

4.9.8 Stabling Yard Plan

The Serpong double tracking project requires additional 166 train cars by 2020. (The number of existing ECs, 26 cars, has been deducted from the total number of train cars required for the train operation in 2020).

The existing depot is located at Bukit Duri in the Manggarai station. The location of stabling yards is planned in the Serpong station where the 120 ECs can stay and the other 46 ECs at the Rawa Buntu stabling yard.

4.9.9 Operation Plan

The current train operation is composed of 4 train cars in one set, however, it is planned that one train shall be composed by 8 train cars taking increasing future passenger demand into account. The existing ECs consist of 8 Express ECs, 4 Executive ECs, 8 Economy ECs and 6 Hiba cars. In total 26 train cars are operated on the line.

Table 4.9.6 Operation Schedule

Section	Section Distance (km)	Schedule Speed (km/h)	Schedule Operation Time
Serpong - Tanah Abang	23.4 km	30	47'
Serpong - Manggarai	26.8 km	30	54'

4.9.10 Minimum Operation Time in Peak Hour

Minimum operation time in a peak hour in 2010 and 2020 is calculated below:

Congestion Ratio:	200%
Passenger Volume /1 car:	8 x 140 passengers x 2.0 = 2,240 passengers
[2010] Train Frequency/1 peak hour:	20,000 passengers / 2,240 =9 trains
[2010] Minimum Operation Time/1 peak hour	60'/ 9 = 7'
[2020] Train Frequency/1 peak hour:	24,800 passengers / 2,240 = 11 trains
[2020] Minimum Operation Time/1 peak hour	60'/ 11 = 5.5'

The stopping stations for express train are planned at the Serpong Station, Jurang Manggu Station, Kebayoran Station and Tanah Abang Station.

The proposed train operation plan is shown in Tables 4.9.7 and 4.9.8 based on passenger demand forecast for 2010 and 2020. The composition of the railway passenger demand on the Serpong-Manggarai section and Serpong-Tanah Abang section is estimated at 20% and 80%, respectively.

Table 4.9.7 Operation Plan (in peak hour)

Year	Section	Number of Cars (Both way/ hour)	Head (Minutes)	Capacity (Both way)	Passenger Volume (Both way)
2010	Serpong – Manggarai	9	7	20,000	38,400
2020	Serpong – Manggarai	11	5.5	24,800	48,870

Table 4.9.8 Operation Plan (one day)

Year	Section	Number of Cars /day	Capacity (passengers/ day)	Passenger Volume (passenger/day)
Phase-1				
2010	Serpong - Tanah Abang	20	44,800	50,000
2020	Serpong - Tanah Abang	30	67,200	62,000
Phase-2				
2010	Serpong – Manggarai	70	156,800	200,000
2020	Serpong – Manggarai	90	201,600	248,000

4.9.11 Cost Estimation

The cost estimation for the Phase 1, “Serpong line double tracking project between Serpong and Tanah Abang,” and the Phase 2, “Short cut line improvement project between Palmerah and Manggarai,” is shown in Tables 4.9.9, respectively.

Table 4.9.9 Cost Estimation for Phase 1 & 2

Cost Item	Phase 1 (L=23.4 km)			Phase 2 (L=5.2 km)			Remarks
	F/C	L/C	Total	F/C	L/C	Total	
Civil & Track	117.3	223.6	340.9	34.0	51.9	85.9	
Electric Facilities	404.6	85.9	490.5	45.1	6.0	51.0	
Building & Depot	95.2	74.8	170.0	23.0	23.0	45.9	
Rolling Stock	280.5	31.5	312.0	884.0	98.6	982.6	40 Cars (Phase1); 126 Cars (Phase 2)
Contingency	90.1	41.7	131.8	98.6	17.9	116.5	
Consulting Service	47.6	29.8	77.4	7.7	6.0	13.6	
Land Acquisition	0	54.4	54.4	0.0	96.1	96.1	A=1.1ha (Phase 1); A=1.2 ha (Phase 2)
Compensation	0	11.1	11.1	0.0	19.6	19.6	
VAT	90.1	41.7	131.8	98.6	17.9	116.5	
Total	1,125.4	594.2	1,719.6	1,190.9	336.6	1,527.5	

Unit: Billion Rp.

Note) Rp. 8,500/US\$, Rp. 77.92 /Yen

4.9.12 Implementation Schedule

The implementation schedule of the Phase 1, “Serpong line double tracking project between Serpong and Tanah Abang,” and the Phase 2, “Short cut line improvement project between Palmerah and Manggarai,” is shown in Figure 4.9.19.

Item	2006	2007	2008	2009	2010	2011 - 2020
Land Acquisition	Phase-1			Phase-2		
Phase-1 (SRP-THB) L=23.4km						
Phase-2 (PLM – MRI) L=5.2km						
Access Road						
Station Square						

Figure 4.9.19 Implementation Schedule

4.10 SHORTCUT LINE BETWEEN THE SERPONG LINE AND THE WESTERN LINE

4.10.1 Palmerah – Karet Shortcut Section

The most important item of the Serpong double tracking project is alignment of the shortcut section between Palmerah and Karet. A curve of 300 meter radius was considered in two alternatives for the alignment; namely, Alternative-1; Elevated Track and Alternative-2; Ground Track. (Refer to Figure 4.10.1)

An elevated track on Penjernihan street (Jl. Penjernihan) can be regarded as an alternative-3. This street has three lanes for one direction, however, neither sidewalk nor median strip is provided. It seems very difficult to construct an elevated track on this street. Another difficulty is lack of space from the Serpong line to Penjernihan street since there are many buildings in this section. Therefore, alternative-3 is not adequate. (Refer to Figure 4.10.1)

4.10.2 Technical Issues

It will be separated from 1.6 km on the Serpong line to Station Karet on the Western line (Total Length L=1.0 km). The route of the shortcut alignment is planned considering two alternatives: alternative-1 is an elevated track (L=0.8km) and alternative-2 is a ground level until Karet station.

The alternative-1 needs a slope with gradient at 2.6%; therefore, the freight train and long/middle train cannot run on this track. In contrast, with the alternative-2 freight trains and long/middle distance trains can be operated in this section. However, it is necessary to

install a scissors crossing turnout, which is very risky for train operation, and it is also difficult to maintain the turnout facilities in proper manner.

In conclusion, the alternative-1 is recommended from viewpoint of railway operation safety.

4.10.3 Social Issues

A considerable number of houses are located in this section and construction of the shortcut section needs resettlement of inhabitants. Further investigation shall be conducted in the next step of the study.

Palmerah – Karet short cut section is shown in Figure 4.10.1 and Figure 4.10.2. The obstacles of the shortcut plan are some housing (about 38 houses) and the old warehouses (unused warehouse: $A=3,000m^2$) of PLN. The shortcut plan on Serpong / Western line between Palmerah and Manggarai is shown in Figure 4.10.3.

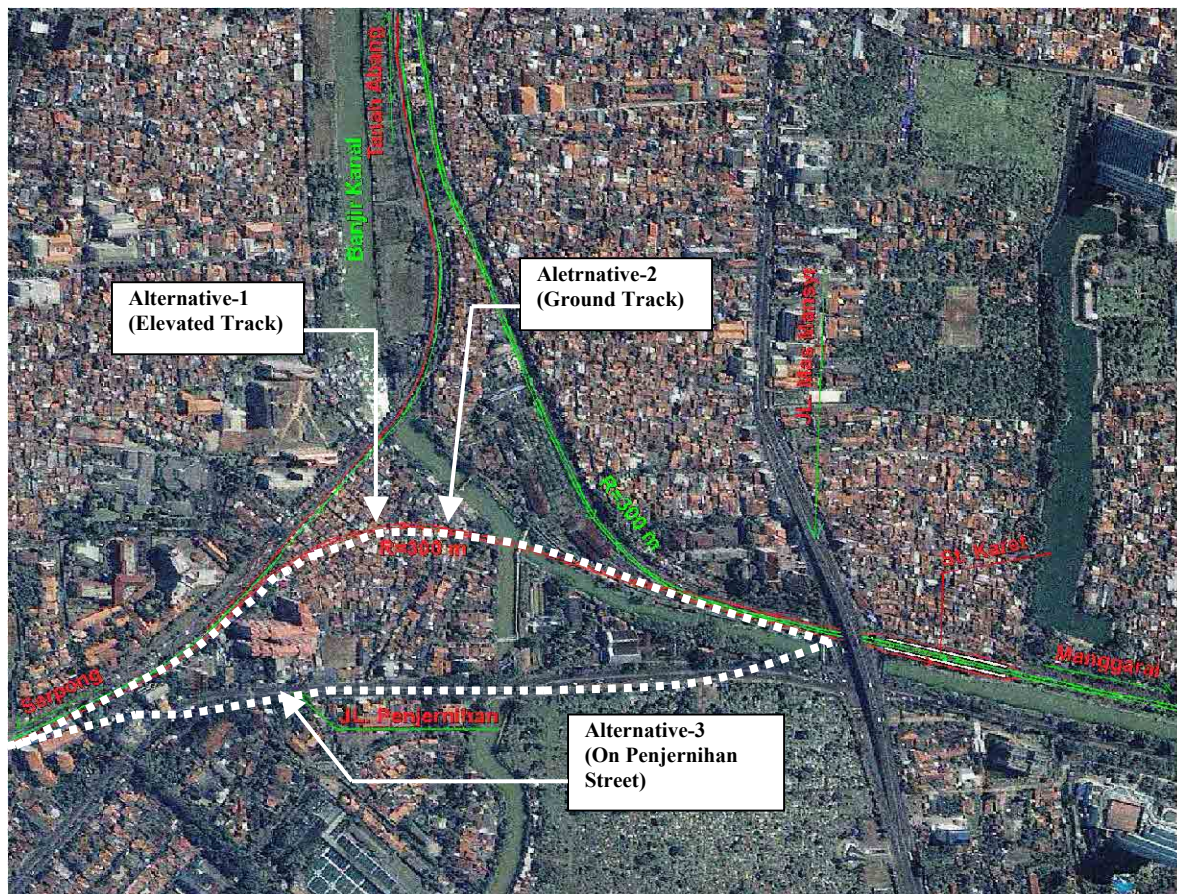


Figure 4.10.1 Palmerah - Karet Shortcut Section



Figure 4.10.2 Alternative-1 (Elevated Track) of Shortcut Plan

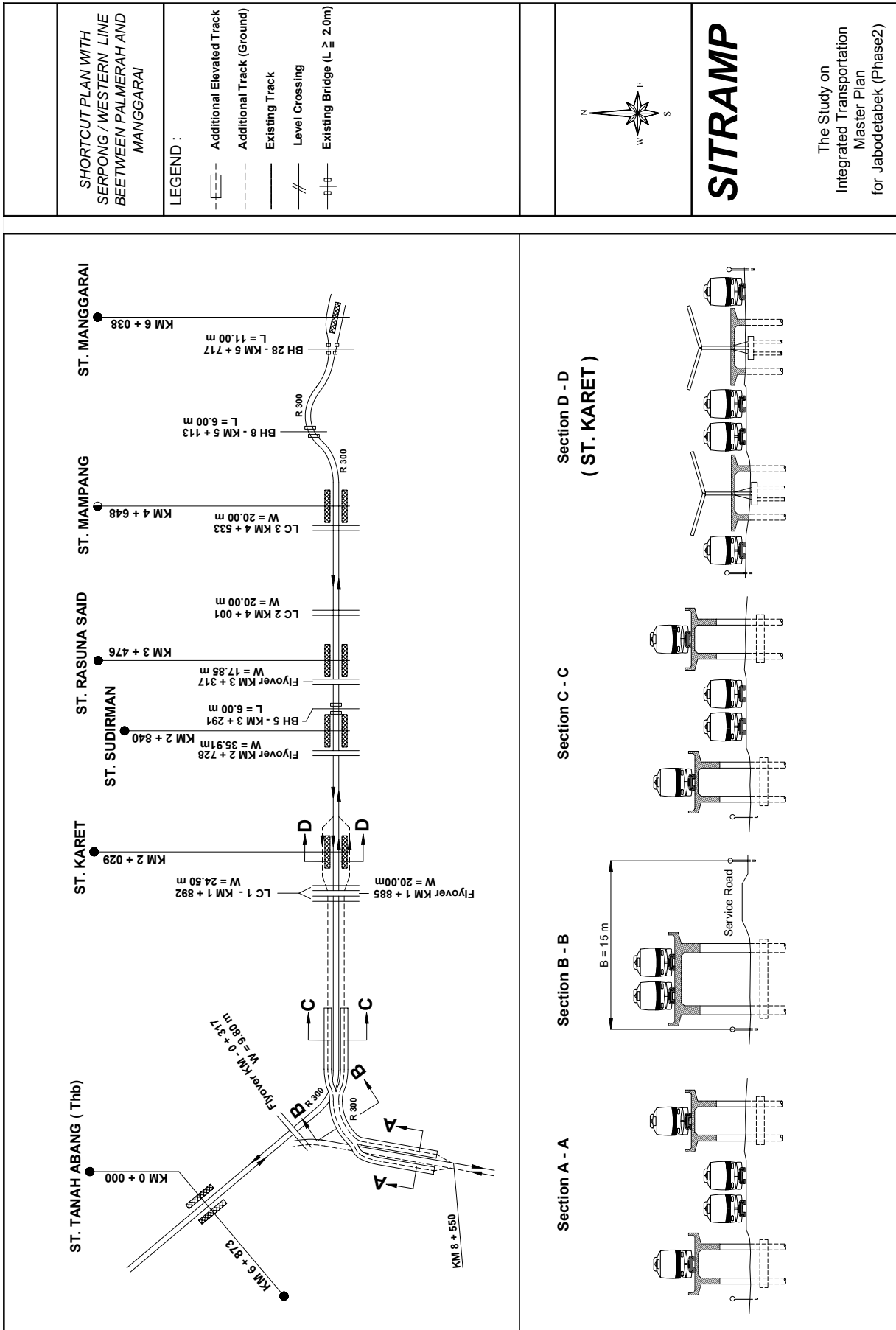


Figure 4.10.3 Shortcut Plan on Serpong / Western Line Between Palmerah and Manggarai

4.11 PRELIMINARY DEMAND FORECAST

Projected passenger demand along Serpong line is shown in Figure 4.11.1. Although a direct railway line is provided to connect Serpong in the east and Cikarang in the west, majority of the railway passenger movements is still expected to be of a commuting nature, clustering in the Serpong-CBD and Bekasi-CBD trips. The section between Sudirman and Manggarai stations (being in the center of Jakarta's CBD) is predicted to become the busiest section serving for more than 300,000 passenger trips in the year 2020.

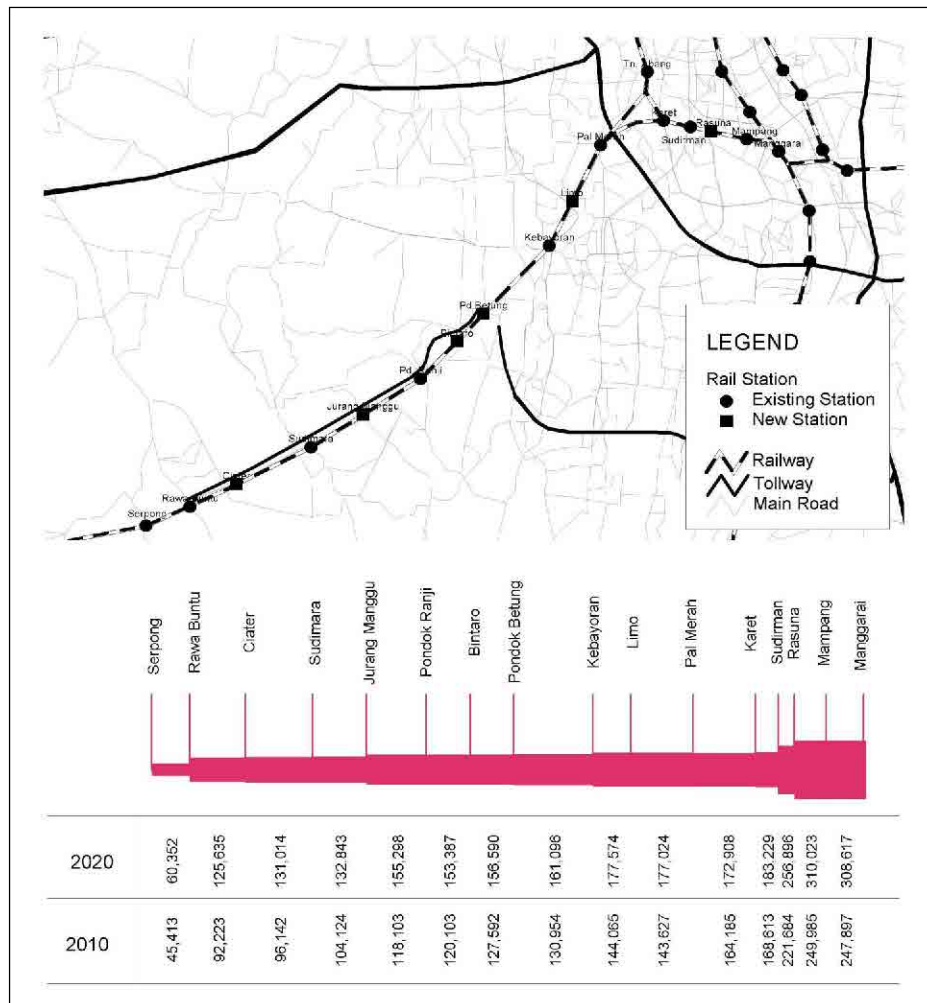


Figure 4.11.1 Projected Demand in Serpong Railway Line, 2010-2020

The estimated number of boarding and alighting passengers on the railway stations along Serpong line is presented in Tables 4.11.1 and 4.11.2 for the years 2010 and 2020 respectively. In the western side, the Rawabuntu station is expected to emerge as a major station, in line with the development of Bumi Serpong Damai town. On the other end, the Sudirman (formerly Dukuh) station will become the busiest station serving for more than 100,000 boarding and alighting passengers daily.

Table 4.11.1 Estimated Number of Boarding and Alighting Passengers - 2010

No.	Station Name	Year 2010				
		Total Daily On+Off	AM Peak Volume (pax/hr)		PM Peak Volume (pax/hr)	
		(pax/day)	Get-On	Get-Off	Get-On	Get-Off
1	Serpong	21,691	1,844	325	542	1,627
2	Rawa Buntu	49,580	4,214	744	1,239	3,718
3	Ciater	6,197	527	93	155	465
4	Sudimara	30,394	2,583	456	760	2,280
5	Jurang Mangu	32,490	2,762	487	812	2,437
6	Pondok Ranji	15,721	1,336	236	393	1,179
7	Bintaro	12,577	1,069	189	314	943
8	Pondok Betung	13,625	1,158	204	341	1,022
9	Kebayoran	44,466	667	3,780	3,557	889
10	Limo	20,454	307	1,739	1,636	409
11	Palmerah	24,012	360	2,041	1,921	480
12	Tanah Abang	33,498	502	2,847	2,680	670
13	Karet	15,764	236	1,340	1,261	315
14	Dukuh (Sudirman)	98,525	1,478	8,375	7,882	1,970
15	Rasuna	49,262	739	4,187	3,941	985
16	Mampang	4,059	203	203	244	162

Table 4.11.2 Estimated Number of Boarding and Alighting Passengers - 2020

No.	Station Name	Year 2020				
		Total Daily On+Off	AM Peak Volume (pax/hr)		PM Peak Volume (pax/hr)	
		(pax/day)	Get-On	Get-Off	Get-On	Get-Off
1	Serpong	30,970	2,632	465	774	2,323
2	Rawa Buntu	70,788	6,017	1,062	1,770	5,309
3	Ciater	8,848	752	133	221	664
4	Sudimara	40,734	3,462	611	1,018	3,055
5	Jurang Mangu	43,543	3,701	653	1,089	3,266
6	Pondok Ranji	21,069	1,791	316	527	1,580
7	Bintaro	16,855	1,433	253	421	1,264
8	Pondok Betung	18,260	1,552	274	456	1,369
9	Kebayoran	55,887	838	4,750	4,471	1,118
10	Limo	25,708	386	2,185	2,057	514
11	Palmerah	30,179	453	2,565	2,414	604
12	Tanah Abang	42,243	634	3,591	3,379	845
13	Karet	19,879	298	1,690	1,590	398
14	Dukuh (Sudirman)	124,244	1,864	10,561	9,939	2,485
15	Rasuna	62,122	932	5,280	4,970	1,242
16	Mampang	5,001	250	250	300	200

4.12 ACCESS ROAD AND STATION SQUARE DEVELOPMENT PLAN

4.12.1 Development Direction

Basic development direction on access roads and railway station squares are summarized as follows:

- Access roads to the railway stations shall have basically a four-lane width with a view to providing bus exclusive lanes in peak hour.
- Minimum station squares are to be provided due to implementation difficulty in reality.
- No additional plan is made on the Bekasi Railway Line in this Study because double-double tracking project has been in progress and the project prepared the plan. In other words, access roads and station square development on the Bekasi Railway Line will follow the plan prepared by the double-double tracking project.
- Public-Private Partnership can be achieved to improve railway services on the Serpong Line. Detail of responsibilities and cost sharing should be discussed further among the relevant agencies. Real estate developers such as Bintaro Jaya and BSD could contribute to construct station facilities and to develop access roads and station squares on Jurang Manggu and Rawabuntu stations; on the other hand PT. KA will be able to provide the lands in front of the stations.

4.12.2 Development Plan

(1) Outline

Some squares inside the land of PT. KA are planned in association with double-track improvement plan. The plan, in this section, on access roads and railway station squares to be borne by the local government for the Serpong Line is summarized in Table 4.12.1 following the development direction mentioned above (see Figure 4.12.1).

Table 4.12.1 Access Road and Station Square Development

(Station squares to be provided by PT. KA are excluded)

Line	No.	Station	First Stage (up to 2010)	Second Stage (after 2010)
Serpong Line	1	Tanah Abang	Road widening: 440m (from 9m to W=16.5m)	New station square 5600m ²
	2	Palmerah	Bus bays at both sides: 3*20m*2places	
	3	Limo (New Station)	Bus bays at both sides: 3*20m*2places	
	4	Kebayoran Lama	Clearance 470m	Widening: 125m (from 8 to W=16.5m)
	5	Pondok Betung	Improvement: from 4m road to 16m L=200m	
	6	Bintaro (New Station)	Sidewalks: L=2*400m (W=3m) 2-lane standardization: L=200m from 10m W=16.5m)	
	7	Pondok Ranji	Widening: 680m (W=26m) (Ex. 10*180m+5*500m)	Widening 3,600m (from 5m to W=26m)
	8	Juramgu Manggu (New Station)	Widening: 6,000m (from 8m to W=26m) Square 3,400 m ² (Bintaro Jaya also has a plan)	
	9	Sudimara	Widening: 2750m (W=26m) including new flyover bridge (Ex. 8m *2000m; 8m*750m)	
	10	Ciater (New Station)	Bus bays: 3m*20m*2 places	
	11	Rawabuntu	Access Road: 700m (from 3m unpaved to 350m*2: W=16.5m) New Square: 6000m ² (BSD also has a plan)	
	12	Serpong	Widening: 6,300m (from 8m to W=26m)	
West Line	13	Karet	Bus bays: 3*20m*2 places=120m ²	
	14	Sudirman (former Dukuh Atas*)	Square: 2,500m ² for short feeder service (beside MRT)	
	15	Rasuna Said (New Station)	Construction of decks for transferring to buses: 7,000m ²	Integration with office building and transferring facilities are expected to be carried out by private sector**.
	16	Mampang	Bus bay at both sides: 3*20m*2 places =125m ²	

Note: * Transferring to/from busway is planned in the busway project.

** Widening of Rasuna Said and transferring to/from busway are planned in the busway project.

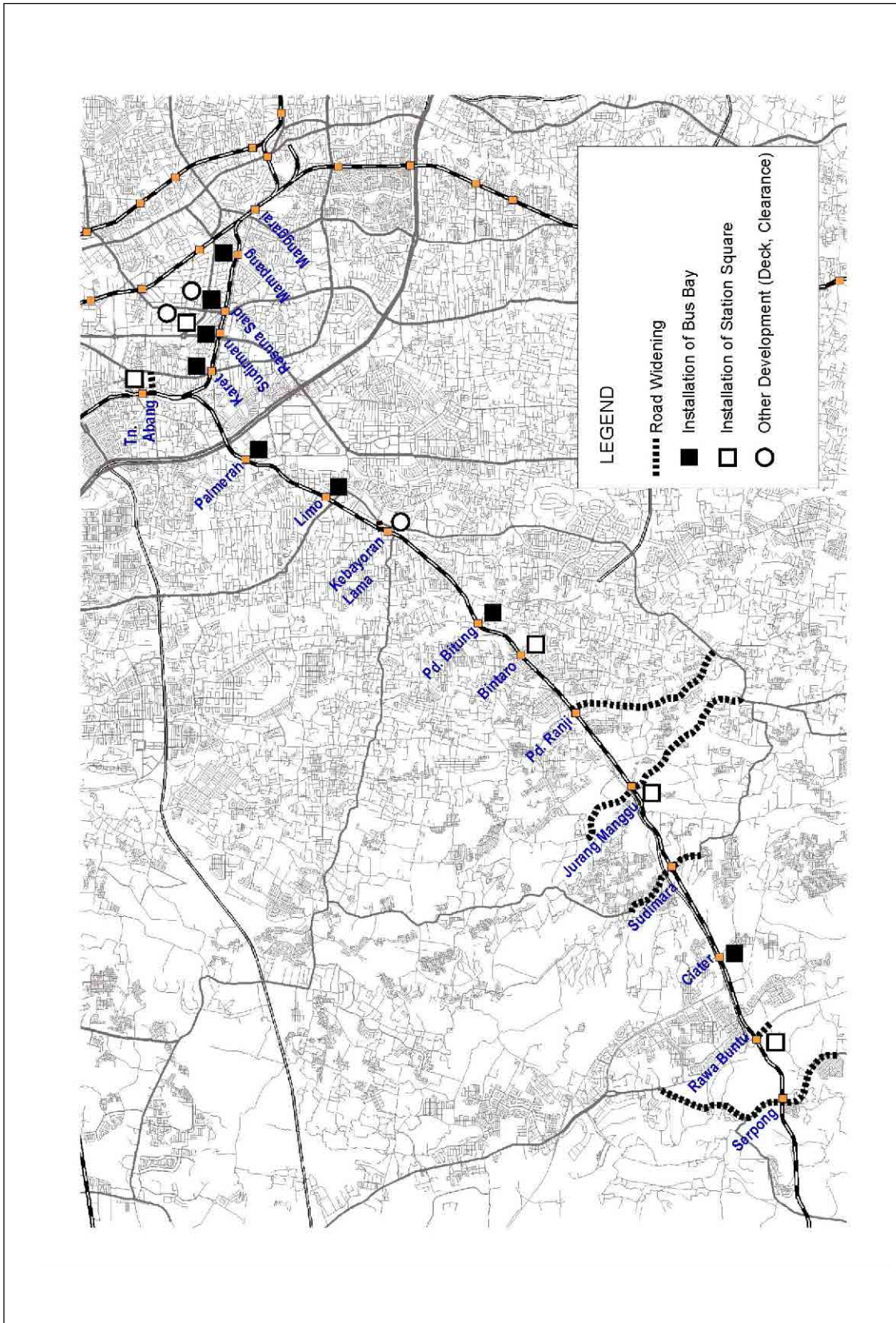


Figure 4.12.1 Development Plan on Access Roads and Station Squares

(2) Preliminary Guide Plan for Major Station Squares

As a detailed design on station squares is not required, preliminary guide plan only on major stations is examined at this pre-feasibility stage.

1) Tanah Abang

This station functions as connecting node between Serpong Line and West Line and it is expected to serve 42,000 boarding/alighting passengers in 2020. Many medium and small buses gather at this railway station for feeder services. In this regard, a 5600 m² station square is provided and a sample plan is shown in Figure 4.12.2. Although land acquisition seems difficult, it is necessary to stipulate this plan in the local spatial plan with a view to guaranteeing the future implementation.

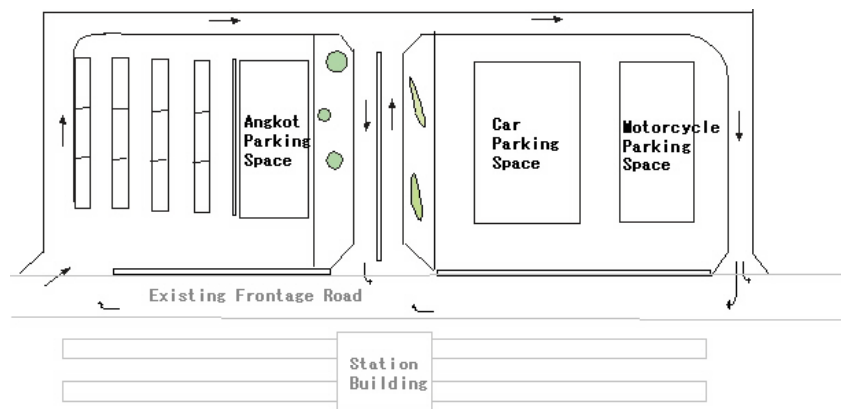


Figure 4.12.2 Tanah Abang Station Square Plan

2) Jurang Manggu

This station is expected to be newly constructed in the double-tracking improvement. Forty-four thousand (44,000) boarding and alighting passengers are forecast in 2020 and most of them will come to the station by feeder bus from Bintaro Jaya where many residents are living at this moment. A square with 3,500 m² in total is planned. PT. KA has its own land around the new station and is expected to provide 2,000 m² for a new station square, while another 1,500 m² has to be provided by the local government. In this regard, staged implementation may be realistic.

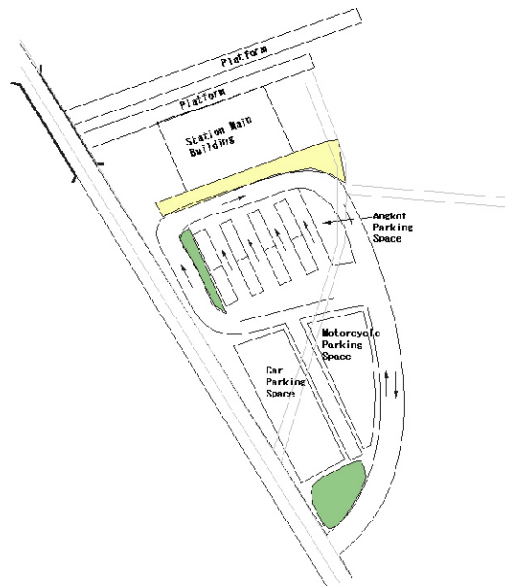


Figure 4.12.3 Jurang Manggu Station Square Plan

Bintaro Jaya also has a railway station square development plan functioning as compound terminal facility between different modes of transportation. Demarcation on implementation cost may be expected between PT. KA and Bintaro Jaya.

3) Rawabuntu

Many residents are living within the sphere of Rawabuntu railway station including BSD housing complex. Seventy-one thousand (71,000) boarding and alighting passengers are expected in 2020. This leads to intensive development and improvement of approach road and station square, of which current conditions are unbelievably poor. Feeder bus service is expected to comprise the major mode of transportation due to a little bit long distance to the center of BSD housing complex. Square size of 5600 m² is provided and a sample plan is shown in Figure 4.12.4.

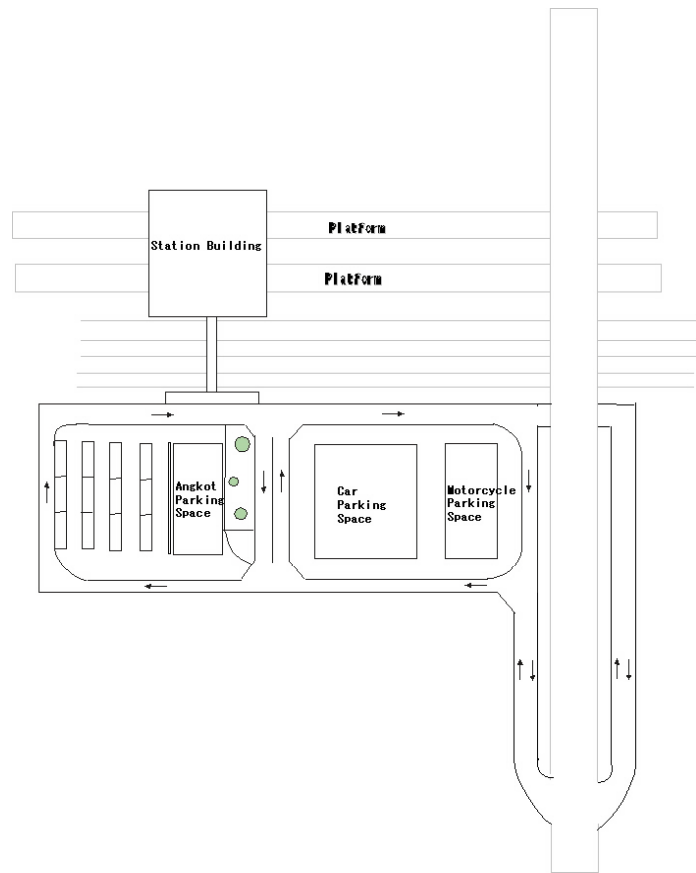


Figure 4.12.4 Rawabuntu Station Square Plan

BSD also has an idea of railway station square development plan to accommodate the residents' requirement to commute to CBD of Jakarta to avoid using private mode of transportation because of critical traffic jam on roads. Demarcation on implementation cost may be expected between PT. KA and Bintaro Jaya as well as Jurang Manggu station.

4) Sudirman

Sudirman railway station plays an important role as a transferring node between railway, busway and MRT, with a projected boarding and alighting passengers of 124,000 in 2020. Connecting paths, gangways and other relevant facilities for transferring between different modes of transportation are planned in each mode of transportation. One of important facilities is, however, for feeder service to patronage. The sphere of Sudirman railway station does not cover a large area so that ojek or minor mode of transportation is expected to accommodate the feeder service. In this end, a 2,500 m² station square is planned to meet this requirement (see Figure 14.12.5).

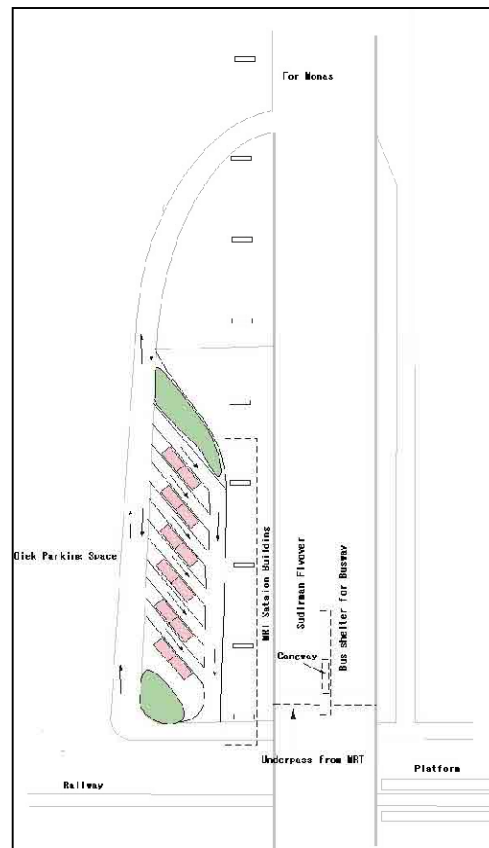


Figure 4.12.5 Sudirman Station Square Plan

5) Rasuna Said

This new railway station has very similar characteristics to Sudirman railway station, indicating 62,000 boarding and alighting passengers in 2020. The sphere of Rasuna Said railway station covers comparatively large hinterland. In other words, feeder service plays an important role to service patronage. According to this background, a square of 7,000 m² is planned. Furthermore, surrounding area of Rasuna Said railway station has big development potential for area development. In addition, the neighboring area has no big obstacles for new development due to moderate urbanization at this moment. This leads to taking advantage of private sector participation such as integration with office building, small bus terminal space and transferring facilities to smoothly accommodate the patronage. Figure 4.12.6 shows a rough example guide plan.

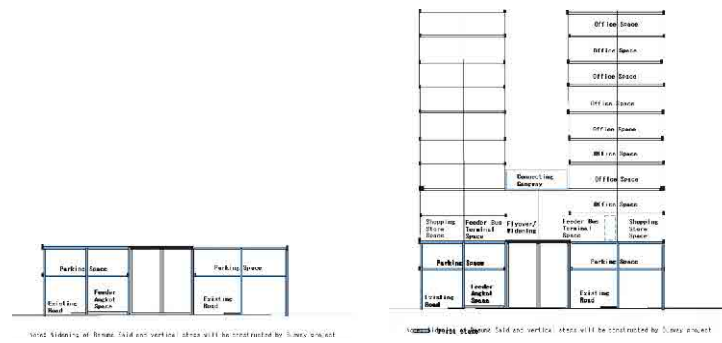


Figure 4.12.6 Rasuna Said Staged Square Plan integrated with Office Building

4.12.3 Cost Estimates

(1) Facilities and Implementation

There are three major incidental development facilities; approach roads to the railway stations, busbay facilities to accommodate feeder service and station square facilities. In terms of station squares, several of the planned squares are inside the right-of-way of land owned by PT. KA and some are outside PT. KA's land. The former is estimated in the railway development cost itself. It is, however, also very important to develop the approach roads, bus bays and station squares, which were planned outside PT. KA's right-of-way with a view to increase rail transportation passengers and to make most use of double tracking development. In this view, the costs for other incidental facility development, which are planned outside PT. KA's right-of-way, are estimated in this section. These costs are expected to be borne by relevant local government or, in some cases, under demarcation between PT. KA and the local government through negotiation.

(2) Approach Road and Bus Bay

The costs of approach roads and busbay development are estimated in Table 4.12.2.

Table 4.12.2 Cost of Approach Roads and Bus Bays

Unit: Million Rp.

Line	No.	Station	Roads and Bus-bays								Total
			Short Term				Long Term				
			Construc tion Cost	Others	Land Cost	Total	Construc tion Cost	Others	Land Cost	Total	
Serpong Line	1	Tanah Abang	2,092	628	39,600	42,320	0	0	0	0	42,320
	2	Palmerah	83	26	1,800	1,909	0	0	0	0	1,909
	3	Limo New Station	83	26	540	649	0	0	0	0	649
	4	Kebayoran Lama	53	0	0	53	Cost	190	9,450	10,286	10,339
	5	Pondok Betung	974	294	10,560	11,828	0	0	0	0	11,828
	6	Bintaro New Station	874	265	10,560	11,699	0	0	0	0	11,699
	7	Pondok Ranji	2,805	842	27,295	30,942	17,974	5,394	140,616	163,984	194,926
	8	Jurang Manggu	30,858	9,262	167,918	208,038	0	0	0	0	208,038
	9	Sudimara	63,105	18,932	56,376	138,413	0	0	0	0	138,413
	10	Ciater New Station	83	26	122	231	0	0	0	0	231
	11	Rawabuntu	2,973	894	22,680	26,547	0	0	0	0	26,547
	12	Serpong	32,196	9,659	136,080	177,935	0	0	0	0	177,935
West Line	13	Karet	116	33	1,800	1,949	0	0	0	0	1,949
	14	Sudirman	0	0	0	0	0	0	0	0	
	15	Rasuna Said	0	0	0	0	63,059	18,922	54,600	136,581	136,581
	16	Mampang	83	26	1,872	1,981	0	0	0	0	1,981
Total			136,378	40,913	477,203	654,494	81,679	24,506	204,666	310,851	965,345

(3) Costs of Square Development

The costs of square development only for those located outside PT. KA's right-of-way are estimated and shown in Table 4.12.3.

Table 4.12.3 Costs of Railway Station Square Development

Unit: Million Rp.

Line	No.	Station	Squares								Total
			Short Term				Long Term				
			Const. Cost	Others	Land	S. Total	Const. Cost	Others	Land	S. Total	
Serpong Line	1	Tanah Abang					5,085	6,661	67,200	78,946	78,946
	2	Palmerah									
	3	Limo New Station									
	4	Kebayoran Lama									
	5	Pondok Betung									
	6	Bintaro New Station									
	7	Pondok Ranji									
	8	Jurang Manggu	1,365	1,788	2,085	5,238					5,238
	9	Sudimara									
	10	Ciater New Station									
	11	Rawabuntu	1,820	2,384	4,800	9,004					9,004
	12	Serpong			0	0					
West Line	13	Karet			0	0					
	14	Sudirman	2,270	2,974	0	5,244					5,244
	15	Rasuna Said			0	0					
	16	Mampang			0	0					
Total			5,455	7,146	6,885	19,486	5,085	6,661	67,200	78,946	98,432