3.5 Urban Transportation Services

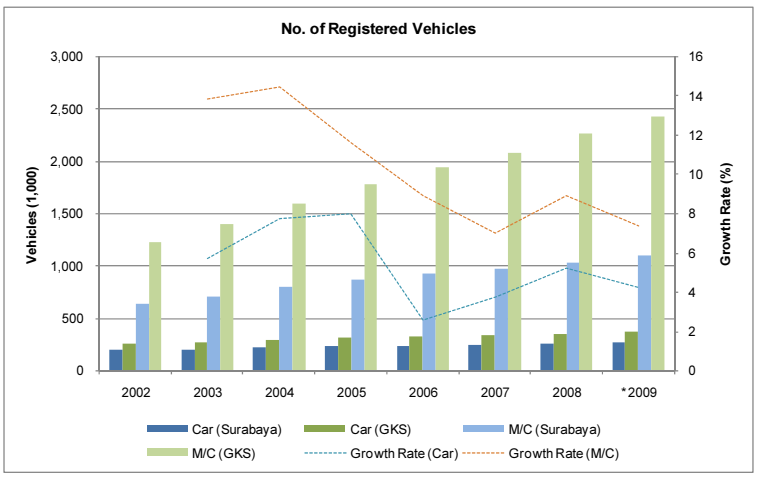
1) Vehicle Ownership

Table 3.5.1 and Figure 3.5.1 show a trend in the number of registered vehicles. The number of motorcycles registered in GKS doubled to 2.4 million since 2002 and its annual growth rate is 10.2%, which is extremely higher than the GRDP growth rate of 6.4% estimated in 2007. The annual growth rate of motorcycle registration outside Kota Surabaya, such as Sidoarjo, Bangkalan, Mojokerto, is much higher than that of Kota Surabaya, which is 8.2%. The registration of passenger cars in GKS has been increasing at 5.3% annually. The growth rate of Kota Surabaya is 4.6%, while that of Sidoarjo is 8.4%. These figures suggest that motorization has been rapidly growing outside Kota Surabaya.

Table 3.5.1 Number of Registered Vehicles

Kab./Kota	Vehicle Type	2002	2003	2004	2005	2006	2007	2008	2009 2)
Gresik	Passenger car 1)	11,976	12,739	13,711	14,978	15,719	16,452	17,439	18,536
	Motorcycle	121,556	138,253	158,710	181,692	197,935	216,759	241,207	260,538
Bangkalan	Passenger car	3,196	3,306	3,420	3,731	3,826	3,924	4,119	4,389
	Motorcycle	26,213	29,677	33,468	38,677	43,776	48,298	56,216	63,619
Mojokerto	Passenger car	10,509	11,016	11,488	12,248	12,570	12,988	13,567	14,494
	Motorcycle	111,356	127,558	147,559	168,856	182,664	195,588	216,327	231,410
Surabaya	Passenger car	190,522	200,565	216,304	231,306	235,318	242,710	253,187	260,720
	Motorcycle	630,933	708,343	800,008	863,838	928,686	972,375	1,028,686	1,094,290
Sidoarjo	Passenger car	35,385	38,344	41,569	46,974	49,639	52,740	57,482	62,059
	Motorcycle	238,967	285,540	337,636	391,580	435,660	478,820	533,724	577,156
Lamongan	Passenger car	3,353	3,476	3,671	4,033	4,292	4,572	4,909	5,339
	Motorcycle	96,432	105,751	119,209	136,831	150,580	162,730	182,424	197,323
GKS Total	Passenger car	254,941	269,446	290,163	313,270	321,364	333,386	350,703	365,537
	Motorcycle	1,225,457	1,395,122	1,596,590	1,781,474	1,939,301	2,074,570	2,258,584	2,424,336

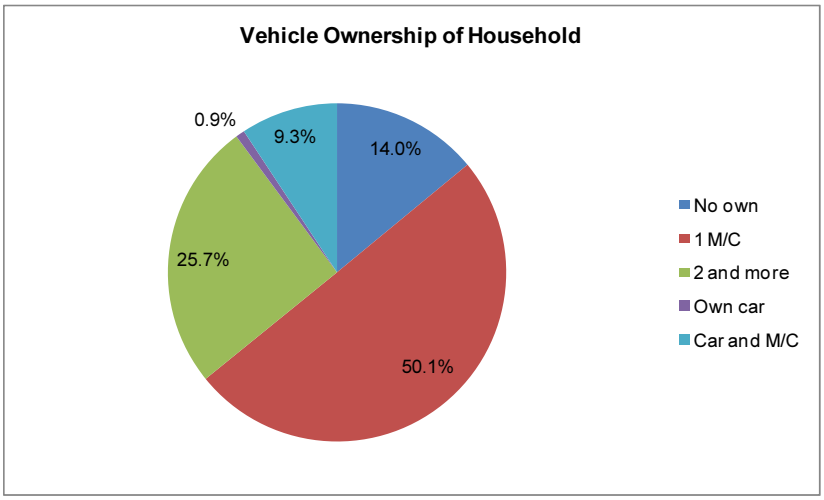
Source: Regional Revenue Agency (DISPENDA)
Notes: 1) Passenger car is the sum of the figures for "sedan," "jeep," and "ST wagon" in the original category.
2) Data in 2009 includes the registration until August.



Source: Regional Revenue Agency (DISPENDA)

Figure 3.5.1 Trend in Vehicle Registration

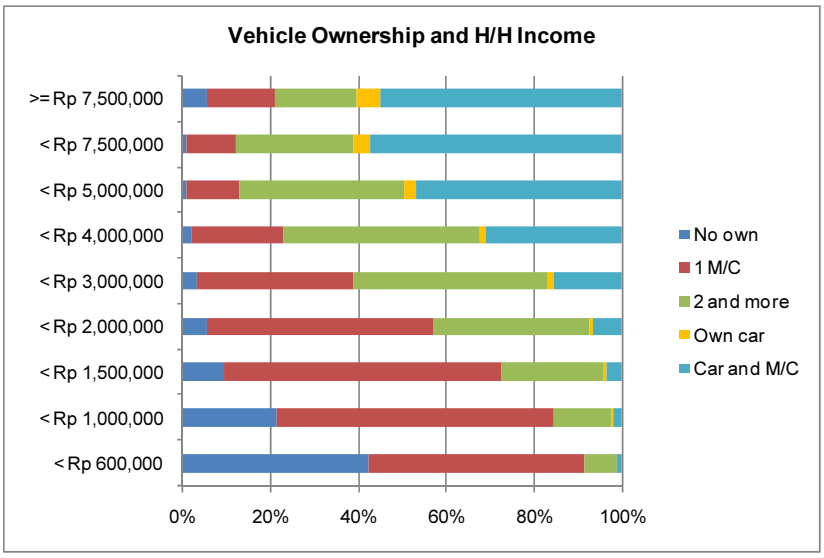
As a result of the Commuter Survey, the ownership of passenger vehicles was estimated, as shown in Figure 3.5.2. The figure shows that more than 75.8% of the total households owned motorcycles and 25.7% of this owned two or more motorcycles. Households owning at least one passenger car shared almost 10% and those not owning any vehicle registered at 14.1%.



Source: 2009 Commuter Survey, JICA Study Team

Figure 3.5.2 Vehicle Ownership

In general, income is a strong factor in vehicle ownership. Figure 3.5.3 illustrates the relationship between vehicle ownership and the level of monthly household income. It shows that the higher the income, the bigger the vehicle ownership becomes. It should be noted that almost all households with household income level of more than Rp. 3 million have cars.



Source: 2009 Commuter Survey, JICA Study Team

Figure 3.5.3 Vehicle Ownership by Household Income

Table 3.5.2 compares the results of the Commuter Survey with official data on vehicle ownership to check the former's reliability. Motorcycle owners comprised about 80% of the survey respondents, which is likely to be reasonable, while that of cars was 44%. However, some room for flexibility should be given because the vehicles might not be registered for household use but for business use.

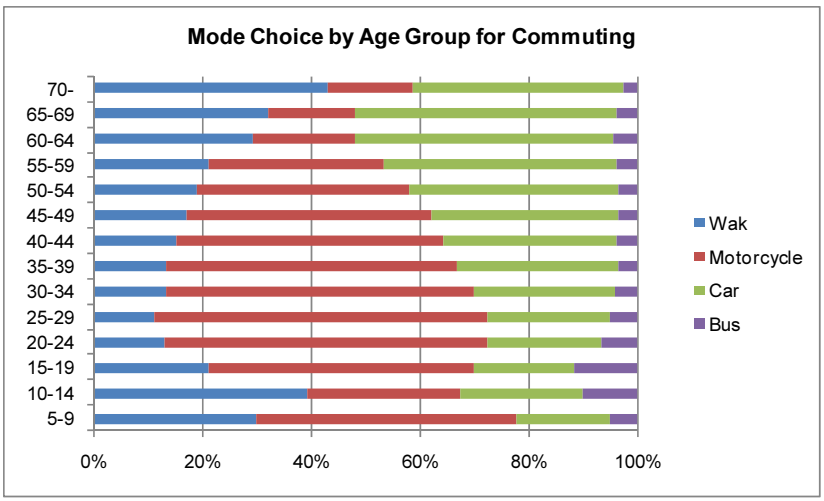
Table 3.5.2 Survey Results and Official Data on Vehicle Ownership

Area	Motorcycle			Passenger Car		
	Commuter Survey	Regional Revenue Agency (DISPENDA) 2009	Coverage (%)	Commuter Survey	Regional Revenue Agency (DISPENDA) 2009	Coverage (%)
Sidoarjo	523.2	577.2	90.6	46.8	62.1	75.4
Gresik	229.0	260.5	87.9	10.6	18.5	57.1
Bangkalan	59.3	63.6	93.2	5.3	4.4	119.6
Kota Surabaya	804.9	1,094.3	73.6	90.3	260.7	34.7
Total	1,616.4	1,995.6	81.0	153.0	345.7	44.2

Source: JICA Study Team

2) Modal Choice by Attribute

Figure 3.5.4 illustrates the modal choice by age group. Motorcycles were used more often by the young generation between 20 and 40 years old. The older the commuters were, the higher the use of passenger cars. The modal choice of those between five and nine years old seems more interesting than the other age groups.



Source: 2009 Commuter Survey, JICA Study Team

Figure 3.5.4 Modal Choice for Commuting by Age Group

3.6 Other Activities

1) Activity Options

The activities investigated in the Trip Diary Survey are listed in Table 3.6.1. The respondents were asked to tick off all activities they made during the designated time period, with start and end times. The options from A to G comprise activities done at home and those from H to R are carried out outside the home. Activities requiring movement, or travel, were answered after X, for example, "B, X, and H.".

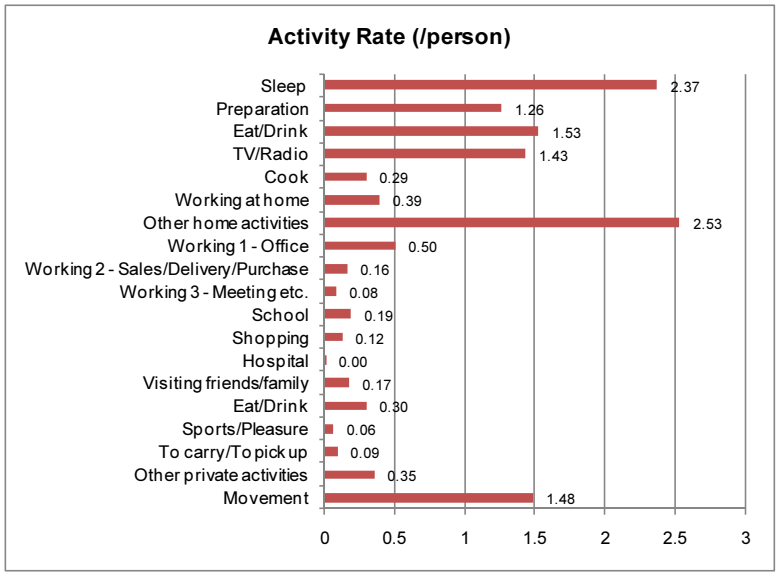
Table 3.6.1 Activities of Survey Respondents

Code	Activity
A	Sleep
B	Preparation
C	Eat/Drink
D	TV/Radio
E	Cook
F	Working at home
G	Other Home Activities
H	Working 1 - Office
I	Working 2 - Sales/Delivery/Purchase
J	Working 3 - Meeting etc
K	School
L	Shopping
M	Hospital
N	Visiting friends/family
O	Eat/Drink
P	Sports/Pleasure
Q	To carry/To Pick up
R	Other Private Activity
X	Movement

Source: 2009 Trip Diary Survey, JICA Study Team

2) Activity Rate

Figure 3.6.1 displays the activity rate, which refers to the average number of times a person does a certain activity per day. The trip rate of "sleep" indicates 2.37, which means that some people wake up early in the morning, sleep again soon after praying, and sleep at night. Because "eat/drink" at home is 1.53 and "eat/drink" outside home is 0.3, it follows that people eat an average of two times a day. The average rate of "working 1 – office," which is a commuting trip if this is accompanied with "movement," indicates 0.50. This figure is slightly higher than the figure shown in Table 3.3.1. The sum total of activity rates outside the home is 2.04. There are some activities that do not go with "movement," as shown in the rate of "movement" which is 1.43.



Source: 2009 Trip Diary Survey, JICA Study Team

Figure 3.6.1 Daily Activity Rate

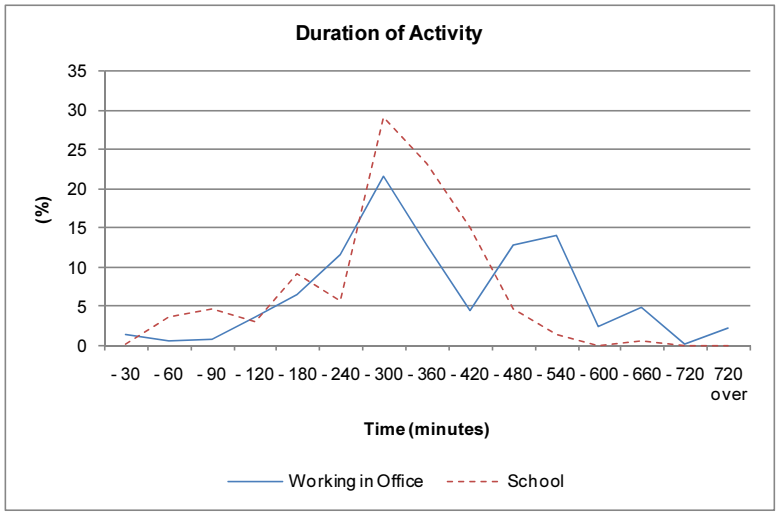
3) Activities Outside the Home

This section discusses how long activities, which were made after "movement," were done and how long the respondents traveled for the activities.

(1) Duration of Activities

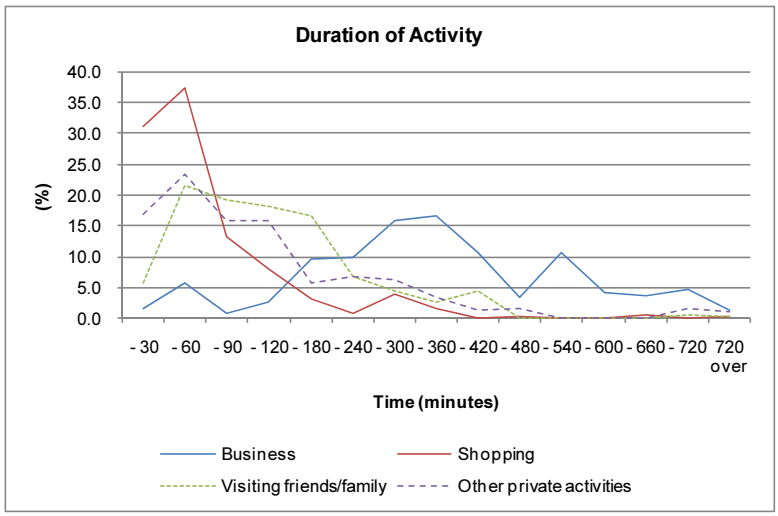
How much time is spent depends on the type of activity. The following figures show the distribution of duration by type of activity outside the home which accompanies "movement," thereby creating a trip. Figure 3.6.2 is the duration of "working in office" and "school." The largest number of answers for both "working in office" and "school" was in the range of 240 to 300 minutes, which is equal to or less than five hours. The working time distribution is the second largest, which is nine hours.

Figure 3.6.3 shows the distribution of duration for the other major activities that have statistically enough number of answers. The duration of "shopping" was found to be shorter and that of business activity was relatively longer. The duration of "visiting friends/family" and other private activities vary.



Source: 2009 Trip Diary Survey, JICA Study Team

Figure 3.6.2 Duration of Work and School Activities

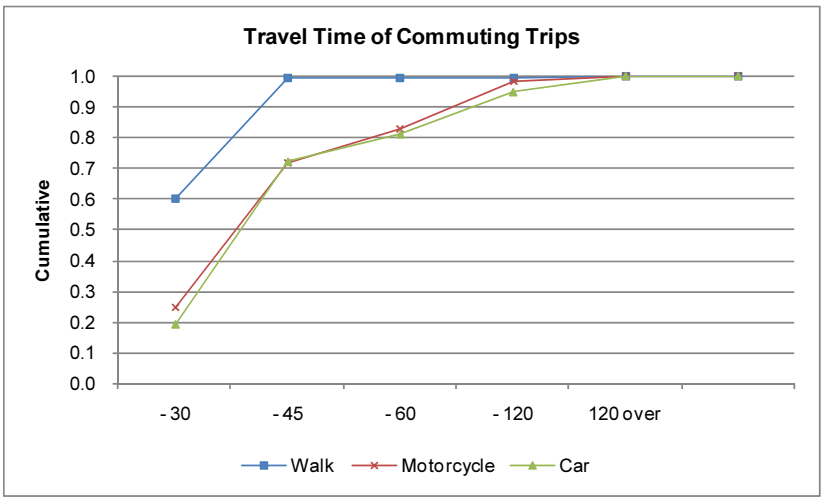


Source: 2009 Trip Diary Survey, JICA Study Team

Figure 3.6.3 Duration of Other Activities

(2) Travel Time

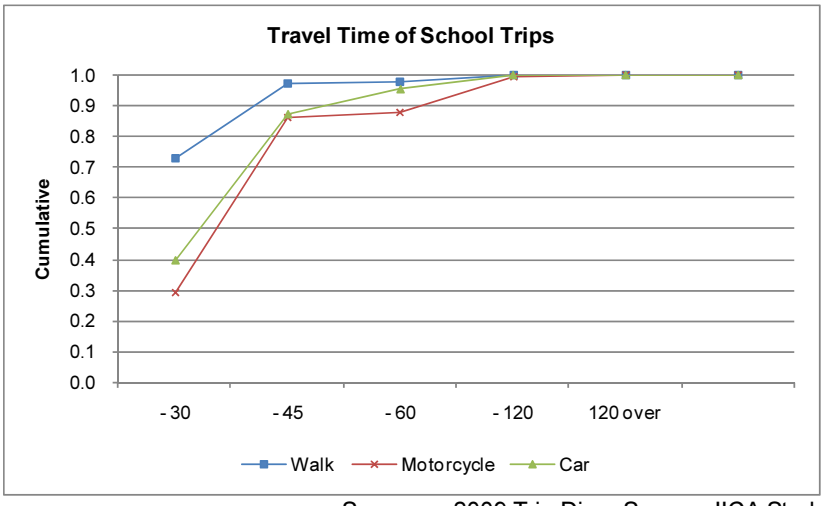
Figure 3.6.4 and Figure 3.6.5 describe the travel time distribution by mode for commuting and to-school trips, respectively. There was a tendency for respondents to answer with round numbers, such as 30 or 60 minutes. For commuting, walking was usually done for less than 30 minutes, or at most 45 minutes, while motorcycles and passenger cars are used for longer travel. Motorcycles and passenger cars have the same distribution.



Source: 2009 Trip Diary Survey, JICA Study Team

Figure 3.6.4 Distribution of Travel Time of Commuting Trips

The travel time of to-school trips was shorter than that of commuting trips by any mode. However, there were persons who walked a long time to go to school. The average travel time estimated based on these answers is discussed in section 3.3.



Source: 2009 Trip Diary Survey, JICA Study Team

Figure 3.6.5 Distribution of Travel Time of To-school Trips

4) Activity Pattern

Table 3.6.2 describes which activities were carried out before and after commuting and to-school trips. Trip rate per person is indicated as well. The activity rate done before both commuting and to-school trips was rather low, while that done after was high. The major activities done after are "eat/drink" for commuting, and "eat/drink" and "visiting friends/family" for to-school trips.

Table 3.6.2 Activity Pattern Before and After Commuting and To-school Trips

(Unit: trips/person/day)

Activity	Commute		School	
	Before	After	Before	After
Working 1 - Office	-	-	0.01	0.00
Working 2 - Sales/Delivery/Purchase	0.00	0.01	0.00	0.01
Working 3 - Meeting etc	0.00	0.00	0.00	0.00
School	0.00	0.00	-	-
Shopping	0.01	0.00	0.01	0.01
Hospital	0.00	0.00	0.00	0.00
Visiting friends/family	0.03	0.06	0.01	0.13
Eat/Drink	0.02	0.49	0.09	0.27
Sports/Pleasure	0.02	0.01	0.03	0.05
To carry/To Pick up	0.01	0.01	0.00	0.00
Other Private Activity	0.01	0.23	0.02	0.25
Total	0.11	0.82	0.16	0.73

Source: 2009 Trip Diary Survey, JICA Study Team

PLANNING ISSUES

4. PLANNING ISSUES

4.1 Road Network Issues

4.1.1 Current Road Traffic

1) Heavy Burden on Toll Road

The only main toll road in GKS is a north–south toll road which connects Manyar (Kab. Gresik), Surabaya, and Gempol (Kab. Pasuruan), extending to Tg. Perak Port. Since the section near the center of Surabaya, namely Dupak–Waru, runs along the western periphery of the Surabaya CBD, many commuting vehicles take this toll road. Moreover, since the toll road is connected to Tg. Perak Port, as well as the major industrial areas of Gresik, Surabaya, Sidoarjo, and Pasuruan, it also serves as a freight transportation corridor. For trucks moving between the port and the industrial areas, there are virtually no alternative routes available except for the route which goes through the CBD, but where they are banned from entering during peak hours. These conditions result in high traffic generation and mix with many slow, heavy vehicles on the existing toll road, as shown in Table 2.1.2. Such a burden on the existing toll road should be alleviated by providing alternative roads for both trucks and passenger vehicles.

2) Traffic Concentration into CBD

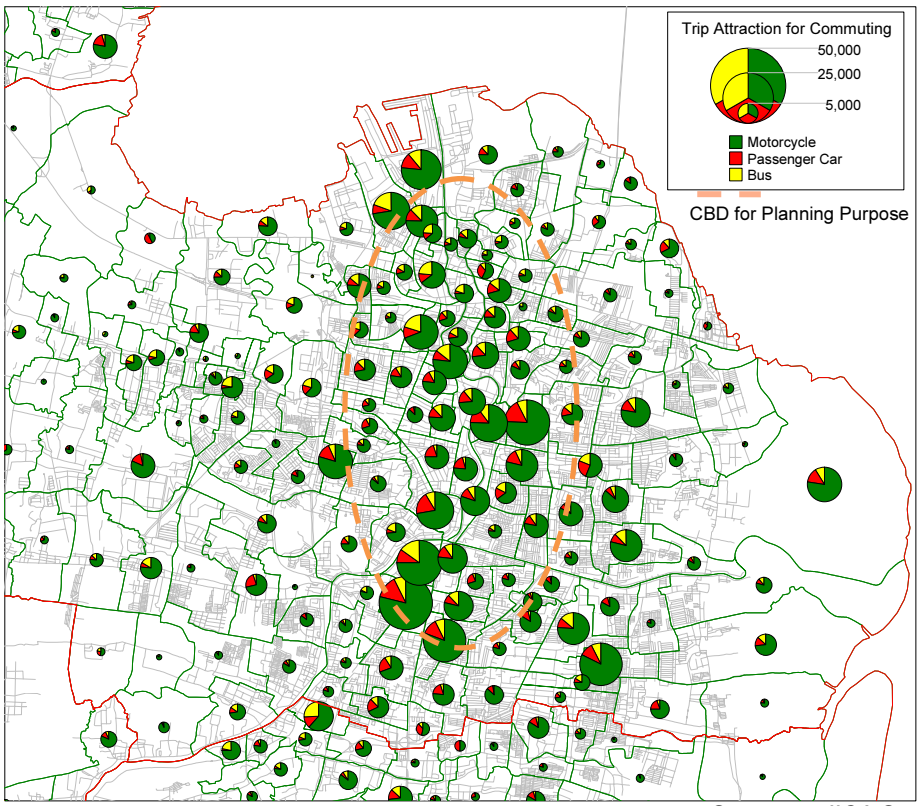
According to the draft spatial plan (RTRW) of Kota Surabaya for 2009–2029, the CBD is defined as an area with dense activities and one that is rapidly developing. It includes old *kota* (area around Jl. Kembang Jepun) and new *kota* (area around Jl. Tunjungan, Jl. Embong Malang, and Jl. Basuki Rachmat), as well as other areas such as Ngagel, Kertajaya, Jemursari, Mulyosari, and Mayjen. Sungkono–HR. Mohammad. For this study, the CBD is defined as the area where commuters' trip destinations are highly concentrated. As shown in Figure 4.1.1, the CBD has a rather long shape extending from north to south.

One of the key issues in urban transportation in Surabaya is how to control and manage the traffic demand into the CBD especially during peak hours. Daily traffic volumes on the roads in and around the CBD are presented in Source: 2009 Traffic Survey, JICA Study Team

Figure 4.1.2. Based on the collected data on the morning peak hour (7:00–8:00) traffic crossing the CBD boundaries, traffic volumes from the following directions to the CBD are remarkable:

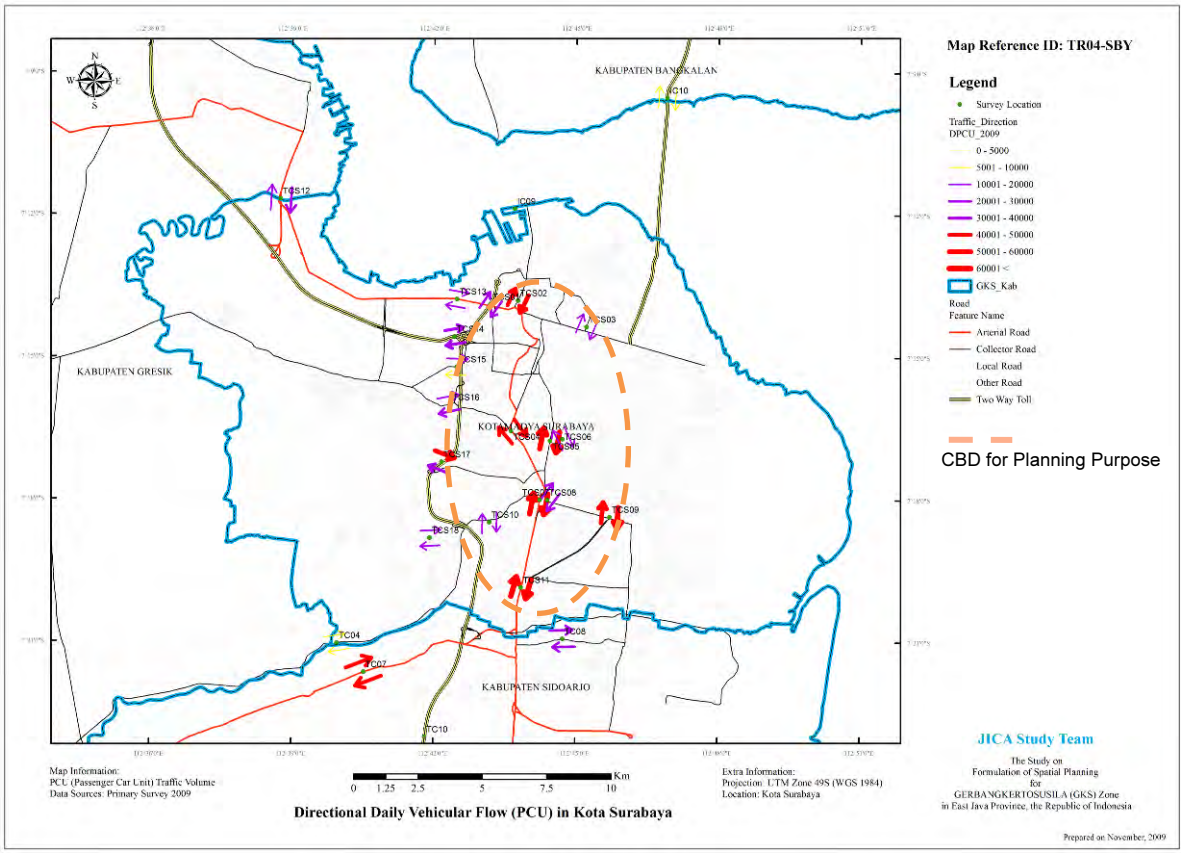
- From western sections (TCS13–TCS18) = 13,500 PCU per hour, and
- From southern sections (TCS11) = 8,000 PCUs per hour.

From the west to the CBD, there are several roads but they are relatively small, mostly with two lanes. On the other hand, there is only one road which directly comes from the south to the CBD (i.e., Jl. Achmad Yani), but the traffic is very large. It should be noted that an additional 4,000 PCUs per hour from the south go to Surabaya in the morning via the toll road, although not all the vehicles enter the CBD.



Source: JICA Study Team

Figure 4.1.1 Commuters' Trip Attraction in the Surabaya CBD



Source: 2009 Traffic Survey, JICA Study Team

Figure 4.1.2 Daily Directional Vehicular Flow in Surabaya

In terms of the road network in the CBD, there are only a few arterial roads that run through it. Although it may be rather difficult to construct new roads in the CBD due to the shortage of available land, it is necessary to provide some roads or flyovers to complement and connect the arterial roads.

3) Low Travel Speeds

The more traffic enters the CBD, the longer the travel time and the lower the travel speed become. Congestion in and around the CBD is severe especially during peak hours, when the major signalized intersections become saturated. As shown in Figures 2.2.8 and 2.2.10, travel speeds during morning and evening peak hours fall below 10 km/h on many road sections due to long waiting time for traffic signals to change, spillover from saturated intersections, and other conflicts such as merging traffic from side roads.

4.1.2 Traffic Control and Management

1) Lack of Traffic Information Systems

As the number of automobiles and motorcycles has rapidly increased in SMA, traffic congestion has become increasingly serious. In light of this situation, it has become important to identify the bottlenecks responsible for traffic congestion using intelligent

transportation systems (ITS), and to disperse traffic through optimal traffic signal control and the provision of traffic information. While the ATCS project is currently under way in Surabaya, traffic conditions on the road sections between intersections should be monitored as well. In addition to traffic monitoring, an efficient and inexpensive way of compiling data and disseminating traffic information is also necessary for SMA.

2) Weak Traffic Regulation

From the viewpoint of a safer and more orderly traffic, current regulations to separate motorcycles and public transportation from other private automobiles need to be maintained. These regulations become more effective if applied to longer and continuous road sections. Therefore, the extension of the target roads needs to be considered. Furthermore, if there are many conflicts between motorcycles and buses that make frequent stops, it may also be necessary to add another lane for motorcycles and buses to secure a smoother and safer traffic flow.

The current truck ban which is applied to certain arterial roads in Surabaya may also need to be reviewed as to whether other roads should be included or more hours should be added to ensure a more efficient use of the CBD roads. Parking regulations, especially on on-street parking, also need to be reassessed to guarantee a more efficient use of roads. In doing so, however, consideration must be given to ensuring that business and commercial activities along the roads, especially in the old kota area, also benefit from any action or decision.

3) Poor Traffic Safety

Pedestrian bridges, especially along the busy main arterial roads in the CBD, are insufficient in number. In order to reduce accidents involving pedestrians, more pedestrian bridges should be provided. In addition, narrow or poorly maintained sidewalks along the arterial roads need to be improved, since sidewalks of good quality will enhance not only pedestrian safety but also the urban amenity and environment. Furthermore, traffic education programs and campaigns, as well as stricter traffic law enforcement, should be promoted to reduce the number of traffic accidents.

4.2 Public Transportation Issues

4.2.1 Bus Transportation

While bus transportation should be planned in accordance with rail-based transportation development plans to realize the most effective public transportation system, there are two important issues to be considered. One is the reconsideration of the bus route structure, and the other is the provision of more bus priority lanes.

1) Reconsideration of Bus Route Structure

As described in section 2.4, current bus services, including both conventional bus and city minibus services, are concentrated on routes originating from suburban areas and ending in the city center. These bus routes should be categorized into three types from a planning

point of view, namely, line-haul bus services, CBD circulator bus services, and suburban feeder bus services. The existing bus route structure should be reconsidered also in light of existing and future travel demand.

2) Provision of More Bus Priority Lanes

As observed in many metropolitan areas, road traffic demand overwhelmingly exceeds the capacity of the road network, causing chronic traffic congestion especially in the CBD. In the context of urban transportation, public transportation should be given priority over private vehicles to secure smoother travel for those who use public transportation. Hence, the current unique traffic management rule of dedicating left lanes only for public transportation and motorcycles should be maintained. In addition, the possibility of applying bus priority lanes to more arterial roads should be examined to form a continuous network for buses. Furthermore, the introduction of dedicated bus lanes and new transit malls where many bus routes meet on these bus priority lanes should be studied.

4.2.2 Railway Transportation

Since rail-based transportation has a great potential for fast, reliable, and comfortable transportation services regardless of road traffic congestion, it should serve as the core mode of the public transportation system to attract more commuters now using private vehicles. To this end, there are two major development projects in the rail sector. One is the improvement of the existing railway system of PT. KA which aims to provide new commuter railway services, and the other is the development of a new rail-based mass transit system such as elevated or underground railway/LRT (light rail transit).

1) Improvement of Existing PT. KA Railway

As explained in section 2.5, there is still room for improvement in the existing PT. KA railway system including its infrastructure and facilities such as rolling stock, tracks, signaling/telecommunication, grade crossings, and electrification. Improving the existing railway has a great advantage in that new land acquisition is not required. Among others, the needed key improvements are as follows:

- Connecting Pasar Turi and Gubeng stations for a continuous commuter train operation between the north and south railway lines;
- Elevating most of the existing railway sections in SMA to avoid grade crossings;
- Double-tracking the existing railway between Lamongan and Sidoarjo/Mojokerto;
- Developing the Pasar Turi commuter station as recommended in the Surabaya Regional Rail Transport System (SRRTS) study conducted by the SNCF (Société Nationale des Chemins de fer français), a French National Railway Corporation;
- Developing a new elevated Surabaya Kota station between Pasar Turi and Gubeng stations;
- Operating inter-city trains from the existing Pasar Turi station for the northern trunk line

and from Gubeng station for the southern trunk line and for Malang line.

- Developing Sidotopo station not only for the current freight operation and locomotive maintenance of the trains on the southern trunk line and Malang Line but also to provide for passenger train services;
- Improving/Developing station plazas and approach roads to provide easier access to the stations for all modes of transportation; and
- Providing a new commuter railway station where the distance between the existing stations is more than 2 km in the central area and more than 4 km in the suburbs.

After improving the existing railway system, commuter trains and inter-city trains can be provided more effectively especially during peak hours. The capacity of commuter trains was estimated as 9,200–16,500 persons/hour/direction for the peak hour, based on an assumption of 6-unit trains, 6-minute intervals, 100–180% congestion ratios, and a combined operation with the inter-city trains (see Table 4.2.1). This capacity is much greater than the current passenger and commuter demand for the PT. KA train services, as described in section 2.5. In order to increase the existing railway passenger demand, it is necessary to provide enough attractive services in terms of frequency, compatibility, comfort, accessibility to stations, and intermodality with bus and private transportation.

Table 4.2.1 Railway Transportation Capacity

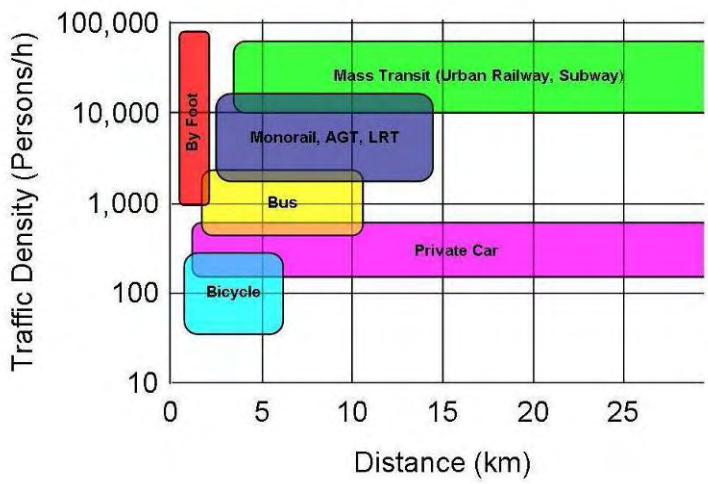
Units per Train	Congestion Ratio	Capacity per Unit (pax)	Frequency (min.)	Trains per Hour	Hourly Capacity (pax/hr)	Daily Capacity (pax/day)
4	180%	1,100	15	4	4,400	44,000
			10	6	6,600	66,000
			8	7.5	8,250	82,500
			6	10	11,000	110,000
			4	15	16,500	165,000
4	200%	1,200	15	4	4,800	48,000
			10	6	7,200	72,000
			8	7.5	9,000	90,000
			6	10	12,000	120,000
			4	15	18,000	180,000
6	180%	1,650	15	4	6,600	66,000
			10	6	9,900	99,000
			8	7.5	12,375	123,750
			6	10	16,500	165,000
			4	15	24,750	247,500
6	200%	1,850	15	4	7,400	74,000
			10	6	11,100	111,000
			8	7.5	13,875	138,750
			6	10	18,500	185,000
			4	15	27,750	277,500

Source: JICA Study Team
Note: Daily capacity was derived based on the assumption that peak hours carry 10% of total daily capacity.

2) Development of a New Rail-based Mass Transit System

After investigating commuter demand forecast, road traffic conditions, land use plans, and development directions in SMA, a new rail-based mass transit system may be recommended to supplement the existing PT. KA railway system. Whether to develop the

new mass transit system as a rail- or a bus-based transportation, such as BRT, will depend on the demand forecast and the service distances on the corresponding transportation corridors, as illustrated in Figure 4.2.1.



Source: Amano, et al. (1990), *Zusetsu Tetsudo Kougaku*, Maruzen.

Figure 4.2.1 Urban Public Transportation Systems by Passenger Density

Based on an assumption of 6-unit trains, 4-minute intervals, and 100–180% congestion ratios, and a service distance of up to 50 km, a mass rapid railway system with a capacity of 14,000–25,000 persons/hour/direction during peak hours will be enough to cover SMA. It may be constructed underground in the Surabaya CBD due to difficulty in land acquisition. On the other hand, in case of a monorail, a capacity of 10,000–18,000 persons/hour/direction during peak hours will suffice based on the same assumption as mentioned above but with a service distance of less than 15 km.

However, if passenger demand is estimated to be lower than the above-mentioned figures, a bus-based transportation system may be sufficient. However, it should be noted that the future passenger demand will also vary depending on the attractiveness and convenience of the new mass transit system including its accessibility and intermodality with other transportation modes.

4.2.3 Integration of Public Transportation

The integration of public transportation should be discussed in the following two aspects, which are further discussed in Chapter 10.

1) Integration of Rail and Bus Transportation

Even if the existing PT. KA railway system is improved and the planned rail-based mass transit system is developed, the rail-based transportation network will not be enough to cover all the travel demand in SMA. Hence, bus transportation is expected to supplement and

complement the rail-based transportation system, especially in areas beyond walking distances from the rail stations. In this case, a reorganization of the bus route structure will be required to provide feeder bus services to provide convenience to potential railway users.

In addition, the introduction of a common fare system would be convenient to public transportation passengers because they can utilize one ticket for several modes. It would also allow free, or at least discounted, transfers between different modes of public transportation. Moreover, it would be another incentive for current private vehicle users to shift to public transportation.

2) Integration of Public Transportation and Land Use

While at present, many large business, commercial, and housing development projects are sprouting all over Surabaya and its vicinity, it is of great importance to make the urban structure convenient for public transportation users through appropriate land-use plans. That is, since office buildings and shopping malls are large trip generators, they should be located within walking distances from stations. Setting high floor area ratios in areas around existing and planned stations will also induce a large amount of generated trips which can easily be served by rail-based transportation systems. After all, both public transportation and land use should be integrated under a concept of transit-oriented development (TOD).

REVIEW OF RELATED POLICY, PLAN, AND PROJECTS

5. REVIEW OF RELATED PLANS, STUDIES, AND PROJECTS

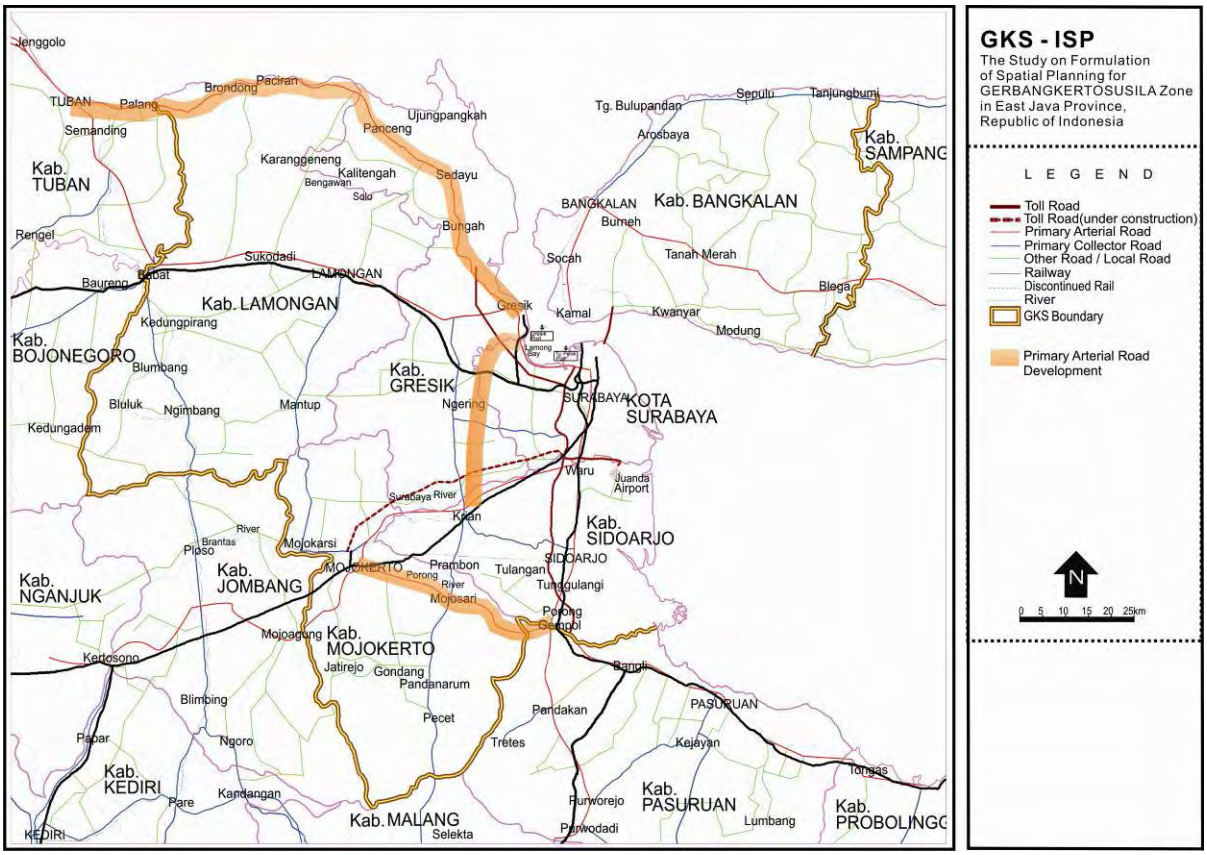
5.1 Road Sector

In this section, existing provincial transportation plans for GKS are described. In addition, recent major road development studies/projects in GKS are also presented especially in light of their implementation status. An explanation of existing road development plans for each kota/kabupaten is provided in this study's Progress Report I.

5.1.1 Road-related Plans for GKS and East Java Province

1) Non-toll Roads in GKS

In GKS, most sections of the existing primary arterial roads, which serve as national highways in East Java province as well as Java Island, have been developed as four-lane roads. The remaining sections of the primary arterial road from Surabaya west to Lamongan, moving southwest to Mojokerto, then south to Sidoarjo, and finally northeast to Bangkalan are also being planned to be widened in the near future to four lanes or at least two lanes with 2-meter hard shoulders. Development plans for other major primary arterial roads are presented in Figure 5.1.1.



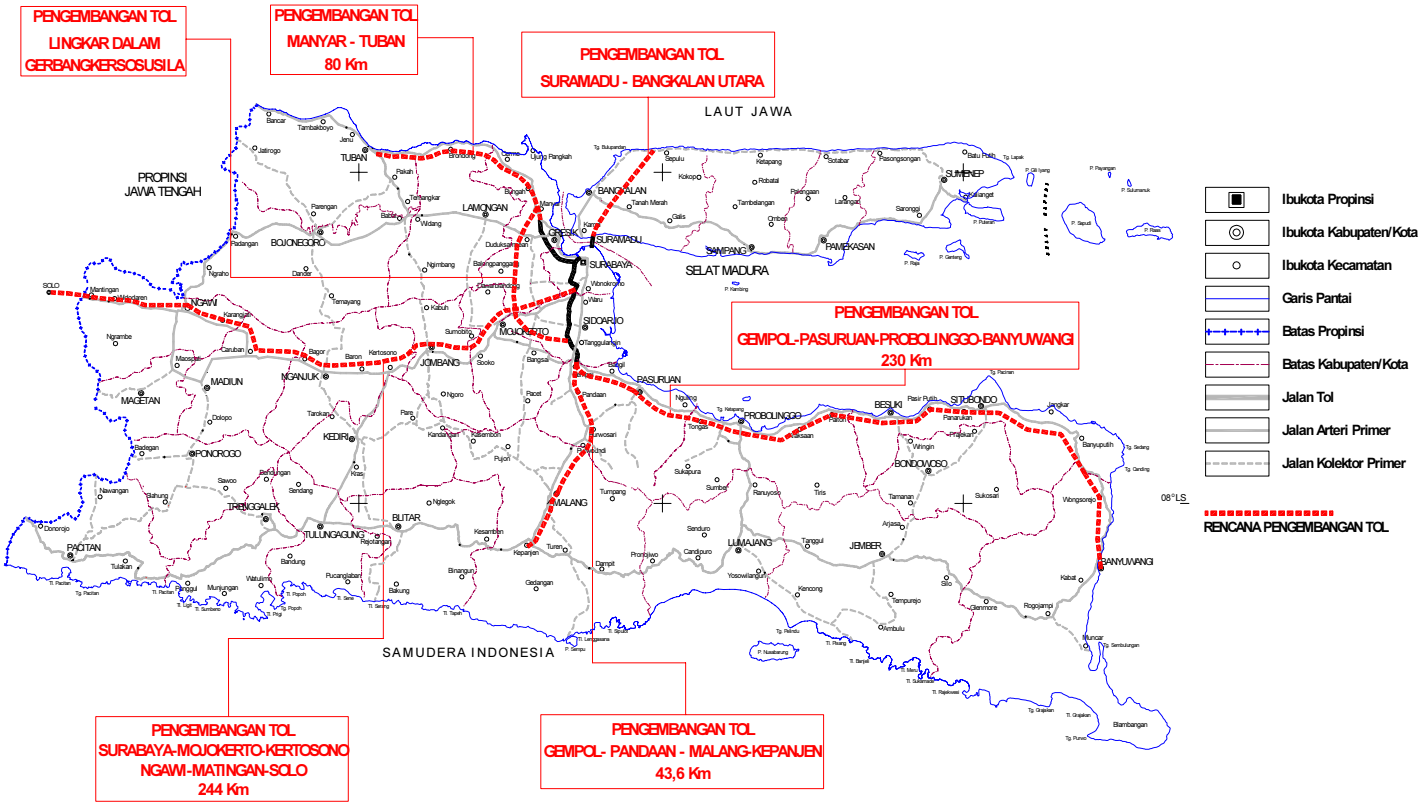
Source: Ministry of Public Works and Transportation Agency (Dinas Perhubungan) of East Java Province

Figure 5.1.1 Primary Arterial Road Development Plan in GKS

Due to the mud flow in Sidoarjo, part of the Mojokerto–Mojosari–Gempol road has served as an alternative road between Surabaya and Malang via Krian especially for heavy trucks. Meanwhile, the section of Gresik–Paciran–Tuban will be upgraded to national road to support the development of industrial and port activities along the road. Furthermore, according to the recent feasibility study conducted by the Ministry of Public Works, the Gresik–Krian (Jl. Romo Kalisari–Jl. Taman Raya (Krian Bypass), 25 km) has been selected for development as the arterial road in western Surabaya. This road will directly connect the existing toll roads and primary arterial roads on the Surabaya–Lamongan and Surabaya–Mojokerto corridors, and thus is expected to serve the regional movement of passengers and goods without going through Surabaya.

2) Toll Roads in GKS

In addition to the current toll roads in SMA, there are plans for toll roads in East Java province, as shown in Figure 5.1.2. The five-year National Development Plan emphasizes the utilization of private funds through public-private partnerships (PPPs) for smoother transportation and enhancement of the toll road network. Among others, the sections listed in Table 5.1.1 which are part of the Trans-Java Toll Road have been given high priority in an acceleration program adopted by the Ministry of Public Works. For the section of Surabaya–Mojokerto (total length: 37 km), in particular, the construction of the toll road is currently under way and it will be completed in 2011.



Source: Transportation Agency (Dinas Perhubungan) of East Java Province

Figure 5.1.2 Planned Toll Roads in East Java Province

Table 5.1.1 Development of Priority Toll Roads in and around GKS

No.	Toll Road Section	Investor/Operator	Length (km)	Investment Cost in Trillion Rp	Status
1	Kertosono–Mojokerto	PT. Marga Hanurata Intrinsic	41	2.21	Land acquisition in progress; Ground-breaking ceremony in 2008
2	Mojokerto–Surabaya	PT. Marga Nuiyasumo Agung	37	2.23	Under construction
3	Surabaya–Gempol	PT. Jasa Marga	43	-	In operation since 1984, discontinued at Porong due to mud flow
4	Gempol–Pasuruan	PT. Jasa Marga	32	1.80	Land acquisition in progress
5	Gempol–Malang		32	1.5 – 2.0	Tendering still open

Source: Ministry of Public Works, Toll Road Management Board (Badan Pengatur Jalan Tol)

Other toll road development plans in GKS include:

- Gresik– Paciran–Tuban,
- Gresik– Lamongan–Bojonegoro,
- Krian–Legundi–Gresik, and
- Suramadu Bridge–Northern Bangkalan.

In Kota Surabaya, there are also development plans for the Surabaya Middle Toll Road (Aloha–Wonokromo–Tg. Perak) and East Ring Road (Waru–Juanda–Suramadu Bridge–Tg. Perak). While the section of Waru–Juanda Airport (13.6 km) has been in service since 2008, the rest are still in the conceptual stage.

3) Freight Traffic in GKS

For container (40 ft.) trucks, roads used for transportation are limited to primary arterial roads as well as toll roads. Future container transportation routes in East Java province are presented in Figure 5.1.3. In accordance with new port development plans, the access trunk roads will be upgraded to primary arterial road class including the northern coastal road section of Gresik–Paciran–Tuban and the coastal road on Madura Island.

In order to reduce road damage caused by overloaded trucks, regulations against overloading are being enforced in accordance with a phased schedule as instructed by the central government. At present, at each weighbridge, overloaded trucks which do not exceed 30% of their loading capacity are still allowed passage after paying fees; however, overloaded trucks over the maximum percentage are given a notice of traffic offense (CPPPL) and are forced to either reduce the load on the spot or to return to their places of origin. Control of overloading is gradually being tightened. In the future, weighbridge stations are to be classified, and weighbridge stations of Type A (i.e., the highest type) will also serve as a rest area for drivers.

Source: Regional Transportation Plan East Java (Tatrawil Jawa Timur) 2009-2029, Transportation Agency (Dinas Perhubungan) of East Java Province

Figure 5.1.3 Planned Transportation Routes in East Java Province for Container Trucks

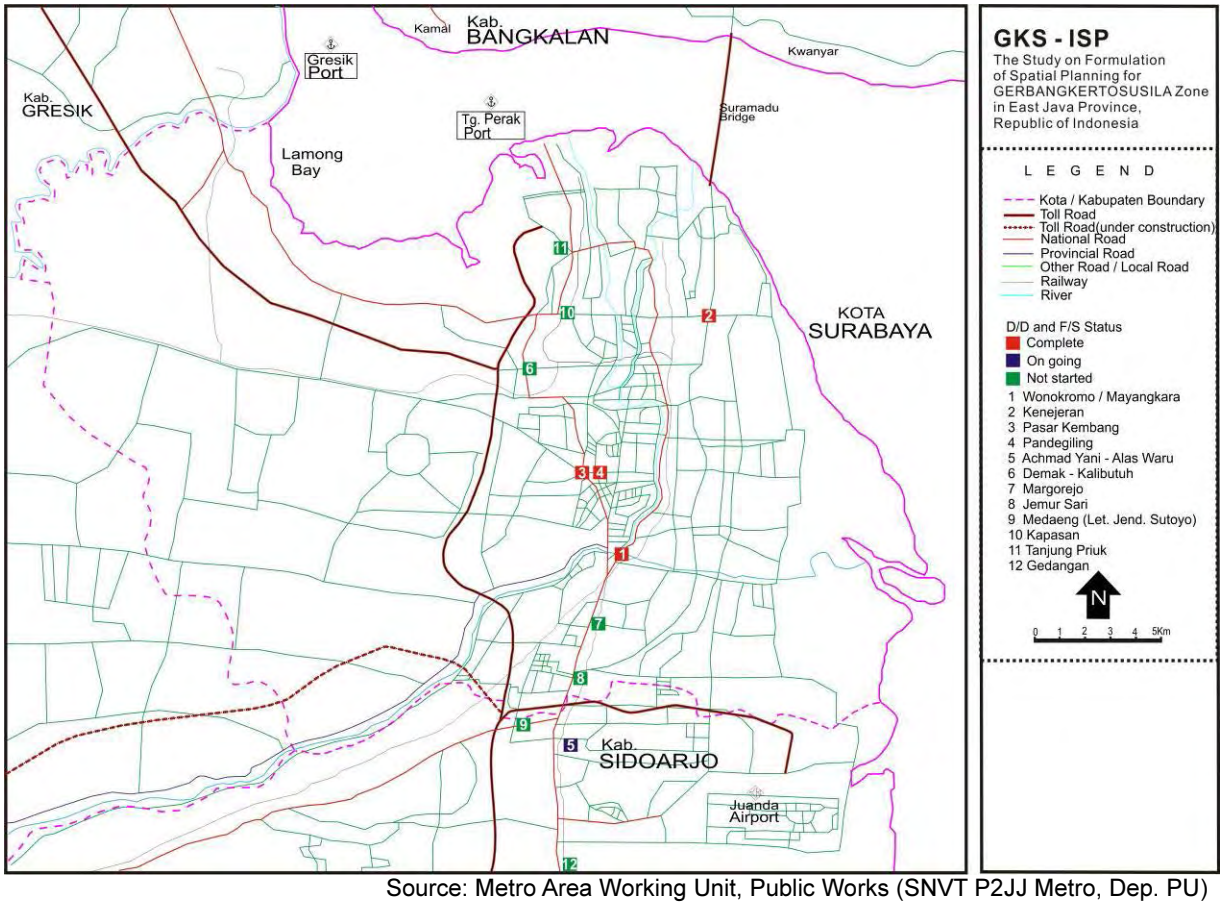
3) Flyover and Underpass Projects in SMA

For solving bottleneck congestion at major intersections and railway crossings in SMA, flyovers and underpasses have been planned by the central and local authorities as an effective countermeasure. However, many of these projects have not been realized yet, mainly because of financial constraints and land acquisition problems. The candidate flyover and underpass projects are listed in Table 5.1.2, and the locations are shown in Figure 5.1.4. While some flyovers are to be constructed over the existing railway, there is also a plan to elevate the railway tracks as proposed by SNCF. Thus, special attention has to be paid to this matter, and coordination between relevant agencies will also be necessary in implementing these projects.

Table 5.1.2 Status of Flyover and Underpass Projects in SMA

No.	Name	Status of D/D and F/S	Remark
1	Wonokromo/Mayangkara	Complete	N-S, 2-way Flyover (additional)
2	Kenjeran	Complete	E-W, 2-way Flyover
3	Pasar Kembang	Complete	N-S, 2-way Flyover Construction to start in 2010
4	Pandegiling	Complete	Changed to E-W Underpass, Construction to start in 2010
5	Achmad Yani–Alas Waru	On going	N-E, 1-way Underpass (under railway)
6	Demak–Kalibutuh	Not started	N-S, 2-way Flyover (over railway)
7	Margorejo	Not started	N-E, 1-way Flyover (over railway) E-S, 1-way Flyover (over railway)
8	Jemur Sari	Not started	N-E, 1-way Flyover (over railway) E-S, 1-way Flyover (over railway)
9	Medaeng (Let. Jend. Sutoyo)	Not started	W-E, 1-way Flyover (to enter Purabaya Bus Terminal)
10	Kapasan	Not started	E-W, 2-way Flyover (over railway)
11	Tanjung Priuk	Not started	E-W, 2-way Flyover (over railway)
12	Gedangan	Not started	E-W, 2-way Flyover

Source: Metro Area Working Unit, Public Works (SNVT P2JJ Metro, Dep. PU)



Source: Metro Area Working Unit, Public Works (SNVT P2JJ Metro, Dep. PU)

Figure 5.1.4 Status of Flyover and Underpass Projects in SMA

5.1.2 Major Road Development Studies and Projects in GKS

For the development of the road sector in GKS, the Government of Japan provided official development assistance to Indonesia in the forms of two major studies/projects, as follows:

- Study for Arterial Road System Development in Surabaya Metropolitan Area (ARSDS – GKS) (JICA, February 1996–June 1997); and
- Surabaya Urban Development Project (SUDP) – Urban Road Sector (formally JBIC Loan IP-400, March 1993–March 2004).

The ARSDS–GKS formulated the first and only master plan on the arterial road system in GKS, and the SUDP prepared the civil works funding for the urban road network in SMA.

1) ARSDS–GKS (JICA Study, 1996–1997)

The objective of this study was to formulate a master plan on the arterial road system, which comprises primary arterial, primary collector, and secondary arterial roads in GKS region as well as to undertake a feasibility study on priority road projects selected during the course of the master plan study. A planning target year for the study was set for 2018 which is the last fiscal year of the Second 25-year National Development Plan. The year 2008 was set as an intermediate year for the planning time horizon.

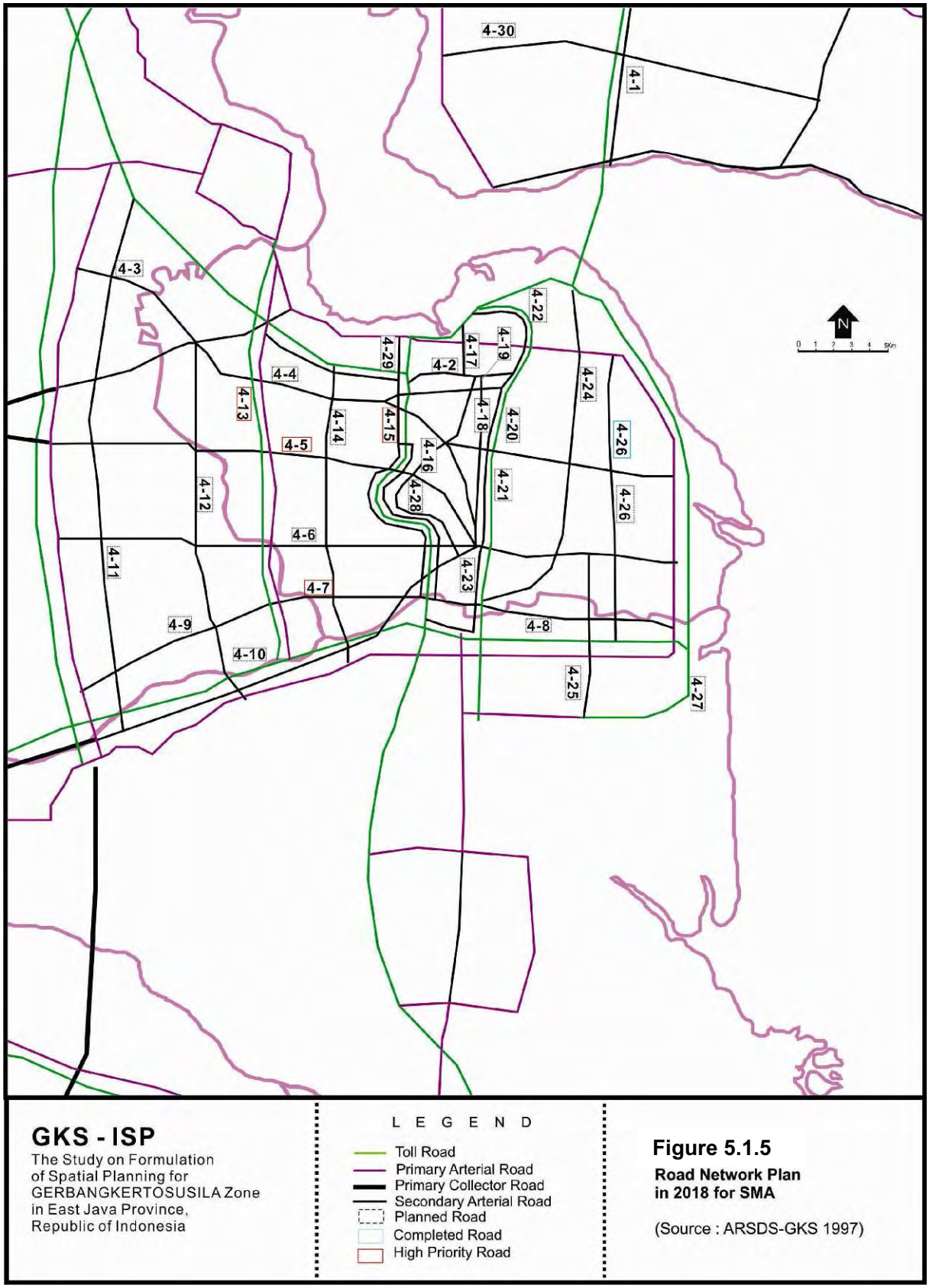
The basic road network master plan, in the target year of 2018, is illustrated in Figure 5.1.5 for SMA and in Figure 5.1.6 for outside SMA but within GKS. In the feasibility study following the master plan, five high-priority roads in SMA were examined as to their feasibility and listed in Table 5.3.1 and marked in red in Figure 5.1.5. Of these projects, only Project 4-25 was implemented as of November 2009.

Table 5.1.3 Planned High-priority Road Projects in SMA up to 2018

Code No.	Length (km)	Road Route
4-7	25.6	Kedamen–Sumur Welut–Jemur Sari–Prapen
4-15	15.5	Jl. Kali Anak–Waru
4-5	27.7	O.R.R (near Crème)–Raya Darmo Permai–Sunkono–Wonokromo–Raya Panjang Jiwo–Eastern Subcenter
4-13	20.6	Gresik–Driyorejo
4-25	9.5	Jl. Raya Rungkut–Jl. Suprapto–Juanda Airport

Source: ARSDS–GKS (1997)

In the ARSDS–GKS master plan, many road projects for SMA and GKS were listed for implementation by 2018. The implemented road projects in the master plan as of November 2009 are marked in blue in Figure 5.1.5 and Figure 5.1.6. While the implementation of road projects in GKS outside SMA has relatively been better, road projects in SMA have not been well implemented mainly because of land acquisition problems.


4-30
4-1
4-3
4-22
4-29
4-17
4-19
4-2
4-24
4-4
4-13
4-14
4-15
4-18
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4-26
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N
0 1 2 3 4 5Km
GKS - ISP
The Study on Formulation of Spatial Planning for GERBANGKERTOSUSILA Zone in East Java Province, Republic of Indonesia
L E G E N D
Toll Road
Primary Arterial Road
Primary Collector Road
Secondary Arterial Road
Planned Road
Completed Road
High Priority Road
Figure 5.1.5
Road Network Plan in 2018 for SMA
(Source : ARSDS-GKS 1997)

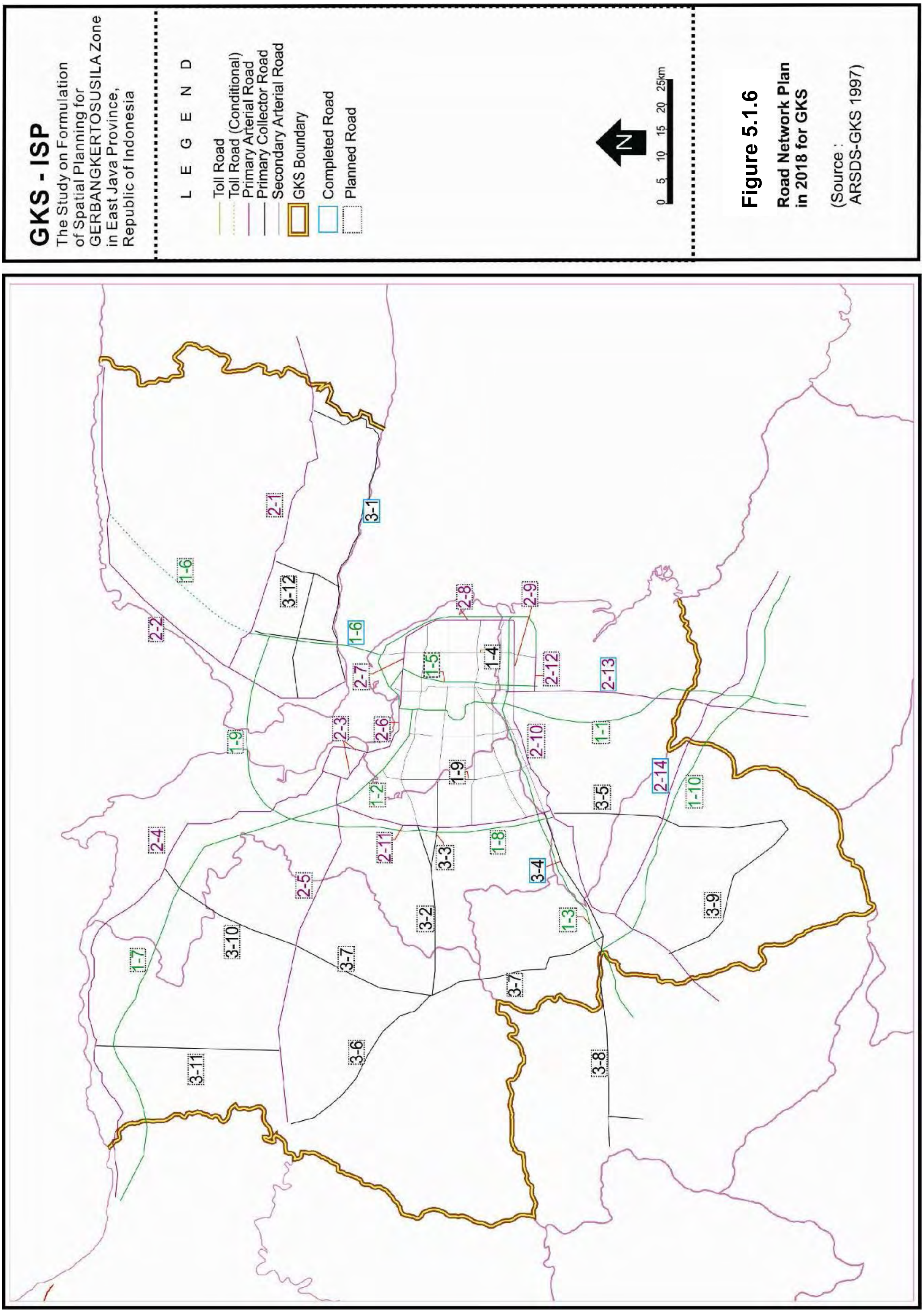


Figure 5.1.6
Road Network Plan in 2018 for GKS
(Source : ARSDS-GKS 1997)

2) SUDP (JBIC Loan, 1993–2004)

The SUDP started in 1993, co-financed by the Japan Bank for International Cooperation (JBIC) and the International Bank for Rural Development (IBRD). The original scope of work was divided into the following five sectors:

- Urban Road;
- Drainage;
- Solid Waste;
- Water Supply; and
- Institutional Management.

The urban road sector implemented eight packages consisting of three packages for Jl. Kenjeran, two packages for the Middle Eastern Ring Road (MERR), two packages for Jl. Margomulyo, and one package for Jl. Mastrip. The completed road sections are listed in Table 5.1.4, and the photos are shown in Figure 5.1.7.

The urban road sector planned to acquire 102.68 ha of land, out of which 72.04 ha was acquired. The Jl. Kenjeran 1B and MERR IIA packages started in July 2002 but were not completed within the loan disbursement period due to the land acquisition problems. The remaining road sections were constructed using government funds. Thus, land acquisition was the biggest issue for the SUDP. Most of the delayed works were due to the delay in land acquisition. Major reasons for the slow land acquisition are: (1) weak legal support; (2) corruption; (3) no strategic action; (4) undisciplined social resistance; and (5) slow administration.

In addition, land acquisition had become more difficult every year. When land acquisition got delayed and the land price went up, budgetary shortage occurred. In fact, the average land price in SUDP jumped four times in a period of three years (1999–2002). Among the above-mentioned reasons, the legal support for land acquisition should be urgently established. Otherwise, land acquisition for all essential public facilities will be seriously hampered. It is recommended that the Land Acquisition and Resettlement Action Plan (LARAP) obligated to the project owner should be endorsed by the local council (DPRD) for legalization to ensure fast land acquisition.

Table 5.1.4 Urban Roads Constructed by SUDP

	Construction Package	Section			Length (m)	Constriction Cost (Rp wo VAT)	Number of Lanes		Width of Road (m)		
							Before	After	Before	After (min.)	
1	Jl.Kenjeran IA	Intersection Jl. Kapasan	to	Cemetery Wr. Supratman (Setro Bridge)	940	2,433,310,232	Two lanes	Dual 3 lanes	7	21	
2	Jl.Kenjeran IB	Cemetery Wr. Supratman (Setro Bridge)	to	Intersection Jl. Kedungcowek	950	8,389,530,818	Two lanes	Dual 3 lanes	7	21	
3	Jl.Kenjeran II	Intersection Jl. Kedungcowek	to	Intersection Jl. Tempurejo	3,030	7,271,552,609	Two lanes	Dual 3 lanes	7	21	
4	Jl.MERR I	Inter section Jl. A. Yani (Waru)	to	Intersection Jl. Pondok Chandra	6,600	**cancelled**	New Construction/ Dual two lanes	Dual 3 lanes	0 / 14		21
5	Jl.MERR IIA	Intersection Jl. Mulyosari	to	Junction Jl. Kenjeran II	2,250	7,301,313,327	New Construction	Dual 3 lanes		21	
6	Jl.MERR IIB	Intersection Jl. A. R. Hakim	to	Intersection Jl. Mulyosari	2,850	9,556,667,082	New Construction/ Dual two lanes	Dual 3 lanes	0 / 14	21	
7	Jl.Banyu Urip I	Inter section Jl. Simo Tambaan II	to	Intersection Jl. Pandegiling		**cancelled**	Two lanes	Dual 3 lanes	7		21
8	Jl.Banyu Urip II	Inter section Jl. Simo Tambaan II	to	Intersection Jl. Balongsari		**cancelled**	Two lanes	Dual 3 lanes	7		21
9	Jl.Margomulio Second Carriageway	Jl. Tol Tandes (west side)	to	Rail way Jl. Margomulyo	1,700	3,253,613,344	New Construction	2 lanes		8	
10	Jl.Margomulio Second Carriageway Additional	Rail way Jl. Margomulyo	to	Intersection Jl. Balongsari	200	755,527,640	New Construction/ two lanes	Dual 2 lanes	0/ 7	16	
11	Jl.Margomulyo III	Intersection Jl. Gresik	to	Intersection Jl. Balongsari	3,200	55,127,571,000	Dual 2 lanes	Dual 3 lanes + Frontage 2 lanes	14	28	
12	Jl.Mastrip I	Intersection Jl. Joyoboyo	to	Intersection Gunungsari TOL	3,209	9,504,364,769	Two lanes	Dual 3 lanes	8	21	
Total				Length (m) =	24,929	103,593,450,821	Area (m2) =	493,040	Ave.=	19.8	21.0

Source: SUDP Project Completion Report (2004)

Jl. Kenjeran I

Jl. Kenjeran IB, Cs

Jl. Kenjeran II

Jl. Margomulyo II

Jl. Margomulyo III

MERR II-A

MERR II-B

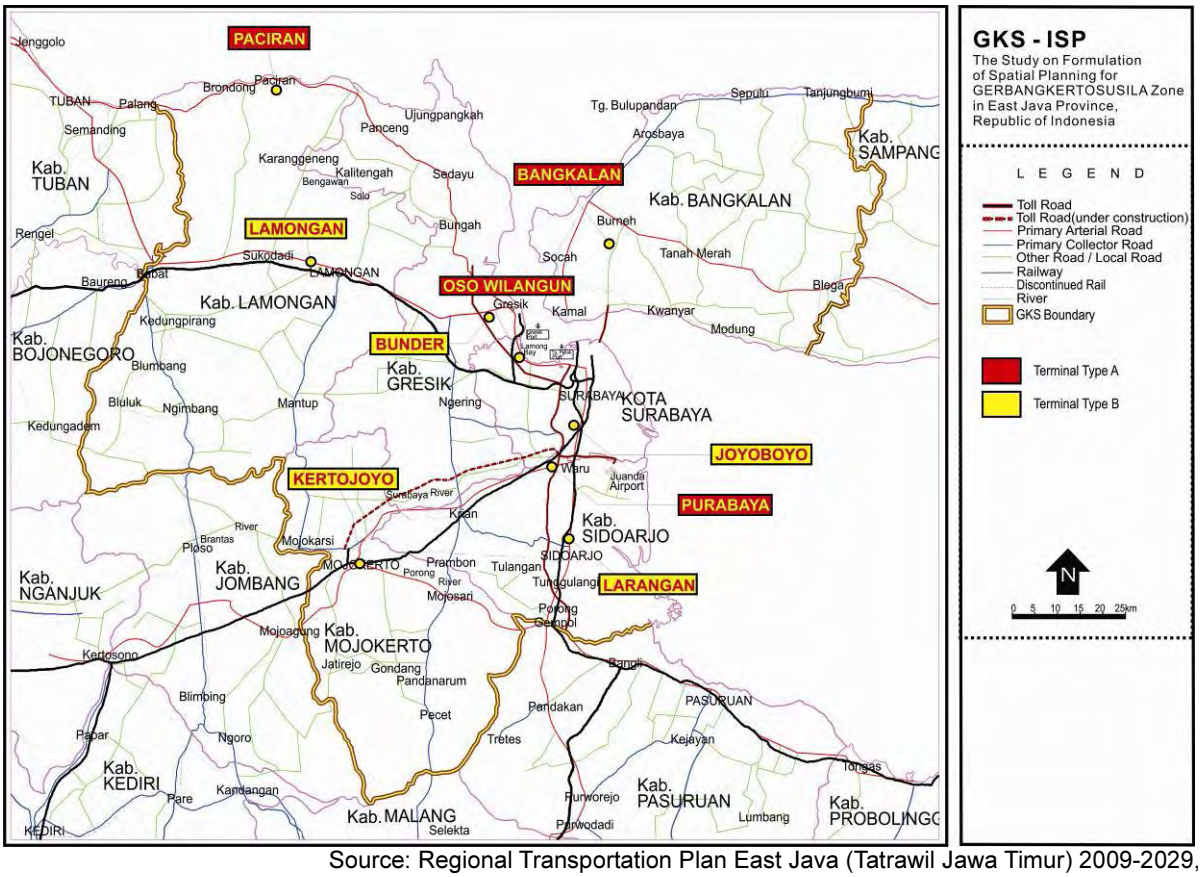
Jl. Mastrip I

Figure 5.1.7 Urban Roads Constructed by SUDP

5.2 Bus Transportation Sector

5.2.1 Inter-city Bus Terminal Development in GKS

Future inter-city bus terminal development is presented in Figure 5.2.1. There is no change in terminal classification of the existing bus terminals in GKS. However, in Paciran, Kabupaten Lamongan, there is a new Type A bus terminal, which is used for both interprovincial and intraprovincial bus services. It is currently under construction and is scheduled to start operation by 2011. The Paciran Bus Terminal will be located just beside a new interisland ferry port. The current interisland passenger ferry terminal is planned to be relocated from Tg. Perak to Paciran Port. Thus, the port and the Paciran Bus Terminal will be integrated as a new national transportation hub (Lamongan Integrated Service).

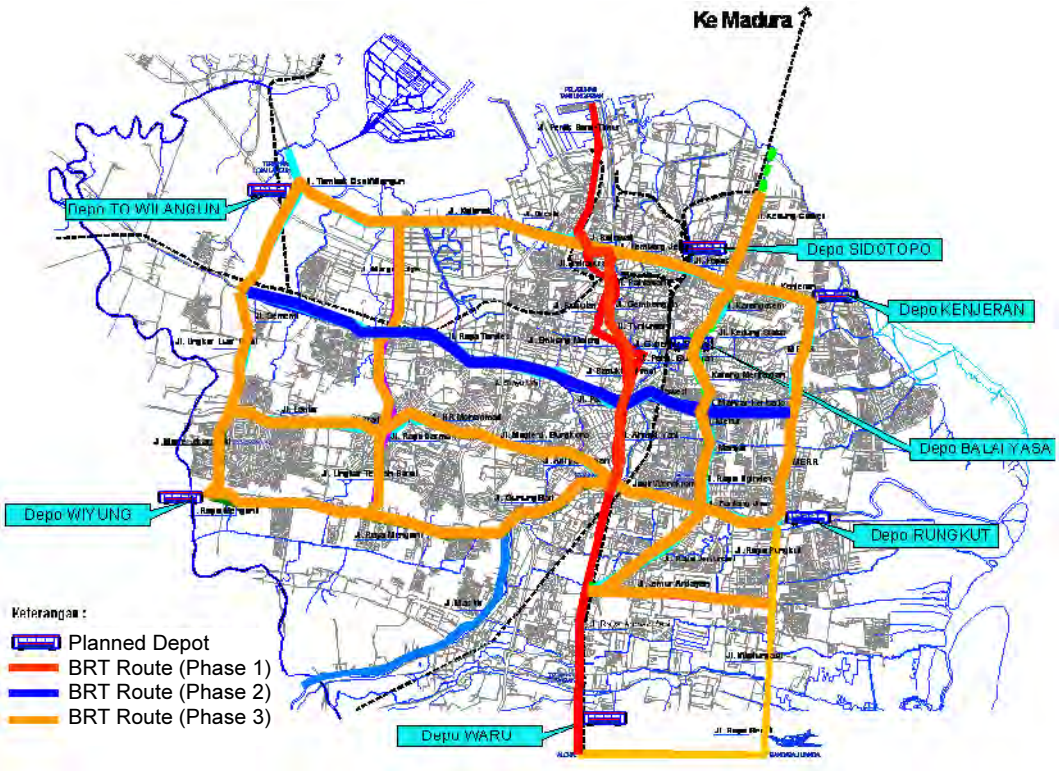


Source: Regional Transportation Plan East Java (Tatrawil Jawa Timur) 2009-2029, Transportation Agency (Dinas Perhubungan) of East Java Province

Figure 5.2.1 Bus Terminal Development Plan in GKS

5.2.2 Bus Rapid Transit in Surabaya

The bus rapid transit (BRT) system has been implemented in Jakarta and Yogyakarta as a trunk transportation mode. It is also being implemented in other major cities in Indonesia, such as in Kota Surabaya, as shown in Figure 5.2.2. It is a phased development starting with the north–south corridor (Tg. Perak–Raya Darmo–Wonokromo–Waru) as Phase 1, followed by the east–west corridor (ITS–Banyu Urip–Tandes–Kandangan–Sememi) as Phase 2. Then, in Phase 3, 15 BRT routes are planned to form a grid network. By this time, Phases 1 and 2 corridors will be converted to a higher-capacity mass transportation system such as a monorail or LRT .



Source: Transportation Agency (Dinas Perhubungan) of East Java Province

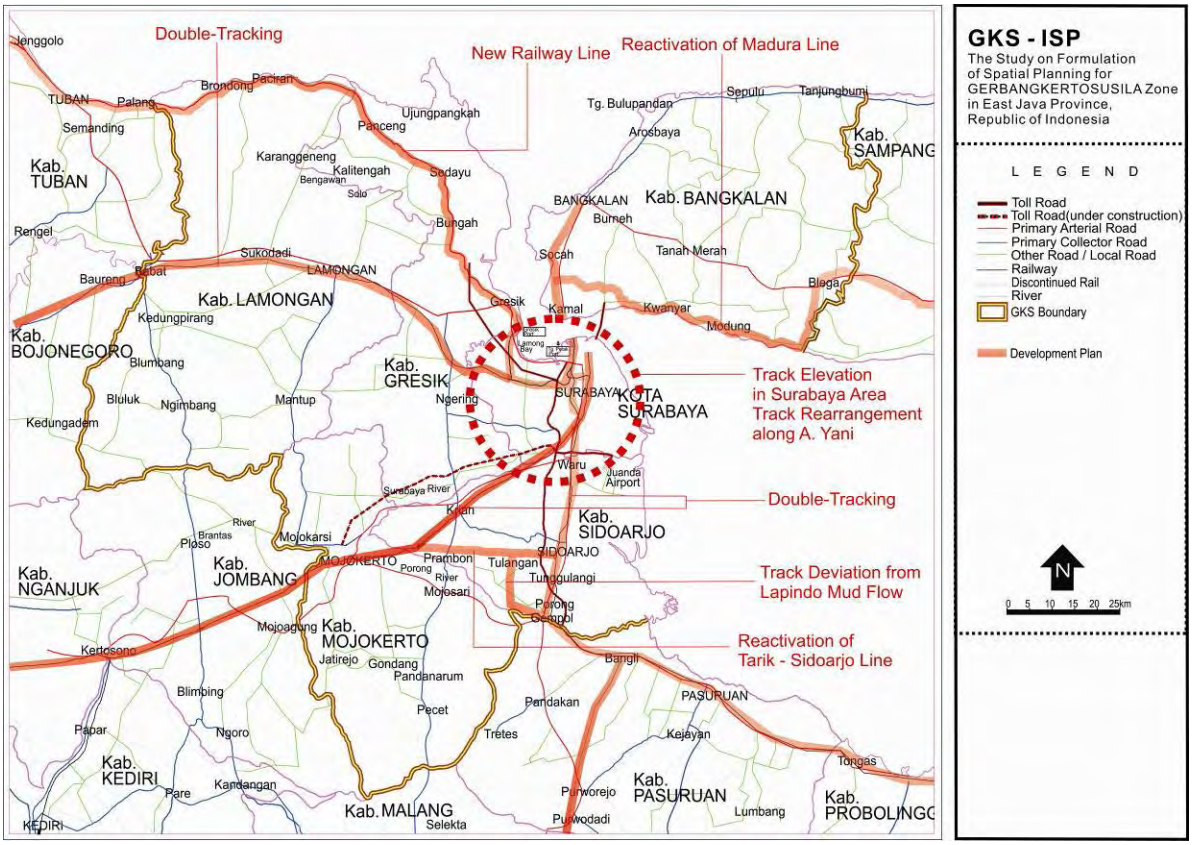
Figure 5.2.2 BRT Network Development Plan in Surabaya

For the Phase 1 route, dedicated BRT lanes are planned in some sections. For this, the road needs to be widened to secure one BRT lane, where necessary. However, the plan has been stopped by the police as the BRT is perceived to worsen traffic congestion. At present, the plan is being reviewed in many aspects including the availability of road space, traffic management, road structure (including elevated structure), safety, environment, and integration with the railway and other transportation modes.

5.3 Railway Sector

5.3.1 Railway Development Plans in GKS

Railway development includes the improvement of the quality of railway services (such as frequency, capacity, and speed) and the development of new railway lines, reactivation of discontinued railway lines, track elevation, and double tracking. On Java Island, there is a plan to eventually double-track the entire sections of the northern Java trunk line (Jakarta–Semarang–Surabaya) and the southern Java trunk line (Jakarta–Yogyakarta–Solo–Surabaya), as well as all the existing railway line in GKS. Major railway development plans for GKS are presented in Figure 5.3.1 and described in subsequent paragraphs.



Source: Regional Transportation Plan East Java (Tatrawil Jawa Timur) 2009-2029, Transportation Agency (Dinas Perhubungan) of East Java Province

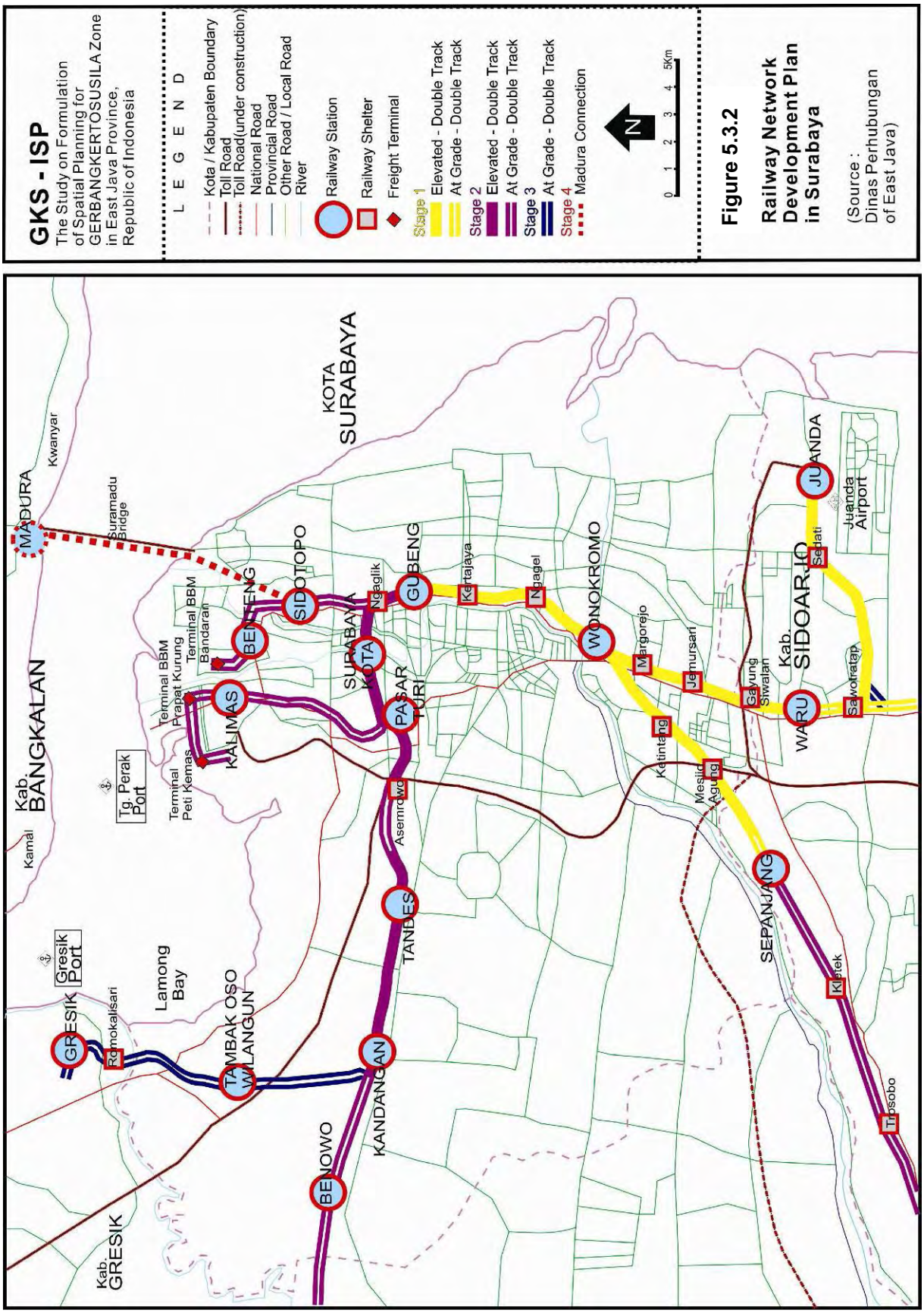
Figure 5.3.1 Railway Network Development Plan in GKS

- A new railway development is planned along the northern coastal corridor of Surabaya–Gresik–Paciran–Tuban with a length of about 75 km;
- The frequency of SULAM commuter train operation which is currently at two trips per direction per day between Surabaya and Lamongan is planned to be increased and its operation extended to Bojonegoro. The local government of Kabupaten Lamongan has also requested to revitalize the Babat–Jombang Line;

- Commuter railway stations in Kabupaten Mojokerto are under inspection at present in order to be added to the SUMO commuter services which have recently started operation with three round trips per day. In addition, double-tracking is planned in Mojokerto. Furthermore, there is a long-term plan to revitalize the non-active railway tracks of Mojokerto– Pungging (– Sidoarjo);
- The reactivation of the discontinued railway line (Kamal–Socah–Bangkalan) east up to Pamekasan in Kabupaten Bangkalan as well as its extension to Kalianget in Kabupaten Sumenep is planned, totaling about 165 km in length;
- The revitalization of the discontinued railway of Sidoarjo–Tarik (25 km) in Kabupaten Sidoarjo is also included in the railway development plan. At present, its track is under construction, and the single track will be completed soon. After completion, this line will be utilized for commuter trains in GKS as well as for long-distance trains on the southern trunk line; and
- The diversion track line avoiding the mud flow area in Sidoarjo is now being planned. The route will share the above-mentioned Sidoarjo–Tarik line until Tulangan and then the route will turn south to Krembung and then southeast to Bangil and back to the original Malang Line. This new railway diversion route will make a further detour than the relocation of the Surabaya–Gempol toll road due to a land acquisition problem. The total track length will be about 14 km.

5.3.2 Railway Development Plans in Surabaya

In Surabaya, the railway tracks are planned to be elevated in order to reduce the number of railway crossings and to achieve smoother and safer road and railway operation. Railway developments for Surabaya mainly focus on the enhancement of commuter train services and are planned in three phases, as shown in Figure 5.3.2.


GKS - ISP
The Study on Formulation of Spatial Planning for GERBANGKERTOSUSILA Zone in East Java Province, Republic of Indonesia
L E G E N D
Kota / Kabupaten Boundary
Toll Road
Toll Road(under construction)
National Road
Provincial Road
Other Road / Local Road
River
Railway Station
Railway Shelter
Freight Terminal
Stage 1
Elevated - Double Track
At Grade - Double Track
Stage 2
Elevated - Double Track
At Grade - Double Track
Stage 3
At Grade - Double Track
Stage 4
Madura Connection
N
0 1 2 3 4 5Km
Figure 5.3.2
Railway Network Development Plan in Surabaya
(Source : Dinas Perhubungan of East Java)
MADURA
Kwanyar
Suramadu Bridge
Kab. BANGKALAN
Kamal
Tg. Perak Port
Terminal Peti Kemas
Terminal BBM Prapat Kurung
Terminal BBM Bandaran
KALIMAS
BENTENG
SIDOTOPO
KOTA SURABAYA
SURABAYA KOTA
Ngaglik
GUBENG
Kertajaya
Ngagel
PASAR TURI
Asemrowo
WONOKROMO
Margorejo
Jemursari
Ketintang
Mesjid Agung
Gayung Siwalan
Kab. SIDOARJO
WARU
JUANDA
Sedati
Juanda Airport
Sawotratap
SEPANJANG
Klatek
Tropodo
Gresik Port
GRESIK
Romokalisari
Lamong Bay
TAMBAK OSO WILANGUN
BENOWO
KANDANGAN
TANDES
Kab. GRESIK

5.3.3 SNCF Study

In the Surabaya metropolitan area, there are plans to increase the commuter railway services. According to the Surabaya Regional Rail Transport System (SRRTS) study conducted by SNCF (Société Nationale des Chemins de fer Français), new commuter services are planned to directly connect the existing commuter services through Surabaya such as Lamongan–Surabaya–Mojokerto. A new railway line connecting Waru and Juanda Airport is also planned, while the section of Pasar Turi–Kota Surabaya–Waru is planned to be elevated. The sequence of the commuter service development as proposed in the SNCF study is as follows:

i) Phase 1 (–2010)

- Clearing ROWs for over 13 km of the line, affecting 4,150 households;
- Completing the double-track connection between Pasar Turi and Gubeng stations, which will provide direct connection between the northwestern and southern Surabaya;
- The existing Kota Surabaya station will stop operating while the new elevated Kota Surabaya station on the connecting line between Pasar Turi and Gubeng stations will start operating;
- Double-tracking the central area between Kandangan and Sidoarjo stations;
- Improving the signal system by replacing the manual signal system with an automatic block system;
- Modernizing the methods of managing traffic; and
- Modernizing the train stations with more appropriate track layouts as part of intermodality and providing better passenger services.

ii) Phase 2 (–2014)

- Clearing ROWs for over 8 km of the line affecting 2,150 households;
- Extending the double track between Lamongan, Porong, and Mojokerto to allow train speeds of 120 km/h and automatic block equipment;
- Electrifying all the lines except the Sidoarjo–Tarik section;
- Constructing the link between Gubeng and Juanda Airport by single track;
- Renovating the line between Tarik and Sidoarjo; and
- Modernizing the train stations and traffic management conditions.

The SNCF study concluded that, with the completion of these investments and the purchase of a high-performance electrified multiple unit (EMU), the commuter services can be extended to the entire SMA from Lamongan to Porong and Mojokerto. Likewise, other services to eastern Java can also be improved along with the long-distance passenger and freight services for all Java. The summary of the "Renewal Plan" of the railway in the SNCF study is shown in Table 5.3.1 to Table 5.3.3.

Table 5.3.1 Station and Track Renewal Plan in the SNCF Study for the Lamongan–Sidoarjo Line

I	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
1	Lamongan	188.574		single track + 2 sidings	double track + 2 sidings
			12.223	single track	double track
2	Duduk	200.797		single track + one siding	double track
			9.767	single track	double track
3	Cerme	210.564		single track + one siding	double track
			5.246	single track	double track
4	Benowo	215.81		single track + one siding	double track
			5.13	single track	double track
5	Kandangan	220.94		double track + one siding	double track + 3 sidings
			3.288	single track	double track
6	Tandes	224.228			
			5.345	single track	double track
7	Pasar Turi	229.573			elevated double track
			1.633	double track	
8	Kota	231.206		terminal station	elevated double track
		0.299			shifted to south between PasarTuri and Gubeng
				non connection	provide double track
9	Gubeng	3.475		double track + 4 sidings	double track + 5 sidings
				double track	double track
10	(Ngagel)		4.406	double track	double track
				double track	double track
11	Wonokromo	7.881		double track + 3 sidings	double track + 3 sidings
			5.771	single track	double track
12	Waru	13.652		single track + one siding	elevated double track + 2 sidings
			4.028	single track	double track
13	Gedangan	17.68		single track + one siding	double track
			7.83	single track	double track
14	Sidoarjo	25.51		single track + 3 sidings	double track + 2 sidings
			9.141	single track	double track
15	Porong	34.651		single track + 2 sidings	double track + 1 siding

Source: SRRTS, SNCF

Table 5.3.2 Station and Track Renewal Plan in the SNCF Study for the Surabaya–Mojokerto Line

II	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
11	Wonokromo	17.361			
			6.806	single track	double track
18	Sepanjang	24.167		single track + 3 sidings	double track + 2 sidings
			9.698	single track	double track
19	Boharen	33.865		single track +2 sidings	double track + 1 siding
			4.465	single track	double track
20	Krian	38.33		single track + 2 sidings	double track + 1 siding
			4.728	single track	double track
21	Kedingding	43.058		single track + 2 sidings	double track + 1 siding
			4.599	single track	double track
22	Tarik	47.657		single track + 3 sidings	double track + 2 sidings
			9.701	single track	double track
23	Mojokerto	57.358		single track + 2 sidings	double track + 1 siding

Source : SRRTS, SNCF

Table 5.3.3 Station and Track Renewal Plan in the SNCF Study for the Branch Lines

III	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
16	Sidotopo	0			
			2.339	Single track	
8	Kota	2.339			elevated
IV	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
16	Sidotopo	0		maintenance site for locomotive including commuter	maintenance site for locomotive including commuter
			3.78		
9	Gubeng	3.78			
V	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
12	Waru	0			elevated
			6.5		
17	Juanda	6.5			elevated
VI	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
14	Sidoarjo	25.51			
			7.554	under reconstruction	single track
24	Tulangan	33.064		under reconstruction	single track + 1 siding
			9.569	under reconstruction	single track
25	Prambon	42.633		under reconstruction	single track + 1 siding
				under reconstruction	single track
22	Tarik				
VII	Name	Position (km)	Distance (km)	Existing State	Renewal Plan by SNCF
5	Kandagan	0			
			9.719	single track	single track
26	Indro	9.719		single track + 2 sidings	single track + 1 siding
			2.906	demolished	single track
27	Gresik	12.625		demolished	single track + 2 sidings

Source : SRRTS, SNCF

5.3.4 Juanda Airport Access

SNCF carried out an additional alternative railway route study for Juanda Airport, and their proposals and conclusions are as follows:

- The service route is from Gubeng station to Juanda Airport Station;
- Commercial forecasts are 10,000 passengers, 30-minute headway, 20-minute journey time, and Rp 50,000 fare;
- The route will follow the old refurbished road and continue to the new access road on the northern side of the airport;
- The first 0.5 km section after the junction with the main line (near Sawotratap Station) will be elevated;
- The next 5.5 km will be at grade, and the following 1.5 km will be elevated up to the western side of the airport terminal; and
- Land acquisition and resettlement action program will not be required.