

## AP.1 APPENDIX TO PRE-FEASIBILITY STUDY ON BUSWAY EXTENSION PROJECT (CULCULATION OF BUS SHELTER'S DIMENSIONS AND CONSTRUCTION COST BREAK DOWN)

### AP1.1 Design Condition in 2007

#### AP1.1.1 Number of Passengers by Each Bus Loading Facility

Calculation that is to define the dimensions of the bus loading facilities was carried out using the actual estimated numbers of passengers for Bus Terminal and Transfer Center, and standardized numbers of passengers for bus stop.

##### (1) Bus Terminals and Transfer Centers

For Bus Terminals and Bus-to-bus Transfer Centers, numbers of the transferring passengers as well as boarding/alighting passengers were tabulated in Table AP.1.1.

**Table AP1.1 NB of Passengers at Bus Terminal and Transfer Center (daily)**

		Traffic Volume (Buses/hour)		NB of Daily Bording/Alighting/Transferring Passenger			
		Bus Type	NB	(1) Bording	(2) Alighting	(3) Transferring	(4) $\Sigma(1)\sim(3)$
PB01	Kota Terminal	-	37	1,650	1,280	9,380	12,310
	L.Bulus Terminal	Articulated	16	5,900	8,350	0	14,250
PB02	Ragunan Terminal	Articulated	4	1,940	1,620	0	3,560
PB03	KP. Rambutan Terminal	Single	30	9,900	9,350	0	19,250
PB04	Kalideres Terminal	Articulated	27	5,880	4,610	0	10,490
	P.Gadung Terminal		27	2,430	2,170	0	4,600
01x02x04	Monas Transer Center	-	49	618	319	22,315	23,251
01x02x04	Harmoni Transer Center	-	49	936	949	5,668	7,553
03x04	Senen Transer Center	-	57	2,254	2,915	22,230	27,399

##### (2) Bus Stops

The figure AP.1.1 indicates the distribution of the numbers of boarding and alighting passengers according to the result of the demand forecast.

Since there are around 80 bus stops, design was carried out using 4 standardized numbers of passengers that were classified by Table AP.1.2,

**Table AP1.2 Class of the Bus Stops**

	NB of Passengers	
	Boarding	Alighting
Class-A	0-1000	0-1000
Class-B	1000-2000	1000-2000
Class-C	2000-3500	2000-3500
Class-D	3500-7000	3500-8000

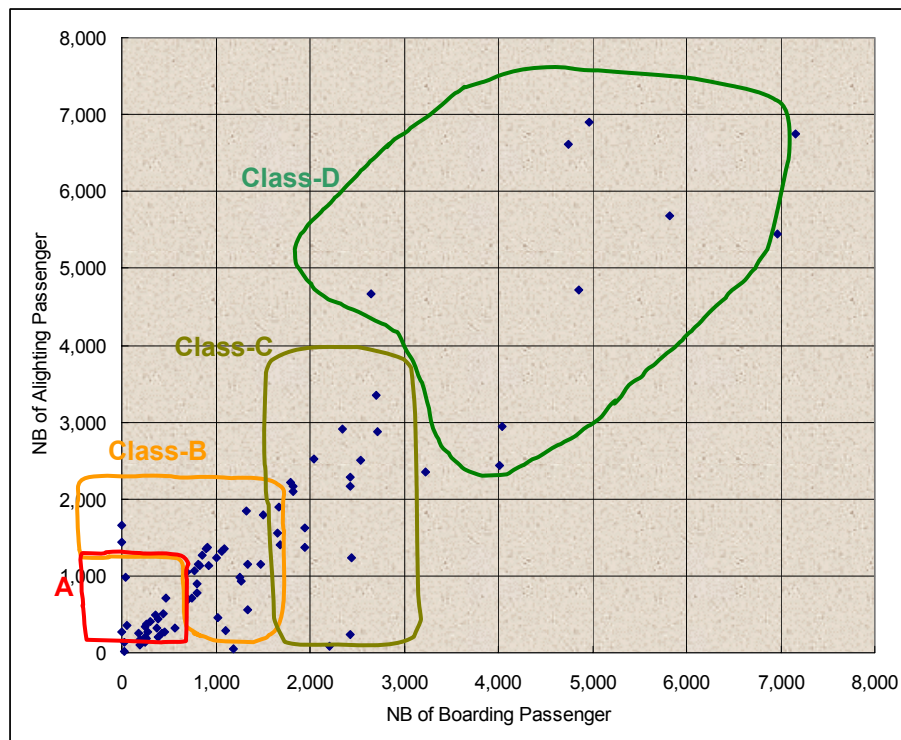


Figure AP1.1 NB of Boarding/Alighting Passengers at Bus Stop (daily)

## AP1.2 Size of the Bus Loading facilities

### AP1.2.1 Form of Loading Area

In “Highway Capacity Manual”, four different types of bus berths are exhibited as figure AP.1.2. Linear Type and Sawtooth Type were adopted in this design, since these are easy to install to the restricted area, such as bus stop along the road.

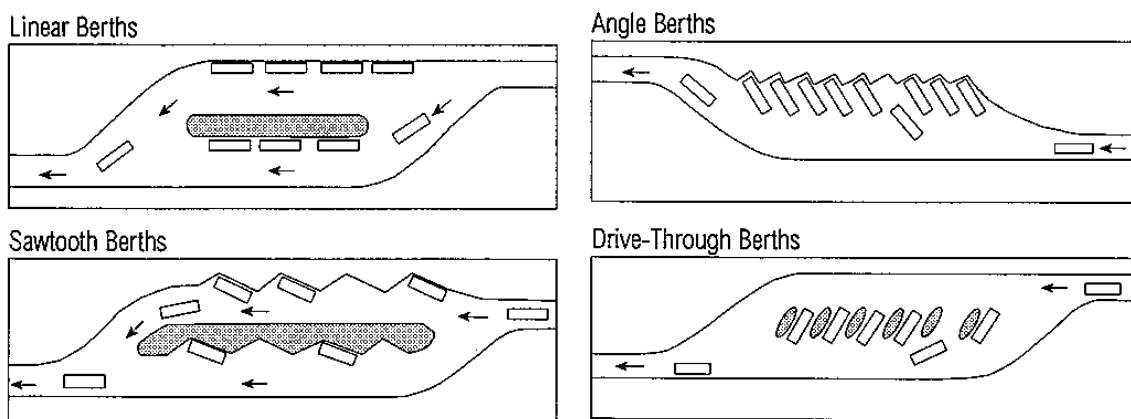


Figure 1.2 Bus Loading Area Design<sup>1</sup>

<sup>1</sup> Source: “Highway Capacity Manual 2000” Transportation Research Board National Research Council, USA

It is recognized that the Liner Type is less efficient than other types, so that Sawthooth Type was adopted when more than three berths would be required.

### AP1.2.2 Calculation of Number of Bus Berth

#### (1) Dwell Time

##### 1) Passenger Volume per Bus Headway

##### a. Hourly Passenger Volume

Hourly passenger volume was converted from daily volume using following formula.

$$PV_{hourly} = PV_{daily} \times PF$$

Where as;

$PV_{hourly}$ : Hourly passenger volume (shown as ③ in Table AP.1.4 )

$PV_{daily}$ : Daily passenger volume (shown as ② in Table AP.1.4 )

PF: Peak Factor (0.1)

Peak factor of 10 percent was assumed considering the present condition.

##### b. Passenger Volume per Bus Headway

Passenger volume per bus headway was calculated by the following formula.

$$PV_{int} = PV_{hourly} \div BV \times AF$$

Where as;

$PV_{int}$ : Passenger volume per bus headway (shown as ④ in Table AP.1.4)

BV: Hourly bus traffic volume (shown as ① in Table AP.1.4)

AF: Proportion of the passenger volume on heavier-direction during the peak hour (0.65)

#### 2) Average dwell time (td)

The results of the calculations are tabulated in Table AP.1.4

In “Transit Capacity and Quality Service Manual”, the time requires for single boarding/alighting passenger (dwell times) is suggested as per fare condition (Table AP.1.2). Since there is no available data in Indonesia regarding the dwell time, the times tabulated in Table AP.1.3 were adopted in the study.

The average dwell time for each bus stopping was calculated by multiplying passenger volume that is built up within the bus interval (shown as ④ in Table AP.1.4) and the tabulated time.

And in the study, alighting time of 2.0 seconds was used for both boarding and alighting, since the pre-payment fare system would be adopted.

**Table 1.3 Required Times for Each Bus Passenger<sup>2</sup>**

		Boarding/ Alighting Time (sec)	Remarks
Boarding*	Pre-Payment	2.0	
	Single Ticket/Token	2.6	
	Exact Fare	3.0	
Alighting		1.7 to 2.0	

\*Note: Add 0.5 seconds if standees are present on the bus

(2) Number of Bus Berths

The results are tabulated in Table AP. 2.6.

Number of bus berths was set bus traffic volume (shown as ① in Table AP. 2.6) less than bus berth capacity (shown as ⑦ in Table AP.2.6) multiplied by number of effective loading area.(Neb; see “3”)

$$\textcircled{1} \leq \textcircled{7} \times N_{eb}$$

1) Capacity of Bus Loading Facilities

Capacity of a bus stop was calculated by the following formula.

$$B_s = N_{eb} B_{bb} = N_{eb} \frac{3,600(g / C)}{t_c + (g / C)t_d + Z_a C_v t_d}$$

Where as;

- Bs: Maximum number of buses per bus stop per hour
- N<sub>eb</sub>: Number of effective loading area (see “3”)
- B<sub>bb</sub> : The number of operating buses per hour (shown as ⑦ in Table AP. 2.6 )
- g/C : Ratio of effective green time to a cycle (see “2”)
- t<sub>c</sub> : Clearance time for sequentially arriving buses (15 sec)
- t<sub>d</sub> : Average dwell time (shown as ⑤ in Table AP. 2.6)
- Z<sub>d</sub> : Probability not to emerge bus queues (0.675)
- C<sub>v</sub> : Variation coefficient of stopping time (0.6)

<sup>2</sup> Source: “Transit Capacity and Quality Service Manual” Transportation Research Board National Research Council, USA

Table AP.1.4 Calculation Sheet for Dwell Time

Route Name	Facility's Name	①		②				③	④	⑤
		Traffic Volume (Buses/hour)		NB of Daily Bording/Alighting/Transferring Passenger				Passenger Volume at Peak 1Hour 2007	Passenger Volume per Headway	Required Dwell Time (sec)
		Bus Type	NB	① Bording	② Alighting	③ Transferring	④ $\Sigma ① \sim ③$			
PB01	Kota Terminal	-	37	1,650	1,280	9,380	12,310	1,231	34	68
	L.Bulus Terminal	Articulated	16	5,900	8,350	0	14,250	1,425	90	180
PB02	Ragunan Terminal	Articulated	4	1,940	1,620	0	3,560	356	89	178
PB03	KP. Rambutan Terminal	Single	30	9,900	9,350	0	19,250	1,925	65	130
PB04	Kalideres Terminal	Articulated	27	5,880	4,610	0	10,490	1,049	39	78
	P.Gadung Terminal		27	2,430	2,170	0	4,600	460	18	36
01x02x04	Monas Transer Center	-	49	618	319	22,315	23,251	2,325	48	96
01x02x04	Harmoni Transer Center	-	49	936	949	5,668	7,553	755	16	32
03x04	Senen Transer Center	-	57	2,254	2,915	22,230	27,399	2,740	49	98
PB01	Class-A Bus Stop	Articulated	16	650	650	0	1,300	130	9	18
	Class-B Bus Stop	Articulated	16	1,300	1,300	0	2,600	260	17	34
	Class-C Bus Stop	Articulated	16	2,275	2,275	0	6,000	600	38	76
	Class-D Bus Stop	Articulated	16	4,550	5,200	0	9,750	975	61	122
PB01 (D.M. - K.S. <sup>1</sup> )	Class-A Bus Stop	Articulated	49	650	650	0	1,300	130	3	6
	Class-B Bus Stop	Articulated	49	1,300	1,300	0	2,600	260	6	12
	Class-C Bus Stop	Articulated	49	2,275	2,275	0	6,000	600	13	26
	Class-D Bus Stop	Articulated	49	4,550	5,200	0	9,750	975	20	40
PB01 (Kota - D.M. K.S.-H.I. <sup>2</sup> )	Class-A Bus Stop	Articulated	22	650	650	0	1,300	130	6	12
	Class-B Bus Stop	Articulated	22	1,300	1,300	0	2,600	260	12	24
	Class-C Bus Stop	Articulated	22	2,275	2,275	0	6,000	600	28	56
	Class-D Bus Stop	Articulated	22	4,550	5,200	0	9,750	975	45	90
PB02-1	Class-A Bus Stop	Articulated	6	650	650	0	1,300	130	22	44
	Class-B Bus Stop	Articulated	6	1,300	1,300	0	2,600	260	44	88
	Class-C Bus Stop	Articulated	6	2,275	2,275	0	6,000	600	100	200
	Class-D Bus Stop	Articulated	6	4,550	5,200	0	9,750	975	163	326
PB02-2	Class-A Bus Stop	Articulated	4	650	650	0	1,300	130	33	66
	Class-B Bus Stop	Articulated	4	1,300	1,300	0	2,600	260	65	130
	Class-C Bus Stop	Articulated	4	2,275	2,275	0	6,000	600	150	300
	Class-D Bus Stop	Articulated	4	4,550	5,200	0	9,750	975	244	488
PB03-1	Class-A Bus Stop	Single	30	650	650	0	1,300	130	5	10
	Class-B Bus Stop	Single	30	1,300	1,300	0	2,600	260	9	18
	Class-C Bus Stop	Single	30	2,275	2,275	0	6,000	600	20	40
	Class-D Bus Stop	Single	30	4,550	5,200	0	9,750	975	33	66
PB03-2	Class-A Bus Stop	Single	15	650	650	0	1,300	130	9	18
	Class-B Bus Stop	Single	15	1,300	1,300	0	2,600	260	18	36
	Class-C Bus Stop	Single	15	2,275	2,275	0	6,000	600	40	80
	Class-D Bus Stop	Single	15	4,550	5,200	0	9,750	975	65	130
PB04	Class-A Bus Stop	Articulated	27	650	650	0	1,300	130	5	10
	Class-B Bus Stop	Articulated	27	1,300	1,300	0	2,600	260	10	20
	Class-C Bus Stop	Articulated	27	2,275	2,275	0	6,000	600	23	46
	Class-D Bus Stop	Articulated	27	4,550	5,200	0	9,750	975	37	74

2) Green Time Ratio (g/C)

In the study, green time ratio (shown as ⑥ in Table AP.1.6) was assumed in following condition.

- $g / C = 1.00$  : in case of no signalized intersection near the bus loading facility which is accessed by the pedestrian bridge
- $g / C = 0.75$  : in case of no signalized intersection near the bus loading facility which is accessed by the cross-walk with traffic signals

- $g / C = 0.50$  : in case of a signalized intersection near the bus loading facility

### 3) Number of Effective Loading Area (N<sub>eb</sub>)

The capacity of plural bus berths varies according to the layout of bus berth. As shown in Table AP.1.5, increasing the number of loading areas at a parallel bus berths has an ever-decreasing effect on capacity as the number of berths increase because the stopping buses interfere with other buses.

On the other hand, no decreasing effect is needed to consider in the sawtooth design.

**Table 1.5 Effective Loading in case of Parallel Berth (N<sub>eb</sub>)**

Loading Area NB	On-Line Loading Areas		Off-Line Loading Areas	
	Efficiency %	NB of Cumulative Effective Loading Areas	Efficiency %	NB of Cumulative Effective Loading Areas
1	100	1.00	100	1.00
2	85	1.85	85	1.85
3	60	2.45	75	2.60
4	20	2.65	65	3.25
5	5	2.70	50	3.75

Note: On-line values were assumed that buses do not overtake each other.

**Table 1.6 Calculation Sheets for Number of Bus Berths**

Route Name	Facility's Name	① Traffic Volume (Buses/hour)		⑤ Required Dwell Time (sec)	Bus Berth Configuration							
		Bus Type	NB		⑥ Green Time Ratio	Clearance Time between Buses	⑦ Bus Berth Capacity (buses/h)	⑧ Required NB of Berth by Type			⑨ Adopted Berth Design	
								Parallel (On-Line)	Parallel (Off-Line)	Sawtooth	Layout Type	NB of Berth
PB01	Kota Terminal	-	37	68	0.75	15	29	2	2	2	Para(On)	2
	L.Bulus Terminal	Articulated	16	180	1.00	15	13	2	2	2	Para(On)	2
PB02	Ragunan Terminal	Articulated	4	178	1.00	15	14	1	1	1	Para(On)	1
PB03	KP. Rambutan Terminal	Single	30	130	1.00	15	18	2	2	2	Para(On)	2
PB04	Kalideres Terminal	Articulated	27	78	1.00	15	29	1	1	1	Para(On)	1
	P.Gadung Terminal	0	27	36	1.00	15	55	1	1	1	Para(On)	1
01x02x04	Monas Transer Center	-	49	96	0.75	15	21	3	3	3	Saw	3
01x02x04	Harmoni Transer Center	-	49	32	0.75	15	52	1	1	1	Para(On)	1
03x04	Senen Transer Center	-	57	98	0.75	15	21	-	4	3	Saw	3

Table 1.6 Calculation Sheets for Number of Bus Berths (Continued)

Route Name	Facility's Name	① Traffic Volume (Buses/hour)		⑤ Required Dwell Time (sec)	Bus Berth Configuration							
		Bus Type	NB		⑥ Green Time Ratio	Clearance Time between Buses	⑦ Bus Berth Capacity (buses/h)	⑧ Required NB of Berth by Type			⑨ Adopted Berth Design	
								Parallel (On-Line)	Parallel (Off-Line)	Sawtooth	Layout Type	NB of Berth
PB01 [g/C=1.00]	Class-A Bus Stop	Articulated	16	18	1.00	15	89	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	16	34	1.00	15	57	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	16	76	1.00	15	30	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	16	122	1.00	15	19	1	1	1	Para(On)	1
PB01 [g/C=0.75]	Class-A Bus Stop	Articulated	16	18	1.00	15	89	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	16	34	0.75	15	50	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	16	76	0.75	15	26	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	16	122	0.75	15	17	1	1	1	Para(On)	1
PB01 [g/C=0.50]	Class-A Bus Stop	Articulated	16	18	0.75	15	75	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	16	34	0.50	15	39	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	16	76	0.50	15	21	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	16	122	0.50	15	14	2	2	2	Para(On)	2
PB02-1 [g/C=1.00]	Class-A Bus Stop	Articulated	6	44	1.00	15	47	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	6	88	1.00	15	26	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	6	200	1.00	15	12	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	6	326	1.00	15	8	1	1	1	Para(On)	1
PB02-1 [g/C=0.75]	Class-A Bus Stop	Articulated	6	44	0.75	15	41	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	6	88	0.75	15	23	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	6	200	0.75	15	11	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	6	326	0.75	15	7	1	1	1	Para(On)	1
PB02-1 [g/C=0.50]	Class-A Bus Stop	Articulated	6	44	0.50	15	33	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	6	88	0.50	15	19	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	6	200	0.50	15	9	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	6	326	0.50	15	6	2	2	2	Para(On)	2
PB02-2 [g/C=1.00]	Class-A Bus Stop	Articulated	4	66	1.00	15	33	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	4	130	1.00	15	18	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	4	300	1.00	15	8	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	4	488	1.00	15	5	1	1	1	Para(On)	1
PB02-2 [g/C=0.75]	Class-A Bus Stop	Articulated	4	66	1.00	15	33	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	4	130	0.75	15	16	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	4	300	0.75	15	7	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	4	488	0.75	15	5	1	1	1	Para(On)	1
PB02-2 [g/C=0.50]	Class-A Bus Stop	Articulated	4	66	0.75	15	30	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	4	130	0.50	15	14	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	4	300	0.50	15	6	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	4	488	0.50	15	4	2	2	2	Para(On)	2
PB03-1 [g/C=1.00]	Class-A Bus Stop	Single	30	10	1.00	15	124	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	30	18	1.00	15	89	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	30	40	1.00	15	51	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	30	66	1.00	15	33	1	1	1	Para(On)	1
PB03-1 [g/C=0.75]	Class-A Bus Stop	Single	30	10	1.00	15	124	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	30	18	0.75	15	75	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	30	40	0.75	15	44	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	30	66	0.75	15	30	2	2	2	Para(On)	2
PB03-1 [g/C=0.50]	Class-A Bus Stop	Single	30	10	0.75	15	102	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	30	18	0.50	15	58	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	30	40	0.50	15	35	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	30	66	0.50	15	24	2	2	2	Para(On)	2
PB03-2 [g/C=1.00]	Class-A Bus Stop	Single	15	18	1.00	15	89	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	15	36	1.00	15	55	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	15	80	1.00	15	28	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	15	130	1.00	15	18	1	1	1	Para(On)	1
PB03-2 [g/C=0.75]	Class-A Bus Stop	Single	15	18	1.00	15	89	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	15	36	0.75	15	48	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	15	80	0.75	15	25	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	15	130	0.75	15	16	1	1	1	Para(On)	1
PB03-2 [g/C=0.50]	Class-A Bus Stop	Single	15	18	0.75	15	75	1	1	1	Para(On)	1
	Class-B Bus Stop	Single	15	36	0.50	15	38	1	1	1	Para(On)	1
	Class-C Bus Stop	Single	15	80	0.50	15	21	1	1	1	Para(On)	1
	Class-D Bus Stop	Single	15	130	0.50	15	14	2	2	2	Para(On)	2
PB04 [g/C=1.00]	Class-A Bus Stop	Articulated	27	10	1.00	15	124	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	27	20	1.00	15	84	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	27	46	1.00	15	45	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	27	74	1.00	15	30	1	1	1	Para(On)	1
PB04 [g/C=0.75]	Class-A Bus Stop	Articulated	27	10	1.00	15	124	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	27	20	0.75	15	71	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	27	46	0.75	15	40	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	27	74	0.75	15	27	2	2	2	Para(On)	2
PB04 [g/C=0.50]	Class-A Bus Stop	Articulated	27	10	0.75	15	102	1	1	1	Para(On)	1
	Class-B Bus Stop	Articulated	27	20	0.50	15	54	1	1	1	Para(On)	1
	Class-C Bus Stop	Articulated	27	46	0.50	15	32	1	1	1	Para(On)	1
	Class-D Bus Stop	Articulated	27	74	0.50	15	22	2	2	2	Para(On)	2

### AP1.2.3 Required Floor Area of Bus Shelters

Waiting areas of the bus shelters that are shown as ⑩ in Table AP.1.7 were calculated by multiplying 1.2 and boarding/alighting passenger volume per bus headway (shown as ④ in Table AP.1.7). 1.2 m<sup>2</sup> is assumed as the minimum area when the standing and free circulation through the queuing area possible without disturbing others within the queue (equivalent to LOS A in Figure below).

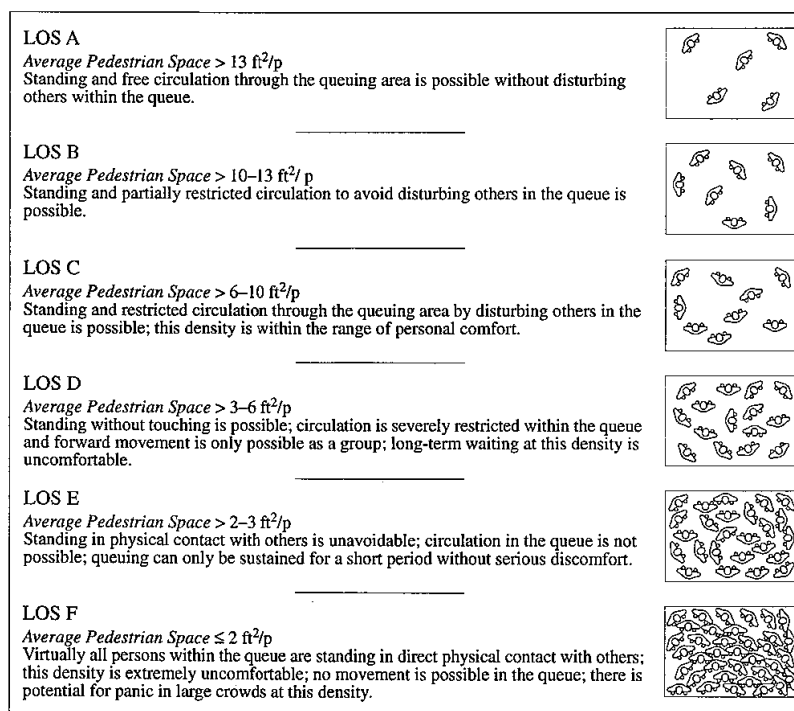


Figure 1.3 Level of Service of Queuing Area <sup>3</sup>

<sup>3</sup> "Exhibit 11-9 Queuing Area Los" Shown in the "Highway Capacity Manual 2000" Transportation Research Board National Research Council, USA



Table 1.7 Calculation Sheets for Waiting Area and Ticketing System

Route Name	Facility's Name	② NB of Daily Boarding/Alighting/Transferring Passenger			③ Passenger Volume at Peak 1Hour	④ Passenger Volume per Headway	⑤ Passenger Volume Passing Through the Gate /peak 1min /direction	⑩ Required Waiting Area (sqm)	⑪ Required NB of Ticketing Gate				⑫ Required Ticket Vending Machine
		(1) Boarding	(2) Alighting	(3) Transferring					Ticketing Gate Way /direction	Total NB of Ticketing Gate Machine			
										In	Out	Bi-Direction	
PB01	Kota Terminal	1,650	1,280	9,380	5,276	34	3	41	1	1	1	1	1
	L.Bulus Terminal	5,900	8,350	0	2,991	90	14	108	1	1	1	1	4
PB02	Ragunan Terminal	1,940	1,620	0	2,269	89	4	107	1	1	1	1	1
PB03	KP. Rambutan Terminal	9,900	9,350	0	5,107	65	17	78	1	1	1	1	5
PB04	Kalideres Terminal	5,880	4,610	0	1,944	39	10	47	1	1	1	1	3
	P.Gadung Terminal	2,430	2,170	0	1,136	18	5	22	1	1	1	1	2
01x02x04	Monas Transfer Center	618	319	22,315	5,010	48	2	58	1	1	1	1	1
01x02x04	Harmoni Transer Center	936	949	5,668	3,004	16	2	20	1	1	1	1	1
03x04	Senen Transfer Center	2,254	2,915	22,230	8,604	49	5	59	1	1	1	1	2
PB01	Class-A Bus Stop	650	650	0	130	9	2	11	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	17	3	21	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	38	4	46	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	61	9	74	1	1	1	1	3
PB01 (D.M. - K.S.*1)	Class-A Bus Stop	650	650	0	130	3	2	4	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	130	6	3	8	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	130	13	4	16	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	130	20	9	24	1	1	1	1	3
PB01 (Kota - D.M. K.S.-H.I.)	Class-A Bus Stop	0	0	0	130	6	2	8	1	1	1	1	1
	Class-B Bus Stop	0	0	0	130	12	3	15	1	1	1	1	1
	Class-C Bus Stop	0	0	0	130	28	4	34	1	1	1	1	1
	Class-D Bus Stop	0	0	0	130	45	9	54	1	1	1	1	3
PB02-1	Class-A Bus Stop	650	650	0	130	22	2	27	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	44	3	53	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	100	4	120	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	163	9	196	1	1	1	1	3
PB02-2	Class-A Bus Stop	650	650	0	130	33	2	40	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	65	3	78	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	150	4	180	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	244	9	293	1	1	1	1	3
PB03-1	Class-A Bus Stop	650	650	0	130	5	2	6	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	9	3	11	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	20	4	24	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	33	9	40	1	1	1	1	3
PB03-2	Class-A Bus Stop	650	650	0	130	9	2	11	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	18	3	22	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	40	4	48	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	65	9	78	1	1	1	1	3
PB04	Class-A Bus Stop	650	650	0	130	5	2	6	1	1	1	1	1
	Class-B Bus Stop	1,300	1,300	0	260	10	3	12	1	1	1	1	1
	Class-C Bus Stop	2,275	2,275	0	600	23	4	28	1	1	1	1	1
	Class-D Bus Stop	4,550	5,200	0	975	37	9	45	1	1	1	1	3

## AP1.2.4 Ticketing Equipments

### (1) Turn Style Gate

In Japan, it is known that 25 passenger can pass through the turn style gate in maximum. In the study, 20 passengers that are 80% of 25 passengers were adopted and following formula was used to calculate the required number of the gates, and the results were shown in Table AP.1.7.

$$N_g = \frac{\max(P_b, P_a) \times PF / 60}{20}$$

Where as;

Ng: Number of ticketing gate (shown as ⑪ in Table AP. 1.7)

Pb: Daily Boarding Passenger (shown as ② in Table AP. 1.7)

Pa: Daily Alighting Passenger (Ditto)

PF: Peak Factor mentioned in “AP.1.2.2 (1)”

From the result of the calculations, it was found that one gate has sufficient capacity for the passengers in 2007 to board or alight. In the study, one gate facility was allocated for each boarding side and alighting side, and also one reversible gate facility was installed.

## (2) Ticket Vending Machine

Number of ticket vending machines was calculated by using formula below, and results were shown in Table AP.1.7. Capacity of the vending machine was assumed as 4 passengers/second according to the experience in Japan.

$$N_{tv} = \frac{P_b \times PF / 60}{4}$$

Where as;

Ntv: Number of ticket vending machine (shown as ⑫ in Table AP1.7)

## **AP1.3 Adjustment Work**

In aforementioned procedure, general data such as boarding/alighting time, clearance time, probability, etc was adopted the values that generally used in USA. Therefore, adjustment work will be occasionally needed using actual observed data on service section.

## **AP1.4 Construction COST BREAK DOWN**

### **AP1.4.1 Civil Works**

This item consists of the civil works relating to busway and bus shelter construction.

Major works of this item are demolition/construction of the pavement/curb, widening/construction of the bridge, construction of the pedestrian bridge, installation of the stair, etc.

The cost of civil works shown in the main text of the “Vol.2 Pre Feasibility Study“ is total of the tabulated cost in B.1.2 and Contingency and VAT.

(1) Cost Break Down

1) PB01

No.	Description	Unit	Unit Cost (thousand Rp.)	Quantity	Cost (million Rp.)	Remarks
<b>1</b>	<b>General</b>				<b>2,321</b>	
1.1	General	Lm	420	5,525	2,321	
<b>2</b>	<b>Drainage</b>				<b>5,563</b>	
2.1	Drainage	Lm	1,075	5,175	5,563	
<b>3</b>	<b>Earth Works</b>				<b>413</b>	
3.1	Common Excavation	m3	13.0	16,317	212	
3.2	Embankment with Material from Common or Borrow Excavation	m3	20.0	0	0	
3.4	Demolition of Pavement	m3	20.0	3,071	61	
	Demolition of Curb	m	7.0	19,913	139	
<b>6</b>	<b>Pavement</b>				<b>12,480</b>	
	Travelled Way	m2	150	66,640	9,996	
	Sidewalk	m3	80	31,050	2,484	
<b>7</b>	<b>Structure</b>				<b>2,424</b>	
7.0	Pedestrian Bridge	m2	8,000	180	1,440	Monas T.C.
7.05	Pedestrian Bridge Stair	m2	6,500	60	390	
7.1	Bridge Widening	m2	6,600	70	459	
7.5.1	Box Culvert (2.5x2.5)	m	3,000	45	135	Duku Atas F.O.
<b>8</b>	<b>Miscellaneous</b>				<b>2,092</b>	
8.1	Precast Concrete Curb	Lm	54	21,713	1,173	
8.2	Lane Marking	m2	71.0	3,672	261	
8.3	Traffic Sign	Each	580.0	12	7	
8.4	Street Lighting Median	Each	27,526	0	0	
8.5	Street Tree Median	Each	827	0	0	
8.7	Traffic Separator	Lm	59	11,050	652	
<b>Total</b>					<b>25,292</b>	
					5,269	Mllion Rp./Km

2) PB02

No.	Description	Unit	Unit Cost (thousand Rp.)	Quantity	Cost (million Rp.)	Remarks
<b>1</b>	<b>General</b>				<b>5,586</b>	
1.1	General	Lm	420	13,300	5,586	
<b>2</b>	<b>Drainage</b>				<b>2,774</b>	
2.1	Drainage	Lm	1,075	2,580	2,774	
<b>3</b>	<b>Earth Works</b>				<b>998</b>	
3.1	Commn Excavation	m3	13.0	27,204	354	
3.2	Embankment with Material from Common or Borrow Excavation	m3	20.0	0	0	
3.4	Demolition of Pavement	m3	20.0	19,859	397	
	Demolition of Curb	m	7.0	35,319	247	
<b>6</b>	<b>Pavement</b>				<b>4,110</b>	
	Travelled Way	m2	150	17,355	2,603	
	Sidewalk	m3	80	18,840	1,507	
<b>7</b>	<b>Structure</b>				<b>26,558</b>	
7.0	Pedestrian Bridge	m2	8,000		0	
7.05	Pedestrian Bridge Stair	m2	6,500	210	1,365	
7.1	Brdge Widening	m2	6,600	3,808	25,133	
7.5.1	Box Culvert (2.5x2.5)	m	3,000	20	60	R.Said Station
<b>8</b>	<b>Miscellaneous</b>				<b>2,540</b>	
8.1	Precast Concrete Curb	Lm	54	13,599	734	
8.2	Lane Marking	m2	71.0	6,702	476	
8.3	Traffic Sign	Each	580.0	25	15	
8.4	Street Lighting Median	Each	27,526	0	0	
8.5	Street Tree Median	Each	827	0	0	
8.7	Traffic Separater	Lm	59	22,300	1,316	
<b>Total</b>					<b>42,566</b>	
					8,868	Mllion Rp./Km

3) PB03

No.	Description	Unit	Unit Cost (thousand Rp.)	Quantity	Cost (million Rp.)	Remarks
<b>1</b>	<b>General</b>				<b>9,362</b>	
1.1	General	Lm	420	22,290	9,362	
<b>2</b>	<b>Drainage</b>				<b>8,751</b>	
2.1	Drainage	Lm	1,075	8,140	8,751	
<b>3</b>	<b>Earth Works</b>				<b>1,702</b>	
3.1	Commn Excavation	m3	13.0	77,661	1,010	
3.2	Embankment with Material from Common or Borrow Excavation	m3	20.0	0	0	
3.4	Demolition of Pavement	m3	20.0	19,826	397	
	Demolition of Curb	m	7.0	42,223	296	
<b>6</b>	<b>Pavement</b>				<b>18,088</b>	
	Travelled Way	m2	150	90,645	13,597	
	Sidewalk	m3	80	56,145	4,492	
<b>7</b>	<b>Structure</b>				<b>4,803</b>	
7.0	Pedestrian Bridge	m2	8,000	150	1,200	Mangga Dua
7.05	Pedestrian Bridge Stair	m2	6,500	270	1,755	
7.1	Brdge Widening	m2	6,600	280	1,848	
7.5.1	Box Culvert (2.5x2.5)	m	3,000	0	0	
<b>8</b>	<b>Miscellaneous</b>				<b>6,476</b>	
8.1	Precast Concrete Curb	Lm	54	47,741	2,578	
8.2	Lane Marking	m2	71.0	15,034	1,067	
8.3	Traffic Sign	Each	580.0	46	27	
8.4	Street Lighting Median	Each	27,526	0	0	
8.5	Street Tree Median	Each	827	0	0	
8.7	Traffic Separater	Lm	59	47,530	2,804	
<b>Total</b>					<b>49,182</b>	
					10,246	Mllion Rp./Km

4) PB04

No.	Description	Unit	Unit Cost (thousand Rp.)	Quantity	Cost (million Rp.)	Remarks
<b>1</b>	<b>General</b>				<b>9,946</b>	
1.1	General	Lm	420	23,680	9,946	
<b>2</b>	<b>Drainage</b>				<b>1,269</b>	
2.1	Drainage	Lm	1,075	1,180	1,269	
<b>3</b>	<b>Earth Works</b>				<b>656</b>	
3.1	Commn Excavation	m3	13.0	16,403	213	
3.2	Embankment with Material from Common or Borrow Excavation	m3	20.0	0	0	
3.4	Demolition of Pavement	m3	20.0	6,940	139	
	Demolition of Curb	m	7.0	43,388	304	
<b>6</b>	<b>Pavement</b>				<b>5,759</b>	
	Travelled Way	m2	150	38,396	5,759	
	Sidewalk	m3	80	0	0	
<b>7</b>	<b>Structure</b>				<b>6,351</b>	
7.0	Pedestrian Bridge	m2	8,000	113	900	Senen T.C.
7.05	Pedestrian Bridge Stair	m2	6,500	270	1,755	
7.1	Brdge Widening	m2	6,600	560	3,696	
7.5.1	Box Culvert (2.5x2.5)	m	3,000	0	0	
<b>8</b>	<b>Miscellaneous</b>				<b>4,581</b>	
8.1	Precast Concrete Curb	Lm	54	4,978	269	
8.2	Lane Marking	m2	71.0	6,113	434	
8.3	Traffic Sign	Each	580.0	59	34	
8.4	Street Lighting Median	Each	27,526	31	853	
8.5	Street Tree Median	Each	827	237	196	
8.7	Traffic Separater	Lm	59	47,360	2,794	
<b>Total</b>					<b>28,561</b>	
					5,950	Mllion Rp./Km

(2) Quantity Calculations

Quantities tabulated in the spreadsheets shown in “B.1.2” were calculated adding “Normal Section” to “Bus Shelter”.

1) Normal Section

STATION	LENGT H (m)	EARTHWORK			DRAINAG E (m)	PAVEMENT				BRIDGE (sqm)	MISCELLANEOUS				
		Common Excavation (cu.m)	Demolition of Pave. (sq.m)	Demolition of Curb (m)		Pave. (m)	Sidewalk (m)	Curb (m)	Separater (m)		Marking (sq.m)	Retaining Wall (sq.m)	Street Lighting	Street Tree	
PB01															
12,925 - 13,275	350	63	70	700		455		700	700		199.5				
13,275 - 13,700	425	3,519	170	1,700	425	3,655	2,550	1700	850		242.3				
13,700 - 14,250	550	6,782	770	1,100	550	7205	3,300	2200	1,100		313.5				
14,250 - 14,600	350	4,568	490	700	350	4865	2,100	1400	700		199.5				
14,600 - 18,450	3,850	1,386	1540	15,400	3,850	48895	23,100	15400	7,700	69.5	2,194.5				
<b>TOTAL</b>	<b>5,525</b>	<b>16,317</b>	<b>3,040</b>	<b>19,600</b>	<b>5,175</b>	<b>65,075</b>	<b>31,050</b>	<b>21,400</b>	<b>11,050</b>	<b>70</b>	<b>3,149</b>			<b>0</b>	<b>0</b>

(Continued)

STATION	LENGT H (m)	EARTHWORK			DRAINAG E (m)	PAVEMENT				BRIDGE (sqm)	MISCELLANEOUS			
		Common Excavation (cu.m)	Demolition of Pave. (sq.m)	Demolition of Curb (m)		Pave. (m)	Sidewalk (m)	Curb (m)	Separator (m)		Marking (sq.m)	Retaining Wall (sq.m)	Street Lighting	Street Tree
PB02														
0 - 250	250	225	250	500		50		0	500		142.5			
250 - 780	530													
780 - 1,050	270													
1,050 - 1,150	100	1,026	140	400	100	1080	3	400	200		57.0			
1,150 - 1,430	280								560	3,808				
1,430 - 1,600	170	1,744	238	680	170	1836	3	680	340		96.9			
1,600 - 5,275	3,675	0	0	0	0	0	0	0	7,350		1,212.8			
5,275 - 5,690	415	0	0	0	0	0	0	0	830		255.2			
5,690 - 9,600	3,910	11,965	11,730	23,460	0	0	9,384	7820	7,820		2,228.7			
9,600 - 10,200	600	0	0	0	0	0	0	0	1,200		342.0			
10,200 - 10,480	280	1,033	630	840	140	1,148	840	840	560		159.6	245.0		
10,480 - 11,950	1,470	7,673	3,528	5,880	1,470	9,114	4,410	0	2,940		837.9			
11,950 - 12,600	650	878	130	1,300		1,105	0	1300	0		370.5			
12,600 - 13,300	700	2,660	2,240	1,400	700	2,800	4,200	1400	0		399.0			
TOTAL	13,300	27,204	18,886	34,460	2,580	17,133	18,840	12,440	22,300	3,808	6,102	245	0	0
PB03														
0 - 400	400	0	0	0		0		0	800		264.0			
400 - 2,050	1,650	1,485	7920	6,600	0	3,300	9900	9,900	3,300		1,732.5			
2,050 - 2,840	790	0	0	0	0	0	0	0	5,680		521.4			
2,840 - 6,020	3,180	1,431	318	3,180	0	1908	0	3180	6,360		2,098.8			
6,020 - 6,275	255	436	459	765	128	153	0	255	510		156.8			
6,275 - 6,780	505	364	202	2,020	253	606	0	0	1,010		250.0			
7,440 - 9,725	2,285	0	0	0	0	0	0	0	4,570		1,302.5			
9,725 - 11,180	1,455	0	0	0	0	0	0	0	2,910		829.4			
11,180 - 11,470	290	0	0	0	0	0	0	0	580		217.5			
11,470 - 12,100	630	397	1,197	1,260	210	567	945	1260	1,260		463.1			
12,100 - 13,250	1,150	311	115	1,150	0	460	0	0	1,150		431.3			
13,250 - 15,400	2,150	0	0	0	0	0	0	0	4,300		1,419.0			
15,400 - 17,750	2,350	20,727	3,055	9,400	2,350	23,970	14,100	9,400	4,700	280	1,339.5			
17,750 - 20,570	2,820	27,664	1,128	5,640	2,820	31,302	16,920	11,280	5,640		1,607.4			
20,570 - 22,950	2,380	24,847	2,142	9,520	2,380	28,084	14,280	9,520	4,760		1,356.6			
TOTAL	22,290	77,661	16,536	39,535	8,140	90,350	56,145	44,795	47,530	280	13,990		0	0
PB04-1														
0 - 9,550	9,550	14,612	1910	19100		16,235		0	19,100		0.0			
9,550 - 10,900	1,350	729	540	5,400		1,350		0	2,700		0.0			
10,900 - 13,200	2,300	0	0	0		0		0	4,600		759.0			
13,200										560				
PB04-2														
0 - 200	200	0	0	0		0		0	400					
200 - 1,150	950	0	0	1,900		475		950	1,900		1,306.3			
1,150 - 2,700	1,550	0	0	0		0		0	3,100		511.5			
2,700 - 6,650	3,950	0	0	0		0		0	7,900		1,303.5			
6,650 - 9,300	2,650	0	2,650	10,600		6,360		0	5,300		1,113.0			
9,300 - 10,480	1,180	1,062	590	4,720	1,180	12,154		2,360	2,360		389.4		31	237
TOTAL	23,680	16,403	5,690	41,720	1,180	36,574	0	3,310	47,360	560	5,383		31	237

## 2) Bus Shelter

Costs relating to bus stop were calculated by multiplying “Number of Bus Shelters by Type” and “Quantity of Each Bus Shelter”.

a. Number of Bus Shelters by Type

		PB01	PB02	PB03	PB04	Total
Shelter for Bus Terminal	Lebak Bulus	1				1
	Ragunan		1			1
	KP.Rambutan			1		1
	Kalideres & Pulogadung				2	2
Shelter for Transfer Center	Monas	1				1
	Senen				1	1
Shelter for Bus Stop	Ic1	5	0	6	3	14
	Ic2	1	0	2	1	4
	Ip1	0	1	3	2	6
	Ip2	1	0	2	1	4
	Iic1	0	0	8	2	10
	Iic2	0	3	0	2	5
	Iic3	0	0	4	2	6
	Iic4	2	3	0	0	5
	Iip1	0	0	4	0	4
	Iip2	0	5	0	0	5
	Iiic	0	0	0	6	6
	Iiip	0	1	0	5	6
Total		11	14	30	27	82

b. Quantities of Each Bus Shelter

The following quantities of shelters are excluded quantities in normal sections.

ITEM	UNIT	QUANTITY	NOTE
<b>Lebak Bulus Terminal</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m		
<b>Ragunan Terminal</b>			
DEMOLITION OF PAVE.	sq.m	320.0	
DEMOLITION OF CURB	m	40.0	
PAVEMENT	sq.m	140.0	
CURB	m	340.0	
LANE MARK	sq.m	510.0	
P. BRIDGE STAIR	sq.m		
<b>KP.Rambutan Terminal</b>			
DEMOLITION OF PAVE.	sq.m	138.2	
DEMOLITION OF CURB	m		
PAVEMENT	sq.m	8.2	
CURB	m	82.0	
LANE MARK	sq.m	164.0	
P. BRIDGE STAIR	sq.m		

(Continued)

ITEM	UNIT	QUANTITY	NOTE
<b>Kalideres &amp; Pulogadung Terminal</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m		
<b>Monas Transfer Center</b>			
DEMOLITION OF PAVE.	sq.m	31.3	
DEMOLITION OF CURB	m	313.0	
PAVEMENT	sq.m	1,565.0	
CURB	m	313.0	
LANE MARK	sq.m	313.0	
P. BRIDGE STAIR	sq.m	30.0	
<b>Senen Transfer Center</b>			
DEMOLITION OF PAVE.	sq.m	45.0	
DEMOLITION OF CURB	m	450.0	
PAVEMENT	sq.m	1,700.0	
CURB	m	450.0	
LANE MARK	sq.m	450.0	
P. BRIDGE STAIR	sq.m	30.0	
<b>lc1 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m	35.0	Cross-Walk: 22.1m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>lc2 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m	35.0	Cross-Walk: 22.1m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>lp1 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m	30.0	
<b>lp2 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m	30.0	



(Continued)

ITEM	UNIT	QUANTITY	NOTE
<b>IIc1 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m	189.0	
DEMOLITION OF CURB	m	336.0	
PAVEMENT	sq.m	33.6	220m x 0.25m
CURB	m	336.0	
LANE MARK	sq.m	40.0	Cross-Walk: 25.6m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>IIc2 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m	217.8	
DEMOLITION OF CURB	m	273.0	
PAVEMENT	sq.m	27.3	220m x 0.25m
CURB	m	273.0	
LANE MARK	sq.m	30.0	Cross-Walk: 19.6m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>IIc3 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m	195.5	
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		Cross-Walk: 22.1m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>IIc4 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		Cross-Walk: 22.1m x 3.0m x 1/2
P. BRIDGE STAIR	sq.m		
<b>IIp1 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m	214.4	
DEMOLITION OF CURB	m		
PAVEMENT	sq.m	4.4	220m x 0.25m
CURB	m	44.0	
LANE MARK	sq.m	70.0	Zebra=2*1/2*3*45/2
P. BRIDGE STAIR	sq.m	30.0	
<b>IIp2 Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m	30.0	
<b>IIIc Type Shelter</b>			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m		

(Continued)

ITEM	UNIT	QUANTITY	NOTE
Ilip Type Shelter			
DEMOLITION OF PAVE.	sq.m		
DEMOLITION OF CURB	m		
PAVEMENT	sq.m		220m x 0.25m
CURB	m		
LANE MARK	sq.m		
P. BRIDGE STAIR	sq.m	30.0	

#### AP1.4.2 Bus Shelter Installation

Bus Shelter Installation consists of new bus shelter constructions and existing bus shelter extensions. Both costs shown in the “B.2.1” and “B.2.2” need to add the contingency and VAT to calculate the cost described in the main text of “Vol.2. Pre Feasibility Study”.

##### (1) New Construction

Costs relating to bus shelter installation were calculated by multiplying “Number of Bus Shelters by Type (mentioned in B.1)” and “Quantity of Each Bus Shelter”.

<b>Lebak Bulus</b>			
BUS SHELTER	sq.m	171.0	FLOOR AREA
BUS STOP DISP.	Set	2.0	
<b>Ragunan</b>			
BUS SHELTER	sq.m	159.5	FLOOR AREA
BUS STOP DISP.	Set	1.0	
<b>KP.Rambutan</b>			
BUS SHELTER	sq.m	130.0	FLOOR AREA
BUS STOP DISP.	Set	2.0	
<b>Kalideres &amp; Pulogadung</b>			
BUS SHELTER	sq.m	92.5	FLOOR AREA
BUS STOP DISP.	Set	1.0	
<b>Monas</b>			
BUS SHELTER	sq.m	460.0	FLOOR AREA
BUS STOP DISP.	Set	6.0	
<b>Senen</b>			
BUS SHELTER	sq.m	460.0	FLOOR AREA
BUS STOP DISP.	Set	6.0	
<b>Ic1</b>			
BUS SHELTER	sq.m	80.5	FLOOR AREA
BUS STOP DISP.	Set	2.0	

(Continued)

ITEM	UNIT	QUANTITY	NOTE
lc2			
BUS SHELTER	sq.m	115.5	FLOOR AREA
BUS STOP DISP.	Set	2.0	
lp1			
BUS SHELTER	sq.m	50.3	FLOOR AREA
BUS STOP DISP.	Set	2.0	
lp2			
BUS SHELTER	sq.m	77.3	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llc1			
BUS SHELTER	sq.m	35.5	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llc2			
BUS SHELTER	sq.m	153.8	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llc3			
BUS SHELTER	sq.m	47.5	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llc4			
BUS SHELTER	sq.m	65.5	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llp1			
BUS SHELTER	sq.m	55.0	FLOOR AREA
BUS STOP DISP.	Set	2.0	
llp2			
BUS SHELTER	sq.m	111.6	FLOOR AREA
BUS STOP DISP.	Set	2.0	
lllc			
BUS SHELTER	sq.m	115.0	FLOOR AREA
BUS STOP DISP.	Set	2.0	
lllp			
BUS SHELTER	sq.m	105.0	FLOOR AREA
BUS STOP DISP.	Set	2.0	

(2) Extension of Existing DKI Shelter

Existing 20 bus shelters constructed by DKI alongside of PB01 must be extended to suite to articulated bus.

45 sqm was considered as requirement floor area for extension for each bus shelter.

### AP1.4.3 Ticketing System Installation

This item consists of the installation of ticketing gate and the ticket vending machine.

From Kota to Blok M, no additional equipment for the ticketing system was considered, since existing system would be able to apply for the demand in 2007.

The cost tabulated below need to add the Contingency and VAT (31% in total) to calculate the cost shown in the main text “Vol.2 Pre Feasibility Study”.

ITEM	Unit Cost (million Rp.)	PB01		PB02		PB03		PB04	
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Ticket Facilities									
Sets of Ticketing Gate									
One Direction (Enter/Exit)	410.0	12	4,920	14	5,740	31	12,710	29	11,890
Bi-Direction	400.0	12	4,800	14	5,600	31	12,400	29	11,600
Ticket Vending Machine	400.0	14	5,600	14	5,600	35	14,000	41	16,400
Total			15,320		16,940		39,110		39,890

### AP1.4.4 Traffic Signal Installation

Main part of this item is bus priority signal installation, but also the center facility including software of the Bus Location System. The total cost of the item is that total a cost tabulated in the table plus 1,572 million Rp (including contingency and VAT). that is the cost for center facility of the Bus Location System.

Regarding the signals, three types of signals such as

- Signals at intersections,
- Signals nearby the crosswalks to the mid-block bus shelters and
- Signals at u-turn openings

were considered.

The cost tabulated below need to add the Contingency and VAT (31% in total) to calculate the cost shown in the main text “Vol.2 Pre Feasibility Study”.

(1) Signals at Intersections

1) PB01

Description	Unit	Quantity	Unit price		Amount		Total Rp. million	Remarks
			F/C x1000 Yen	L/C x1000 Rp	F/C x1000 Rp	L/C x1000 Rp		
Bus priority signal								
Local controller	no.	15	1,400	10,000	1,636,320	150,000	1,786	Footing & wiring included
Bus priority/preemption software	set	15	200	5,000	233,760	75,000	309	
3-aspect vehicle lantern	set	30	180	2,000	420,768	60,000	481	Signal wiring included
Signal pole (straight)	no.		60	1,000	0	0	0	
Roadside tag reader	set	30	500	3,000	1,168,800	90,000	1,259	
Tag reader pole	no.	30	150	2,000	350,640	60,000	411	
Conduit	m	3,000		200		600,000	600	Supply & installation
Handhole	unit	30		500		15,000	15	
Timing parameter set	set	15	150	4,000	175,320	60,000	235	
Miscellaneous works	LS	1	6,000	100,000	467,520	100,000	568	
Sub-total					4,453,128	1,210,000	5,663	

2) PB02

Description	Unit	Quantity	Unit price		Amount		Total Rp. million	Remarks
			F/C x1000 Yen	L/C x1000 Rp	F/C x1000 Rp	L/C x1000 Rp		
Bus priority signal								
Local controller	no.	11	1,400	10,000	1,199,968	110,000	1,310	Footing & wiring included
Bus priority/preemption software	set	11	200	5,000	171,424	55,000	226	
3-aspect vehicle lantern	set	22	180	2,000	308,563	44,000	353	Signal wiring included
Signal pole (straight)	no.		60	1,000	0	0	0	
Roadside tag reader	set	22	500	3,000	857,120	66,000	923	
Tag reader pole	no.	22	150	2,000	257,136	44,000	301	
Conduit	m	2,200	0	200		440,000	440	Supply & installation
Handhole	unit	22	0	500		11,000	11	
Timing parameter set	set	11	150	4,000	128,568	44,000	173	
Miscellaneous works	LS	1	6,000	100,000	467,520	100,000	568	
Sub-total					3,390,299	914,000	4,304	

3) PB03

Description	Unit	Quantity	Unit price		Amount		Total Rp. million	Remarks
			F/C x1000 Yen	L/C x1000 Rp	F/C x1000 Rp	L/C x1000 Rp		
Bus priority signal								
Local controller	no.	24	1,400	10,000	2,618,112	240,000	2,858	Footing & wiring included
Bus priority/preemption software	set	24	200	5,000	374,016	120,000	494	
3-aspect vehicle lantern	set	48	180	2,000	673,229	96,000	769	Signal wiring included
Signal pole (straight)	no.		60	1,000	0	0	0	
Roadside tag reader	set	48	500	3,000	1,870,080	144,000	2,014	
Tag reader pole	no.	48	150	2,000	561,024	96,000	657	
Conduit	m	4,800	0	200		960,000	960	Supply & installation
Handhole	unit	48	0	500		24,000	24	
Timing parameter set	set	24	150	4,000	280,512	96,000	377	
Miscellaneous works	LS	1	6,000	200,000	467,520	200,000	668	
Sub-total					6,844,493	1,976,000	8,820	

4) PB04

Description	Unit	Quantity	Unit price		Amount		Total Rp. million	Remarks
			F/C x1000 Yen	L/C x1000 Rp	F/C x1000 Rp	L/C x1000 Rp		
Bus priority signal								
Local controller	no.	15	1,400	10,000	1,636,320	150,000	1,786	Footing & wiring included
Bus priority/preemption software	set	15	200	5,000	233,760	75,000	309	
3-aspect vehicle lantern	set	36	180	2,000	504,922	72,000	577	Signal wiring included
Pedestrian lantern	set	10	100	1,500	77,920	15,000	93	New signal
Mastarm	no.	2	300	20,000	46,752	40,000	87	New signal
Signal pole (straight)	no.	6	60	1,000	28,051	6,000	34	
Roadside tag reader	set	36	500	3,000	1,402,560	108,000	1,511	
Tag reader pole	no.	36	150	2,000	420,768	72,000	493	
Conduit	m	3,720	0	200		744,000	744	Supply & installation
Conduit for new signal	m	80		200		16,000	16	Supply & installation
Handhole	unit	44	0	500		22,000	22	
Timing parameter set	set	15	150	4,000	175,320	60,000	235	
Miscellaneous works	LS	1	6,000	200,000	467,520	200,000	668	
Sub-total					4,993,893	1,580,000	6,574	

(2) Signals at Cross Walk/U-turn Opening

Unit cost of the Signals for Cross-Walk and U-turn was estimated roughly refer to the cost estimated in “B.4.2”.

ITEM	Unit Cost (million Rp.)	PB01		PB02		PB03		PB04	
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Traffic Signals									
CrossWalk to Bus Shelter	420.0	6	2,520	4	1,680	11	4,620	13	5,460
U-turn opening	430.0	4	1,720	4	1,720		0		0
Total			4,240		3,400		4,620		5,460



**Appendix 2 (2): Economic Analysis of Busway**

	Total 2004-20010	Total 2004-2015	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>2. Benefits (billion rupiahs)</b>														
1) VOC Savings	668	1,494	0	0	106	139	122	137	165	165	165	165	165	165
2) Travel Cost Savings														
High income group	468	1,189	0	0	90	114	44	75	145	145	144	144	144	144
Middle income group	538	1,370	0	0	68	85	101	126	158	161	163	166	169	172
Low income group	25	39	0	0	4	6	7	5	3	3	3	3	3	3
<b>Total Travel Cost Savings</b>	<b>1,031</b>	<b>2,598</b>	<b>0</b>	<b>0</b>	<b>163</b>	<b>205</b>	<b>152</b>	<b>206</b>	<b>305</b>	<b>308</b>	<b>311</b>	<b>313</b>	<b>316</b>	<b>319</b>
<b>Total Benefits</b>	<b>1,699</b>	<b>4,092</b>	<b>0</b>	<b>0</b>	<b>269</b>	<b>343</b>	<b>274</b>	<b>343</b>	<b>470</b>	<b>473</b>	<b>476</b>	<b>478</b>	<b>481</b>	<b>484</b>
<b>Discounted benefits</b>														
1) VOC Savings	723	1,215	0	0	84	99	77	78	84	75	67	60	53	47
2) Travel Cost Savings	1,215	1,938	0	0	130	146	97	117	155	139	125	113	102	92
<b>Total benefits</b>			<b>0</b>	<b>0</b>	<b>214</b>	<b>244</b>	<b>174</b>	<b>195</b>	<b>238</b>	<b>214</b>	<b>192</b>	<b>173</b>	<b>155</b>	<b>139</b>
<b>3. Net Benefits (billion rupiahs)</b>														
Net Benefits (economic prices)	3,747	1,153	-204	-361	-93	39	267	336	463	466	469	471	474	1,420
Net Benefits (discounted at 12 %)	1,153		-204	-322	-74	27	169	191	235	211	189	170	153	408
Accumulated Net Benefits (discounted at 12 %)			-204	-526	-600	-572	-403	-212	22	233	422	592	745	1,153
<b>NPV</b>	<b>1,153 billion rupiahs</b>													
<b>EIRR</b>	<b>12% (discount rate)</b>													
	<b>31.9%</b>													







**Appendix 5 (1): Economic Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	Total 2004-2020	Total 2004-2040	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>1. Costs (billion rupiahs)</b>																			
1) Serpong Line Double Tracking																			
Land & Compensation	180	0	0	0	65	0	0	0	115	0	0	0	0	0	0	0	0	0	0
Civil and Track Work	545	409	0	0	158	179	99	63	46	0	0	0	0	0	0	0	0	0	0
Electric Facility	690	1,105	0	0	0	125	500	19	45	0	0	0	0	0	0	0	0	0	0
Building and Depot	275	206	0	0	31	65	121	29	29	0	0	0	0	0	0	0	0	0	0
Rolling Stock	1,553	1,930	0	0	0	225	150	707	471	0	0	0	0	0	0	0	0	0	0
O&M	778	2,328	0	0	0	0	0	14	14	75	75	75	75	75	75	75	75	75	77
Sub-total	4,021	5,976	0	0	254	594	870	948	605	75	75	75	75	75	75	75	75	75	77
2) Station Square																			
Land & Compensation	74	74	0	0	0	0	3	3	0	0	0	0	0	0	22	22	22	22	4
Investment Cost	24	24	0	0	0	0	0	6	6	0	0	0	0	0	4	4	4	4	4
O&M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	98	98	0	0	0	0	3	10	6	0	0	0	0	0	22	26	26	26	4
3) Access Road																			
Land & Compensation	684	684	120	120	120	120	120	120	0	0	0	0	0	0	68	68	68	68	0
Civil Work	283	283	0	0	59	59	59	59	59	0	0	0	0	0	35	35	35	35	35
O&M	29	119	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	4
Sub-total	996	1,086	0	0	120	120	179	179	60	2	2	2	2	2	71	106	107	107	39
<b>Total Financial Cost</b>																			
Land & Compensation	938	758	0	0	185	120	123	238	0	0	0	0	0	0	91	91	91	91	0
Construction Cost	3,370	3,958	0	0	189	594	929	884	657	0	0	0	0	0	0	0	39	39	39
O&M	807	2,444	0	0	0	0	0	14	15	77	77	77	77	77	77	77	77	78	79
Total (Financial Cost)	5,115	7,160	0	0	373	713	1,052	1,136	672	77	77	77	77	77	168	207	208	208	118
SCF																			
1) Serpong Line Double Tracking																			
Land & Compensation	126	0	0	0	46	0	0	0	81	0	0	0	0	0	0	0	0	0	0
Civil and Track Work	463	347	0	0	134	152	84	54	39	0	0	0	0	0	0	0	0	0	0
Electric Facility	552	884	0	0	0	100	400	16	36	0	0	0	0	0	0	0	0	0	0
Building and Depot	234	176	0	0	26	55	103	25	25	0	0	0	0	0	0	0	0	0	0
Rolling Stock	1,242	1,544	0	0	0	180	120	566	377	0	0	0	0	0	0	0	0	0	0
O&M	661	1,977	0	0	0	0	0	12	12	64	64	64	64	64	64	64	64	64	66
Sub-total	3,279	4,928	0	0	206	487	707	752	489	64	64	64	64	64	64	64	64	64	66
2) Station Square																			
Land & Compensation	52	52	0	0	0	0	2	2	0	0	0	0	0	0	16	16	16	16	0
Investment Cost	19	19	0	0	0	0	0	5	5	0	0	0	0	0	0	0	3	3	3
O&M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	71	71	0	0	0	0	2	7	5	0	0	0	0	0	16	19	19	19	3
3) Access Road																			
Land & Compensation	479	479	0	0	84	84	84	84	84	0	0	0	0	0	48	48	48	48	0
Civil Work	241	241	0	0	0	0	50	50	50	0	0	0	0	0	0	30	30	30	30
O&M	25	101	0	0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	3
Sub-total	744	820	0	0	84	84	134	134	51	2	2	2	2	2	50	80	80	80	33
<b>Total Economic Cost</b>																			
Land & Compensation	657	531	0	0	129	84	86	167	0	0	0	0	0	0	64	64	64	64	0
Construction Cost	2,751	3,211	0	0	160	487	757	715	532	0	0	0	0	0	0	0	33	33	33
O&M	686	2,078	0	0	0	0	0	12	13	66	66	66	66	66	66	66	66	66	67
Total (Economic Cost)	4,094	5,820	0	0	290	571	843	894	545	66	66	66	66	66	129	162	163	163	100
<b>Discounted total costs</b>																			
		2,348	0	0	231	406	536	507	276	30	26	24	21	19	33	37	33	33	18

**Appendix 5 (2): Economic Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
<b>1. Costs (billion rupiahs)</b>																					
1) Serpong Line Double Tracking																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-180
Civil and Track Work	0	0	0	0	0	0	125	500	19	45	0	0	0	0	0	0	0	0	0	0	-136
Electric Facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-275
Building and Depot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-69
Rolling Stock	0	0	0	0	0	0	0	0	0	0	0	225	150	707	471	0	0	0	0	0	-1,175
O&M	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Sub-total	77	77	77	77	77	77	203	578	97	123	77	302	227	785	549	77	77	77	77	77	-1,758
2) Station Square																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investment Cost																					
O&M																					
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3) Access Road																					
Land & Compensation	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Civil Work	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
O&M																					
Sub-total	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
<b>Total Financial Cost</b>																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-180
Construction Cost	0	0	0	0	0	0	125	500	19	45	0	225	150	707	471	0	0	0	0	0	-1,655
O&M	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
Total (Financial Cost)	82	82	82	82	82	82	207	582	101	127	82	306	232	789	553	82	82	82	82	82	-1,753
SCF																					
1) Serpong Line Double Tracking																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-126
Civil and Track Work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-116
Electric Facility	0	0	0	0	0	0	100	400	16	36	0	0	0	0	0	0	0	0	0	0	-220
Building and Depot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-59
Rolling Stock	0	0	0	0	0	0	0	0	0	0	0	180	120	566	377	0	0	0	0	0	-940
O&M	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Sub-total	66	66	66	66	66	66	166	466	81	102	66	245	186	632	443	66	66	66	66	66	-1,395
2) Station Square																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investment Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O&M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3) Access Road																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Civil Work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O&M	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Sub-total	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
<b>Total Economic Cost</b>																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-126
Construction Cost	0	0	0	0	0	0	100	400	16	36	0	180	120	566	377	0	0	0	0	0	-1,334
O&M	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Total (Economic Cost)	70	70	70	70	70	70	170	470	85	106	70	249	189	635	447	70	70	70	70	70	-1,391
<b>Discounted total costs</b>	10	9	8	7	6	6	13	31	5	6	3	10	7	21	13	2	2	1	1	1	-24

Appendix 5 (3): Economic Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development

	Total 2004-2020	Total 2004-2040	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>2. VOC and TTC (billion rupiahs)</b>																			
<b>1) New 4b</b>																			
VOC H	237,605	704,340	7,601	8,228	8,944	9,760	10,232	10,847	11,540	12,251	13,040	13,914	14,883	15,956	17,145	18,463	19,923	21,542	23,337
VOC M	256,342	600,842	12,434	12,884	13,380	13,919	13,794	14,260	15,009	15,147	15,301	15,473	15,664	15,873	16,101	16,350	16,619	16,911	17,225
VOC L	16,483	20,856	2,501	2,218	1,971	1,755	1,383	1,124	949	816	702	605	522	450	389	337	291	252	219
Sub-total	510,430	1,326,038	22,537	23,330	24,294	25,433	25,409	26,231	27,498	28,214	29,043	29,992	31,068	32,279	33,635	35,149	36,834	38,705	40,780
TTC H	148,908	707,006	3,316	3,671	4,079	4,531	4,726	5,322	6,183	6,882	7,651	8,511	9,472	10,547	11,751	13,101	14,615	16,315	18,226
TTC M	152,627	470,656	7,125	7,318	7,529	7,753	7,598	8,141	9,221	9,302	9,391	9,486	9,590	9,701	9,821	9,949	10,085	10,231	10,386
TTC L	6,699	9,833	1,044	897	771	663	534	441	378	331	290	254	223	196	172	151	133	116	102
Sub-total	308,234	1,187,495	11,486	11,886	12,379	12,947	12,859	13,905	15,792	16,515	17,332	18,252	19,285	20,444	21,743	23,200	24,832	26,662	28,715
Total	818,664	2,513,533	34,023	35,216	36,673	38,380	38,267	40,135	43,290	44,729	46,375	48,244	50,353	52,723	55,379	58,349	61,666	65,367	69,495
<b>2) Without Serpong Line</b>																			
VOC H	245,311	748,272	7,601	8,228	8,944	9,760	10,232	10,857	11,555	12,340	13,216	14,197	15,292	16,515	17,881	19,408	21,113	23,018	25,148
VOC M	257,620	606,843	12,434	12,884	13,380	13,919	13,805	14,276	15,029	15,180	15,349	15,538	15,747	15,977	16,228	16,500	16,796	17,116	17,461
VOC L	16,512	20,919	2,501	2,218	1,971	1,755	1,385	1,127	961	818	705	607	524	453	391	338	293	254	220
Sub-total	519,443	1,376,035	22,537	23,330	24,294	25,433	25,429	26,261	27,535	28,337	29,270	30,342	31,563	32,944	34,500	36,247	38,202	40,389	42,830
TTC H	147,413	692,905	3,316	3,671	4,079	4,531	4,735	5,336	6,214	6,886	7,636	8,471	9,404	10,445	11,609	12,909	14,364	15,992	17,815
TTC M	153,361	475,437	7,125	7,318	7,529	7,753	7,608	8,153	9,232	9,322	9,419	9,525	9,639	9,761	9,893	10,034	10,185	10,346	10,518
TTC L	6,707	9,862	1,044	897	771	663	535	442	379	332	291	255	224	196	173	152	133	117	103
Sub-total	307,481	1,178,205	11,486	11,886	12,379	12,947	12,878	13,931	15,825	16,540	17,346	18,251	19,267	20,403	21,674	23,095	24,682	26,455	28,436
Total	826,924	2,554,240	34,023	35,216	36,673	38,380	38,307	40,192	43,360	44,877	46,616	48,594	50,829	53,347	56,174	59,341	62,884	66,844	71,266
<b>3. Benefits (billion rupiahs)</b>																			
<b>1) VOC Savings</b>																			
1) VOC Savings	9,013	49,997	0	0	0	0	20	30	37	124	227	350	495	665	865	1,098	1,369	1,684	2,049
2) Travel Cost Savings	-753	-9,291	0	0	0	0	19	26	33	25	14	-0	-18	-41	-69	-105	-150	-207	-279
Total benefits	8,260	40,706	0	0	0	0	39	56	70	148	241	350	477	625	795	992	1,218	1,477	1,770
<b>Discounted benefits</b>																			
1) VOC Savings	4,566	23,953	0	0	0	0	13	17	19	56	92	126	159	191	222	252	280	308	334
2) Travel Cost Savings	-567	-7,291	0	0	0	0	12	15	17	11	6	-0	-6	-12	-18	-24	-31	-38	-45
Total benefits	3,999	16,662	0	0	0	0	25	32	36	67	97	126	154	180	204	227	249	270	289
<b>Saved Cost of Existing Serpong Line</b>																			
<b>1) Procurement cost of rolling stock</b>																			
1) Procurement cost of rolling stock	468	510	0	0	0	0	112	0	131	0	0	0	75	0	75	0	0	0	75
2) OM Cost	347	977	0	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32
Total benefits	814	1,487	0	0	0	0	112	0	163	32	32	32	106	32	106	32	32	32	106
<b>Discounted benefits</b>																			
<b>1) Procurement cost of rolling stock</b>																			
1) Procurement cost of rolling stock	278	278	0	0	0	0	71	0	66	0	0	0	24	0	19	0	0	0	12
<b>2) OM Cost</b>																			
2) OM Cost	255	977	0	0	0	0	0	0	16	14	13	11	10	9	8	7	6	6	5
Total benefits	343	1,254	0	0	0	0	71	0	82	14	13	11	34	9	27	7	6	6	17
<b>4. Net Benefits (billion rupiahs)</b>																			
<b>Net Benefits (economic prices)</b>																			
Net Benefits (economic prices)	36,374	1,993	0	0	-290	-571	-692	-837	-312	114	207	316	518	590	773	862	1,087	1,408	1,807
<b>Net Benefits (discounted at 12 %)</b>																			
Net Benefits (discounted at 12 %)	1,993	1,993	0	0	-231	-406	-439	-475	-168	52	84	114	167	170	198	197	222	257	295
<b>Accumulated Net Benefits (discounted at 12 %)</b>																			
Accumulated Net Benefits (discounted at 12 %)			0	0	-231	-637	-1,077	-1,552	-1,710	-1,688	-1,575	-1,461	-1,294	-1,125	-926	-729	-506	-249	-46
<b>NPV</b>																			
<b>EIRR</b>																			
<b>12% (discount rate)</b>																			
<b>18.9%</b>																			
<b>1,993 billion rupiahs</b>																			

**Appendix 5 (4): Economic Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
<b>2. VOC and TTC (billion rupiahs)</b>																				
1) New 4b																				
VOC H	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337
VOC M	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225
VOC L	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
Sub-total	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780
TTC H	18,937	19,676	20,443	21,240	22,069	22,929	23,824	24,753	25,718	26,721	27,763	28,846	29,971	31,140	32,354	33,616	34,927	36,289	37,705	39,175
TTC M	10,791	11,212	11,649	12,104	12,576	13,066	13,576	14,105	14,655	15,227	15,821	16,438	17,079	17,745	18,437	19,156	19,903	20,679	21,486	22,324
TTC L	106	110	115	119	124	129	134	139	144	150	156	162	168	175	182	189	196	204	212	220
Sub-total	29,835	30,998	32,207	33,463	34,768	36,124	37,533	38,997	40,518	42,098	43,740	45,446	47,218	49,060	50,973	52,961	55,027	57,173	59,402	61,719
Total	70,615	71,779	72,988	74,244	75,549	76,905	78,314	79,777	81,298	82,879	84,520	86,226	87,999	89,840	91,753	93,741	95,807	97,953	100,183	102,499
<b>2) Without Serpong Line</b>																				
VOC H	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148	25,148
VOC M	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461	17,461
VOC L	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Sub-total	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830	42,830
TTC H	18,509	19,231	19,981	20,761	21,570	22,412	23,286	24,194	25,137	26,118	27,136	28,195	29,294	30,437	31,624	32,857	34,138	35,470	36,853	38,290
TTC M	10,929	11,355	11,798	12,258	12,736	13,233	13,749	14,285	14,842	15,421	16,022	16,647	17,296	17,971	18,672	19,400	20,156	20,943	21,759	22,608
TTC L	107	111	116	120	125	130	135	140	145	151	157	163	169	176	183	190	197	205	213	221
Sub-total	29,545	30,697	31,895	33,138	34,431	35,774	37,169	38,618	40,125	41,689	43,315	45,005	46,760	48,583	50,478	52,447	54,492	56,617	58,825	61,120
Total	72,375	73,527	74,724	75,968	77,260	78,603	79,998	81,448	82,954	84,519	86,145	87,834	89,589	91,413	93,308	95,276	97,322	99,447	101,655	103,949
<b>3. Benefits (billion rupiahs)</b>																				
1) VOC Savings																				
	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049	2,049
2) Travel Cost Savings																				
	-290	-301	-313	-325	-338	-351	-364	-379	-393	-409	-425	-441	-458	-476	-495	-514	-534	-555	-577	-599
Total benefits	1,760	1,748	1,736	1,724	1,712	1,698	1,685	1,671	1,656	1,640	1,625	1,608	1,591	1,573	1,554	1,535	1,515	1,494	1,472	1,450
<b>Discounted benefits</b>																				
DR																				
1) VOC Savings	298	266	238	212	190	169	151	135	121	108	96	86	77	68	61	55	49	43	39	35
2) Travel Cost Savings	-42	-39	-36	-34	-31	-29	-27	-25	-23	-21	-20	-18	-17	-16	-15	-14	-13	-12	-11	-10
Total benefits	256	227	202	179	158	140	124	110	97	86	76	67	59	52	46	41	36	32	28	25
<b>Saved Cost of Existing Serpong Line</b>																				
1) Procurement cost of rolling stock																				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) OM Cost																				
	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Total benefits	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
<b>Discounted benefits</b>																				
DR																				
1) Procurement cost of rolling stock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) OM Cost	5	4	4	4	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1
Total benefits	5	4	4	4	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1
<b>4. Net Benefits (billion rupiahs)</b>																				
Net Benefits (economic prices)																				
	1,721	1,710	1,698	1,686	1,674	1,660	1,547	1,232	1,602	1,566	1,586	1,390	1,545	969	1,270	1,497	1,477	1,456	1,509	2,597
Net Benefits (discounted at 12%)																				
	251	222	197	175	155	137	114	81	94	82	74	58	58	32	38	40	35	31	29	44
Accumulated Net Benefits (discounted at 12%)																				
	296	519	716	891	1,046	1,183	1,298	1,378	1,472	1,555	1,629	1,687	1,745	1,777	1,815	1,855	1,890	1,921	1,950	1,993

**Appendix 6 (1): Financial Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

Assumptions	Tariff (Case 3): Flag Fall= Rp. 1.000 Distance Portion= Rp.200/km		Cost Burden by PT. KA																		
	2004-20	2004-2040	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
<b>1. Project Cost (Rp. billion)</b>																					
<b>(1) Capital Cost</b>																					
1) Land Procurement :	180	180	65	0	0	0	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) Construction cost	130	130	69	40	15	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
<1> Civil Works	205	205	54	68	14	44	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
<2> Bridge Works	92	92	0	33	49	2	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
<3> Track Works	540	865	0	98	392	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
<4> Electric Facilities	166	166	24	36	60	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
<5> Station Building and Station Plaza	50	50	0	15	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<6> Construction of Stabling Yard	1,294	1,673	0	187	125	589	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393
<7.1> Rolling Stock	0	315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<7.2> Rolling Stock (Replacement)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<1>: SUB TOTAL : <1> ~ <7>	2,477	3,495	148	476	689	677	487	487	487	487	487	487	487	487	487	487	487	487	487	487	487
<II> Physical Contingency : <1> x 10 %	248	350	15	48	69	68	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
<III> Consulting Cost : (<1> + <II>) x 7 %; Excluding Rolling Stock Cost	91	116	11	22	43	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
<IV> VAT : <1> x 10 %	248	350	15	48	69	68	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
Total Construction Cost : (<1>+<II>+<III>+<IV>)	3,063	4,311	189	594	870	819	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592
<b>Total Capital Cost (Land, Construction &amp; Rolling Stock)</b>	<b>3,243</b>	<b>4,491</b>	<b>254</b>	<b>594</b>	<b>870</b>	<b>934</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>	<b>592</b>
<b>(2) OM Cost</b>																					
1) Serpong - Tanah Abang	164	455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) Palmerah - Manggarai	614	1,902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>778</b>	<b>2,357</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2. Financial Analysis of PT. KA</b>																					
<b>(1) Capital Cost Burden by PT. KA</b>																					
1) Land Procurement :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) Construction cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<1> Civil Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<2> Bridge Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<3> Track Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<4> Electric Facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<5> Station Building and Station Plaza	166	166	24	36	60	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
<6> Construction of Stabling Yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<7> Rolling Stock	1,294	1,988	0	187	125	589	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393
<1>: SUB TOTAL : <1> ~ <7>	1,460	2,154	24	223	185	612	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416
<II> Physical Contingency : <1> x 10 %	146	216	2	22	19	61	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
<III> Consulting Cost : (<1> + <II>) x 7 %; Excluding Rolling Stock Cost	13	13	2	3	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
<IV> VAT : <1> x 10 %	146	216	2	22	19	61	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Total Construction Cost : (<1>+<II>+<III>+<IV>)	1,765	2,598	31	271	226	737	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501
<b>Total Capital Cost Burden by PT. KA</b>	<b>1,765</b>	<b>2,598</b>	<b>31</b>	<b>271</b>	<b>226</b>	<b>737</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>501</b>
<b>(2) OM Cost</b>																					
Serpong - Tanah Abang	164	455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmerah - Manggarai	614	1,902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total OM Cost Burden by PT. KA</b>	<b>778</b>	<b>2,357</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Appendix 6 (2): Financial Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
<b>T. Project Cost (Rp. billion)</b>																				
<b>(1) Capital Cost</b>																				
<b>1) Land Procurement :</b>																				
< 1 > Civil Works																				
< 2 > Bridge Works																				
< 3 > Track Works																				
< 4 > Electric Facilities																				
< 5 > Station Building and Station Plaza																				
< 6 > Construction of Stabling Yard																				
< 7-1 > Rolling Stock																				
< 7-2 > Rolling Stock (Replacement)																				
< I > : SUB TOTAL : < I > ~ < I >	125	125	125	125	125	125	125	125	125	125	125	187	125	589	125	393	0	0	0	0
< II > Physical Contingency : < II > x 10 %																				
< III > Consulting Cost : (< I > + < II >) x 7 %; Excluding Rolling Stock Cost	13	0	13	0	13	10	8	10	52	2	4	13	19	59	52	0	0	0	0	0
< IV > VAT : (< I > x 10 %	13	0	13	0	13	10	52	2	4	13	19	13	59	52	0	0	0	0	0	0
Total Construction Cost : (< I > + < II > + < III > + < IV >)	150	0	150	0	150	125	650	19	45	150	225	150	707	621	0	0	0	0	0	-1,893
<b>Total Capital Cost (Land, Construction &amp; Rolling Stock)</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>125</b>	<b>650</b>	<b>19</b>	<b>45</b>	<b>150</b>	<b>225</b>	<b>150</b>	<b>707</b>	<b>621</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-1,893</b>
<b>(2) OM Cost</b>																				
1) Serpong - Tanah Abang	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
2) Palmerah - Manggarai	63	63	63	63	63	63	63	63	63	66	66	66	66	66	66	66	66	66	66	67
<b>Total</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>83</b>
<b>2. Financial Analysis of PT. KA</b>																				
<b>(1) Capital Cost Burden by PT. KA</b>																				
<b>1) Land Procurement :</b>																				
< 1 > Civil Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 2 > Bridge Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 3 > Track Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 4 > Electric Facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 5 > Station Building and Station Plaza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 6 > Construction of Stabling Yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< 7 > Rolling Stock	125	0	125	0	125	0	125	0	125	0	125	187	125	589	125	518	0	0	0	-1,348
< I > : SUB TOTAL : < I > ~ < I >	125	0	125	0	125	0	125	0	125	0	125	187	125	589	125	518	0	0	0	-1,348
< II > Physical Contingency : < II > x 10 %	13	0	13	0	13	0	13	0	13	0	13	19	13	59	52	0	0	0	0	-135
< III > Consulting Cost : (< I > + < II >) x 7 %; Excluding Rolling Stock Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
< IV > VAT : (< I > x 10 %	13	0	13	0	13	0	13	0	13	0	13	19	13	59	52	0	0	0	0	-135
Total Construction Cost : (< I > + < II > + < III > + < IV >)	150	0	150	0	150	0	150	0	150	0	150	225	150	707	621	0	0	0	0	-1,618
<b>Total Capital Cost Burden by PT. KA</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>0</b>	<b>150</b>	<b>225</b>	<b>150</b>	<b>707</b>	<b>621</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-1,618</b>
<b>(2) OM Cost</b>																				
Serpong - Tanah Abang	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Palmerah - Manggarai	63	63	63	63	63	63	63	63	63	66	66	66	66	66	66	66	66	66	66	67
<b>Total OM Cost Burden by PT. KA</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>83</b>



**Appendix 6 (3): Financial Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	Annual growth rate		Year																	
	2010-20	Total	2004-20	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>(3) Number of Passenger</b>																				
1) Total Geton (Passenger per day)																				
Serpong	3.8%									10,562										15,383
Rawa Buntu	3.6%									24,790										35,394
Ciater	3.0%									3,099										4,424
Sudimara	3.0%									15,197										20,367
Jurangmangu	3.0%									16,245										21,771
Pd. Ranji	3.0%									7,861										10,535
Bintaro	3.0%									6,288										8,428
Pd. Belung	3.0%									6,812										9,130
Kebyorarang	2.3%									22,233										27,943
Limo	2.3%									10,227										12,854
Pal Merah	2.3%									12,006										15,069
Karet	2.3%									7,882										9,939
Sudirman	2.3%									49,262										62,122
Rasuna	2.3%									24,631										31,061
Manpanng	2.1%									2,030										2,501
Manggarai	2.1%																			
<b>Total</b>	<b>2.7%</b>									<b>219,125</b>										<b>286,941</b>
2) Total Section Volume (Passenger per day)																				
Serpong	2.9%									45,413										60,352
Rawa Buntu	3.1%									92,223										125,635
Ciater	3.1%									96,142										131,014
Sudimara	2.5%									104,124										132,843
Jurangmangu	2.8%									118,103										155,298
Pd. Ranji	2.5%									120,103										153,387
Bintaro	2.1%									127,592										166,590
Pd. Belung	2.1%									130,954										161,096
Kebyorarang	2.1%									144,065										177,574
Limo	2.1%									143,627										177,024
Pal Merah	0.5%									164,185										172,908
Karet	0.6%									168,613										183,229
Sudirman	1.5%									221,684										256,896
Rasuna	2.2%									249,985										310,023
Manpanng	2.2%									247,897										308,617
Manggarai	2.2%																			2,662,486
<b>Total</b>										<b>2,662,486</b>										<b>1,24</b>
<b>(4) Passenger Revenue (Rp. billion per year)</b>																				
1) Flag Fall	1,000 Rp.									80	82	84	87	88	92	94	97	99	102	105
2) Distant Portion	200 Rp./ km									266	271	277	283	288	295	301	307	314	320	327
<b>Total Passenger Revenue</b>										<b>346</b>	<b>353</b>	<b>361</b>	<b>369</b>	<b>378</b>	<b>386</b>	<b>395</b>	<b>404</b>	<b>413</b>	<b>422</b>	<b>432</b>
3) Breakdown of Distant Portion Revenue																				
Serpong	Distance (km)	59	228							5	5	5	5	5	5	6	6	6	6	6
Rawa Buntu	1,404	180	716							14	14	15	15	16	16	17	17	17	18	19
Ciater	2,077	225	892							17	18	19	19	20	20	21	22	22	23	24
Sudimara	2,481	189	692							15	16	16	16	17	17	18	18	18	19	19
Jurangmangu	1,991	244	926							19	20	20	21	21	22	23	23	24	25	25
Pd. Ranji	2,231	177	651							14	15	15	15	16	16	16	17	17	18	18
Bintaro	1,620	185	649							15	15	16	16	16	17	17	17	18	18	19
Pd. Belung	1,625	347	1,222							28	29	30	30	31	32	32	33	34	34	35
Kebyorarang	2,972	180	634							15	15	15	16	16	16	17	17	17	18	18
Limo	1,396	299	1,053							24	25	25	26	27	27	28	28	29	29	30
Pal Merah	2,327	358	1,063							32	32	32	32	33	33	33	33	33	33	33
Karet	2,644	122	373							11	11	11	11	11	11	11	11	11	11	12
Sudirman	0,861	112	370							9	10	10	10	10	10	10	10	11	11	11
Rasuna	0,586	263	933							22	22	22	23	23	24	24	25	25	26	27
Manpanng	1,172	309	1,104							25	26	26	27	27	28	29	29	30	31	31
Manggarai	1,390	3,248	11,506							266	271	277	283	288	295	301	307	314	320	327
<b>Total</b>										<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>
<b>(5) Net Revenue</b>																				
1) Flag Fall	1,000 Rp.									80	82	84	87	88	92	94	97	99	102	105
2) Distant Portion	200 Rp./ km									266	271	277	283	288	295	301	307	314	320	327
<b>Total Passenger Revenue</b>										<b>346</b>	<b>353</b>	<b>361</b>	<b>369</b>	<b>378</b>	<b>386</b>	<b>395</b>	<b>404</b>	<b>413</b>	<b>422</b>	<b>432</b>
3) Breakdown of Distant Portion Revenue																				
Serpong	Distance (km)	59	228							5	5	5	5	5	5	6	6	6	6	6
Rawa Buntu	1,404	180	716							14	14	15	15	16	16	17	17	17	18	19
Ciater	2,077	225	892							17	18	19	19	20	20	21	22	22	23	24
Sudimara	2,481	189	692							15	16	16	16	17	17	18	18	18	19	19
Jurangmangu	1,991	244	926							19	20	20	21	21	22	23	23	24	25	25
Pd. Ranji	2,231	177	651							14	15	15	15	16	16	16	17	17	18	18
Bintaro	1,620	185	649							15	15	16	16	16	17	17	17	18	18	19
Pd. Belung	1,625	347	1,222							28	29	30	30	31	32	32	33	34	34	35
Kebyorarang	2,972	180	634							15	15	15	16	16	16	17	17	17	18	18
Limo	1,396	299	1,053							24	25	25	26	27	27	28	28	29	29	30
Pal Merah	2,327	358	1,063							32	32	32	32	33	33	33	33	33	33	33
Karet	2,644	122	373							11	11	11	11	11	11	11	11	11	11	12
Sudirman	0,861	112	370							9	10	10	10	10	10	10	10	11	11	11
Rasuna	0,586	263	933							22	22	22	23	23	24	24	25	25	26	27
Manpanng	1,172	309	1,104							25	26	26	27	27	28	29	29	30	31	31
Manggarai	1,390	3,248	11,506							266	271	277	283	288	295	301	307	314	320	327
<b>Total</b>										<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>	<b>1,010</b>
<b>(6) Net Revenue</b>																				
1) Flag Fall	1,000 Rp.									80	82	84	87	88	92	94	97	99	102	

**Appendix 6 (4): Financial Analysis of Serpong Line Double Tracking, Access Improvement and Integrated Land Development**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Annual growth rate																				
2010-20																				
<b>(3) Number of Passenger</b>																				
1) Total Get-on (Passenger per day)																				
Serpong																				
RawaBuntu																				
Ciater																				
Sudimara																				
Jurangmangu																				
Pd. Ranji																				
Bintaro																				
Pd. Belung																				
Kebayorng																				
Limo																				
Pal Merah																				
Karet																				
Sudirman																				
Rasuna																				
Manpanng																				
Manggarai																				
<b>Total</b>																				
2) Total Section Volume (Passenger per day)																				
Serpong																				
RawaBuntu																				
Ciater																				
Sudimara																				
Jurangmangu																				
Pd. Ranji																				
Bintaro																				
Pd. Belung																				
Kebayorng																				
Limo																				
Pal Merah																				
Karet																				
Sudirman																				
Rasuna																				
Manpanng																				
Manggarai																				
<b>Total</b>																				
<b>(4) Passenger Revenue (Rp. billion per year)</b>																				
1) Flag Fall	108	111	114	117	120	123	126	130	133	137	141	145	149	153	157	161	166	170	175	180
2) Distant Portion	334	341	349	356	364	372	380	388	396	405	414	423	432	442	451	461	472	482	493	504
<b>Total PassengerRevenue</b>	<b>442</b>	<b>452</b>	<b>462</b>	<b>473</b>	<b>484</b>	<b>495</b>	<b>506</b>	<b>518</b>	<b>530</b>	<b>542</b>	<b>555</b>	<b>568</b>	<b>581</b>	<b>594</b>	<b>608</b>	<b>623</b>	<b>637</b>	<b>652</b>	<b>668</b>	<b>683</b>
<b>(5) Breakdown of Distant Portion Revenue</b>																				
Serpong	6	7	7	7	7	7	8	8	8	8	8	8	9	9	9	10	10	10	11	11
Rawa Buntu	20	20	21	22	22	23	24	24	25	26	27	28	28	29	30	31	32	33	34	35
Ciater	24	25	26	27	28	29	29	30	31	32	33	34	35	35	37	38	39	40	41	43
Sudimara	20	20	21	21	22	22	23	23	24	25	25	26	27	27	28	29	29	30	31	31
Jurangmangu	26	27	27	28	29	30	31	31	32	33	34	35	36	37	38	39	40	41	43	44
Pd. Ranji	19	19	20	20	20	21	22	22	23	23	24	24	25	26	27	27	28	29	30	30
Bintaro	19	19	20	20	20	21	21	22	22	23	23	24	24	25	26	27	28	29	30	30
Pd. Belung	19	19	20	20	20	21	21	22	22	23	23	24	24	25	26	27	28	29	30	30
Kebayorng	36	36	37	38	39	40	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Limo	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	27	27	27
Pal Merah	31	31	32	33	33	34	35	36	37	38	38	39	39	40	41	42	43	44	45	46
Karet	34	34	34	34	34	34	35	35	35	35	36	36	36	36	36	37	37	37	37	37
Sudirman	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	13	13	14	14	15
Rasuna	11	11	11	12	12	12	12	12	13	13	13	13	13	14	14	14	14	14	15	15
Manpanng	27	28	28	29	30	30	31	32	32	33	34	34	35	36	37	38	39	40	41	41
Manggarai	32	33	33	33	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	49
<b>Total</b>	<b>334</b>	<b>341</b>	<b>349</b>	<b>356</b>	<b>364</b>	<b>372</b>	<b>380</b>	<b>388</b>	<b>396</b>	<b>405</b>	<b>414</b>	<b>423</b>	<b>432</b>	<b>442</b>	<b>451</b>	<b>461</b>	<b>472</b>	<b>482</b>	<b>493</b>	<b>504</b>
<b>(5) Net Revenue</b>																				
	215	374	235	395	406	268	429	291	452	462	325	263	351	-193	-93	543	557	572	568	2,219



**Appendix 7 (2): Economic Analysis of 2nd JORR**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
<b>1. Costs (billion rupiahs)</b>																					
1) Total Financial Cost																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,061
Construction Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,498
O&M	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Total (Financial Cost)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-4,459
2) Total Economic Cost																					
Land & Compensation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,236
Construction Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,099
O&M	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Total (Economic Cost)	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	-3,250
3) Discounted total costs	12	11	10	9	8	7	6	6	6	5	4	4	4	3	3	2	2	2	2	2	-55
<b>2. VOC and TTC (billion rupiahs)</b>																					
1) New 4b																					
VOC H	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337	23,337
VOC M	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225	17,225
VOC L	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
Sub-total	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780	40,780
TTC H	18,937	19,676	20,443	21,240	22,069	22,929	23,824	24,753	25,718	26,721	27,763	28,846	29,971	31,140	32,354	33,616	34,927	36,289	37,705	39,175	
TTC M	10,791	11,212	11,649	12,104	12,576	13,066	13,576	14,105	14,655	15,227	15,821	16,438	17,079	17,745	18,437	19,156	19,903	20,679	21,486	22,324	
TTC L	106	110	115	119	124	129	134	139	144	150	156	162	168	175	182	189	196	204	212	220	
Sub-total	29,835	30,998	32,207	33,463	34,768	36,124	37,533	38,997	40,518	42,098	43,740	45,446	47,218	49,060	50,973	52,961	55,027	57,173	59,402	61,719	
Total	70,615	71,779	72,988	74,244	75,549	76,905	78,314	79,777	81,298	82,879	84,520	86,226	87,999	89,840	91,753	93,741	95,807	97,953	100,183	102,499	
2) Without 2nd JORR																					
VOC H	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692	23,692
VOC M	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301	17,301
VOC L	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Sub-total	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213	41,213
TTC H	19,310	20,063	20,845	21,658	22,503	23,381	24,293	25,240	26,224	27,247	28,310	29,414	30,561	31,753	32,991	34,278	35,615	37,004	38,447	39,946	
TTC M	10,851	11,274	11,714	12,171	12,646	13,139	13,651	14,184	14,737	15,311	15,909	16,529	17,174	17,843	18,539	19,262	20,014	20,794	21,605	22,448	
TTC L	107	111	116	120	125	130	135	140	146	151	157	163	170	176	183	190	198	206	214	222	
Sub-total	30,268	31,449	32,675	33,950	35,274	36,649	38,079	39,564	41,107	42,710	44,376	46,106	47,904	49,773	51,714	53,731	55,826	58,003	60,265	62,616	
Total	71,481	72,662	73,888	75,162	76,486	77,862	79,291	80,776	82,319	83,923	85,588	87,319	89,117	90,985	92,926	94,943	97,039	99,216	101,478	103,829	
3. Benefits (billion rupiahs)																					
1) VOC Savings	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432
2) Travel Cost Savings	433	450	468	486	505	525	545	567	589	612	636	660	686	713	741	770	800	831	863	897	
Total benefits	866	883	900	919	938	957	978	999	1,021	1,044	1,068	1,093	1,118	1,145	1,173	1,202	1,232	1,263	1,296	1,329	
Discounted benefits																					
1) VOC Savings	63	56	50	45	40	36	32	28	25	23	20	18	16	14	13	12	10	9	8	7	
2) Travel Cost Savings	63	59	54	50	47	43	40	37	35	32	30	28	26	24	22	20	19	18	16	15	
Total benefits	126	115	105	95	87	79	72	66	60	55	50	46	42	38	35	32	29	27	25	22	
4. Net Benefits (billion rupiahs)																					
Net Benefits (economic prices)	781	798	815	834	853	872	893	914	936	959	983	1,008	1,034	1,060	1,088	1,117	1,147	1,178	1,211	1,248	4,579
Net Benefits (discounted at 12%)	114	104	95	86	79	72	66	60	55	50	46	42	39	35	32	30	27	25	23	21	77
Accumulated Net Benefits (discounted at 12%)	-449	-345	-251	-164	-85	-13	53	113	168	218	264	307	345	381	413	443	470	495	518	548	595



**Appendix 8 (2): Financial Analysis of 2nd JORR**

		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
<b>1. Cost Schedule (Rp. Billion)</b>																											
	Toll	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Section 1	0	40	0	37	0	29	0	0	0	0	7	58	0	10	0	0	0	0	0	0	0	0	0	0	0	0
	I	0	12	0	11	0	9	0	0	0	0	2	18	0	3	0	0	0	0	0	0	0	9	0	0	0	0
	Section 14	0	52	0	48	0	38	0	0	0	0	9	76	0	13	0	0	0	0	0	0	0	38	0	0	0	0
	Total capital cost	0	52	0	48	0	38	0	0	0	0	9	76	0	13	0	0	0	0	0	0	0	38	0	0	0	0
	Annual O&M cost	61	61	63	63	63	63	64	64	64	64	64	64	66	66	66	66	66	66	66	66	66	66	67	67	67	67
<b>2. Traffic</b>																											
<b>1) PCU per day (2 directions)</b>																											
	Toll	23,344	24,512	25,737	27,024	28,375	29,794	31,284	32,848	34,490	36,215	38,026	39,927	41,923	44,019	46,220	48,531	50,958	53,506	56,181	58,990	61,940	65,037	68,289	71,703	75,288	
	1	45,924	48,220	50,631	53,162	55,821	58,612	61,542	64,619	67,850	71,243	74,805	78,545	82,472	86,596	90,926	95,472	100,246	105,258	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	2	71,491	75,066	78,819	82,760	86,898	91,243	95,805	100,596	105,625	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	3	56,624	59,456	62,428	65,550	68,827	72,269	75,882	79,676	83,660	87,943	92,525	96,847	101,689	106,774	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	4	70,064	73,567	77,246	81,108	85,163	89,422	93,893	98,587	103,517	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	5	77,204	81,064	85,118	89,374	93,842	98,534	103,461	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	6	62,351	65,468	68,742	72,179	75,788	79,577	83,556	87,734	92,120	96,726	101,563	106,641	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	7	84,490	88,715	93,151	97,808	102,699	107,833	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	8	81,651	85,733	90,020	94,521	99,247	104,209	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	9	48,592	51,021	53,573	56,251	59,064	62,017	65,118	68,374	71,792	75,382	79,151	83,109	87,264	91,627	96,209	101,019	106,070	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	
	10	40,195	42,162	44,270	46,484	48,808	51,249	53,811	56,502	59,324	62,293	65,409	68,678	72,112	75,718	79,503	83,479	87,653	92,035	96,637	101,469	106,542	108,000	108,000	108,000	108,000	
	11	28,173	29,581	31,061	32,614	34,244	35,956	37,754	39,642	41,624	43,705	45,891	48,185	50,594	53,124	55,780	58,569	61,498	64,573	67,801	71,191	74,751	78,488	82,413	86,534	90,860	
	12	12,913	13,559	14,237	14,949	15,696	16,481	17,305	18,170	19,079	20,033	21,034	22,086	23,190	24,360	25,567	26,846	28,188	29,597	31,077	32,631	34,262	35,976	37,774	39,663	41,646	
	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Toll Free	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1,391	1,461	1,534	1,611	1,691	1,776	1,868	1,938	2,014	2,090	2,153	2,218	2,276	2,333	2,381	2,428	2,477	2,525	2,567	2,605	2,645	2,679	2,711	2,744	2,780	
<b>3. Annual Toll Revenue (Rp. Billion)</b>																											
	Toll revenue	2,054	2,307	2,592	2,912	3,272	3,676	4,115	4,592	5,109	5,671	6,250	6,893	7,568	8,300	9,064	9,889	10,795	11,774	12,809	13,908	15,108	16,372	17,727	19,204	20,813	
<b>4. Cost (Section 1-14)</b>																											
	Investment cost	0	52	0	48	0	38	0	0	0	0	9	76	0	13	0	0	0	0	0	0	0	38	0	0	0	
	O&M	61	61	63	63	63	63	64	64	64	64	64	64	66	66	66	66	66	66	66	66	66	66	67	67	67	
	Total	61	114	63	111	63	101	64	64	64	64	73	140	66	79	66	66	66	66	66	66	66	104	67	67	67	
<b>5. Net Revenue (Rp. Billion)</b>																											
	Total	1,992	2,194	2,530	2,802	3,209	3,575	4,051	4,528	5,044	5,598	6,110	6,827	7,489	8,234	8,998	9,823	10,729	11,707	12,743	13,842	15,004	16,305	17,661	19,137	20,746	