

4.9 RAILWAY FACILITY DEVELOPMENT PLAN FOR THE SERPONG AND THE WESTERN LINES

4.9.1 Technical Standards for Railway Track Facilities

In principle, the Indonesian Railway Standard (PD-10) is referred to as technical standard for railway track facilities. In the cases that the PD-10 does not stipulate the technical requirement, other acknowledged Codes / Standards are referred to Table 4.9.1.

Table 4.9.1 Standards of Track Facilities

No.	Item	Description	Remarks	Reference
1	Class of Railway	Class – I	Class of railway is primarily determined by the passing tonnage/year. Class I is applied to serve more than 20 pass ton/year. In addition, the new track could not be in lower class category compared to the existing track.	Railway Standards of PT. KA
2	Rail Type	UIC R54 Rail	Rail type to be applied should be in line with the standard Class I of Railway.	Railway Standards of PT. KA
3	Tie (Sleeper)	Pre-stressed Concrete Sleeper, 60 cm intervals	Tie type applied should be in line with the standard Class I of Railway.	Railway Standards of PT. KA
4	Rail Fastener	Double Elastic Type	Fastener type applied shall be in line with the standard Class I of Railway.	Railway Standards of PT. KA
5	Position of 2 nd track from the 1 st track	Min. 4m between axis lines		Railway Standards of PT. KA
6	Ballast Profile	Profiles will follow the distance between tracks		Railway Standards of PT. KA
	- Ballast depth	300 mm minimum		
	- Shoulder width	500 mm minimum		
	- Edge inclination	1:2		
7	Rail Length	CWR (Continuous Welded Rail)	-	Railway Standards of PT. KA
	Welding type	Flash Butt /Thermite		
8	Turn-outs	R54#10 or bigger tangent number.	Double Slip Switch or Scissor Crossings should be avoided as much as possible, due to expensive maintenance cost.	

4.9.2 Effective Length of Lines in Station Yards

1) Lines for Diesel-Hauled Passenger Train

$$L = 21 \text{ m (passenger car length)} \times 12 \text{ cars} + 15.2 \text{ m (locomotive length)} \times 2 \text{ locomotives} + 20 \text{ m (margin length)} = 302.4 \text{ m or more}$$

2) Lines for freight trains

$$L = 16 \text{ m (fright car length)} \times 13 \text{ cars} + 15.2 \text{ m (locomotive length)} + 20 \text{ m (margin length)} = 243.2 \text{ m or more}$$

3) Lines for EC with 8 cars trains

$$L = 20.7 \text{ m (electric car length)} \times 8 \text{ cars} + 20\text{m (margin length)} = 185.6 \text{ m or more}$$

4.9.3 Earthwork Volume

The earthwork volume on the Serpong line double tracking and the shortcut with the Western line (cutting bank volume, embankment volume, bridge, level crossing drainage, etc) are shown in Table 4.9.2.

Table 4.9.2 Earthwork Volume



Item	Serpong Line	Western Line (Between Palmerah – Mampang)
Cutting bank	125,000 m ³	-
Embankment	73,000 m ³	-
Retaining wall	6,600 m ²	-
Drainage (U Type)	23,500 m	1,000 m
Extension of level crossing	930 m ²	320 m ²
Bridge	32 locations	Elevated Track =800 m
Sub-ballast	70,400 m ³	3,000 m ³
Fence	10,000 m	2,000 m

4.9.4 Design Standards

The Standard of the alignment, roadbed and railway was adopted from the Indonesian railway standard (PD-10). The design standards are shown in Table 4.9.3.

Table 4.9.3 Design Standard

Item	Standard	
Curve	Minimum Radius=300 m	
Track Distance	Minimum =4.0 m Bridge Section 4.5 m	
Maximum Gradient	i=2.6 % (Palmerah - Karet)	
Track Structure	Rail	UIC R54
	Sleeper	Concrete Sleeper(Interval 60cm)
	Ballast	Minimum =300 mm
	Shoulder	Minimum =500 mm
	Turnout	R54 (1:10)

TYPICAL CROSS SECTION IN STRAIGHT	LEGEND :	Sheet :	
			

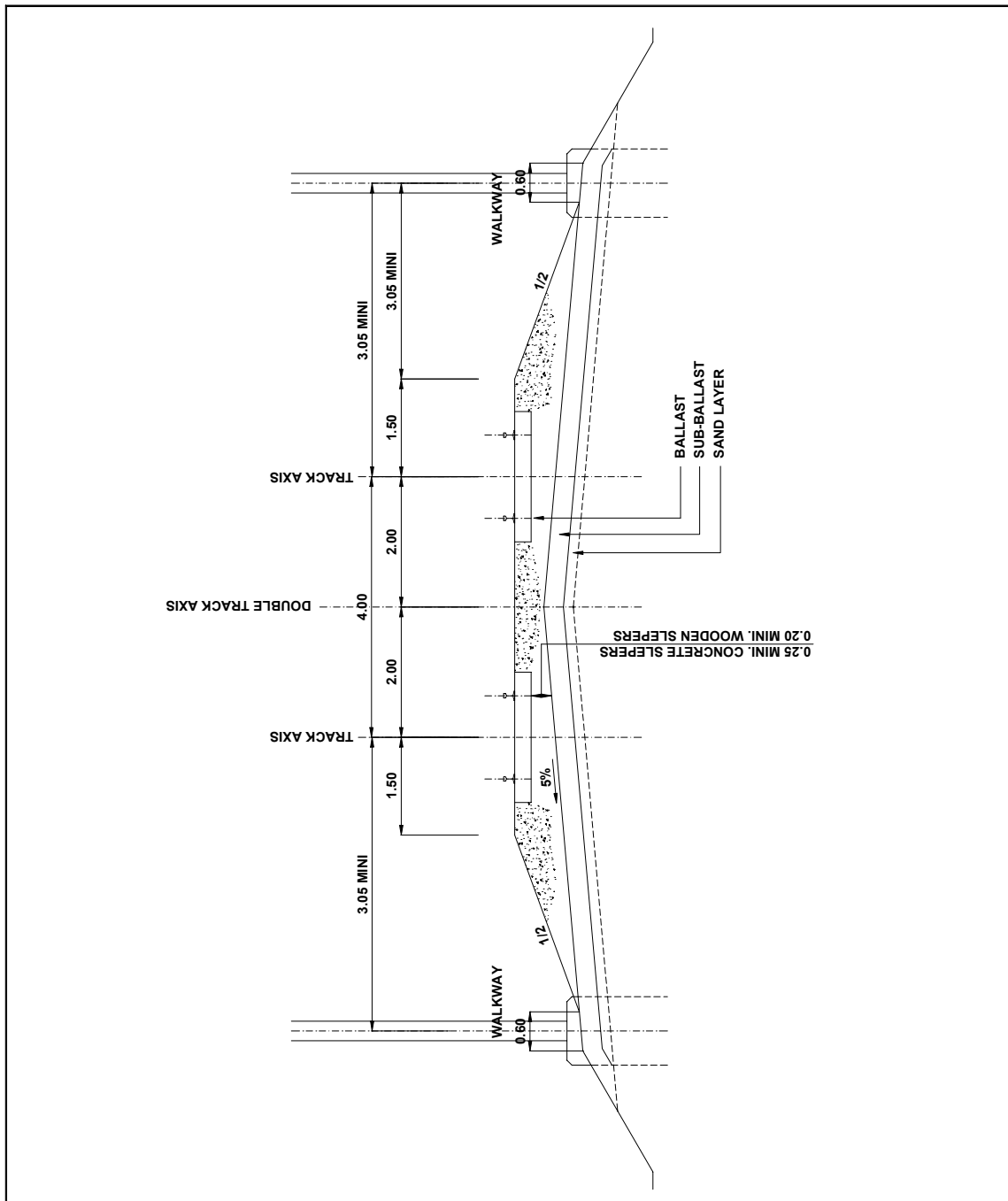


Figure 4.9.1 Typical Cross Section in Straight

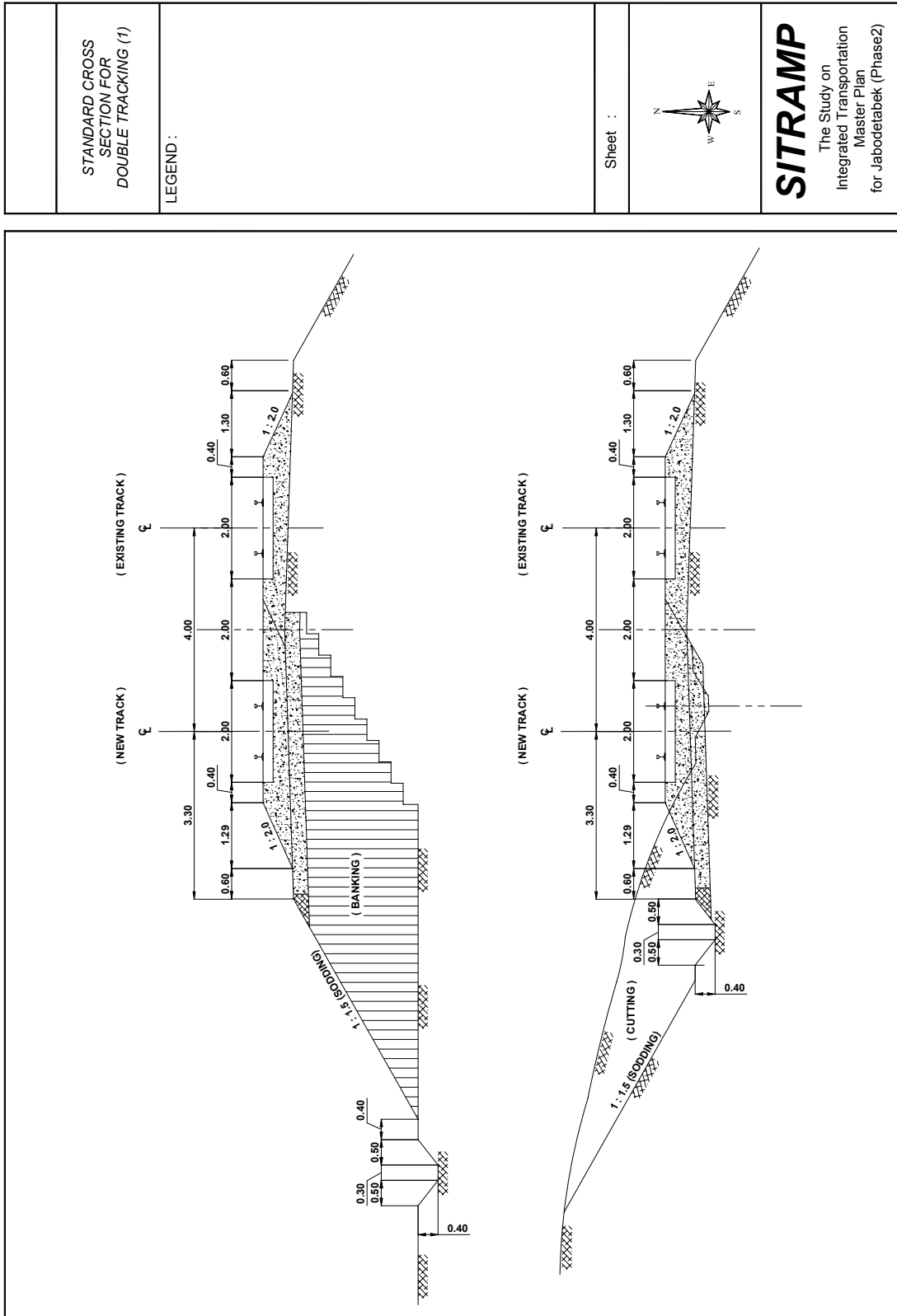


Figure 4.9.2 Standard Cross Section for Double Tracking

4.9.5 Station Structure Plan

The basic station structure is planned to be over-track station. The existing over-track stations are the Tanah Abang station and the Sudirman (the former Dukuh Atas) station in Jabodetabek area. In this study, most of stations were designed as over-track stations like the Sudirman station, however, Jurang Manggu station was planned as a ground station because it is on an embanked segment (height =5m).

Table 4.9.4 Station Structural Plan

Station Classification	Serpong Line	Western Line
Over-track Station	1) Serpong, 2) Rawa Buntu, 3) Sudimara, 4) Pondok Ranji, 5) Kebayoran, 6) Palmerah,	1) Karete, 2) Sudirman* ¹⁾ , 3) Mampang
New Station (Over-track Station)	1) Ciater, 2) Bintaro, 3) Pondok Betung, 4) Limo,	1) Rasuna Said
New Station (Ground Station)	1) Jurang Manggu	-
Total	11 stations	3 stations

*¹⁾: Sudirman station has no improvable plan.

The stations which need passing track for express trains include Kebayoran, Pondok Ranji, Sudimara and Serpong station. In the track layout plan of the Serpong station, shunting operation for long distance train from Merak is taken into account.

4.9.6 Design of Platforms

(1) Length

- 1) For Passenger car trains

$$L = 21 \text{ m (passenger car length)} \times 12 \text{ cars} + 20 \text{ m (margin length)} = 280 \text{ m or more}$$

- 2) For EC with 8 cars trains

$$L = 20.7 \text{ m (electric car length)} \times 8 \text{ cars} + 20 \text{ m (margin length)} = 185.6 \text{ m or more}$$

- 3) For EC with 12 cars trains

$$L = 20.7 \text{ m (electric car length)} \times 12 \text{ cars} + 20 \text{ m (margin length)} = 268.4 \text{ m or more}$$

(2) Width

Minimum width of platforms

- 1) In the case of side platforms: 2.0 m
- 2) In the case of island platforms: 3.0 m (6.0 m around staircases)

Table 4.9.5 Current Situation of the Proposed Stations

No.	Station Name	Building & Station Area Condition	Traffic Circulation & Transportation Network
1	Rasuna Said*	The station is planned to be built under the bridge of Jl Rasuna Said with main entrance from Jl. Latuharhari and to form an over-track station. The station square will be provided across station, separated Jl. Latuharhari. At present the land is used as green area/park.	Pedestrian accessibility to the station should be improved because of high density traffic on Jl. Rasuna Said. A busbay and a bus shelter are properly prepared so that the traffic flows are not disturbed.
2	Limo	The new station is planned between Palmerah and Kebayoran stations and to be an over-track station. The station square will be across the station building, separated Jl. Tentara Pelajar, and become one substation and have its own signaling equipment facilities.	The traffic flows surrounding the station in peak hours are considerably high, thus adequate arrangement of passenger flows and improvement of pedestrian accessibility to the station building and the station square are needed.
3	Pondok Betung	The station will be added between Kebayoran and Bintaro stations. There is an existing platform and the proposed structure is over-track station with two passing tracks.	The station is to be located +200 m from level crossing with Jl Bintaro Permai and near flyover/bridge Kebon Jeruk - Pondok Pinang toll road
4	Bintaro	The station will be located between Pondok Betung and Pondok Ranji stations. An over-track station is proposed.	The station is located among housing complexes of Bumi Bintaro Permai and Bintaro Jaya I. Various modes of transportation are available such as mikrolet and ojek.
5	Jurang Manggu	The station will be developed between Pondok Ranji and Sudimara stations. It is proposed to construct a ground station with two passing tracks.	The road to the station is accessible from Jl Cendrawasih.
6	Ciater	The station will be between Sudimara and Serpong stations. A ground station is proposed.	The road to the station is accessible and near Nusa Loka Bumi Serpong Damai housing area.

**) Western Line

4.9.7 Design Concept of the Station Building

Railway stations are public building from which passengers travel by using the train. The station building acts as a transition space between the street or station square and the platforms.

(1) Planning and Space Requirements

- 1) Space of a station is functionally divided into station office zone and passenger zone. Passenger flows become complex as a size of station increases. Careful planning is needed in conjunction with implementing the following:
- 2) Facilities for passengers should be positioned near the major street or towards to the center of station square.

- 3) Circulation of passenger flows should be shortened and simplified as much as possible. In this regard, facilities serving for passengers such as platforms, pedestrian bridges, concourse and ticketing facilities should be placed in strategic locations to function properly.
- 4) Appropriate circulation pattern of vehicles and pedestrians should be taken into consideration for designing a station square.
- 5) It is important for passengers to locate the ticket office at the first access point and should be located in the most visible place.
- 6) It is desirable to unify the station office zone with an efficient layout.
- 7) Enough clearances should be kept to secure smooth passenger flows.

(2) Design Standards

The space requirement of the station is based on the passenger demand in the year 2020. The size and layout of the station building and related facilities shall be determined by the following factors:

- Number of boarding and alighting passengers /day
- Number of passengers in the peak hour
- Peak ratio
- Total number of station staff and number of station staff / day

(3) Architectural Design Concept

1) Planning Concept

- Station Layout

A layout of stations is determined by track geometry, operational requirements, forecasted passenger demand and electrical and mechanical requirements. The station shall be divided into public and non-public areas (restricted area). The public areas shall be further subdivided into 'paid' and 'unpaid' areas. Stations shall be located either beside platforms on ground or over-tracks, taking station-specific constraints into account.

- Entrances

Station entrances shall be located with particular reference to passenger flow pattern, the formation of station square and physical site constraints.

- Concourse

Typically the concourse will contain the ticket barrier in a manner that divides the concourse into distinct areas. The ‘unpaid area’ is a space where passengers gain access to the systems, obtain travel information and purchase tickets. Passing through the ticket barrier passengers enter the ‘paid area,’ which includes access to the platforms. The arrangement of the concourse is assessed on a station-by-station basis and is determined by site-specific constraints and passenger access requirements. However, it shall be planned in such a way that the ticket hall supervisor can achieve maximum surveillance over the ticket office. Ticket barrier and ticket office shall be positioned to minimize cross flows of passengers and provide adequate circulation space.

- Station Accommodation

Office accommodation, operational areas and M/E (what’s M/E) space is required in the non-public areas at each station. The arrangement of the station accommodation shall be planned on station-by-station basis and is determined by station layout, site constraints and passenger access requirements.

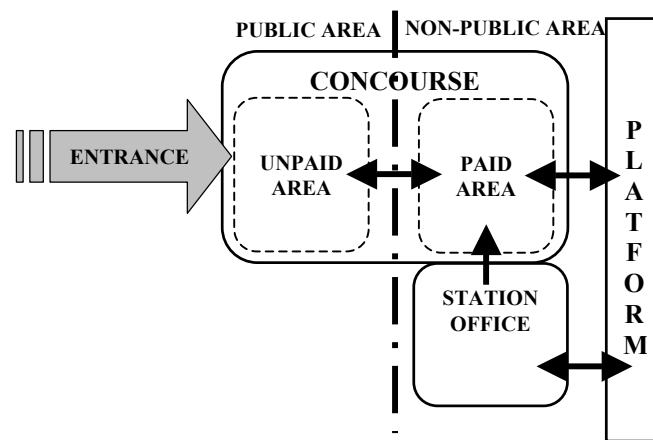


Figure 4.9.3 Planning Concept of Station Zoning

2) Stations Location and Station Square

In order to support urban development, the interface between the urban environment and the railway is very important. The railway station shall play a major role as interchange point between the railway system and the other urban transportation system.

For safety of pedestrians, busbays and private car parking areas should be separated. In the front area, a minimum crossing between pedestrians and vehicles are allowed for effective use

of space. From the functional and architectural points of view, the desirable layout for the station square area is to locate it along the platform.

Besides, the efficiency aspect and land utilization surrounding the station square should be considered.

3) Prototype Design of Station

Two typical station designs shall be applied for the Serpong Line and the Western Line: one is over-track station and the other ground level station. In principle, over-track station will be applied except for the stations located on the embankment or locations with technical difficulty.

- Over-Track Stations

The following 10 stations on the Serpong Line shall be over-track stations: Palmerah Station, Limo Station, Kebayoran Station, Pondok Betung Station, Bintaro Station, Panduk Ranji Station, Sudimara Station, Ciater Station, Rawa Buntu Station and Serpong Station. On the Western Line, Sudirman Station, Rasuna Said Station and Mampang Station shall be over-track stations.

- Ground Level Stations

Ground level station shall be planned at Jurang Manggu Station (Serpong Line) only. Station layouts are different according to platform type and the number of passing tracks. Standard stopping stations have two platforms. At stations with three tracks, two platforms are provided as well: one lateral and the other located centrally between two tracks and called "Island Platform."

For some stations the number of platforms is larger. Except for the over-track station, platforms are covered by shelters, equal to the platform length.

One pedestrian bridge is provided at small-size stations for access to the opposite platform and two pedestrian bridges at medium-size stations. At over-track stations passengers can access from concourse to platforms by stairs.

The access Road and station square development plan of each station will be shown in Figure 4.9.4 –4.9.18.

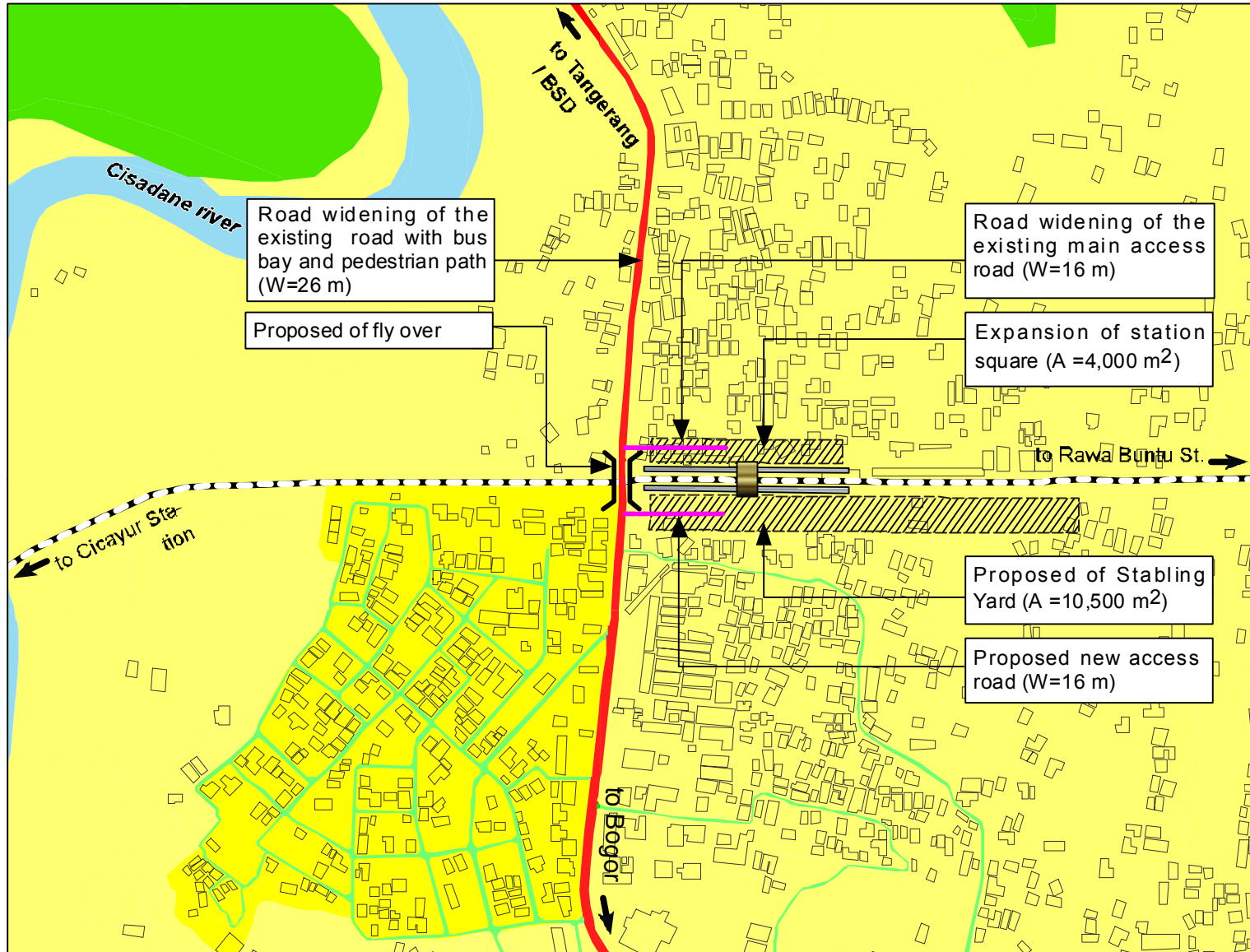


Figure 4.9.4

Access Road and Station Square Development Plan

Station : Serpong

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



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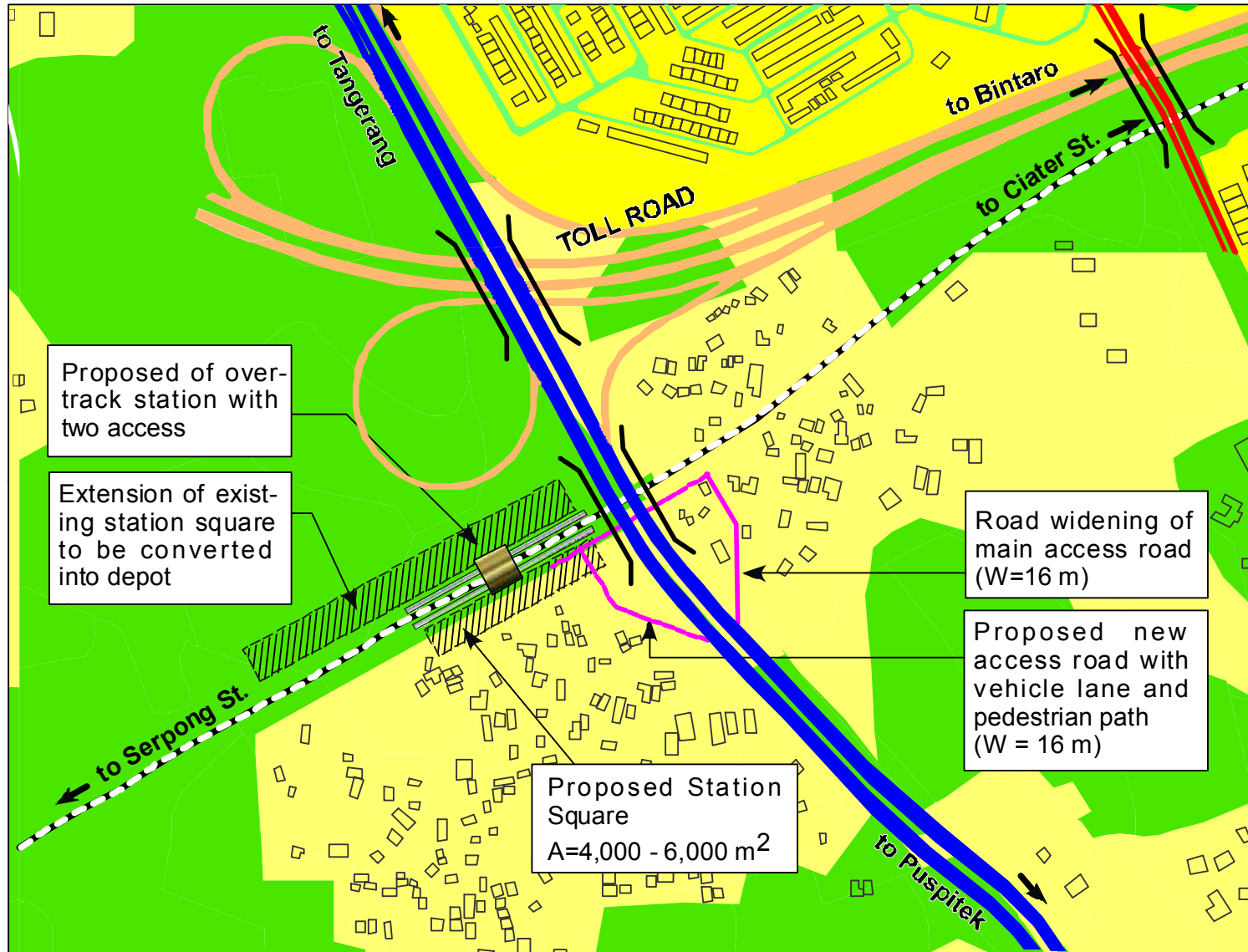


Figure 4.9.5

Access Road and Station Square Development Plan

Station : Rawa Buntu

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

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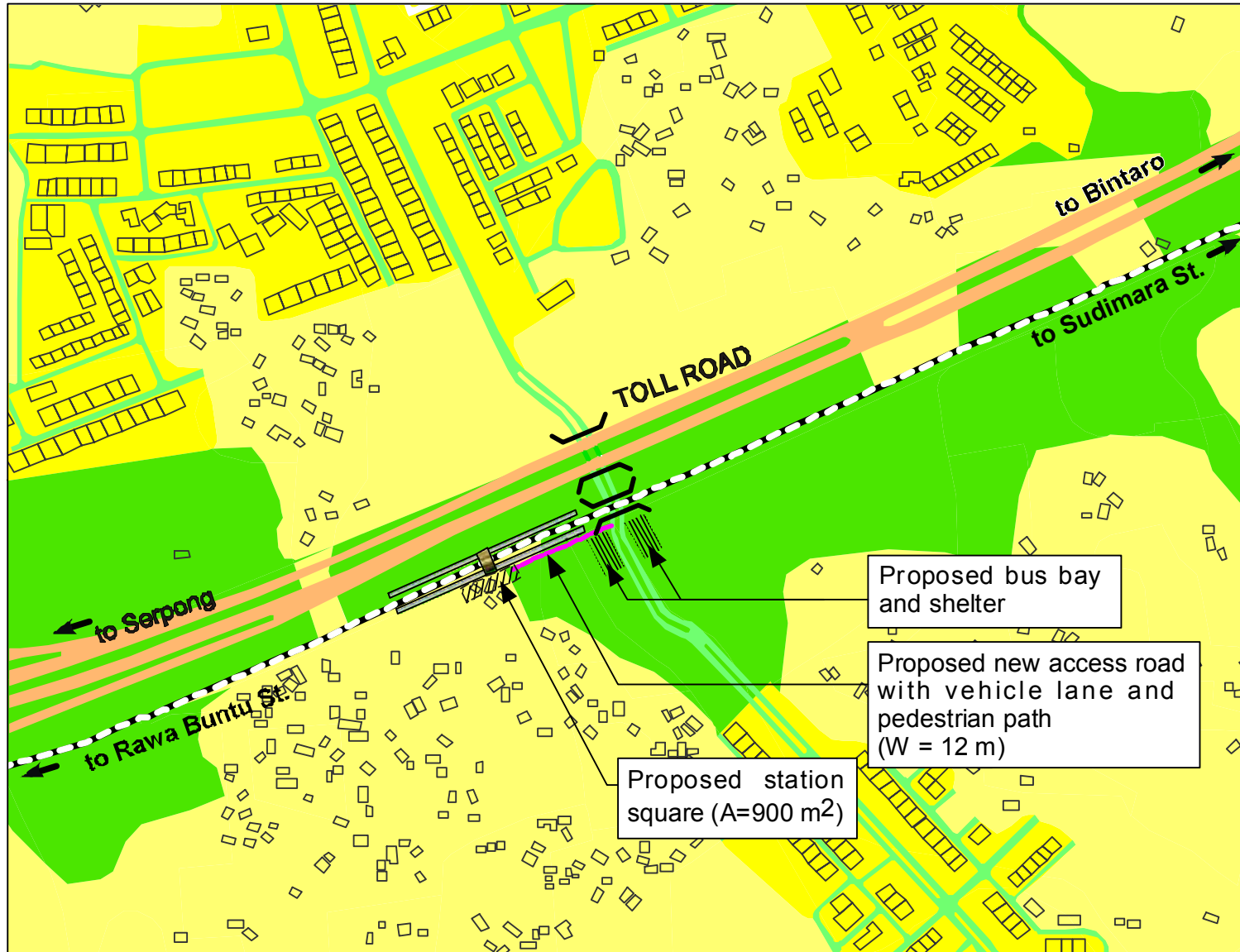


Figure 4.9.6

Access Road and Station Square Development Plan

Station : Ciater

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



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















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Figure 4.9.7

Access Road and Station Square Development Plan

Station : Sudimara

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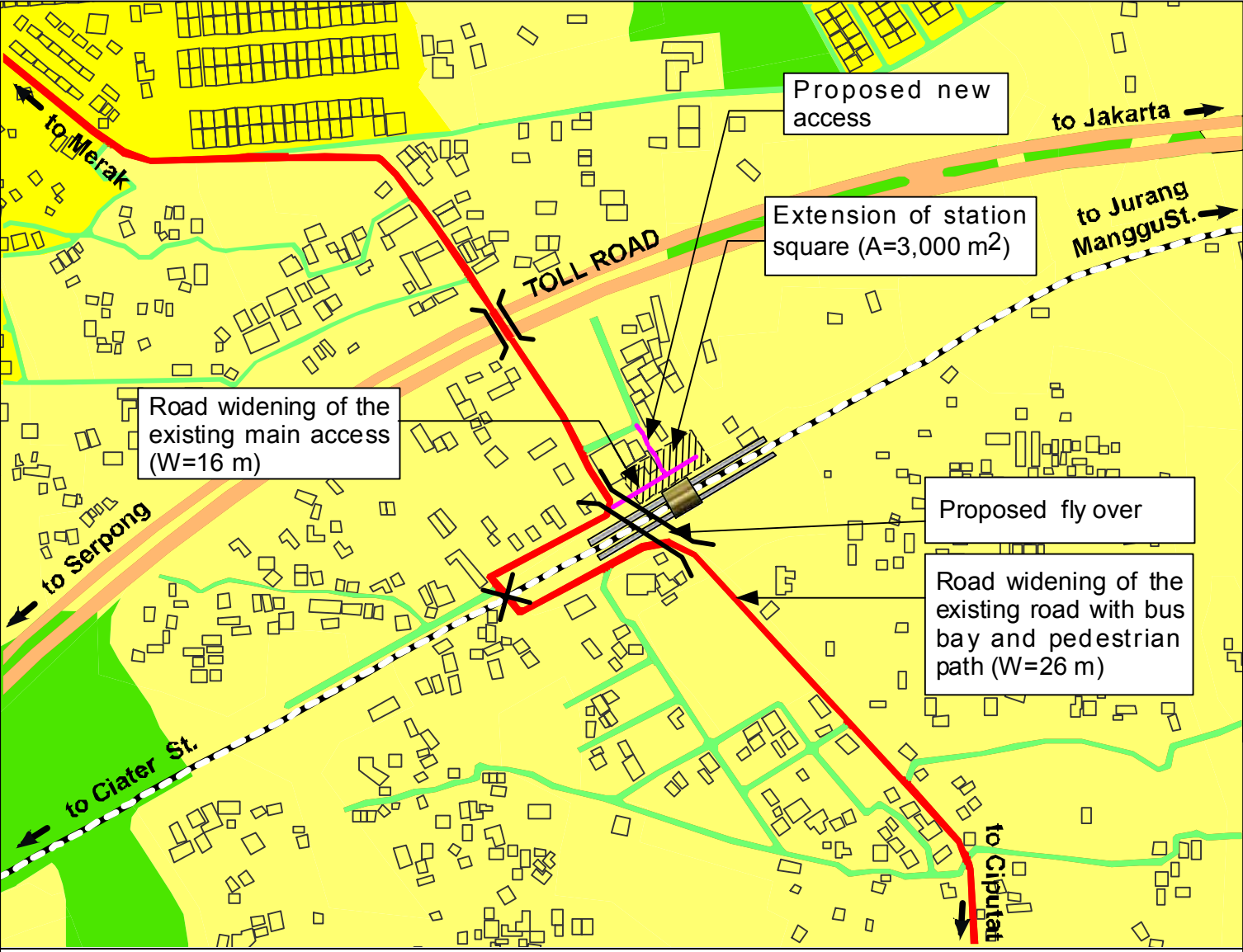
-  RAILWAY
-  STATION
-  STATION SQUARE
-  BUS BAY
-  PLATFORM
-  MAIN ACCESS TO STATION
-  PROPOSED ACCESS TO STATION
-  ARTERIAL WITH TOLL ROAD
-  PRIMARY ARTERIAL
-  PROPOSED PRIMARY ARTERIAL
-  MAIN ROAD COLLECTOR
-  LOCAL ROAD
-  FLY OVER
-  CONNECTION BRIDGE
-  UNDERPASS
-  LEVEL CROSSING



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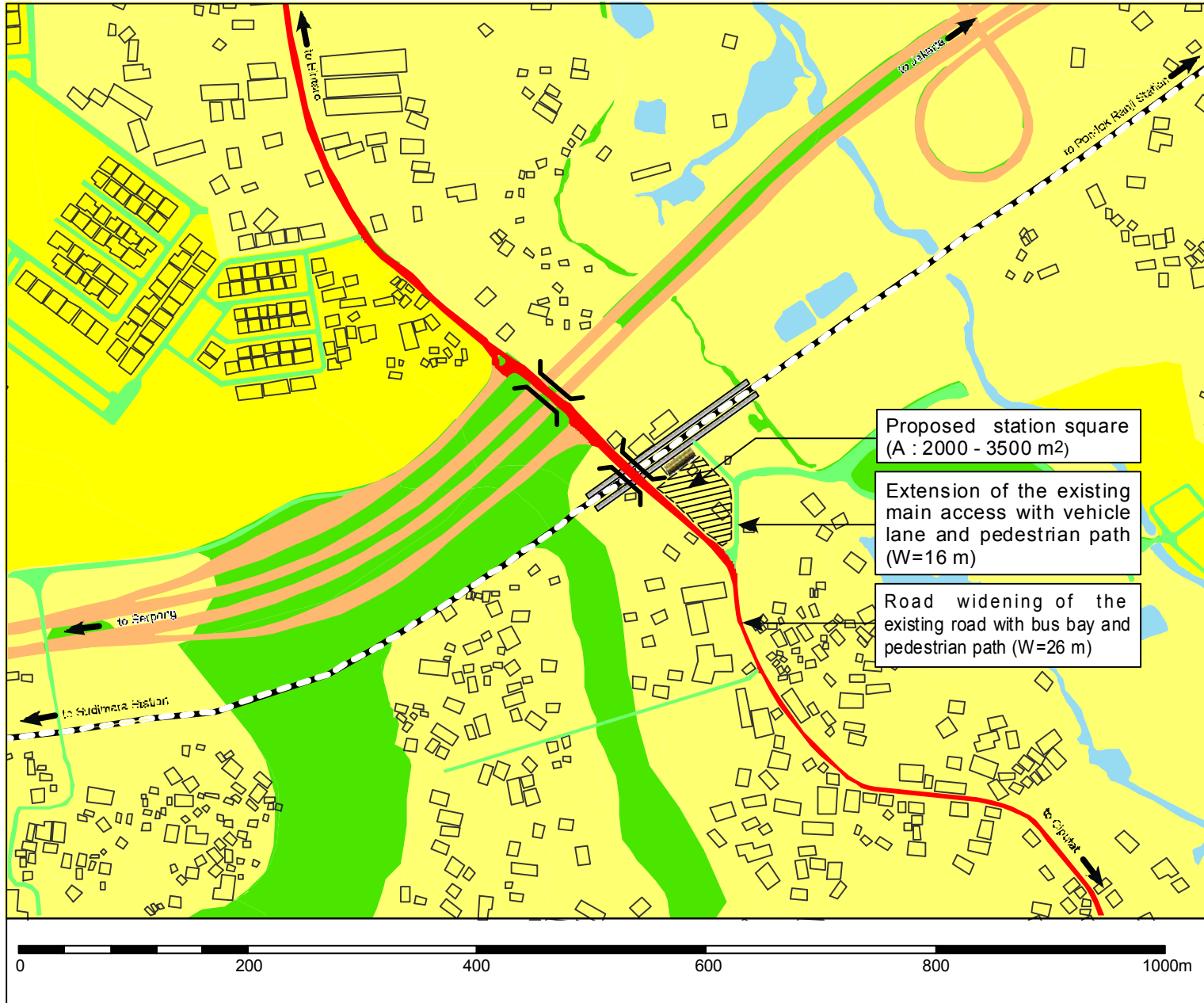


Figure 4.9.8

Access Road and Station Square Development Plan

Station : Jurang Manggu

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1:5,000

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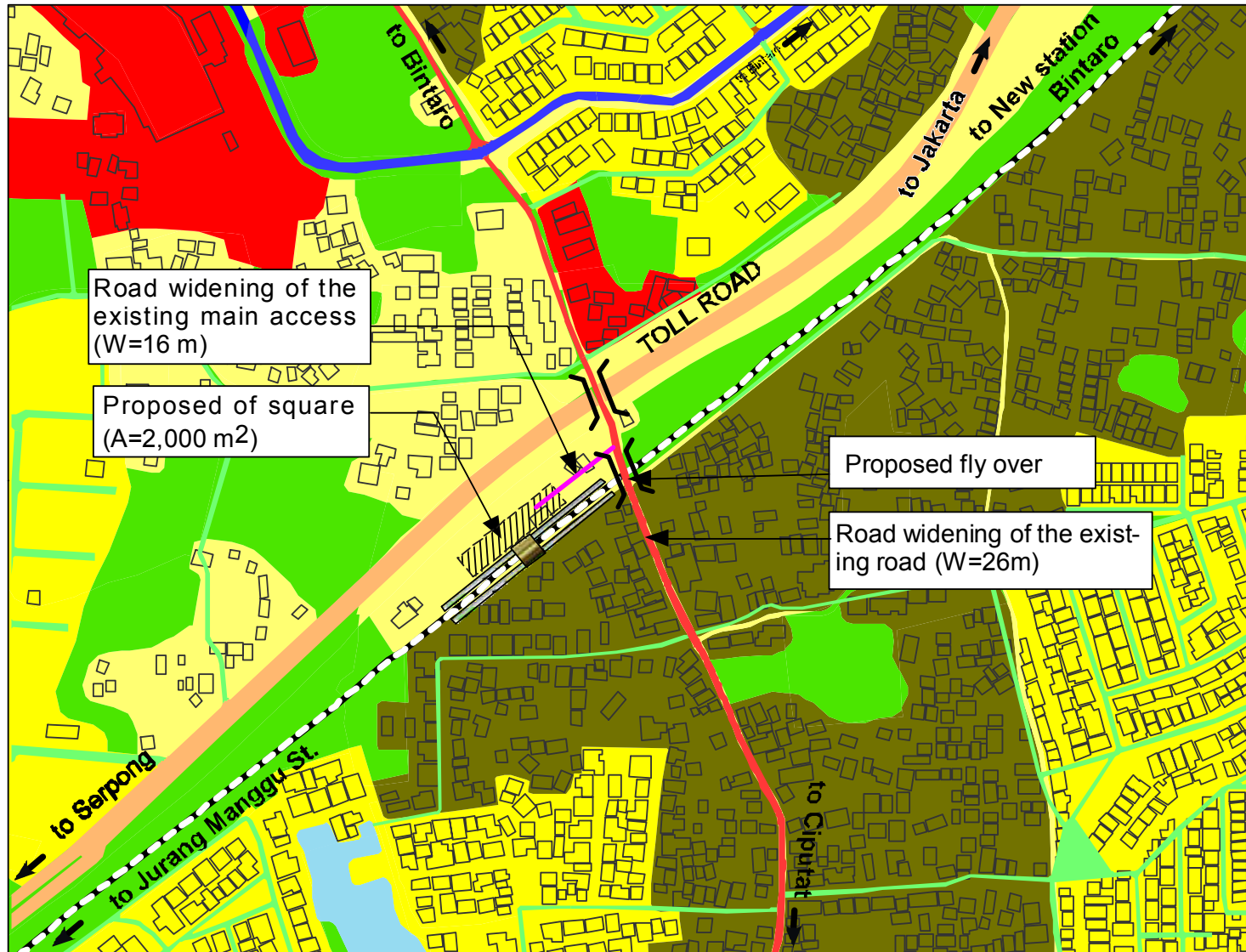


Figure 4.9.9

Access Road and Station Square Development Plan

Station : Pondok Ranji

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

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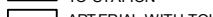

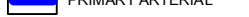







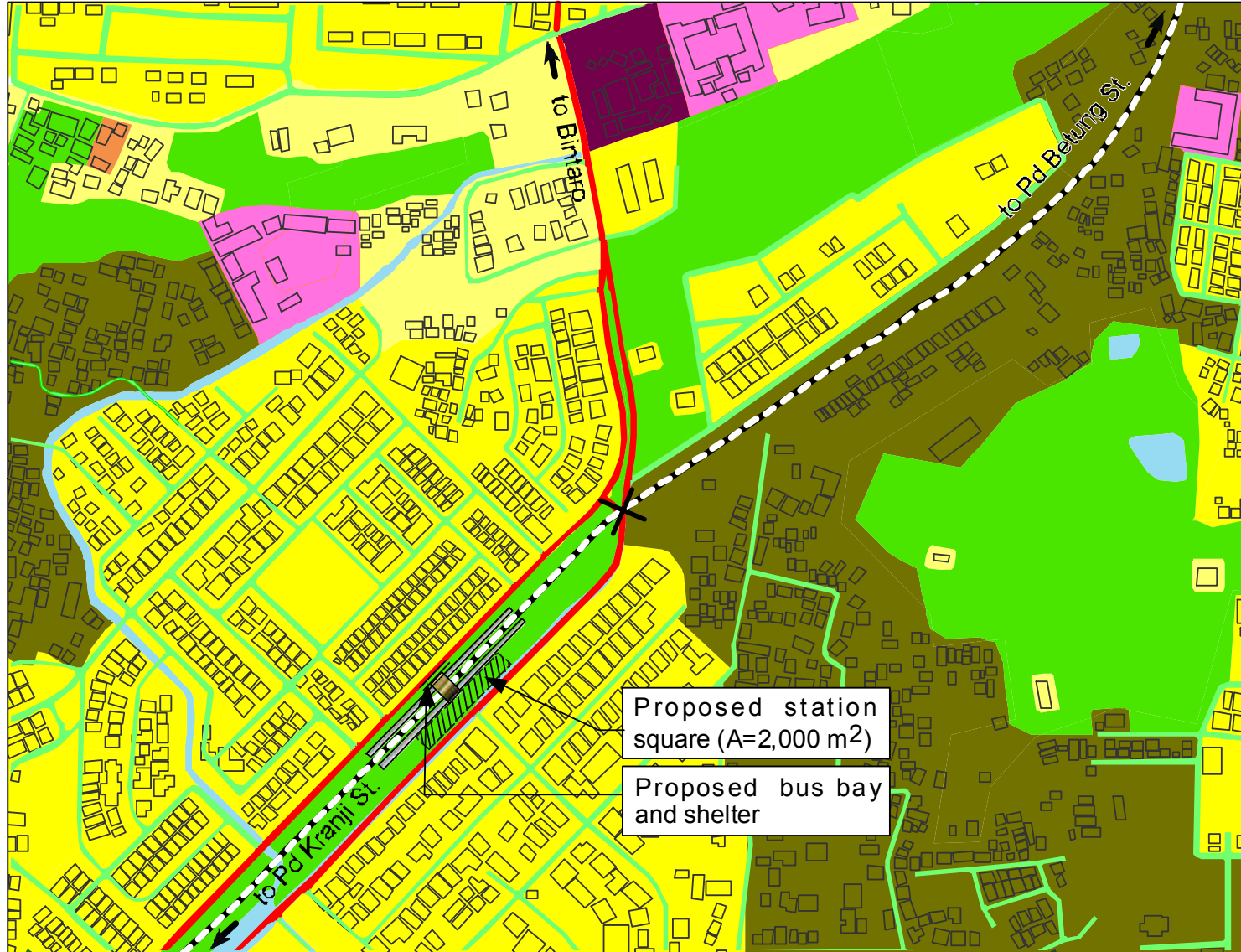
Figure 4.9.10

Access Road and Station Square Development Plan

Station : Bintaro (new)

Legend

-  RAILWAY
-  STATION
-  STATION SQUARE
-  BUS BAY
-  PLATFORM
-  MAIN ACCESS TO STATION
-  PROPOSED ACCESS TO STATION
-  ARTERIAL WITH TOLL ROAD
-  PRIMARY ARTERIAL
-  PROPOSED PRIMARY ARTERIAL
-  MAIN ROAD COLLECTOR
-  LOCAL ROAD
-  FLY OVER
-  CONNECTION BRIDGE
-  UNDERPASS
-  LEVEL CROSSING



Proposed station square (A=2,000 m²)

Proposed bus bay and shelter



Scale : 1:5,000

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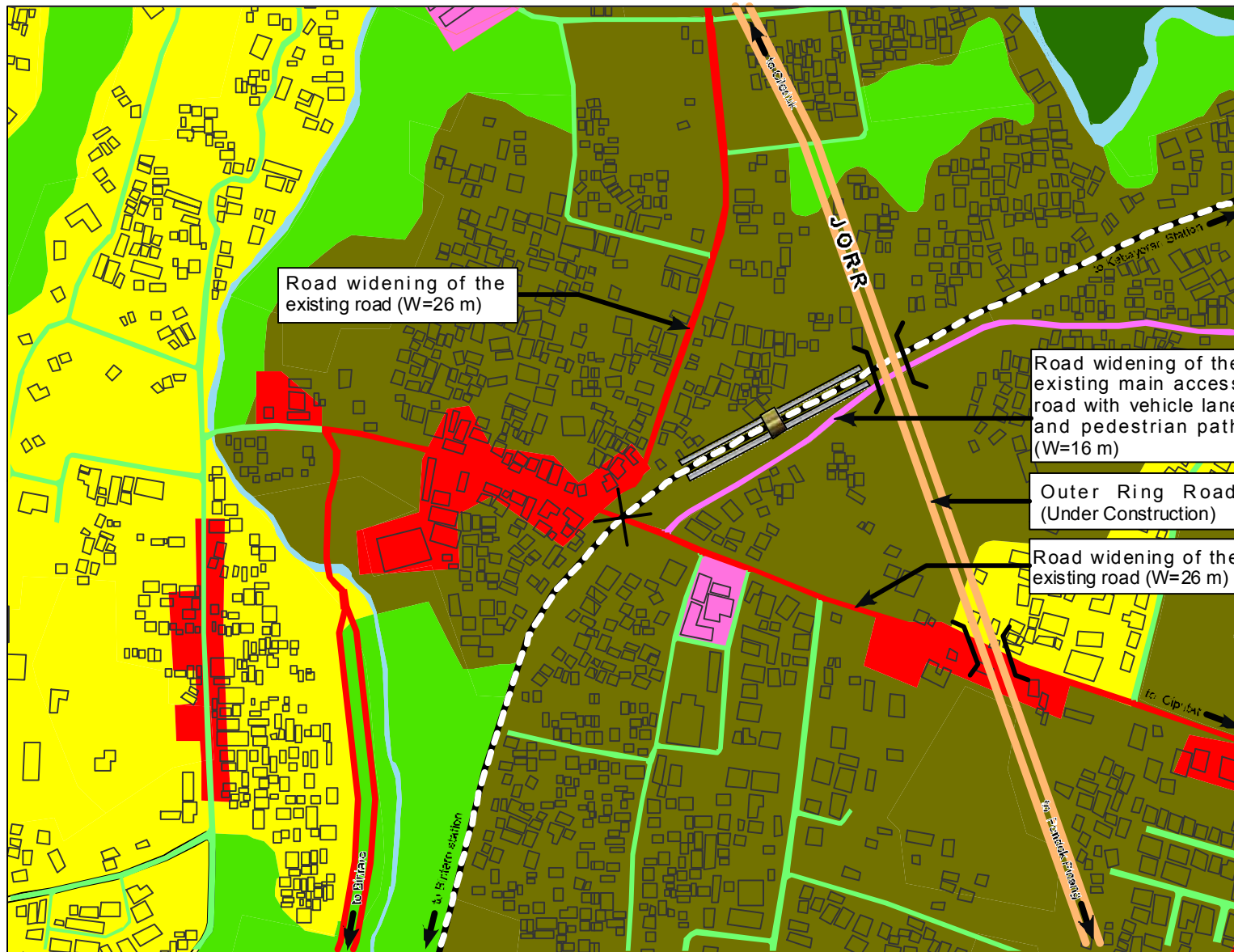


Figure 4.9.11

Access Road and Station Square Development Plan

Station : Pondok Betung

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

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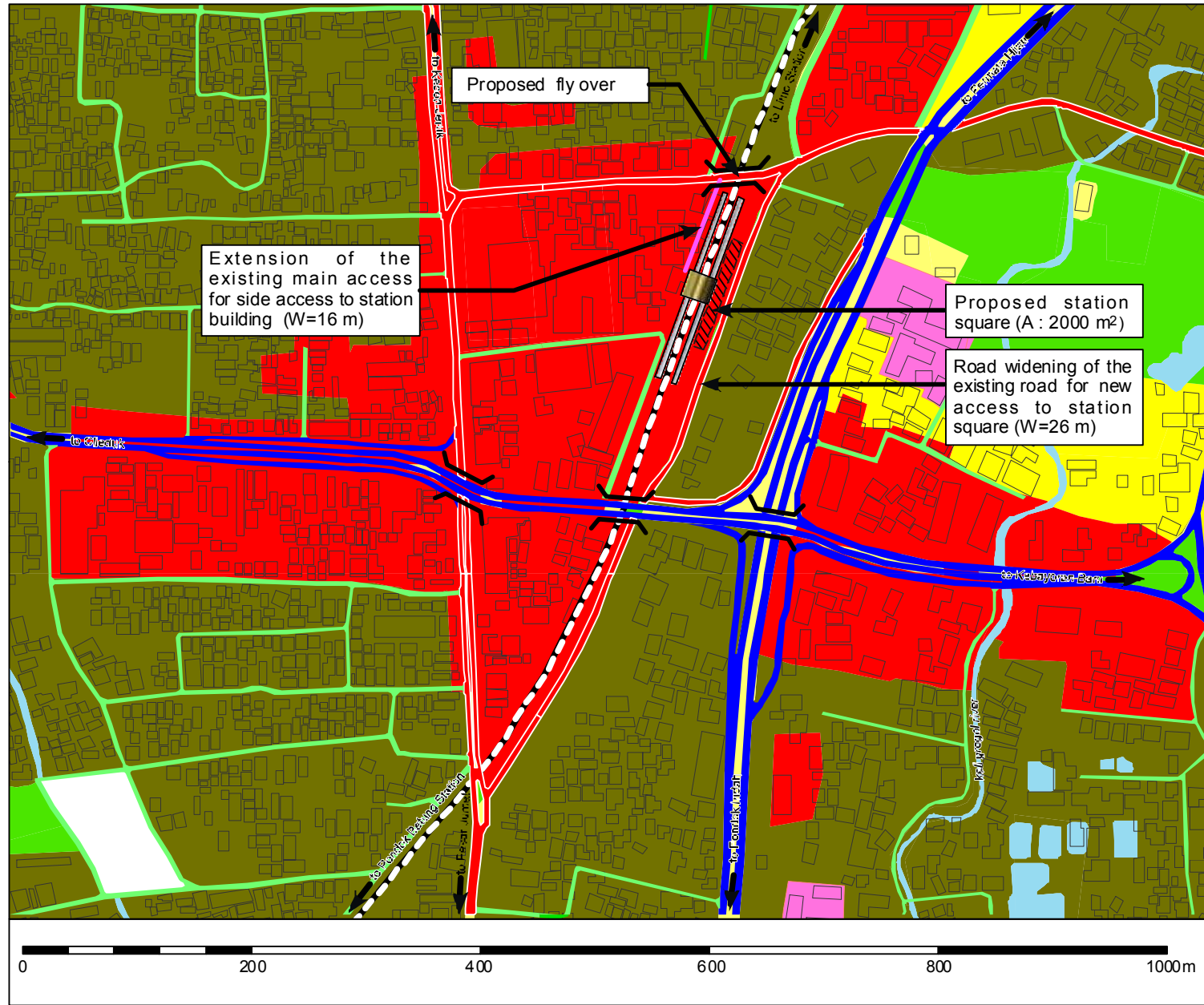


Figure 4.9.12

Access Road and Station Square Development Plan

Station : Kebayoran

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

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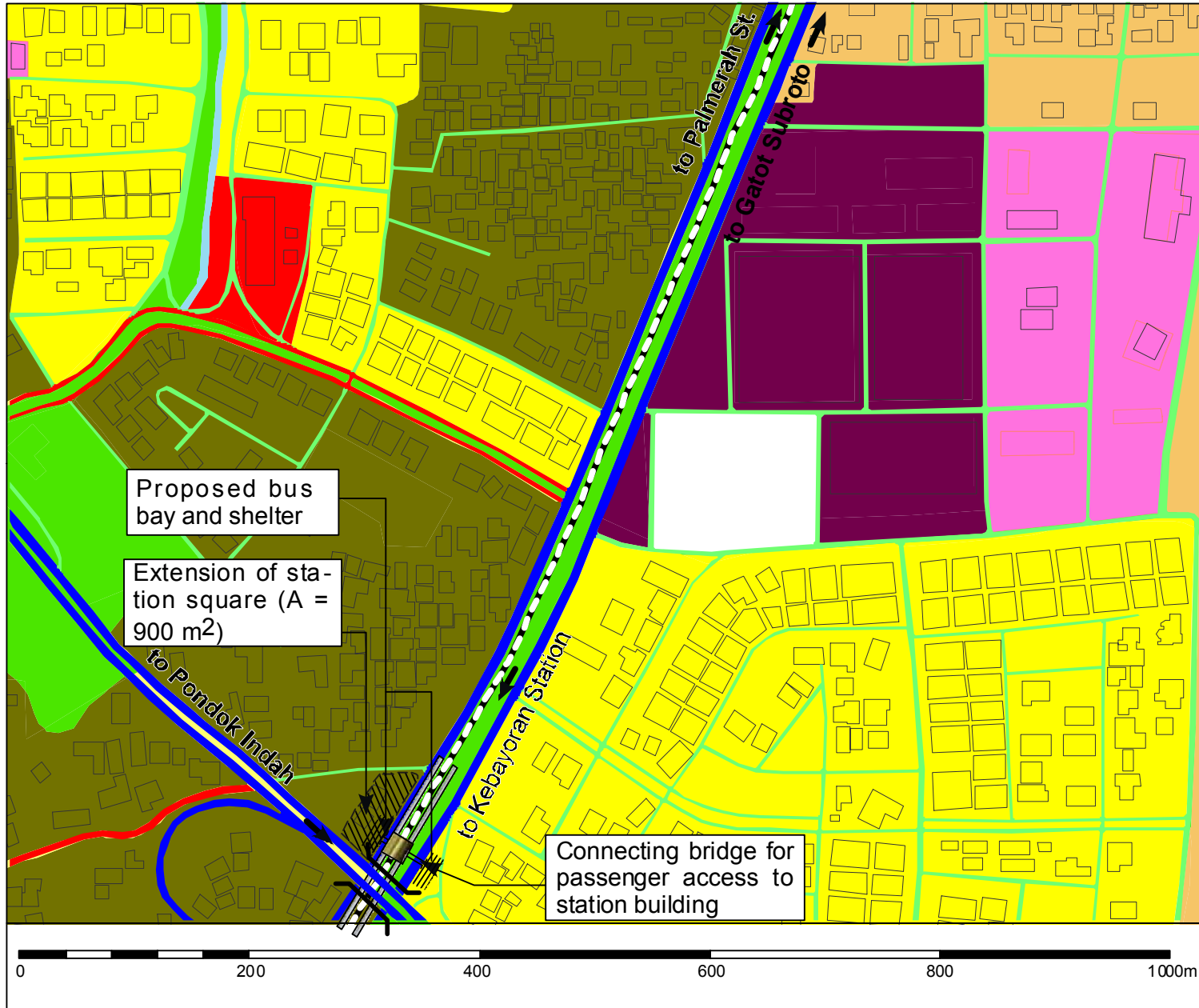


Figure 4.9.13

Access Road and Station Square Development Plan

Station : Limo

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING

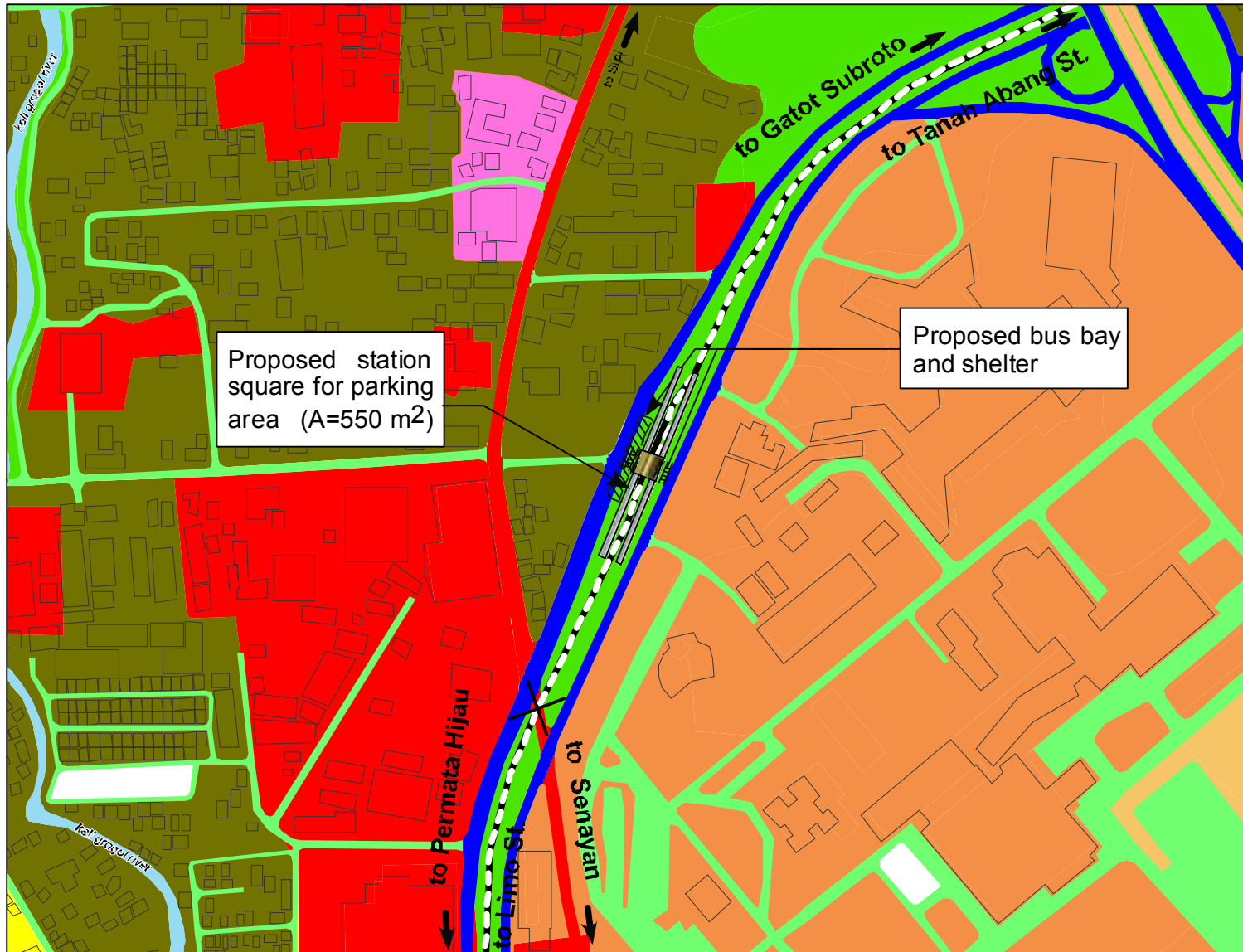


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Proposed station square for parking area (A=550 m²)

Proposed bus bay and shelter

Figure 4.9.14

Access Road and Station Square Development Plan

Station : Palmerah

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



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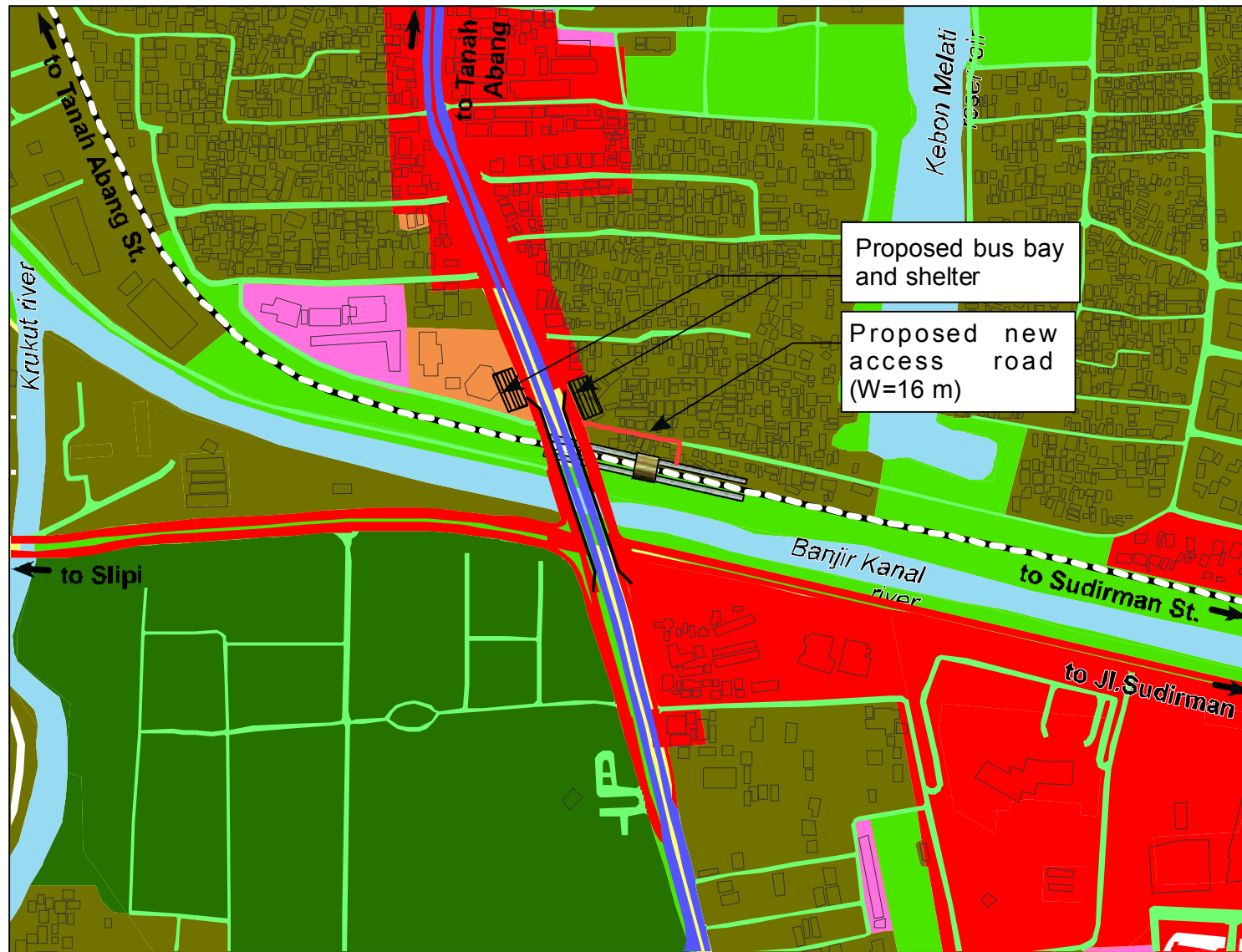


Figure 4.9.15

Access Road and Station Square Development Plan

Station : Karet

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



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Square for feeder service
A=2,500 m²

Connecting Bridge for passenger access building

Figure 4.9.16

Access Road and Station Square Development Plan

Station : Sudirman

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

SITRAMP

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











Figure 4.9.17

Access Road and Station Square Development Plan

Station : Rasuna Said

Legend

-  RAILWAY
-  STATION
-  STATION SQUARE
-  BUS BAY
-  PLATFORM
-  MAIN ACCESS TO STATION
-  PROPOSED ACCESS TO STATION
-  ARTERIAL WITH TOLL ROAD
-  PRIMARY ARTERIAL
-  PROPOSED PRIMARY ARTERIAL
-  MAIN ROAD COLLECTOR
-  LOCAL ROAD
-  FLY OVER
-  CONNECTION BRIDGE
-  UNDERPASS
-  LEVEL CROSSING



Scale : 1;5,000

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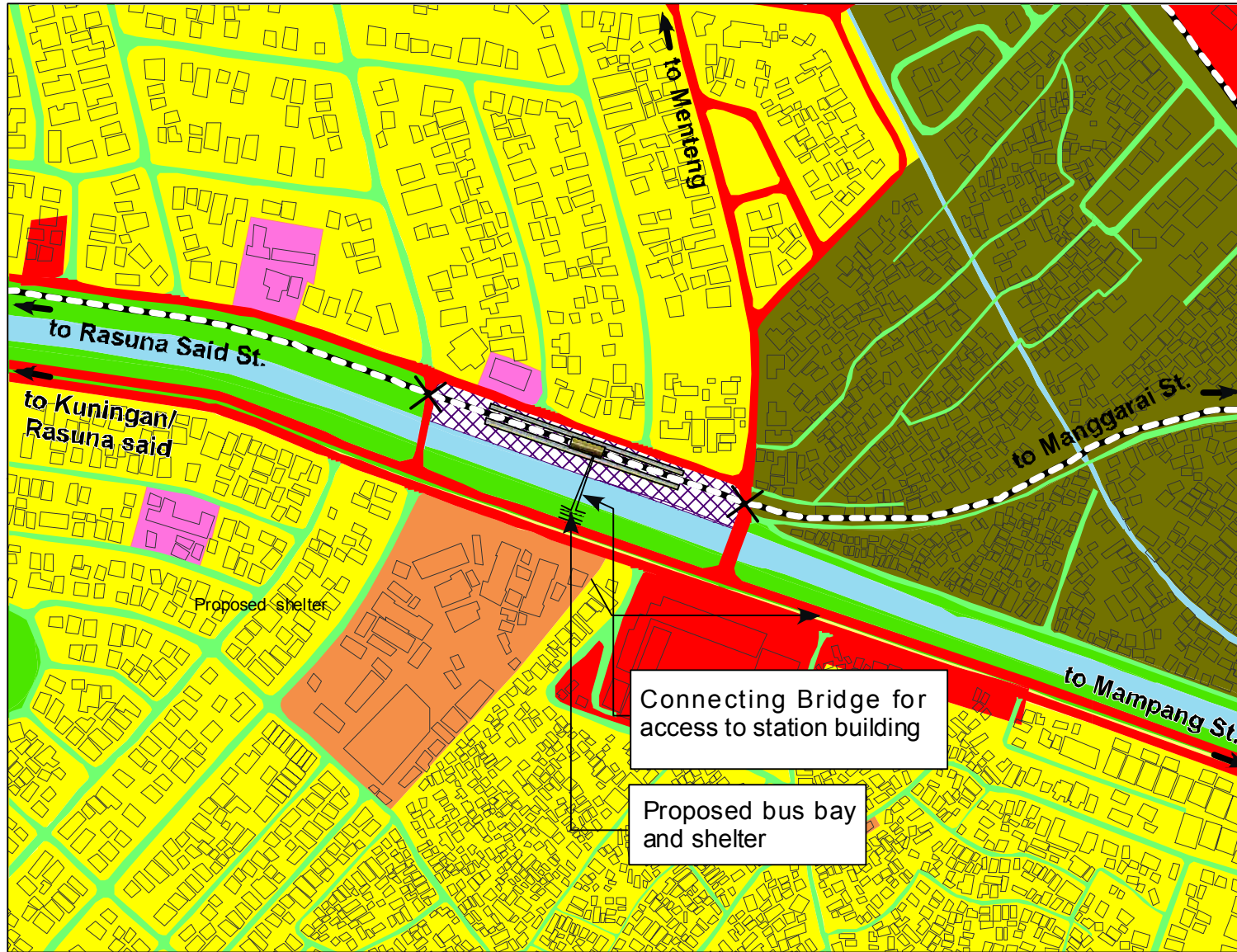


Figure 4.9.18

Access Road and Station Square Development Plan

Station : Mampang

Legend

- RAILWAY
- STATION
- STATION SQUARE
- BUS BAY
- PLATFORM
- MAIN ACCESS TO STATION
- PROPOSED ACCESS TO STATION
- ARTERIAL WITH TOLL ROAD
- PRIMARY ARTERIAL
- PROPOSED PRIMARY ARTERIAL
- MAIN ROAD COLLECTOR
- LOCAL ROAD
- FLY OVER
- CONNECTION BRIDGE
- UNDERPASS
- LEVEL CROSSING



Scale : 1;5,000

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Connecting Bridge for access to station building

Proposed bus bay and shelter

