown in Table SMR-I2-1.

Table SMR-I2-1 Contents of Working Group Meeting

No.	Date	Main Discussion Contents
1	5th January 2011	1. Survey of 35 individual treatment plants 2. Intermediate survey result of candidate sites for WWTP 3. Volume and water quality of wastewater
2	20th January 2011	1. Flow of sewerage planning (for Japan's case) 2. Organizations related sewerage planning and project implementation: Introduction of the related organizations in Japan and confirmation of the counterpart organization. 3. Intermediate survey result of candidate sites for WWTP
3	13th April 2011	1. Intermediate survey result of candidate sites for WWTP 2. Population projection 3. Final survey result of individual treatment plant for commercial 4. Activities for the coming 3 months (May to July)
4	16th August 2011	1. Method to set sewerage zones

I3 Training for GIS Database Development

As a capacity development for C/P team, GIS Database development trainings were performed. Major objective of the trainings were intended to increase user base of GIS software in participating institutes. Basic Analysis Course was designed for starter to learn about operations while analysis on GIS. CAD Data Conversion Course was also planned to learn also very basic operations but for more practical issues to be solved. Trainings were done on 1st November 2011 until 22nd November 2011. During training period, fourteen (14) attendees have attended on Basic Analysis Course and eleven (11) attendees have attended on CAD Conversion Course. More detailed explanation on training course is shown on I3.1.

In the training course, following objectives were sat for the technical aspect.

1. Learn how to change graphical expression using GIS software
2. Learn how to prepare database for GIS software
3. Learn how to use existing GIS database for own use

At the follow up meeting, attendees have prepared and presented their original maps for their professions. Therefore, generally all of the attendees have archived the goals.

One of the major objectives of this training was to establish social networks among GIS users in C/P team. It is planned share following awareness for the issues surrounding GIS Database development in DKI Jakarta.

1. Necessity of catching up base map improvement in DKI Jakarta and following their roadmap
2. Necessity of establishing feedback cycle for data quality improvement
3. Necessity of burden sharing and information sharing among participating institutes

During follow-up meeting, C/P team member have mentioned about plan to set up regular meeting to tackle above mentioned issues. Therefore, it is considered that attendee from C/P team member shared understanding about their issues surrounding GIS Database development in DKI Jakarta.

On the other hand, for the contents of training, there were requests that needs of contents to solve problems in the fields such as procedures for backup and version controls for data sharing and repetition drills for each procedure. These requests were involving issues which happen in operation stage. Therefore it is sort out as findings in the training and issues to be solved in the future in I3.4.

I3.1 Target Attendee for Training

Attendees for training were selected from institutes that are related to sewage network developments. The conditions to select attendee were not limited by experiences for GIS training. But to cover possible user in the every sections that might use GIS software. In following table shows distribution of attendee for the training. There were no limit for each attendee to select training course, but most of attendee chose to select both prepared training courses.

Table SMR-I3-1 Participating Institutes and Distribution of the Attendee

Institution	Expected Roll	Number	Current Status of Spatial Data Development
PD-PALJAYA	O/M of GIS Database	7	Developed GIS Database for Sewerage Network and Customer
DTR	Provision of Base map	1	Developed Topological Map and Land Use Map on CAD Platform
BAPPDA		1	Developed Future Land Use Map
D-PU		1	Developed Road Map, River and Channel Network Map
BPLHD		2	Developed Groundwater Distribution Map and Water Quality Map

I3.2 Objectives of Training Course

Objective of training is to develop capacity to maintain operational GIS database last for ages. Which is migration from CAD based operation to GIS based operation.

- Poor connection between each participating institute (Data is isolated)
- Major user base are still using CAD only (Browse only not for geo-spatial analysis)

Major problem for C/P team to utilize GIS was poor linkage among participating institutes. It's very costly for each agency to maintain all of the geo-spatial data by oneself. Even if data is existed, since major part of the data is in CAD format, it still requires additional cost to utilize as geo-spatial data.

In the training, courses were designed to establish following condition to solve above mentioned issues.

- Increase GIS users who use same GIS Database as a Base of GIS Analysis
- Establish implementation structure for CAD data conversion for short term

In the training course, attendee learned usage of existing GIS database and CAD Data conversion methodology which required for short term development of GIS Database. Through these trainings, attendees were trained as personals that coordinate use of GIS database and encourage migration from CAD base operation to GIS base operation. In addition, the JICA Expert team prepared Indonesian version of training material. This was meant attendee to take over training and establishing capacity development cycle.

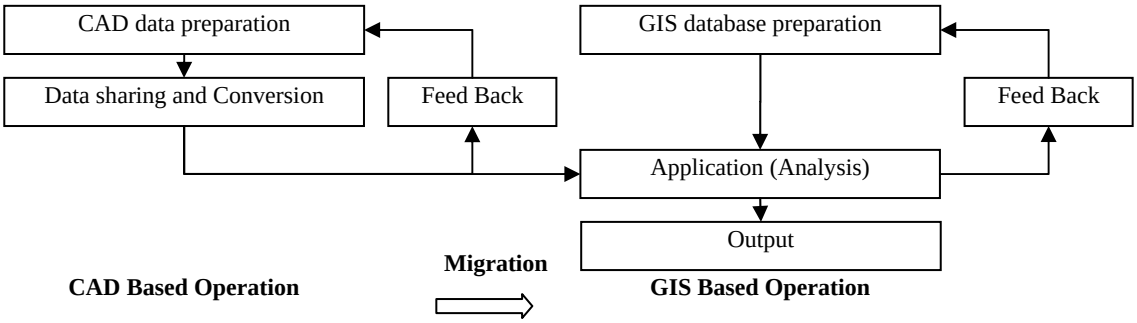


Figure SMR-I3-1 Migration process to GIS Operation Environment

Current situations in DKI Jakarta were using CAD as a major platform to use geo-spatial data. Each C/P institute's operations were completed within their institute only and yet to be shared among institutes. In this situation, costs for data conversion and operation/maintenance were very high and it is difficult to utilize geo-spatial data in GIS. To change this situation is objective of this training.

I3.3 Basic Analysis Course

In Basic Analysis Course attendee shall learn basic GIS operation through utilizing existing GIS Database. The training course has 4 (four) days of practical work session and around 2 (two) weeks of self-learning session. Following tables shows schedule for this training course.

I3.4 CAD Data Conversion Course

In CAD Data Conversion Course attendee shall learn practical CAD data conversion methodology. The training course has 3 (three) days of practical work session and around 2 (two) weeks of self-learning session. Schedule of this training course is shown below.

I3.5 Training Schedule

The training schedules were as follows.

Table SMR-I3-2 Planned Schedule and Actual Schedule

			3-Oct	10-Oct	17-Oct	24-Oct	31-Oct	7-Nov	14-Nov	21-Nov
1	Material Preparation	Plan								
		Actual								
2	Kick off meeting	Plan								
		Actual								
3	Self-learning Session	Plan								
		Actual								
4	Hands-on Session	Plan								
	Basic Analysis Course	Actual								
4	Hands-on Session	Plan								
	CAD Data Conversion Course	Actual								
5	Preparation for Presentation	Plan								
		Actual								
6	Follow Up Session	Plan								
		Actual								

I3.6 Results

The training courses (Basic Analysis course and CAD Data Conversion course) were started from 1st November 2011 until 22nd November 2011. During training sessions, 14 (fourteen) attendee attended Basic Analysis course. 11 (eleven) attendee attended CAD Data Conversion course.

I3.7 Issues to Be Solved

From the result of survey that are done during preparation and training, following issues were recognized.

- Needs of the continuous training for attendee
- Needs of management body for GIS Database development
- Needs of establishing feedback cycle

From hearing, most of attendee has less chance to apply GIS skill in their regular jobs. It makes attendee difficult to maintain skills that are earned from GIS training. Therefore, it is necessary to prepare measures for refining attendee's skills after training sessions.

In addition DKI Jakarta spatial agency is planning to introduce new topological map which covers whole Jakarta area based on new survey result. It requires major update for GIS Database to catch up. To update GIS Database with no much delay, management for cooperation and efficiency for the process to update GIS database shall become issue. Therefore, it is recommended to organize the secretariat to maintain direction and progress for the GIS database development.

Meanwhile, improvement cycle for geo-spatial data in DKI Jakarta is in very poor condition. It is still difficult to modify source data even from inside of DKI Jakarta. It made GIS Database in-service difficult to increase their value. It is important to establish feed-back cycle which includes reflection for source data.

I4 Assessment of Capacity Development through the Project

Capacity development was implemented through the activities of the Project (Output-2). The project purpose, output and objectively verifiable indicators to evaluate the achievement are shown in Table A2-1.

As shown in the table, there are not any direct indicators to evaluate the capacity development of C/P. Therefore, JICA expert team evaluated the capacity development of C/P related to "the capacity to prepare the revised wastewater master plan" through the following activities;

- Discussion on the basic items (wastewater collection system, planned population, planned wastewater volume, and other planning conditions) for the preparation of the New M/P at WG meetings
- Discussion on the process to prepare the New M/P, such as examination of the priority zones, at WG meetings
- Discussion on the facility plan for the main sewerage plants at WG meetings
- Discussion on the sewerage treatment system at WG meetings
- Learning about the basic plans, and operation and maintenance for wastewater management through training in Japan
- Implementation of river water quality and quantity analysis, and socio-economic survey with JICA expert team
- Learning about development of GIS database (training)

The member list of WG is shown in Table SMR-I4-1. Members are selected from each related agency of DKI. During the Project, the same members mostly continue to implement activities with JICA expert team. Therefore, capacity of each C/P member is developed from the qualitative evaluation.

Table SMR-I4-1 List of Working Group Members

No.	Name	Position and Organization
1	Liliansari	Director of PD PAL JAYA
2	Rama Boedi	Commissioner of PD PAL JAYA
3	Ati Setiawati	Technical and Business Director, PD PAL JAYA
4	Aris S.	Section Head of OM, PD PAL JAYA
5	Setyo Duhkito	Section Head of Development and Program, PD PAL JAYA
6	Hendry Sitohang	Sub-Section Head of Program Management, PD PAL JAYA
7	Yudi Indarto	Director for Administration and Finance, PD PAL JAYA
8	Driah Triastuti	Staff / Spatial Plan and Environment Subdivision, Urban Infrastructure and Environment Division, BAPPEDA
9	Eko Gumelar	Staff of Environmental Impact Control Division, BPLHD
10	Wawan Kurniawan	Staff of Environmental Impact Control Division, BPLHD
11	Jouce Victor	Staff of Spatial & Environment Bureau, Regional Secretary, Spatial Use & Environment Bureau
12	Samsu Hadi	Staff of Macro Planning of Urban, City Spatial Planning Agency
13	Siti Harfiah	Staff of Macro Planning of Urban, City Spatial Planning Agency
14	Weny Budiati	Staff of Macro Planning of Urban, City Spatial Planning Agency
15	Dimas Y. Rukmana	Staff of Macro Planning of Urban, City Spatial Planning Agency
16	Elisabeth T	Staff of Planning For Water Resources Management, Public Works agency

PART-J ACTION PLAN FOR IMPLEMENTATION OF PRIORITIZED PROJECTS

PART-J ACTION PLAN FOR FEASIBILITY STUDY OF THE NEW MASTER PLAN

J1 Definition of Action Plan

The action plan consists of the following two plans and shall be defined as follows:

Table SMR-J1-1 Definition of Action Plan for Prioritized Projects

No.	Item	Definition
1	Action Plan for Implementation of the New M/P	It includes the actions to be needed for facilitating the projects which will be implemented under Japanese yen loan scheme. It shows the schedule of the required actions such as feasibility study, procedures to be done by the Indonesian side and procedures for Japanese yen loan.
2	Action Plan for Prioritized Capacity Development	It is the action plan for prioritized capacity development of staff to conduct O&M of sewerage and sanitation facilities to be constructed in Zone No.1 and No.6 after the implementation of the projects.

J2 Action Plan for Implementation of the New Master Plan

The action plan for implementing the New M/P is the one to be needed for facilitating the projects ~~to~~ which will be implemented under Japanese yen loan scheme. The details of the action plan are shown in Table SMR-J2-1 and the detailed activities are described hereinafter.

Table SMR-J2-1 Action Plan for Implementation of the New Master Plan

No.	Item	Related Organization	2012				2013				2014				Remarks (Related Page in the New M/P)
			1 - 3	4 - 6	7 - 9	10 - 12	1 - 3	4 - 6	7 - 9	10 - 12	1 - 3	4 - 6	7 - 9	10 - 12	
[Implementation of F/S]		JICA F/S Team													
	①Natural conditions and socio-economic surveys		⑥Formulation of execution plan												
	②Preliminary design of facilities		⑦Economic and financial analysis												
	③Cost estimation		⑧Recommendation for implementation organization												
	④Formulation of implementation schedule		⑨Confirmation of environmental and social considerations												
	⑤Examination of procurement methods		⑩Preparation of examining implementation of yen loan projects												
[Procedures by the Indonesian Side]															
1	Secure of facility sites	BAPPEDA													WWTP, STP and PS
2	Approval of the Revised M/P	DKI Governor													
3	Enforcement of Sanitation Law	Cipta Karya													
4	Conducting AMDAL	Cipta Karya													
5	Establishment of Desludging System	(To be decided)													Page D-51 in the New M/P
6	Reorganization of wastewater management sector	DKI													Page G-8 in the New M/P
7	Preparation and submission of IP	Cipta Karya													
8	Securing required budget	BAPPENAS													
[Procedures for Japanese Yen Loan]															
1	Fact Finding Mission	JICA													
2	Appraisal Mission	JICA													
3	Loan Agreement	JICA													
4	Consultant Procurement	Cipta Karya													
5	Consulting Service	Cipta Karya													

J2.1 Implementation of Feasibility Study (F/S)

J2.1.1 Outline of Prioritized Projects for F/S

(1) Off-Site System (Sewerage)

(a) Prioritized Project Areas

As mentioned in “D2 Setting Sewerage Zones”, the prioritized project areas are Zone No.1 and Zone No.6 for the target areas in the Short-Term Development Plan (target year of 2020). The location of the prioritized projects is as shown in Figure SMR-J2-1 (red colored areas in the figure).

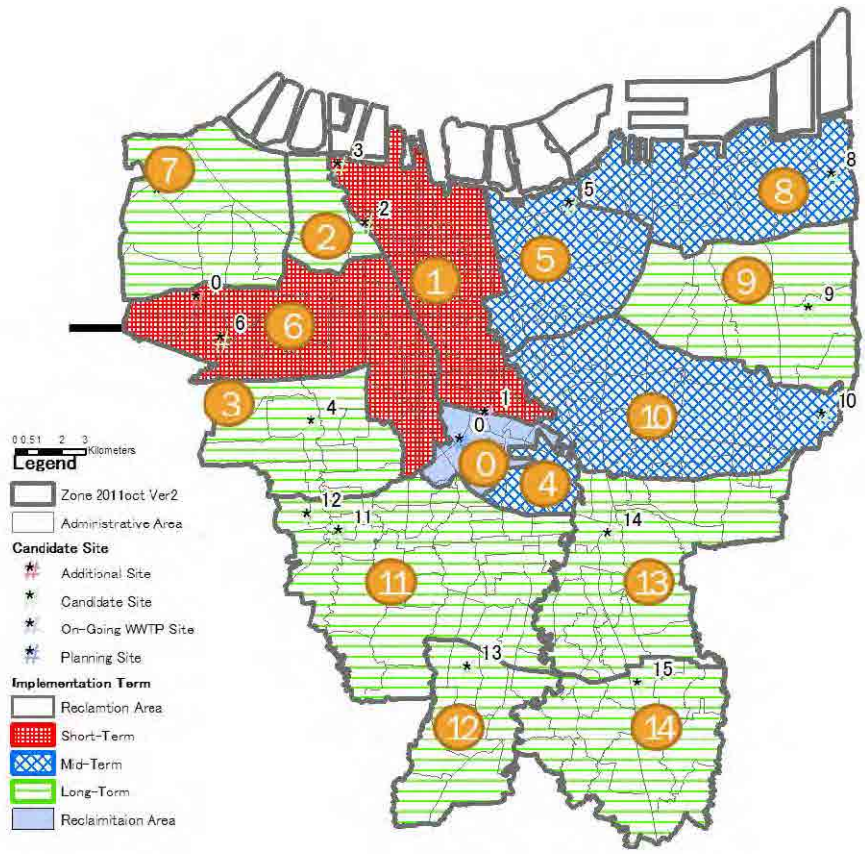


Figure SMR-J2-1 Location of Prioritized Project Areas

The prioritized project areas include one or more cities (or Wilayah), districts (or Kecamatan) and sub-districts (or Kelurahan) and the details are as shown in Table D7-4 of Section D7.

(b) Main Facilities

The main facilities of two prioritized projects are as shown in Table SMR-J2-2. As seen in the table, the scale of the projects is almost the same.

Table SMR-J2-2 Main Facilities of Prioritized Projects for Off-Site System (as of the New M/P)

Facility	Prioritized Area	
	Zone No.1	Zone No.6
Wastewater Treatment Plant	1 plant (264,000m^3/day)	1 plant (313,000m^3/day)
Relay Pumping Station	Nil	1 station
Sewers		
➢ Trunk sewer (dia. 900～2,400mm)	15km	24km
➢ Main sewer (350～800mm)	86km	155km
➢ Secondary & Tertiary sewer (200～300mm)	657km	829km
Sewer - Total	758km	1,008km
House Connection	102,000	131,000

Note: The contents of the facilities are subject to change after the detail examination in F/S.

(2) On-Site System

(a) Contents of the Project for On-Site System

i) Structural improvement of the conventional septic tanks
ii) Introduction of regular desludging system
(It is expected that item i) and ii) are implemented by the Indonesian side as Japanese technical cooperation project, if necessary)
iii) Reinforcement of sludge treatment capacity

(b) Main Facilities

The outline of improvement of the existing sludge treatment plants and the construction of the proposed sludge treatment plant is as shown in Table SMR-J2-3.

Table SMR-J2-3 Outline of Improvement and Construction of Sludge Treatment Plant

Facility & Place	Outline of Improvement & Construction
A. Improvement of the existing STP (1) Pulo Gebang STP (East Jakarta City) (2) Duri Kosambi STP (West Jakarta City) [STP: sludge treatment plant]	<Duri Kosambi STP> The existing facility is discontinued and the sludge treatment function is integrated into the sludge treatment section of the new WWTP(Zone No.6). ◆ Capacity: 930m^3/day ◆ Expected project period: one year (2013) <Pulo Gebang STP> Reduce unsanitary working condition and overwork by using machines for taking out grit and extracting sludge. ◆ Capacity increase by introduction of mechanization: 300m^3/day → 450m^3/day ◆ Required expansion area: 500m^2 ◆ Expected project period: one year (2013)
B. Construction of New STP 1 plant in Southern part of DKI	◆ Capacity: 600m^3/day ◆ Treatment method: Solid liquid separation – activated sludge treatment method ◆ Required land area: 1.5ha ◆ Expected project period: two years (2013-2014)

J2.1.2 Items for Implementation of Feasibility Study

For two prioritized projects, since it is scheduled that PPP F/S by JICA is conducted for Zone No.1, examination for Zone No.6 will be conducted on condition that Japanese yen loan scheme is applied for it. The expected study items for F/S of Zone No.6 are listed in Table SMR-J2-4.

Table SMR-J2-4 Proposed Main Study Items for F/S

No.	Study Item
1	Natural conditions and socio-economic surveys
2	Preliminary design of facilities (WWTP, STP, PS and sewers)
3	Cost estimation
4	Formulation of implementation schedule
5	Examination of procurement methods
6	Formulation of execution plan
7	Economic and financial analysis
8	Recommendation for implementation organization
9	Confirmation of environmental and social considerations
10	Preparation of examining implementation of yen loan projects

Note: WWTP = Wastewater Treatment Plant, PS = Pumping Station

J3 Action Plan for Human Resources Development

J3.1 Training of Technical Managers (Overseas Engineers' Training)

When employees do not have any particularly specialized knowledge, the most effective approach to quickly and strategically developing them into comprehensive sewerage management engineers is to use a training method that combines on-the-job training (OJT) with intensive courses providing specialized knowledge. To accomplish this, onsite training at actual wastewater treatment plants and course study in overseas locations should be planned.

Table SMR-J3-2 shows an example of a six-month training program. OJT is divided into a Phase 1 and Phase 2.

Phase 1: Trainees will acquire basic technologies by gaining two months of elementary practical experience at a sewerage facility, followed by intensive courses on the basic knowledge fields shown in Table SMR-J3-1.

Phase 2: Trainees will once again receive two months of practical experienced at a sewerage facility based on the basic technologies they acquired in Phase 1. Then they will participate in intensive courses that include review of what they have learned thus far. These steps will solidify their acquisition of the relevant technologies.

Table SMR-J3-1 Sample Overseas Engineers' Training Program

Training items		1st month	2nd month	3rd month	4th month	5th month	6th month	Remarks
		Phase 1			Phase2			
OJT		═══						
	Pipeline facilities	──			──			
	Pump stations facilities	──			──			
	Treatment plant facilities		═══	·····		═══	·····	
	Analysis		·····			·····		
Course training				═══			═══	
	Sewerage planning and design			·····			·····	
	Sewerage maintenance and management			·····			·····	
	General water environments			·····			·····	

J3.2 Training of Workers in Charge of Specific Operations (Basic Training at Domestic Wastewater Treatment Facilities)

Firmly establishing basic knowledge of sewerage systems in Jakarta will require not only training to cultivate the technical managers described above, but also training for all employees involved in sewerage systems to bolster their understanding of the basics of wastewater treatment. Here, basic sewerage system training should be planned for workers who are actually involved in onsite operations as well as administrative personnel.

When providing basic sewerage system training, it is effective to have trainees gain understanding of the principles and mechanisms of wastewater treatment by giving them hands-on experience with wastewater treatment mechanisms. This should be achieved through operation and management of existing ITP facilities that have typical forms of activated sludge treatment. At the same time, it is effective to have trainees acquire fundamental knowledge of sewerage systems and water environments through basic training.

J3.3 Action Plan for Human Resources Development and Training Content

Table SMR-J3-2 presents an action plan for human resources development to serve as the first-stage prioritized project to be established based on this Master Plan. An example of training content is presented in J3.2.3 of Main Report.

The action plan will aim to train 12 technical managers specializing in sewerage systems by 2015 through the implementation of overseas engineers' training, and then to cultivate them as specialist engineers by having them participate in project teams and on-the-job training in planning and construction following the completion of their training. Moreover, it will provide domestic basic sewerage system training to 15 workers who are actually involved in the maintenance and management of sewerage facilities as well as administrative workers by 2015.

Table SMR-J3-2 Action Plan for Human Resources Development

Item		2012		2013		2014		2015		2016	
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half
Priority project	Planning (F/S)										
	Design and construction										
	Operation										
Overseas engineers' training (12 trainees)	No.1 (2trainees)										
	No.2 (2trainees)										
	No.3 (2trainees)										
	No.4 (2trainees)										
	No.5 (2trainees)										
	No.6 (2traineees)										
Domestic basic sewerage system training (15 trainees)	ITP operation										
	No.1 (5trainees)										
	No.2 (5trainees)										
	No.3 (5trainees)										

J3.4 Capacity Development of Staff to Introduce the Regular Deslugding System of On-site Sanitation Facility

(1) Training for Supervising Staff for Regular Desludging

Training will be provided abroad for DKI staff who will participate in the project.

DKI does not have a department specializing in household wastewater treatment. It does not have enough staff with the knowledge and experience in household wastewater treatment. Therefore, even if laws, regulations and guidelines are developed for implementing regular desludging, only a few staff members have the abilities needed to utilize the regulations and guidelines. When the regular desludging system starts, many private businesses will participate in the desludging operation. This will require officials who will control and supervise the operation of these businesses. Therefore, in parallel to the introduction of the regular desludging system, the following training will be conducted.

(2) Program Contents

The training program will be designed so that the trainee can learn about Japanese technologies and knowledge and consider improvements in their decentralized wastewater treatment systems in order to make them suitable for Jakarta's conditions. More specifically, the program will include the following content.

- The participants will learn about the institutional framework and the technologies used in the night soil/sludge treatment system in Japan.
- The participants will receive on-site training at wastewater/sludge treatment facilities in order to deepen their understanding of night soil/sludge treatment system in Japan, etc.
- The participants will analyze problems in the current wastewater/sludge treatment systems, etc. in Jakarta as part of the practical training.
- The participants will consider the introduction of appropriate technologies in Jakarta as part of the practical training.

- The participants will consider a human resource development plan in Jakarta as part of the practical training.

Training materials will include audiovisual aids and field books for practical training as well as other materials prepared for the training program. The training materials will be written by experts (including external academic experts) in night soil/sludge treatment technologies. They will then be translated into Indonesia language.

(3) Training Duration, Time and Target Participant

Training shall be conducted for two to three weeks once every three years from 2012 to 2014. Target participants shall be DKI staffs who are in charge of on-site sludge management.

PART - K RECOMMENDATIONS

PART-K RECOMMENDATIONS

<Off-site (Sewerage) System>

1. The New M/P has proposed improvement plans for off-site and on-site treatment system. On the other hand, M/P and improvement plans for drainage system development (including surface drainage and drainage by drainage pipelines) will be formulated in other projects in the near future. Therefore, the Indonesian side is needed to tackle a comprehensive water environment management. (see PART-C: C2.1)
2. At F/S, the wastewater treatment system should be examined based on the detail information and analysis of them. (see PART-C: C2.1)
3. At F/S, the characteristics of wastewater in the target areas should be investigated thoroughly because these characteristic are the important parameters for the design of WWTPs. (see PART-D: D4.1)
4. WWTP layout plan should have flexibility for the future strict water standards, treatment water recycling, upgrade of treatment facility in the future, etc. (see PART-D: D7.2.3)
5. For the reclamation area, off-site system is recommended considering the fact that recycle of treated wastewater would be necessary to save the fresh water/groundwater use. Therefore, necessary land area should be kept for WWTP(s) and pumping station(s) before the commencement of development by the developers. Expected sewerage system in the reclamation area is shown in Appendix-7.

<On-site System>

1. At present, structure and other function of the conventional septic tanks should be improved, and the regular desludging system should be introduced until the sewerage system is developed all over DKI Jakarta. The conventional septic tanks do not have appropriate treatment capacity and it lead to the groundwater pollutions, etc. Basically, it is better to prohibit using the conventional septic tanks, and to connect the sewerage or to replace with the packaged aerobic wastewater treatment plants (Johkasou, etc.). However, it takes a long time to develop the sewerage system all over DKI Jakarta, and the economic and institutional environment to make the packaged aerobic wastewater treatment plant as the standard on-site facility for households in DKI Jakarta does not exists. Therefore, it is recommended to minimize the negative impacts of using the conventional septic tanks by strengthening septage management at present (see PART-D: D8.2).
2. Strengthening septage management, which is the management of sludge from on-site sanitation system such as the construction of sludge treatment facilities, introduction of regular sludge system, improvement of the structure of the septic tank, is the nationwide issue not limited to DKI Jakarta. Sanitation Law, including strengthening septage management, should be enacted as soon as possible.
3. It is necessary to establish a new regulation or system that the responsible agency/person has an obligation to install small scale wastewater treatment facility for each house or several houses in new housing development areas, which have a difficulty to access the sewerage system. (see PART-D: D8.2.2)
4. In order to introduce a regular desludging system, the most important issue is to optimize organizational system including utilization of private sector. However, it is indispensable to arrange sludge treatment facility appropriately. Especially for the target areas of the long-term plan, on-site system should be kept for more than 20 years. So the sludge treatment system should be arranged as soon as possible, and this arrangement should be included in the short-term plan. (see PART-D: D8.3)

＜Recommendations for Organizations and Systems＞

1. Laws, organizations, and systems based on the philosophy of “water circulation”

The basic concept of "water circulation" should be taken as the philosophy of the New M/P, and should be shared in the all aspect of the administrative development such as all laws, policies, organizations, technologies, systems, environmental education, water, wastewater treatment, and social environments. (see PART-G: G1)

2. Basic policy and institutional framework
   DKI Jakarta has fallen the most behind in sewerage development among cities of Indonesia, although it is the capital with a population of no less than about nine million and the actual center of politics and economics of Indonesia. Considering this status, DKI Jakarta shall indicate clearly and widely its basic policy and directions for the management of wastewater and sludge, which is "Abolish septic tanks and, implement the comprehensive development plan of sewerage system for both black water and gray water steadily and rapidly" to Jakarta citizens and should improve the current institutional framework. (see PART-G: G3.4)

3. Improvement of institutional framework on comprehensive sewerage management
   DKI Jakarta should establish an institutional framework which overview all related works of sewerage and sludge treatment and make a concrete policy and plans of DKI Jakarta for its citizens. This institutional framework will engage in preparation of legal framework and drafting, planning, and implementing of system in a comprehensive and coordinated manner based on the said basic philosophy and the basic policy. Furthermore, the framework should promote planning and developing sewage treatment according to the M/P. (see PART-G: G3.4)

4. Preparation for improvement of institutional framework on sewerage management
   To improve the said administrative department/body, DKI Jakarta should set up a preparatory committee consisting of secondments from institutions / agencies related to sewage and sludge treatment. The committee shall make concrete discussion on the organization and the system according to the sewerage system development plan. By the end of FY 2013 at the latest, DKI Jakarta should improve the institutional framework of sewage management and start it working. (see PART-G: G3.4)

5. Authority of institutional framework on sewerage management
   The improved institutional framework of wastewater and sludge management should have administrative function concerning budgets, preparation of legislation, planning, construction, operation, and preparation of regulations and guidelines as well as being an authorized department that unifies directions of both on-site and off-site treatment so that the wastewater management budget is spend in the most efficient way. (see PART-G: G3.4)

6. Establishment of law system
   It will be important to review current laws and ordinances and to restructure laws, regulations, design guidelines, and methods of operation to ensure that they are systematic and comprehensive based on the concept of water circulation.

   On Output-1, draft Sanitation Law, Criteria of sewerage discharge standards, and Guideline for preparation of sewerage master plan are preparing. Based on the circumstances, the preparatory committee and the improved institutional framework of wastewater and sludge management will review the existing decrees and regulations and renew them to achieve targets of short-term, medium-term and long-term plans on on-site and off-site treatment aiming comprehensive management of wastewater. (see PART-G: G4.2)

7. Organization of operation of off-site treatment
   In line with the implementation of phased sewerage projects based on the New M/P, review the organization of PD PAL JAYA, which is the public sewerage company, incrementally reinforce its participation in sewerage construction projects and capabilities in operation and management, and improve its maintenance technologies. (see PART-G: G5.2)

8. Management system of on-site treatment
   The sewage management administration should examine and implement qualitative and quantitative improvement measures for on-site treatment while sequentially watching sewerage development plan and its progress based on environmental improvement targets for public water

bodies. It should execute treatment of increasing amounts of sludge and planning and construction of treatment facilities, while at the same time it should build the administrative system for desludging. When doing so, taking into consideration the income and expenditure situation of sewerage works, on balance, it is appropriate to set up subsidies that cover the reasonable portion of septic tank replacement expenses
In desludging, transportation of sludge, and the operation of ITPs of establishments such as office buildings and commercial buildings, the maximum utilization of private-sector should be examined. (see PART-G: G5.3)

9. Introduction of private sector into sewerage development project
Considering that sewage and sludge treatment system is social infrastructure with the greatest publicity and that the business entities need to ensure profitability, introduction of private sector should be carried out after deliberate investigation on the scope of works, techniques, organization and application. (see PART-G: G7.1)

10. Establishment of a division for PPP contract and operational management
It is necessary to make sure that there is no contradiction between DKI Jakarta and the PPP entity pertaining to their mutual risk management. Therefore, DKI Jakarta should establish a specialized division which deals with PPP contracting works and their operational management. (see PART-G: G7.1)

11. Realistic PPP
When considering the introduction of PPP, the area to be covered by PPP needs to be confined to the portion for which the private sector can assume the risk.
The BOT model, in which the private operator is responsible for the construction and operation of the WWTPs and the public sector is responsible for the construction and maintenance of the piping system, and the public sector pays the bulk sewage treatment fee to the private operator, would be the one of realistic PPP option for the sewerage works.
In addition to the BOT model, there is the Management Contract model in which the management of the concerned public entity is entrusted to the private operator on management fee basis for the limited period. In this model, private enterprises do not bear capital investment or financing risk, nor do they bear the tariff risk. This model is an option to be considered in sewerage works whose project profitability is low. (see PART-E: E3.8.5)

12. Institutional framework for developing human resources

In order to establish and develop the institutional framework, many human resources, who have the administrative and technical capacity on the water environment preservation measures, are required. In order to foster these human resources, recruitment of younger generations and the development of the education system from the long term view point is required. (see PART-G: G6)

APPENDICES

Appendix − 1 : List of Counterpart

PEMERINTAH PROVINSI DAERAH KHUSUS
IBUKOTA JAKARTA

KEPUTUSAN GUBERNUR PROVINSI DAERAH KHUSUS
IBUKOTA JAKARTA

NOMOR 28/2011

TENTANG

PEMBENTUKAN TIM PENDAMPING PROYEK PENGEMBANGAN KAPASITAS SEKTOR AIR LIMBAH MELALUI REVIEW MASTER PLAN AIR LIMBAH

DENGAN RAHMAT TUHAN YANG MAHA ESA

GUBERNUR PROVINSI DAERAH KHUSUS IBUKOTA JAKARTA,

Menimbang :

a. bahwa dalam rangka menindaklanjuti Record of Discussion Between Japan International Cooperation Agency and Authorities Concerned of The Government of The Republic of Indonesia on Japanese Technical Cooperation for Project For Capacity Development of Wastewater Sector Through Reviewing The Wastewater Management Master Plan in DKI Jakarta tanggal 17 Juni 2010 perlu dipersiapkan rencana penyusunan Review Master Plan Air Limbah di DKI Jakarta;

b. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a, serta untuk memperlancar dan efektivitas penyusunan, perlu menetapkan Keputusan Gubernur tentang Pembentukan Tim Pendamping Proyek Pengembangan Kapasitas Sektor Air Limbah Melalui Review Master Plan Air Limbah;

Mengingat :

1. Undang-Undang Nomor 10 Tahun 2004 tentang Pembentukan Peraturan Perundang-undangan;

2. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah sebagaimana telah beberapa kali diubah terakhir dengan Undang-Undang Nomor 12 Tahun 2008;

3. Undang-Undang Nomor 29 Tahun 2007 tentang Pemerintahan Provinsi Daerah Khusus Ibukota Jakarta sebagai Ibukota Negara Kesatuan Republik Indonesia;

4. Undang-Undang Nomor 32 Tahun 2009 tentang *Perlindungan dan* Pengelolaan Lingkungan Hidup;

5. Peraturan Daerah Nomor 10 Tahun 2008 tentang Organisasi Perangkat Daerah;

MEMUTUSKAN

Menetapkan : KEPUTUSAN GUBERNUR TENTANG PEMBENTUKAN TIM PENDAMPING PROYEK PENGEMBANGAN KAPASITAS SEKTOR AIR LIMBAH MELALUI REVIEW MASTER PLAN AIR LIMBAH.

KESATU : Membentuk Tim Pendamping Proyek Pengembangan Kapasitas Sektor Air Limbah Melalui Review Master Plan Air Limbah di Provinsi Daerah Khusus Ibukota Jakarta dengan susunan keanggotaan sebagaimana tercantum dalam Lampiran Keputusan Gubernur ini.

KEDUA : Penanggung Jawab sebagaimana dimaksud pada diktum KESATU mempunyai tugas :

a. memastikan bahwa pelaksanaan Review Master Plan Air Limbah di Provinsi DKI Jakarta berjalan dengan baik; dan
b. melaporkan pelaksanaan proyek kepada Gubernur setiap 1 (satu) tahun sekali atau tergantung kebutuhan.

KETIGA : Tim Pengarah sebagaimana dimaksud pada diktum KESATU mempunyai tugas :

a. mengarahkan dan mengawasi rencana kerja tahunan dari proyek sejalan dengan rencana operasional;
b. mengkaji kemajuan proyek dan mengevaluasi penyelesaian target dan pencapaian tujuan;
c. mengidentifikasi ketetapan cara atau metode penyelesaian isu-isu utama yang muncul dari atau terkait proyek; dan
d. melaporkan hasil pelaksanaan tugas sebagaimana huruf a, huruf b dan huruf c di atas kepada Penanggung jawab setiap 4 (empat) bulan sekali.

KEEMPAT : Tim Teknis sebagaimana dimaksud pada diktum KESATU mempunyai tugas:

a. memberikan pendampingan teknis bagi pelaksanaan proyek;
b. memfasilitasi koordinasi antar pemangku kepentingan terkait pelaksanaan proyek; dan
c. melaporkan hasil pelaksanaan tugas sebagaimana huruf a dan huruf b kepada Tim Pengarah setiap 1 (satu) bulan sekali.

KELIMA : Tim Pelaksana sebagaimana dimaksud pada diktum KESATU mempunyai tugas :

a. memfasilitasi komunikasi antara Tim Teknis dengan Tim Konsultan Pelaksana Proyek;
b. membantu pelaksanaan tugas harian Tim Teknis; dan
c. melaporkan hasil pelaksanaan tugas sebagaimana huruf a dan huruf b kepada Tim Teknis setiap 2 (dua) minggu sekali.

KEENAM : Sekretariat Tim sebagaimana dimaksud pada diktum KESATU berkedudukan di Divisi Teknis dan Bisnis PD PAL Jaya.

KETUJUH : Biaya yang diperlukan dalam pelaksanaan tugas TIM sebagaimana dimaksud pada diktum KESATU, dibebankan pada Rencana Kerja Anggaran Perusahaan (RKAP) PD PAL Jaya Tahun Anggaran 2011 atau sumber pembiayaan lain yang sah dan tidak mengikat.

KEDELAPAN : Keputusan Gubernur ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di Jakarta
pada tanggal 6 Januari 2011

a.n. GUBERNUR PROVINSI DAERAH KHUSUS IBUKOTA JAKARTA
SEKRETARIS DAERAH,

FAJAR PANJAITAN
NIP 195508261976011001

Tembusan :

1. Gubernur Provinsi DKI Jakarta
2. Wakil Gubernur Provinsi DKI Jakarta

Lampiran Keputusan Gubernur Provinsi Daerah Khusus Ibukota Jakarta

Nomor 28/2011
Tanggal 6 Januari 2011

TIM PENDAMPING PROYEK PENGEMBANGAN KAPASITAS SEKTOR AIR LIMBAH MELALUI REVIEW MASTER PLAN AIR LIMBAH

I. Penanggung Jawab : Sekretaris Daerah Provinsi DKI Jakarta

II. Tim Pengarah :

Koordinator ① : Deputi Gubernur Bidang Tata Ruang dan Lingkungan Hidup Provinsi DKI Jakarta

Anggota ② : 1. Asisten Pembangunan dan Lingkungan Hidup Sekda Provinsi DKI Jakarta

③ 2. Kepala Badan Perencanaan Pembangunan Daerah Provinsi DKI Jakarta

④ 3. Kepala Badan Pengelola Lingkungan Hidup Daerah Provinsi DKI Jakarta

⑤ 4. Kepala Dinas Pekerjaan Umum Provinsi DKI Jakarta

⑥ 5. Kepala Dinas Kebersihan Provinsi DKI Jakarta

⑦ 6. Direktur Utama PD PAL Jaya

III. Tim Teknis :

Koordinator ⑧ : Kepala Bidang Prasarana Sarana Kota dan Lingkungan Hidup Badan Perencanaan Pembangunan Daerah Provinsi DKI Jakarta

Anggota ⑨ : 1. Kepala Bidang Pengendalian Pencemaran dan Sanitasi Lingkungan Badan Pengelola Lingkungan Hidup Daerah Provinsi DKI Jakarta

⑩ 2 Kepala Bidang Perencanaan Ruang Kota Dinas Tata Ruang Provinsi DKI Jakarta

⑪ 3. Kepala Bidang Pengelolaan Sumber Daya Air Dinas Pekerjaan Umum Provinsi DKI Jakarta

⑫ 4. Kepala Bidang Teknik Pengelolaan Kebersihan Dinas Kebersihan Provinsi DKI Jakarta

⑬ 5. Kepala Bagian Lingkungan Hidup Biro Tata Ruang dan Lingkungan Hidup Setda Provinsi DKI Jakarta

⑭ 6. Kepala Bagian Prasarana Kota Biro Prasarana dan Sarana Kota Setda Provinsi DKI Jakarta

⑮ 7 Direktur Teknik dan Bisnis PD PAL Jaya

IV. Tim Pelaksana

Koordinator

16 1. Kepala Bidang Pengembangan dan Program PD PAL Jaya

Anggota

17 : 2. Kepala Subbidang Tata Ruang, Lingkungan Hidup, Energi dan Sumber Daya Alam Badan Perencanaan Pembangunan Daerah Provinsi DKI Jakarta

18 3. Kepala Subbidang Pengendalian Habitat dan Sanitasi Lingkungan Badan Pengelola Lingkungan Hidup Daerah Provinsi DKI Jakarta

19 4. Kepala Seksi Perencanaan Makro Ruang Kota Dinas Tata Ruang Provinsi DKI Jakarta

20 5. Kepala Seksi Perencanaan Pengelolaan Sumber Daya Air Dinas Pekerjaan Umum Provinsi DKI Jakarta

21 6. Kepala Seksi Pengembangan Metode Pengelolaan Kebersihan Dinas Kebersihan Provinsi DKI Jakarta

22 7. Kepala Subbagian Tata Air Biro Prasarana dan Sarana Kota Setda Provinsi DKI Jakarta

23 8. Kepala Subbidang Pengelolaan Program PD PAL Jaya

a.n. GUBERNUR PROVINSI DAERAH KHUSUS
IBUKOTA JAKARTA
SEKRETARIS DAERAH,

FADJAR PANJAITAN
NIP 195608261976011001

The Goverment of DKI Jakarta Province

Decree of Governoor of DKI Jakarta Province

No. 28/2011

On

Formation of counterpart for The Project of Capacity Development of Wastewater Sector

Through Reviewing the Wastewater Management Master plan

By the blessed of GOD Almighty

Governoor of DKI Jakarta Province

Considering : a. That in order to following up the and authorities Concerned of the Government of the Repblic Indonesia on Japanese technical Cooperation for the project of Capacity Development of Wastewater Sector Through Reviewing the Wastewater Management Master plan in DKI Jakarta, dated 17th June 2010, it is necessary to prepare the plan of drafting the Review Master plan for Wastewater in DKI Jakarta

b. based on the consideration as mentioned in letter a, to accelerate and effectiveness of the drafting, it is necessary to enacted the Governoor decree on establishment of the counterpart team for the Project of Capacity Development of Wastewater Sector Through Reviewing the Wastewater Management Master plan.

Recalling : 1. Law No 10 year 2004 on establishment of legislation.

2. law No 32 year 2004 on Local Government as in several times changing, last with the law No 12 year 2008

3. Law no 29 year 2007 on Goverment of DKI Jakarta Province as the capital of Republic Indonesia

4. Law no 32 year 2009 on Protection and Environmental management

5. Regional regulation No 10 year 2008 on Local Staff Organization

DECIDED

Enacted : The Governoor Decree on the establishment of Counterpart team for the Project of Capacity Development of Wastewater Sector Through Reviewing the Wastewater Management Master plan

First : Establish the counterpart for the Project of Capacity Development of Wastewater Sector Through Reviewing the Wastewater Management Master plan in DKI Jakarta with the formation of the member as mentioned in the attachment of this Governoor Decree

Second : The Responsible person as mentioned in the First has duties:

a. To make sure the implementation for the Review Master Plan of Wastewater in DKI Jakarta goes well; and
b. Reporting the implementation of the Project to the Governoor onec in every 1 (one) year or depend on the necessity.

Third : Sterring team as mentioned in the First have duties:

a. Directing and monitoring the annual plan of the project in line with the operational plan.
b. Review the progress of the project and evaluated the finishing of the target and achievement of the objective.
c. Identify the determination of ways or completion method from the issues raised from or related with the project; and
d. Report the implementation of the duties as mentioned in letter a, b, and c above to the responsible Person once in every 4 (four) months

Fourth : The Technical team as mentioned in the First have duties:

a. To give the technical counterparting to the implementation of the Project
b. To facilitate the coordination between stakeholder related with the implementation of the project; and
c. To report the implementation of the duties as mentioned in letter a and b to the streering team once in every 1 (one) month

Fifth : The Implementer team as mentioned in the First have duties:

a. Facilitating the communication between Technical team and Consultant team of the project
b. Assist the implementation of daily duty of the Technical team; and
c. Report the implementation of the duties as mentioned in letter a and b to the technical team once in every 2 (two) weeks.

Sixth : The secretariate of the team as mentioned in the First, located in the division of Technical and business of PD PAL Jaya.

Seventh : The cost required on the implementation of the team duties as mentioned on the First, bear to the Company Budgeting Work Plan (Rencana Kerja Anggaran Perusahaan) PD PAL Jaya, fiscal year 2011 or other legitimate financial source.

Eighth : This governoor decree is valid from the enacted date.

Enacted in Jakarta

On date of January 6th 2011

On behalf of Governoor of DKI Jakarta

Regional Secretary

Fadjar Panjaitan

Nip 195508261976011001

CC:

1. Governoor of DKI Jakarta Province
2. Deputy Governoor of DKI Jakarta Province

Attachment : The Decree of Governoor of DKI Jakarta Province

Number 28/2011

Dated January 6th 2011

COUNTERPART TEAM FOR THE PROJECT OF CAPACITY DEVELOPMENT OF WASTEWATER SECTOR THROUGH REVIEWING THE WASTEWATER MANAGEMENT MASTER PLAN

I. Responsible Person : The regional Secretary of DKI Jakarta Province

II. Streering Team :

Coordinator : Deputy Governoor on Spatial and Environmental of DKI Jakarta Province

Member :

1. Assistant Development and Environtmental, Regional Secretary of DKI Jakarta Province
2. Head of BAPPEDA, DKI Jakarta Province
3. Head of BPLHD, DKI Jakarta Province
4. Head of Public Works Agency (Dinas PU), DKI Jakarta Province
5. Head of Cleansing Agency (Dinas Kebersihan), DKI jakarta Province
6. President Director of PD PAL Jaya

III. Technical Team : Head of City Infrastructure and Environmental Division, BAPPEDA DKI Jakarta Province

Member :

1. Head of Pollution control and Sanitation Division, BPLHD DKI Jakarta Province
2. Head of City Spatial Planning Division, Spatial Agency (Dinas Tata Ruang) DKI Jakarta Province
3. Head of Water Resources Management Division, Public Works Agency (Dinas PU), DKI Jakarta Province
4. Head of Cleansing Menagement Technic Division, Cleansing Agency (Dinas Kebersihan), DKI Jakarta Province

5. Head of Environmental Division, Bureau of Spatial adn Environmental, Regional Secretary of DKI Jakarta Province
6. Head of City Infrastructure Division, Bureau of City Infrastructure, Regional Secretary of DKI Jakarta Province
7. Director of Technical and Business, PD PAL Jaya

IV. Implementer Team

Coordinator :

1. Head of Development and Program Division, PD PAL Jaya

Member :

2. Head of Sub-division of Spatial, Environmental, Energy and Water Resources, BAPPEDA DKI Jakarta Province
3. Head of Subdivison of Habitat Control and Sanitation, BPLHD DKI Jakarta Province
4. Head of Urban Macro Planning Section, Spatial Agency (Dinas Tata Ruang), DKI Jakarta Province
5. Head of Water Resources Management Planning section, Public Works Agency (Dinas PU), DKI Jakarta Province
6. Head of Development of Cleansing Management Method Section, Cleansing Agency (Dinas Kebersihan) DKI Jakarta Province
7. Head of Water Management Sub-division, Bureau of City Infrastructure, Regional Secretary of DKI Jakarta Province
8. Head of Program Management Sub-division, PD PAL Jaya

On behalf of Governoor DKI Jakarta Province

Regional Secretary

Fadjar Panjaitan

Nip 195508261976011001

Appendix − 2 : Minutes of meeting (Inception Report)

MINUTES OF MEETING

ON

THE FIRST JOINT COORDINATING COMMITTEE

FOR

THE PROJECT FOR CAPACITY DEVELOPMENT OF WASTEWATER SECTOR THROUGH REVIEWING THE WASTEWATER MANAGEMENT MASTER PLAN IN DKI JAKARTA

At the commencement of the Project for Capacity Development of Wastewater Sector through Reviewing the Wastewater Management Master Plan in DKI Jakarta (hereinafter referred to as "the Project"), the Government of the Republic of Indonesia (hereinafter referred to as "GOI") and Japan International Cooperation Agency (hereinafter referred to as "JICA") hold the 1st Joint Coordinating Committee (hereinafter referred to as "JCC") meeting chaired by Director General of Human Settlements, Ministry of Public Works, on 15th December 2010 in Jakarta.

During the JCC meeting, JICA and the Indonesian authorities concerned discussed on the issues related to the implementation of the Project. As the result of the discussions, JICA and the Indonesian authorities concerned agreed on the matters referred to in the documents attached hereto, subject to approval by the competent higher authorities on both sides.

Jakarta, 15th December 2010

Shigenori OGAWA
Senior Representative
Indonesia Office
Japan International
Cooperation Agency (JICA)

Budi Yuwono P.
Director General
of Human Settlements
Ministry of Public Works
The Republic of Indonesia

Fadjar Panjaitan
Provincial Secretary of
DKI Jakarta
The Republic of Indonesia

Dedy Supriadi Priatna
Deputy for Infrastructure
BAPPENAS
The Republic of Indonesia

ATTACHMENT

1. Commencement of the Project

At the 1st JCC meeting, JICA and GOI formally declared the commencement of the Project. JICA formally introduced to GOI, JICA Long Term Expert, Mr. Hideichiro NAKAJIMA, and also JICA Expert Team, headed by Mr. Masahiro TAKEUCHI.

2. Preparation of Domestic Wastewater Law and Related Regulations (Output 1)

JICA Long Term Expert explained the frameworks of the project and action to be taken for preparation of Domestic Wastewater Law and related regulations. It was suggested to GOI to prioritize laws and regulations to be prepared through this project.

GOI agreed on it.

3. Revision of Wastewater Management Master Plan in DKI Jakarta (Output 2)

JICA Expert Team explained the Inception Report which contains mainly the following:

(1) Purpose and scope of the Project
(2) Overall schedule of the Project
(3) Basic policies of the Project
(4) Project implementation policies
(5) Project implementation organization and staffing plan
(6) Reports

GOI requested JICA to prepare the reports in Indonesian Language, not only in English. JICA noted it.

GOI requested JICA to identify and propose the candidate site for sewerage treatment plants in Master Plan at the early stage of project, so that DKI Jakarta can start preparation of land acquisition earlier. JICA noted it.

GOI mentioned that the activities of the Project shall be adjusted to the City Sanitation Strategy of DKI Jakarta to be prepared by DKI Jakarta, and also shall coordinate with the other related activities.

4. New JCC members

GOI proposed the following related parties as the JCC member, in addition to the members listed in "ANNEX VI JOINT COORDINATION COMMITTEE" of Record of Discussion dated 15th December 2010 (hereinafter referred as to "the R/D")..

- Head of Planning and Foreign Aid Bureau, Secretary General, Ministry of Public Works
- Director of Loan & Grant, Directorate General, Loan Management, Ministry of Finance

JICA agreed on it. The revised list of JCC members are attached as Annex-2.

5. Revision of Project Framework, Project Design Matrix (PDM) and Plan of Operation (PO)

(1) JICA proposed to revise descriptions in "ANNEX 1: PROJECT FRAMEWORK" of the R/D as follows:

a) Originally written as:

5. Activities

(2-2-5) To conduct topographic and geological survey at sewage treatment plant sites"

shall be revised as:

5. Activities

(2-2-5) To select the sewage treatment plant sites based on the technical suitability

b) Serial number of "5. Activities"shall be revised as follows:

Serial Number (Original)	Activity	Serial Number (Revised)
2-2-8	To conduct Initial Environmental Examination (IEE)	2-2-12
2-2-9	To develop an improvement plan of the organizational functions	2-2-8
2-2-10	To develop an activity plan of environmental education in wastewater sector	2-2-9
2-2-11	To evaluate the selected alternative option by economical, financial, technical, social and environmental aspects	2-2-10
2-2-12	To identify priority actions to be taken for implementation of the master plan and make an action plan including implementation of a feasibility study and capacity development for related stakeholders	2-2-11

GOI agreed on it.

Project Design Matric (PDM) attached to the R/D shall be revised accordingly. The revised PDM is attached in Annex-3.

(2) Regarding Plan of Operation (PO) attached to the R/D, JICA also proposed that the target for the activities of Output-1 shall be revised as "Domestic Wastewater Laws and Related Regulations".

GOI agreed on it. The revised PO is attached in Annex-4.

6. Training of Indonesian Personnel in Japan

GOI requested that the Counterpart Trainings in Japan should be conducted at the earlier stage of the Project.

JICA noted it.

7. Further Discussions

GOI stated that Directorate General of Human Settlement, the Ministry of Public Works has already prepared "Review of Master Plan and Detail Design for Jakarta Wastewater Development Project" (hereinafter referred to as "Review Master Plan 2009") by their own budget, and they would like to accelerate the construction of sewerage system in DKI Jakarta. In this regards, GOI expressed their intention to propose JICA for Preparatory Survey on development of sewerage system in DKI Jakarta, starting from the middle of June 2011, in parallel with this Project. GOI also expressed their strong intension for the implementation of construction works using Japanese ODA Loan.

JICA noted it and suggested to have another meeting to discuss how to accelerate the development of sewerage system in DKI Jakarta in order to catch up with the original schedule. JICA also emphasized that it would depend on GOI's strong initiative and participation in implementing the Project with assistance of JICA experts.

Annexes

Annex-1 List of Attendants
Annex-2 List of Joint Coordinating Committee Member (Revision-1)
Annex-3 Revised Project Design Matrix (PDM)
Annex-4 Revised Plan of Operation (PO)

Annex-1

List of Attendants

[Indonesian side]

Ministry of Public Works

Mr. Syukrul Amien	Director of Environmental Sanitation Development, DGHS
Mr. Antonius Budiono	Director of Program Development, DGHS
Mr. Handy B. Legowo	Sub-Director of Sanitation, Directorate of Environmental Sanitation Development, DGHS
Ms. Rini Agustin	Sub-Director of Foreign Affairs, DGHS
Ms. Emah Sudjimah	Section Head of Development and Facilitation, Sub-directorate of Wastewater System Development, Directorate of Environmental Sanitation Development, DGHS
Mr. Indra Bangun	Staff of Foreign Cooperation Bureau, Secretary General
Mr. Sunarjo	Staff of Directorate of Program Development, DGHS
Mr. Budi Felinov	Staff of Directorate of Program Development, DGHS
Mr. Joko Karsono	Staff of Directorate of Program Development, DGHS
Mr. Dahlan	Staff of Law Division, DGHS

DKI Jakarta

Ms. Sarwo Handayani	Head of BAPPEDA
Ms. Tyas	Assistant Deputy Governor for Environment
Mr. Dudi Gardesi	Section Head of Planning and Maintenance of Water Resources, Public Works Agency
Mr. Tauhid Tjakra	Assistant of Development and Environment, Secretary of Province
Ms. Esti	Secretary of Director of PD PAL JAYA
Ms. Aktina Tetradewi	Staff of Assistant Deputy Governor for Environmental Division
Mr. Eko Gumelar	Staff of Environmental Impact Control Division, Environmental Board (BPLHD)
Mr. Wawan Kurniawan	Staff of Environmental Impact Control Division, Environmental Board (BPLHD)
Ms. Liliansari Loedin	President Director, PD PAL JAYA
Ms. Driah T.	Staff of BAPPEDA

BAPPENAS

Mr. Aldy K. Mardikanto	Staff of Planning, Directorate of Housing and Settlement, Deputy of Infrastructure

[Japanese side]

JICA Indonesia Office

Mr. Shigenori Ogawa	Senior Representative, JICA Indonesia Office
Ms. Keiko Kitamura	Project Formulation Advisor, JICA Indonesia Office

Project Team

(JICA Long-term Expert)

Mr. Hideichiro Nakajima	Chief Advisor/Sewerage Policy Advisor

(JICA Short-term Expert)

Mr. Masahiro Takeuchi	Leader/Sewerage Planning
Mr. Kazushi Hashimoto	Sub-Leader/On-site System-1
Dr. Lalit Agrawal	Wastewater Treatment Planning
Mr. Takashi Miyagawa	Institution-1/Environmental Education
Mr. Atsushi Kato	Coordinator/Assistant of Sewerage Planner

Annex-2

List of Joint Coordinating Committee Members

Position	Institution
Indonesian Side	
Chairperson	Director General of Human Settlements, Ministry of Public Works
Member	Deputy Governor for Spatial Planning and Environment, DKI Jakarta
	Head of BAPPEDA, DKI Jakarta
	Assistant of Development and Environment, Secretary of Province, DKI Jakarta
	Head of Public Works Department, DKI Jakarta
	Head of Environmental Management Board, DKI Jakarta
	Head of Cleansing Department, DKI Jakarta
	Director of Settlements and Housing, BAPPENAS
	Director of Program Development, Directorate General of Human Settlements, Ministry of Public Works
	Director of Environmental Sanitation Development, Directorate General of Human Settlements, Ministry of Public Works
	President Director of PD PAL JAYA
	Head of Planning and Foreign Aid Bureau, Secretary General of Ministry of Public Works
	Director of Loan & Grant, Directorate General, Loan Management, Ministry of Finance
Japanese Side	
Member	Chief Representative of JICA Indonesia Office
	JICA Experts
	Other personnel concerned, to be assigned by JICA, if necessary.

Project Design Matrix-2 (PDM2)

Project Title: The Project for Capacity Development of Wastewater Sector through Reviewing the Wastewater Management Master Plan in DKI Jakarta

Implementing Agencies: Directorate General of Human Settlement of Ministry of Public Works (MPW) and DKI Jakarta

Cooperating Agency: PD PAL JAYA

Project Site: DKI Jakarta

Target Group:
(Direct): Staff members of MPW, DKI Jakarta and PD PAL JAYA
(Indirect): Residents of DKI Jakarta

Duration: 2010 – 2012 (2 years)
Date: 15th December 2010

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
[Overall Goal] 1. Proper policy, system and plan in wastewater sector are established. 2 DKI Jakarta has enough capacity to improve wastewater sector conditions.	1-1 Domestic Wastewater Law is enacted. 1-2 Regulations and standards related to Domestic Wastewater Law are enacted. 2-1 Finance is prepared. 2-2 Revised wastewater management master plan is implemented.	Domestic Wastewater Law Regulations and standards related to Domestic Wastewater Law Record and information from MPW and DKI Jakarta Record and information from MPW and DKI Jakarta	
[Project Purpose] Capacity of Ministry of Public Works and DKI Jakarta in formulation of wastewater sector policies and wastewater management plans is enhanced.	1-1 Draft Domestic Wastewater Law is submitted to the parliament. 1-2 Draft Regulations and standards related to Domestic Wastewater Law are submitted to MPW. 2. An action plan of the implementation of the revised Wastewater Management Master Plan in DKI Jakarta is developed (with information on timeframe, target, organization/section in charge, sources of the budget for each work item).	Information from MPW and DKI Jakarta Information from MPW and DKI Jakarta Action plan	1. Improvement of the wastewater management system remains as a priority in the policy of Ministry of Public Works and DKI Jakarta. 2. Financial resources for implementation of the master plan are available 3. Land for sewage treatment plants is secured.
[Outputs] 1. Domestic Wastewater Law and its regulations are prepared. 2. The wastewater management master plan in DKI Jakarta is revised.	1-1 Draft Domestic Wastewater Law is developed. 1-2 Regulations and standards related to Domestic Wastewater Law are developed. 2-1 Revised wastewater management master plan is approved in DKI Jakarta.	Draft Domestic Wastewater Law Related regulations and standards Revised wastewater management master plan	

Activities		Inputs		Important Assumption
		Japanese Side	Indonesian Side	
1	**Domestic Wastewater Law and its regulations are prepared.**	1. Experts (1) Long-term expert - Chief Advisor/Sewerage Policy Advisor (2) Short-term expert team 1) Leader/Sewerage planning 2) Sub-leader/On-site system 3) Urban planning 4) Wastewater treatment planning 5) Sewerage facilities planning 6) Urban drainage 7) GIS 8) Institution 9) Economics/finance 10) Environmental and social consideration 11) Environmental education 12) Coordinator 2. Equipment (1) Personal computer and software for GIS: 2 sets (2) Printer: 2 sets 3. Training in Japan 4. Local cost	1. Assignment of Counterpart personnel 2. Project office spaces and other necessary facilities 3. Necessary data/ information 4. Allocation of operational cost for the Project	
1-1	To collect and analyze basic information related to national wastewater sector, and identify institutional and technical issues based on existing data and previous study			
1-2	To select priority laws and regulations comprises norms, standards, guidelines and criteria to be developed or revised			
1-3	To develop draft of laws and regulations comprises norms, standards, guidelines and criteria that are selected in activity (1-2)			
1-4	To hold a seminar with relevant organizations / stakeholders in the wastewater sector to share and discuss the result of activity (1-3)			
1-5	To develop or revise laws and regulations identified in activity (1-2) based on the result of activity (1-4) and (2-2-13)			
2	**The wastewater management master plan in DKI Jakarta is revised.**			
2-1	**To conduct survey for reviewing the wastewater management master plan in DKI Jakarta**			
2-1-1	To review the existing data and information including progress of the master plan, related plans and policies			
2-1-2	To assess capacity of wastewater sector in DKI Jakarta and PD PAL JAYA.			
2-1-3	To identify flood condition and major drainage facilities			
2-1-4	To conduct site survey and data analysis			
2-1-5	To analyze socio economic data for establishing the master plan			
2-1-6	To identify institutional issues (organizational, financial and human resources related) in the relevant organizations in wastewater in DKI Jakarta			
2-1-7	To conduct field survey for selection of sewage treatment plant sites			
2-1-8	To conduct water quality survey			
2-1-9	To evaluate the present condition and to identify the issues			

Activities		Inputs		Important Assumption
		Japanese Side	Indonesian Side	
2-2	**To review the master plan**			
2-2-1	To develop the basic plan for wastewater management including targets, strategies and actions			
2-2-2	To develop the frame work for wastewater management system			
2-2-3	To develop the planning data (qualities and quantity of wastewater generation)			
2-2-4	To make a zoning of off-site system and on-site system			
2-2-5	To select the sewage treatment plant sites based on the technical suitability			
2-2-6	To develop alternative studies of the master plan (construction cost, OM cost, environment and others)			
2-2-7	To select the most appropriate alternative option			
2-2-8	To develop an improvement plan of the organizational functions			
2-2-9	To develop an activity plan of environmental education in wastewater sector			**[Pre-conditions]**
2-2-10	To evaluate the selected alternative option by economical, financial, technical, social and environmental aspects			Appropriate human resources are assigned and budget is allocated to the Project.
2-2-11	To identify priority actions to be taken for implementation of the master plan and make an action plan including implementation of a feasibility study and capacity development for related stakeholders			
2-2-12	To conduct Initial Environmental Evaluation (IEE)			
2-2-13	To publish the revised wastewater management master plan in DKI Jakarta			

Plan of Operation-2 (PO2)

Project Title: The Project for Capacity Development of Wastewater Sector through reviewing the Wastewater Management Master Plan in DKI Jakarta
Duration: July 2010 ~ June 2012 (2 years)

				2010						2011												2012					
				7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
			Joint coordinating committee					○						○					○								○
			Terminal Evaluation																				○				
1. Domestic Wastewater Law and its regulations are prepared.		Target	Person in-charge																								
1-1	To collect and analyze basic information related to national wastewater sector, and identify institutional and technical issues based on existing data and previous study	Domestic Wastewater Law and Related Regulations	Mr. Handy Legowo (DGHS),Mr. Rudy Arifin (DGHS),Chief of Wastewater Development Region 1 Section																								
1-2	To select priority laws and regulations comprises norms, standards, guidelines and criteria to be developed or revised		Mr. Handy Legowo (DGHS),Mr. Rudy Arifin (DGHS), Mrs. Kuswahyuni (Head of Sub-division of Law)																								
1-3	To develop draft of laws and regulations comprises norms, standards, guidelines and criteria that are selected in activity (1-2)		Mr. Handy Legowo (DGHS),Mr. Rudy Arifin (DGHS), Mrs. Kuswahyuni (Head of Sub-division of Law)																								
1-4	To hold a seminar with relevant organizations / stakeholders in the wastewater sector to share and discuss the result of activity (1-3)		Mr. Handy Legowo (DGHS),Mr. Rudy Arifin (DGHS), Mrs. Kuswahyuni (Head of Sub-division of Law)																								
1-5	To develop or revise laws and regulations identified in activity (1-2) based on the result of activity (1-4) and (2-2-13)		Mr. Handy Legowo (DGHS),Mr. Rudy Arifin (DGHS), Mrs. Kuswahyuni (Head of Sub-division of Law)																								
Training in Japan																											
2.The wastewater management master plan in DKI Jakarta is revised			Person in-charge																								
2-1	To conduct survey for reviewing the wastewater management master plan in DKI Jakarta																										
2-1-1	To review the existing data and information including progress of the master plan, related plans and policies		Head of Urban Infrastructure and Environment Division, DKI Jakarta																								
2-1-2	To assess capacity of wastewater sector in DKI Jakarta and PD PAL JAYA		All C/P related to output 2																								
2-1-3	To identify flood condition and major drainage facilities		Head of Planning and Programming Division																								
2-1-4	To conduct site survey and data analysis		All C/P related to output 2																								
2-1-5	To analyze socio economic data for establishing the master plan		All C/P related to output 2																								
2-1-6	To identify institutional issues (organizational, financial and human resources related) in the relevant organizations in sanitation and sewerage in DKI Jakarta		BAPPEDA																								
2-1-7	To conduct field survey for selection of sewage treatment plant sites		Environmental Board, DKI Jakarta PD PAL JAYA																								
2-1-8	To conduct water quality survey		Environmental Board, DKI Jakarta																								
2-1-9	To evaluate the present condition and to identify the issues		All C/P related to output 2																								
2-2	To review the master plan																										
2-2-1	To develop the basic plan for wastewater management including targets, strategies and actions		BAPPEDA, Environmental Board, DKI Jakarta PD PAL JAYA																								
2-2-2	To develop the frame work for wastewater management system		BAPPEDA, Environmental Board, DKI Jakarta PD PAL JAYA																								
2-2-3	To develop the planning data (qualities and quantity of wastewater generation)		BAPPEDA, Environmental Board, DKI Jakarta PD PAL JAYA																								
2-2-4	To make a zoning of off-site system and on-site system		BAPPEDA, Environmental Board, Cleansing Department DKI Jakarta PD PAL																								
2-2-5	To select the sewage treatment plant sites based on the technical suitability		BAPPEDA																								
2-2-6	To develop alternative studies of the master plan (construction cost, OM cost, environment and others)		BAPPEDA																								
2-2-7	To select the most appropriate alternative option		All C/P related to output 2																								
2-2-8	To develop an improvement plan of the organizational functions		BAPPEDA																								
2-2-9	To develop an activity plan of environmental education in wastewater sector		BAPPEDA, Environmental Board, DKI Jakarta PD PAL JAYA																								
2-2-10	To evaluate the selected alternative option by economical, financial, technical, social and environmental aspects		BAPPEDA																								
2-2-11	To identify priority actions to be taken for implementation of the master plan and make an action plan including implementation of a feasibility study and capacity development for related stakeholders		BAPPEDA																								
2-2-12	To conduct Initial Environmental Evaluation (IEE)		Environmental Board, DKI Jakarta																								
2-2-13	To publish the revised wastewater management master plan in DKI Jakarta		BAPPEDA																								
Training in Japan																											

DESD/DGHS: Directorate of Environmental Sanitation Development, Directorate General of Human Settlements, Ministry of Public Works

Appendix − 3 : Minutes of Meeting (Interim Report)

Minutes of 2nd JCC Meeting and Confirmation Meeting on Basic Plan

Project	**The Project for Capacity Development of Wastewater Sector through Reviewing the Wastewater Management Master Plan in DKI Jakarta**
Date & Time	For 2nd JCC: 27th July 2011 / 09:30 ～ 12:00 For Confirmation Meeting on Basic Plan: 2nd August 2011 / 10:00 ～ 12:00
Place	For 2nd JCC: Conference Room 3rd Floor, Directorate General of Human Settlement For Confirmation Meeting on Basic Plan: Conference Room 7th Floor, DGHS
Meeting title	The Second Joint Coordinating Committee and Confirmation Meeting on the Basic Plan
Attendants	***Attendant List for 2nd JCC***

[Indonesian side]

(Ministry of Public Works)

Mr. Susmono	Secretary of Director, General, Directorate General of Human Settlements (DGHS)
Mr. Syukrul Amien	Director, Directorate of Environmental Sanitation Development (PPLP), DGHS
Mr. Handy B. Legowo	Sub-Director, PPLP, DGHS
Ms. Emah Sudjimah	Head of Division, PPLP, DGHS
Ms. Mahardiani K	Staff of PPLP, DGHS
Mr. Pongsilurang	Head of Working Unit, PPLP Jabodetabek, DGHS
Mr. Sunarjo	Staff of DGHS
Ms. EE Fitri	Staff of Directorate of Foreign Planning and Coordination (PKLN)
Mr. Fajar Nur	Staff of PKLN
Mr. Rizki	Staff of PKLN

(DKI Jakarta)

Ms. Saptastry Ediningtyas Kusumadewi	Assistant Deputy Governor for Environment
Ms. Aktina Teradewi	Staff of Assistant Deputy Governor for Environment
Ms. Sarwo Handayani	Head of Regional Planning and Development Board (BAPPEDA)
Ms. Vera Revina Sari	Head of Division of City Infrastructure and Environment, BAPPEDA
Mr. Dudi Gardesi	Head of Division of Planning and Maintenance of Water Resource, Public Works Agency (DPU)
Mr. Novizal	Staff of DPU
Ms. Elisabeth T	Staff of DPU
Mr. Andono Warih	Head of Division, Regional Environment Management Board (BPLHD)
Mr. Eko Gumelar	Staff of BPLHD
Mr. Budhi Karya	Head of Division, Cleansing Agency (DK)
Mr. Robet	Staff of DK
Ms. Liliansari Loedin	President Director, PD PAL JAYA

[Japanese side]

(JICA Indonesia Office)

Ms. Kitamura Keiko	Project Formulation Advisor, JICA Indonesia Office

(Project Team)

<JICA Long-term Expert>	
Mr. Nakajima Hideichiro	Chief Advisor/Sewerage Policy Advisor
Ms. Dewi Agustina	JICA (secretary) for Long term expert
<JICA Short-term Expert>	
Mr. Takeuchi Masahiro	Leader/Sewerage Planning
Mr. Hashimoto Kazushi	Sub-Leader/On-site System-1
Mr. Morita Akira	On-site System-2
Mr. Takashima Shigeki	Urban Planning
Dr. Lalit Agrawal	Wastewater Treatment Planning
Mr. Tsunoji Hiromi	Sewerage Facilities Planning
Mr. Sato Tadafumi	Urban Drainage
Mr. Tanaka Uyu	GIS
Mr. Miyagawa Takashi	Institution-1/Environmental Education
Dr. Emori Hiroyoshi	Institution-2
Mr. Akagi Makoto	Economics/Finance
Ms. Matsubara Hiromi	Environmental and Social Consideration
Ms. Anisa Muslicha	Assistant for JICA Expert Team
Ms. Titis R	Assistant for JICA Expert Team
Mr. Denny S	Assistant for JICA Expert Team
Ms. Nandia G	Assistant for JICA Expert Team
Ms. Hana Nurul Karima	Assistant for JICA Expert Team
Mr. Adachi Gaku	Jakarta Office of Yachiyo Engineering Co. Ltd.

Attendant List for Confirmation Meeting on Basic Plan

[Indonesian side]

(Ministry of Public Works)

Mr. Sjukrul Amien	Director,. PPLP DJCK
Mr .Handy B. Legowo	Sub-Director. PPLP DJCK
Mr. Pongsilurang	Head of Working Unit, PPLP Jabodetabek, DGHS

(DKI Jakarta)

Ms. Liliansari	President, PD PAL JAYA
Ms. Driah T	Bappeda DKI
Mr. Fadly Haley Tanjung	Bappeda DKI
Mr. Salim	Dinas Pertamanan (Park Agency)
Mr. Hendr	Dinas Pertamanan (Park Agency)
Ms. Aktina Teradewi	Sewerage Facilities Planning
Mr. Dimas Yoga R	Staff of DTR
Ms. Weny Budiati	Staff of DTR
Mr. Robet	DK
Mr. Wawan Kurniawan	BPLHD
Mr. Eko Gumelar S	BPLHD

[Japanese side]

(JICA Indonesia Office)

Ms. Kitamura Keiko	Project Formulation Advisor
Ms. Juni Melani	Program Officer

(Project Team)

<JICA Long-term Expert>	
Mr. Nakajima Hideichiro	Chief Advisor/Sewerage Policy Advisor
Ms. Dewi Agustina	JICA (secretary) for Long term expert
<JICA Short-term Expert>	
Mr. Takeuchi Masahiro	Leader/Sewerage Planning
Mr. Morita Akira	On-site System-2
Mr. Takashima Shigeki	Urban Planning
Dr. Lalit Agrawal	Wastewater Treatment Planning
Mr. Tsunoji Hiromi	Sewerage Facilities Planning
Mr. Miyagawa Takashi	Institution-1/Environmental Education
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Mr. Akagi Makoto	Economics/Finance
Ms. Titis R	Assistant for JICA Expert Team
Mr. Denny S	Assistant for JICA Expert Team

Mr. Nakajima, Chief Advisor and JICA Long-term Expert, explained the progress of Output-1 (Domestic Wastewater Law) and leader of JICA Short-term Expert, Mr. Takeuchi explained the Interim Report (IT/R) and Basic Plan for Output-2 (Reviewing Wastewater Management Master Plan) to the JCC members.

Both sides agreed in principle with the contents of the IT/R except the comments made by BAPPEDA as follows:

1. BAPPEDA has a role of steering development and planner of the program and its coordination. Therefore, words of “there is no agency which coordinates the policies of the organizations involved in wastewater management” should be revised accordingly.
2. For the explanation on institution in the level of control & monitoring, the role of Dinas Pengawasan dan Penertiban Bangunan (Building Control and Monitoring Agency) should be added.
3. Explanation on the “special budgetary frameworks” should refer to RPJMD (Regional Medium Term Development Plan) of DKI Jakarta 2007 – 2012 on Dedicated Program and it is necessary to be explained that the prioritized fields of budget are not only “flooding measures” and “transportation measures”.
4. Explanation on the position of PD PAL JAYA in the budgetary system of Government of DKI Jakarta Province is needed to be completed with the explanation of its law regulations.
5. The budget in the amount of Rp5.2 trillion is not only for flood control and subway development, but also for all dedicated programs. Therefore, the related part should be revised accordingly.

The Japanese side confirmed the comments and agreed to incorporate these comments into the draft final report to be submitted to the Indonesian side in December 2011.

Regarding the Basic Plan, the Indonesian side made comments as follows:

1. In the Basic Plan, the sewerage coverage ratios for the Improvement Target are set as 20% in 2020, 40% in 2030 and 80% in 2050. As for the improvement target, we agree to the target in 2050. However, we consider that the targets in 2020 and 2030 are too optimistic. Targeted figures for the facilities (wastewater treatment plant, sewer pipes, etc.) are acceptable as they are. However, the rate of house connections seems not to increase so much because only 8 years are left to the target year of 2020. Therefore, the coverage ratio should be divided into two (2) ratios, that is, the facility coverage ratio and the service coverage (or house connection) ratio. For the improvement target in the year 2020, the facility coverage ratio should be set as 20%, while the service coverage ratio is set as 10%.
2. For the service coverage ratio, the progress of the ratio for a short span of time should be expressed for easier understanding.
3. For the improvement ratio on On-site System, more specific targets such as CST (Conventional Septic Tank), MST (Modified Septic Tank), etc., should be set.
4. In RTRW2030 of DKI Jakarta, the new city plan includes reclamation areas in the northern part of DKI Jakarta. Therefore, the Basic Plan should show the sewerage zones including those reclamation areas.
5. In the Old M/P, there were six (6) sewerage zones and the New M/P will adopt different sewerage zones. Therefore, the Basic Plan should explain the difference.
6. Facility coverage ratio and service coverage ratio in 2014 should be 4% instead of 2% since the capacity of Setiabudi WWTP and network will be expanded by 2014.

The Japanese side revised the Basic Plan based on the comments made by the Indonesian side and submitted the revised version on 9th August 2011 of the Basic Plan to the Indonesian side as attached to this minutes.

Other comments made by the Indonesian side as mentioned below shall be taken into account in the course of preparation for the draft final report:

1. For BOD generated from other sources than domestic wastewater and treated wastewater from commercial & institutional buildings and industry, it will be assumed for three (3) categories such as BOD at upstream area, BOD from solid waste and BOD from untreated industrial wastewater.

Remarks & Comments:

Attachment: Basic Plan (Revised Version of 9th August 2011)

Appendix − 4 : Population and Area of Each Sewerage Zone for Kelurahan Basis

Population and area of each sewerage zone for Kelurahan basis are shown in Table A4-1.

Table A4-1 Population and Area of Each Sewerage Zone for Kelurahan Basis

Sewerage Zone No.	Kelurahan	Area (ha)	Population (person)	
		2030&2050	2020	2030&2050
0	MANGGARAI	72	29,284	29,573
0	MANGGARAI SELATAN	8	5,191	5,678
0	BUKIT DURI	11	4,984	5,450
0	MENTENG DALAM	42	7,549	8,256
0	SETIABUDI	67	4,048	4,088
0	KARET	92	9,271	9,363
0	KARET SEMANGGI	90	4,143	4,184
0	KARET KUNINGAN	174	27,912	31,136
0	MENTENG ATAS	57	25,906	28,899
0	KUNINGAN TIMUR	136	5,257	5,309
0	PASAR MANGGIS	78	29,972	30,269
0	GUNTUR	66	7,799	9,141
0	KUNINGAN BARAT	2	480	536
0	SENAYAN	118	4,867	4,915
0	SELONG	16	817	825
0	KEBON MANGGIS	0	50	50
0	KAMPUNG MELAYU	1	529	520
0	MENTENG	3	370	408
0	PEGANGSAAN	0	12	14
0	KEBON MELATI	1	231	256
0	KARET TENGSIN	150	22,610	29,610
0	BENDUNGAN HILIR	18	3,084	3,156
0	GELORA	18	223	229
Total Population for Sewerage Zone No. 0		**1,220**	**194,589**	**211,865**
1	PASAR MANGGIS	0	39	39
1	KEBON MANGGIS	0	50	49
1	CIDENG	125	20,539	22,756
1	PETOJO UTARA	113	24,099	26,699
1	KEBON KELAPA	79	10,227	11,330
1	GAMBIR	250	3,155	3,496
1	PETOJO SELATAN	114	20,932	23,655
1	DURI PULO	68	26,519	29,381
1	MANGGA DUA SELATAN	130	40,569	45,847
1	KARANG ANYAR	50	34,444	38,161
1	PASAR BARU	95	5,208	5,328
1	GUNUNG SAHARI UTARA	0	0	1
1	KARTINI	52	23,245	25,754
1	SENEN	0	4	4
1	KENARI	0	15	15
1	KEBON SIRIH	83	13,254	13,560
1	GONDANGDIA	147	6,872	7,614
1	CIKINI	78	10,228	11,559
1	MENTENG	239	27,874	30,882
1	PEGANGSAAN	97	24,359	26,988
1	KAMPUNG BALI	72	15,158	15,507
1	KEBON KACANG	72	24,714	27,382
1	KEBON MELATI	126	31,406	34,795
1	PETAMBURAN	0	40	44
1	BENDUNGAN HILIR	0	5	5
1	GROGOL	1	41	47
1	TOMANG	0	36	38
1	JELAMBAR BARU	0	14	15
1	PINANGSIA	94	12,576	13,265
1	GLODOK	37	13,529	14,270
1	MANGGA BESAR	55	12,271	12,942
1	TANGKI	38	20,093	21,193
1	KEAGUNGAN	35	39,794	46,363
1	KRUKUT	56	28,131	29,671
1	TAMAN SARI	68	28,427	32,470
1	MAPHAR	63	37,008	39,033
1	PEKOJAN	78	43,536	49,728
1	ROA MALAKA	53	8,438	8,900
1	KRENDANG	33	30,185	34,478
1	TAMBORA	29	15,956	19,531
1	JEMBATAN LIMA	47	32,976	34,781
1	DURI UTARA	37	29,676	31,301
1	TANAH SEREAL	63	46,821	54,551
1	ANGKE	79	40,727	42,956
1	JEMBATAN BESI	52	44,840	51,218
1	KALI ANYAR	31	37,532	39,587
1	DURI SELATAN	38	21,398	22,569
1	PENJARINGAN	455	103,277	111,943
1	PEJAGALAN	197	46,401	50,294
1	KAPUK MUARA	0	1	1
1	PLUIT	778	67,729	60,728

Table A4-1 Population and Area of Each Sewerage Zone for Kelurahan Basis

Sewerage Zone No.	Kelurahan	Area (ha)	Population (person)	
		2030&2050	2020	2030&2050
1	ANCOL	494	13,485	14,012
Total Population for Sewerage Zone No. 1		**4,901**	**1,137,853**	**1,236,736**
2	KAPUK	255	63,702	72,762
2	KEDAUNG KALI ANGKE	54	8,402	9,597
2	JELAMBAR BARU	1	253	267
2	WIJAYA KUSUMA	0	41	47
2	ANGKE	0	9	9
2	PEJAGALAN	171	40,205	43,579
2	KAPUK MUARA	895	27,998	22,781
2	PLUIT	0	0	0
Total Population for Sewerage Zone No. 2		**1,376**	**140,610**	**149,042**
3	GROGOL UTARA	330	52,686	58,774
3	GROGOL SELATAN	282	58,028	64,733
3	CIPULIR	93	28,703	31,391
3	PETUKANGAN UTARA	280	69,192	77,187
3	PETUKANGAN SELATAN	0	1	2
3	ULUJAMI	111	31,977	34,972
3	KEBON JERUK	369	68,085	77,769
3	SUKABUMI UTARA	156	57,846	67,396
3	KELAPA DUA	145	34,243	39,895
3	SUKABUMI SELATAN	167	32,300	36,893
3	MERUYA UTARA	406	50,939	59,349
3	MERUYA SELATAN	323	38,413	47,020
3	JOGLO	446	50,770	62,146
3	SRENGSENG	455	54,909	63,974
Total Population for Sewerage Zone No. 3		**3,563**	**628,092**	**721,501**
4	MANGGARAI	35	14,115	14,255
4	MANGGARAI SELATAN	48	31,495	34,445
4	BUKIT DURI	96	43,617	47,702
4	MENTENG DALAM	209	37,572	41,090
4	TEBET TIMUR	133	28,899	31,606
4	TEBET BARAT	164	34,869	38,134
4	KEBON BARU	126	54,813	59,946
4	MENTENG ATAS	39	17,903	19,972
4	KUNINGAN TIMUR	85	3,289	3,322
4	KAMPUNG MELAYU	0	244	240
4	BIDARA CINA	0	85	84
Total Population for Sewerage Zone No. 4		**935**	**266,901**	**290,796**
5	MANGGA DUA SELATAN	0	19	21
5	PASAR BARU	86	4,723	4,832
5	GUNUNG SAHARI UTARA	123	20,114	22,285
5	KARTINI	0	25	27
5	GUNUNG SAHARI SELATAN	414	24,034	26,628
5	KEMAYORAN	59	24,952	27,645
5	KEBON KOSONG	101	31,045	40,657
5	SERDANG	82	36,058	40,751
5	HARAPAN MULYA	53	20,562	22,782
5	UTAN PANJANG	54	36,340	43,145
5	CEMPAKA BARU	97	35,230	39,032
5	SUMUR BATU	114	29,619	33,473
5	SENEN	84	7,892	8,919
5	BUNGUR	63	16,073	16,444
5	TANJUNG PRIOK	2	234	254
5	PAPANGGO	224	47,182	56,491
5	SUNGAI BAMBU	140	29,646	34,798
5	SUNTER AGUNG	525	109,293	128,288
5	SUNTER JAYA	513	72,519	85,124
5	RAWABADAK SELATAN	0	96	113
5	ANCOL	393	10,721	11,140
5	PADEMANGAN BARAT	151	89,795	97,329
5	PADEMANGAN TIMUR	97	50,666	54,917
5	KELAPA GADING BARAT	0	11	14
Total Population for Sewerage Zone No. 5		**3,375**	**696,849**	**795,109**
6	GROGOL UTARA	0	1	1
6	SENAYAN	0	14	14
6	CIDENG	0	1	1
6	KAMPUNG BALI	0	43	44
6	KEBON KACANG	0	0	0
6	KEBON MELATI	0	8	8
6	PETAMBURAN	88	36,306	40,224
6	KARET TENGSIN	2	309	404
6	BENDUNGAN HILIR	141	24,534	25,099
6	GELORA	316	3,865	3,955
6	KAPUK	0	91	104
6	CENGKARENG TIMUR	13	3,124	3,295
6	KEDAUNG KALI ANGKE	238	36,948	42,203
6	DURI KOSAMBI	535	94,786	110,434

Table A4-1 Population and Area of Each Sewerage Zone for Kelurahan Basis

Sewerage Zone No.	Kelurahan	Area (ha)	Population (person)	
		2030&2050	2020	2030&2050
6	RAWA BUAYA	371	50,965	58,214
6	CENGKARENG BARAT	1	223	254
6	GROGOL	101	29,373	33,551
6	JELAMBAR	157	57,072	65,189
6	TANJUNG DUREN UTARA	133	29,411	31,021
6	TOMANG	179	46,120	48,645
6	JELAMBAR BARU	149	47,644	50,253
6	WIJAYA KUSUMA	227	48,636	55,553
6	TANJUNG DUREN SELATAN	136	45,748	55,998
6	ANGKE	0	15	16
6	KEDOYA UTARA	326	72,690	88,977
6	DURI KEPA	366	82,166	86,663
6	KEDOYA SELATAN	219	57,080	77,067
6	SEMANAN	528	104,430	121,670
6	KALI DERES	21	3,469	3,963
6	JATIPULO	84	52,411	55,282
6	KOTA BAMBU UTARA	67	39,380	44,981
6	SLIPI	98	28,544	33,256
6	PALMERAH	220	97,309	111,149
6	KEMANGGISAN	210	47,446	50,043
6	KOTA BAMBU SELATAN	58	24,755	26,110
6	KEMBANGAN UTARA	417	73,350	99,035
6	KEMBANGAN SELATAN	473	36,941	43,040
6	PEJAGALAN	0	1	2
Total Population for Sewerage Zone No. 6		**5,874**	**1,275,209**	**1,465,718**
7	KAPUK	365	91,229	104,204
7	CENGKARENG TIMUR	340	81,648	86,118
7	CENGKARENG BARAT	392	82,696	94,458
7	KAMAL	492	53,933	61,604
7	TEGAL ALUR	560	117,007	136,322
7	PEGADUNGAN	794	86,916	106,392
7	KALI DERES	482	79,548	90,861
7	KAMAL MUARA	1,119	17,169	12,690
Total Population for Sewerage Zone No. 7		**4,544**	**610,146**	**692,649**
8	TANJUNG PRIOK	419	53,411	57,892
8	PAPANGGO	80	16,767	20,075
8	SUNGAI BAMBU	97	20,495	24,057
8	KEBON BAWANG	173	84,502	91,592
8	WARAKAS	108	46,149	50,021
8	RAWABADAK UTARA	127	62,131	74,390
8	KOJA	243	55,011	65,865
8	LAGOA	158	91,783	115,455
8	TUGU SELATAN	186	42,362	50,722
8	RAWABADAK SELATAN	178	51,181	60,076
8	TUGU UTARA	239	92,906	109,054
8	KALI BARU	348	99,883	103,785
8	CILINCING	687	70,376	69,602
8	SEMPER BARAT	318	99,420	116,700
8	MARUNDA	894	35,249	28,682
8	SEMPER TIMUR	432	52,606	61,749
8	ANCOL	15	404	420
Total Population for Sewerage Zone No. 8		**4,702**	**974,636**	**1,100,137**
9	PULO GADUNG	29	5,467	5,376
9	RAWA TERATE	184	15,855	17,223
9	CAKUNG BARAT	622	51,236	54,564
9	UJUNG MENTENG	422	30,427	33,051
9	CAKUNG TIMUR	936	56,762	61,660
9	SUKAPURA	566	69,560	75,397
9	ROROTAN	1,018	42,914	56,701
9	KELAPA GADING BARAT	744	51,468	68,004
9	PEGANGSAAN DUA	555	70,330	92,926
9	KELAPA GADING TIMUR	313	57,695	72,575
Total Population for Sewerage Zone No. 9		**5,389**	**451,714**	**537,477**
10	KEBON MANGGIS	78	23,643	23,250
10	PALMERIAM	65	24,832	24,420
10	KAYU MANIS	55	33,876	36,076
10	UTAN KAYU UTARA	100	63,111	91,868
10	PISANGAN BARU	72	47,685	51,799
10	UTAN KAYU SELATAN	117	30,234	29,732
10	KAYU PUTIH	384	47,380	46,593
10	RAWAMANGUN	264	41,417	40,729
10	PISANGAN TIMUR	180	55,657	59,272
10	JATINEGARA KAUM	130	27,479	29,264
10	PULO GADUNG	148	28,278	27,808
10	CIPINANG	150	43,031	42,316
10	JATI	207	38,858	42,210
10	RAWA TERATE	231	19,939	21,659

Table A4-1 Population and Area of Each Sewerage Zone for Kelurahan Basis

Sewerage Zone No.	Kelurahan	Area (ha)	Population (person)	
		2030&2050	2020	2030&2050
10	JATINEGARA	653	85,785	84,360
10	PENGGILINGAN	424	82,448	87,803
10	CAKUNG BARAT	0	4	4
10	PULO GEBANG	676	92,025	99,964
10	KAMPUNG MELAYU	47	29,672	29,180
10	BALI MESTER	67	13,021	13,866
10	RAWA BUNGA	84	19,495	21,176
10	CIPINANG BESAR SELATAN	72	15,016	15,991
10	CIPINANG MUARA	164	39,136	38,485
10	CIPINANG BESAR UTARA	113	52,097	51,232
10	PONDOK BAMBU	91	14,702	15,657
10	KLENDER	297	79,771	84,953
10	DUREN SAWIT	171	22,472	24,411
10	MALAKA JAYA	85	35,852	38,181
10	PONDOK KELAPA	1	160	174
10	MALAKA SARI	104	29,910	29,413
10	PONDOK KOPI	70	13,271	14,416
10	KWITANG	44	17,921	19,855
10	KENARI	90	12,886	13,183
10	KRAMAT	71	33,747	37,389
10	PASEBAN	82	26,403	29,252
10	CEMPAKA PUTIH BARAT	125	41,591	47,002
10	RAWASARI	124	17,088	17,482
10	CEMPAKA PUTIH TIMUR	217	28,244	31,292
10	KEBON SIRIH	0	11	11
10	JOHAR BARU	117	42,301	46,866
10	KAMPUNG RAWA	30	16,681	18,481
10	GALUR	27	20,643	24,510
10	TANAH TINGGI	62	43,024	47,667
Total Population for Sewerage Zone No. 10		**6,289**	**1,450,797**	**1,549,252**
11	KARET SEMANGGI	0	9	9
11	KUNINGAN BARAT	96	20,806	23,210
11	MAMPANG PRAPATAN	80	30,240	35,442
11	PELA MAMPANG	200	62,473	63,091
11	TEGAL PARANG	105	47,595	52,052
11	BANGKA	309	28,391	31,050
11	PEJATEN BARAT	297	53,883	60,109
11	PASAR MINGGU	195	41,438	45,319
11	JATI PADANG	240	40,222	40,620
11	RAGUNAN	147	14,638	14,783
11	CILANDAK TIMUR	208	24,645	24,889
11	PEJATEN TIMUR	298	61,747	62,358
11	GROGOL SELATAN	0	0	0
11	CIPULIR	95	29,349	32,098
11	KEBAYORAN LAMA UTARA	200	74,912	83,569
11	PONDOK PINANG	679	81,614	100,471
11	KEBAYORAN LAMA SELATAN	229	57,478	62,861
11	GANDARIA SELATAN	160	29,270	29,560
11	CIPETE SELATAN	238	27,425	27,696
11	CILANDAK BARAT	590	81,383	89,006
11	LEBAK BULUS	439	48,060	53,613
11	PONDOK LABU	348	52,511	53,030
11	SENAYAN	25	1,013	1,023
11	RAWA BARAT	66	8,611	8,696
11	SELONG	127	6,537	6,602
11	GUNUNG	142	13,915	14,052
11	KRAMAT PELA	124	24,112	24,353
11	MELAWAI	127	5,262	5,314
11	PETOGOGAN	85	22,695	22,921
11	PULO	110	11,415	12,484
11	GANDARIA UTARA	157	52,715	53,236
11	CIPETE UTARA	170	50,851	55,613
11	PANCORAN	141	25,021	27,364
11	DUREN TIGA	190	21,663	21,879
11	KALIBATA	245	49,377	54,001
11	CIKOKO	67	16,650	18,210
11	PENGADEGAN	99	30,964	36,290
11	RAWAJATI	142	17,144	18,749
11	TANJUNG BARAT	119	14,964	16,365
11	PETUKANGAN UTARA	0	3	3
11	PETUKANGAN SELATAN	211	42,372	47,268
11	ULUJAMI	94	27,102	29,640
11	PESANGGRAHAN	196	39,341	43,025
11	BINTARO	456	68,582	76,507
11	CAWANG	0	44	47
11	CILILITAN	0	33	35
11	BALE KAMBANG	0	53	60

Table A4-1 Population and Area of Each Sewerage Zone for Kelurahan Basis

Sewerage Zone No.	Kelurahan	Area (ha)	Population (person)	
		2030&2050	2020	2030&2050
Total Population for Sewerage Zone No. 11		**8,246**	**1,458,528**	**1,578,573**
12	RAGUNAN	322	32,182	32,500
12	CILANDAK TIMUR	175	20,646	20,850
12	KEBAGUSAN	278	49,015	53,605
12	PONDOK LABU	0	14	14
12	TANJUNG BARAT	237	29,737	32,523
12	JAGAKARSA	516	80,917	99,615
12	LENTENG AGUNG	315	79,341	97,673
12	SRENGSENG SAWAH	557	71,689	84,021
12	CIGANJUR	367	46,721	60,398
12	CIPEDAK	405	54,624	74,136
12	CIJANTUNG	0	46	50
Total Population for Sewerage Zone No. 12		**3,172**	**464,932**	**555,385**
13	TANJUNG BARAT	0	0	0
13	BIDARA CINA	124	41,623	40,932
13	CIPINANG CEMPEDAK	166	36,161	35,561
13	RAWA BUNGA	0	2	3
13	CIPINANG BESAR SELATAN	98	20,583	21,920
13	CIPINANG MUARA	102	24,432	24,026
13	CAWANG	194	37,717	40,166
13	CILILITAN	182	51,161	55,575
13	KRAMAT JATI	144	38,688	38,045
13	BATU AMPAR	253	43,290	51,894
13	BALE KAMBANG	169	30,344	34,631
13	DUKUH	173	26,304	28,574
13	KAMPUNG TENGAH	197	39,556	42,125
13	GEDONG	203	34,092	38,906
13	PONDOK BAMBU	322	51,960	55,335
13	DUREN SAWIT	291	38,205	41,501
13	MALAKA JAYA	19	7,814	8,321
13	PONDOK KELAPA	570	69,521	75,518
13	MALAKA SARI	29	8,212	8,075
13	PONDOK KOPI	158	30,027	32,617
13	PINANG RANTI	215	27,301	32,726
13	MAKASAR	145	46,279	52,817
13	KEBON PALA	213	54,851	58,414
13	HALIM PERDANA KUSUMA	1,299	46,522	50,535
13	CIPINANG MELAYU	263	49,998	54,311
13	SUSUKAN	38	6,855	7,301
13	RAMBUTAN	96	17,212	18,697
13	SETU	118	7,601	8,257
13	BAMBU APUS	124	10,402	11,299
13	CEGER	166	7,367	8,408
13	LUBANG BUAYA	362	67,674	77,234
Total Population for Sewerage Zone No. 13		**6,433**	**971,754**	**1,053,724**
14	TANJUNG BARAT	1	143	156
14	LENTENG AGUNG	1	155	191
14	GEDONG	56	9,361	10,683
14	CIJANTUNG	246	45,165	49,061
14	BARU	197	30,726	32,722
14	KALI SARI	252	42,247	45,891
14	PEKAYON	302	52,551	59,974
14	CIBUBUR	496	67,947	72,361
14	KELAPA DUA WETAN	336	46,053	49,046
14	CIRACAS	396	75,325	81,823
14	SUSUKAN	174	31,169	33,193
14	RAMBUTAN	132	23,858	25,916
14	PONDOK RANGON	472	28,397	35,746
14	CILANGKAP	547	25,220	30,232
14	MUNJUL	281	23,065	25,055
14	CIPAYUNG	185	25,096	26,726
14	SETU	163	10,505	11,412
14	BAMBU APUS	207	17,419	18,922
14	CEGER	161	7,149	8,159
Total Population for Sewerage Zone No. 14		**4,605**	**561,551**	**617,269**
Reclamation Area		**5,146**	**0**	**110,049**
Total (Area and Population Except Reclamation Area)		**64,624**	**11,284,161**	**12,555,233**
Total (Area and Population)		**69,769**	**11,284,161**	**12,665,282**

Appendix − 5 : Minutes of Meeting for the General Coordination Meeting on 21st October 2011

Minutes of Meeting (MM-CP-211021)

Project	**The Project for Capacity Development of Wastewater Sector through Reviewing the Wastewater Management Master Plan in DKI Jakarta**
Date & Time	21st October 2011 / 9：00 ～ 11：30
Place	**Cipta Karya, Ministry of Public Works**
Purpose	**Coordination among PU, DKI Jakarta, JICA Expert Team and PPP F/S Team on Wastewater Management in DKI Jakarta**
Attendants	**[Cipta Karya]** Mr. Sjukrul Amien: Director of Environmental Sanitation Development, DGHS Mr. Handy B. Legowo: Sub-Director of Sanitation, Directorate of Environmental Sanitation Development, DGHS Ms. Emah Sudjimah: Section Head of Development and Facilitation, Sub-directorate of Wastewater System Development, Directorate of Environmental Sanitation Development, DGHS **[BAPPEDA]** Ms. Vera Revina Sari: Head of City Infrastructure and Environment Division **[PD PAL JAYA]** Ms. Liliansari Loedin: President Director, PD PAL JAYA Ms. Ati Setiawati: Technical and Business Director, PD PAL JAYA
	[JICA Project Team] Mr. Hideichiro Nakajima: Chief Advisor/Sewerage Policy Advisor Mr. Masahiro Takeuchi: Leader of Short-term expert team Dr. Lalit Agrawal: Expert for Wastewater Treatment Planning, Short-term expert team Mr. Hiromi Tsunoji: Expert for wastewater facility, Short-term expert team Mr. Uyu Tanaka: Expert for GIS, Short-term expert team **[JICA PPP F/S Team]** Mr. Kenichi Yamamoto Mr. Koichi Suzuki **[JICA Indonesia Office]** Mr. Shigenori Ogawa: Senior Representative, JICA Indonesia Office Ms. Keiko Kitamura: Project Formulation Advisor, JICA Indonesia Office

The main points discussed in the meeting are described as below:

Session 1 : Explanation by JICA Expert Team in Review Master Plan

Mr. Takeuchi, leader of JICA Short Term Expert Team (JICA Expert Team) explained about the outline of the project and Dr. Lalit, expert of wastewater treatment planning, made presentation of the sewerage zoning, land requirement and treatment process. After the presentation, there were discussions as follows:

- Ms. Vera of BAPPEDA explained about the availability of the lands for WWTP proposed by JICA Expert Team. The results were summarized as in the table below.

Site No.	Location Proposed by JICA Expert Team	Development Phase	Status	Notes
1	**Pejagalan**	Short Term (2020)	OK with Notes	Please re-design the Pejagalan WWTP Layout, 50 % area should be green.

2	**Muara Angke**	Long Term (2050)	Not Yet Decided	We maybe cannot use the area in fisherman villages, we should find another area in Muara Angke
6	**Duri Kosambi**	Short Term (2020)	OK	Belongs to Cleansing Agency
5	**Sunter Pond**	Mid Term (2030)	OK	
10	**Pulo Gebang**	Mid Term (2030)	OK	
7	**Kamal – Pegadungan**	Mid Term (2030)	OK	
3	**Srengseng City Forest Park**	Long Term (2050)	Maybe OK with Notes	The design of WWTP layout should be integrated well with the forest park, most important things, how to make WWTP hidden in the forest park
8	**Marunda**	Long Term (2050)	Maybe OK	Because it is in long term, and it is also part of the planning for pond development.
9	**Rorotan**	Long Term (2050)	Maybe OK	
12	**Ulujami Pond Planning**	Long Term (2050)	Maybe OK	
14	**Kp. Dukuh Pond Planning**	Long Term (2050)	Maybe OK	
15	**Ceger RW 05 Pond Planning**	Long Term (2050)	Maybe OK	
13	**Ragunan**	Long Term (2050)	Not Yet Decided	Should be confirmed the location for WWTP and confirmed with Ragunan Master Plan and ownership
11	**Bendi Park**	Long Term (2050)	Not Yet Decided	

- Mrs. Vera also explained about Daan Mogot land of Housing Agency which is the land proposed by DKI where a low cost apartment will be constructed and so BAPPEDA asked Housing Agency to keep/spare some area for WWTP with the land area of not more than 3 ha.

  DKI proposed a land called as BMW land to the M/P team, but there is a problem with land ownership.
- Mr. Sjukrul Amien stated that the result of this meeting will be reported to the Governor.
- Mrs. Liliansari gave information to Mr. Sjukrul Amien that the sewerage zones proposed by JICA Expert Team will be changed according to the availability of the lands.
- Mrs. Liliansari informed that JICA Expert Team should include the existing sewerage service area (Setiabudi Pond and Krukut Pumping Station which is planned for WWTP construction) as a part of sewerage zones of DKI Jakarta (to name it with new number or put it as a part of zone 1 or zone 4).
- There was a small correction on slide No. 7 River Water Quality (BOD Load): smaller ranked zone has bigger BOD Load than the higher ranked zone (e.g. zone 10 ranked as No.4 has 1.15, while zone 1 ranked as No. 2 has 1.04).
- The JICA Expert team stated that they will check and revise the zoning based on the comment.

Session II: Brief Explanation on PPP by PPP F/S Team

Mr. Yamamoto and Mr. Suzuki of PPP F/S team explained about technical and financial aspects on PPP F/S.

After the presentation, there were discussions as follows:

- Ms. Liliansari requested PPP F/S team that the PPP F/S must follow the Master Plan (M/P), so it must input the strategy, etc. included in the M/P.
- The PPP F/S team confirmed it.

- Ms. Liliansari also stated about the tariff that the existing condition should be enacted by the Local government with many considerations including the subsidy from the government, so it should be discussed furthermore.
- Mr. Yamamoto explained that this PPP is trying to reduce subsidies by the central or local government, and it is the main point.
- Ms. Liliansari stated that the target of PPP F/S team and the new M/P should be synchronized in the term of target year.
- Ms. Ati informed that in the central Zone, some of the buildings already had their own ITP, so it is also one of the problems, because we tried to cross subsidy between commercial and residential.
- Mr. Sjukrul Amien stated that the new M/P should consider the subsidy from central government, calculating the profit and loss.
- Mr. Sjukrul Amien also stated that:
  - If PPP project deals with construction of WWTP only and responsible for the main WWTP, we should consider who will take responsibility for the connection pipes.
  - Will PPP also be responsible for the connection pipes or local/central government?
  - We should have further discussion about this matter.

Other Comments

- Mr. Ogawa of JICA Indonesia Office stated that JICA intends to start PPP F/S as early as possible and whether it is possible for the F/S to be started immediately after the sewerage zones are determined and the candidate sites for WWTP are approved by the Governor.
- Mr. Sjukrul Amien agreed to the proposal by Mr. Ogawa.
- Ms. Liliansari requested the PPP F/S team to submit more detailed technical proposal to the Indonesian side since the presentation today is not so clear for the technical aspect.
- Mr. Nakajima asked to the Indonesian side the following:
  - When the land issue is explained to the Governor, it should be explained to him that if wastewater treatment with a high space saving innovation technology is applied, the initial cost become too high.

The meeting is concluded with thanks from the both sides.

Remarks & Comments:

Appendix − 6 : Letter of Governor of DKI Jakarta

PEMERINTAH PROVINSI DAERAH KHUSUS IBUKOTA JAKARTA
SEKRETARIAT DAERAH
Jalan Medan Merdeka Selatan No. 8 - 9
JAKARTA

Kode Pos : 10110

Nomor : 1631/-1.774.13
Sifat : Segera
Lampiran :
Hal : Lokasi IPAL Review Master Plan Pengelolaan Air Limbah DKI Jakarta untuk Tahap Pengembangan I (2012 - 2020)

16 Desember 2011

Kepada

Yth. 1. Direktur Jenderal Cipta Karya Kementerian Pekerjaan Umum
2. Deputi Menteri Negara Perencanaan Pembangunan Nasional/Kepala Badan Perencanaan Pembangunan Nasional Bidang Sarana dan Prasarana

di

Jakarta

Sehubungan dengan kebutuhan lahan untuk IPAL Tahap Pengembangan I (2012 – 2020) Review Master Plan Pengelolaan Air Limbah DKI Jakarta, dengan ini saya sampaikan lokasi lahan IPAL sebagai berikut :

1. Zona I : Pejagalan, Kelurahan Penjaringan, Kota Administrasi Jakarta Utara
   Luas sebesar ± 6,9 Ha, dimana desain dibuat terintegrasi antara fasilitas fisik IPAL (± 3,3 Ha) dengan area hijau (± 3,6 Ha).

2. Zona 6 : IPAL Duri Kosambi, Kota Administrasi Jakarta Barat
   Luas lahan untuk IPAL Sistem Terpusat sebesar ± 3 Ha (tidak termasuk untuk fasilitas pengolahan lumpur septic tank yang sudah ada).

Atas perhatian dan kerja sama Saudara, saya ucapkan terima kasih.

SEKRETARIS DAERAH PROVINSI DKI JAKARTA,

FADJAR PANJAITAN
NIP 19550826197601100 1

Tembusan :

1. Gubernur Provinsi DKI Jakarta
2. Wakil Gubernur Provinsi DKI Jakarta
3. Asisten Pembangunan dan Lingkungan Hidup Sekda Provinsi DKI Jakarta
4. Kepala Badan Perencanaan Pembangunan Daerah Provinsi DKI Jakarta
5. Kepala Badan Pengelola Keuangan Daerah Provinsi DKI Jakarta
6. Kepala Dinas Pekerjaan Umum

6. Kepala Dinas Pertamanan dan Pemakaman Provinsi DKI Jakarta
7. Kepala Dinas Kebersihan Provinsi DKI Jakarta
8. Direktur Utama PD PAL Jaya
9. JICA Indonesia

DKI Jakarta Local Government

Regional Secretariat

Jalan Merdeka selatan no. 8-9

Jakarta

==========

No: 1631/-1.774.13

Content: Urgent

Attachment:-

Subject: **Location of WWTP of Review Master Plan Wastewater Management DKI Jakarta for Phase 1 (2012-2020) Development**

To

1. Director General of Cipta Karya, Ministry of Public Works
2. Deputy State Minister of National Development Planning/Head of National Development Planning Board (Bappenas), Division of Infrastructure and Its Facilities

In Jakarta

Related with the land necessity for development of WWTP in Phase 1 (2012-2020) of Review Master Plan of Waste Water Management in DKI Jakarta, herewith I inform you the location of WWTP land are as follows:

1. Zone 1 : Pejagalan, Kelurahan (Sub-district) Penjaringan, City Administrative North Jakarta. The area is ±6,9 Ha, in which the design will be integrated between the WWTP physical facilities (± 3,3Ha) and the green area (± 3ha).
2. Zone 6 : WWTP Duri kosambi, City Administrative West Jakarta. The area is ± 3Ha for centralized WWTP (not included the existing septic sludge treatment plant)

Thank you for your attention and cooperation.

Regional Secretary of DKI Jakarta Province

Fadjar Panjaitan

Nip. 195508261976011001

CC

1. Governor of DKI Jakarta
2. Vice Governor of DKI Jakarta
3. Assistant of Development and Environment, Regional Secretary of DKI Jakarta
4. Head of Regional Development Planning Board (Bappeda) DKI Jakarta Province
5. Head of Regional Financial Management Board (BPKD) DKI Jakarta province
6. Head of Park and Funeral Agency DKI Jakarta Province
7. Head of Cleansing Agency
8. President Director PD PAL JAYA
9. JICA Indonesia

Appendix − 7 : Expected Sewerage System in the Reclamation Area

Expected Sewerage System in the Reclamation Area

(Land for WWTP shall be allocated in the reclamation area)