9 Institutional Development

9.1 Establishment of TransJabodetabek (Regional BRT Agency)

9.1.1 Proposed Functions and Organization

A regional BRT agency, TransJabodetabek, is a vital factor to expedite and improve public bus transport service across the Jabodetabek region. The BRT agency will be under the structure of the JTA, yet it will be established as autonomous statutory agency to plan, manage and control the delivery of bus services across the Jabodetabek BRT network.

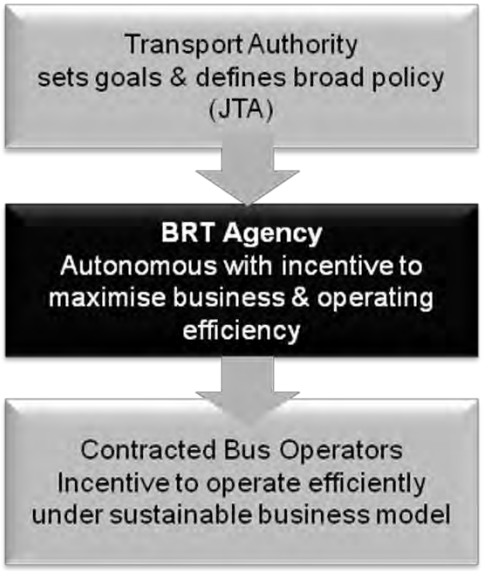
TransJabodetabek would operate as a corporate entity, (BUMD,BUMN) with major stakeholders being central and local governments and it would operate as a commercial business. As such, it is not under the patronage of any single local government and thus solves the cross-border issues and conflicts, allowing it to expand its business across the Jabodetabek region without political constraints.

As a commercial and autonomous agency, the question arises how to solve the political issues across the operating areas. This is the role of the JTA, which sets the Strategic Urban Transport Policy (SUTP) across the region.

The strategic policy guides TransJabodetabek in it operation, and translates the coordinated political strategy into business objectives, service scope and service levels in the form of an 'Operational Plan' which becomes the business plan for the agency. The Operational Plan is discussed further in the next section.

TransJabodetabek as the system manager of the BRT system (including intermediate and connected feeder routes) functions as a business with the following responsibilities:

Figure 9.1.1 Conceptual Framework of BRT Management and Operation



Source: JAPTraPIS

- To plan the route network and develop services
- To generate patronage and build revenue
- Manage system efficiency and costs
- Ensure financial performance
- Manage fare collection and policy
- Manage and enforce bus operator contracts
- Be responsible for customer service delivery and complaints and manage public relations, marketing and promotion

The functions of TransJabodetabek would include:

- Develop and implement the Revenue and Marketing Plan

- Financial and Administrative Management
- Benchmarking system cost recovery
- Maintain infrastructure and systems
- Assess /analyze & manage risk
- Manage bus operator contracts

Its work and administration are guided by Standard Operating Procedures (SOP) for control and management of the system and the bus operating contracts. Specific SOPs are developed to outline set procedures and processes for:

- Monitoring and control of operations
- Vehicle breakdown response
- Emergency & accident response
- Malfunction and technical support request
- Safety and Security response and action
- Reporting procedures
- Quality inspection procedures
- Inspection and audit of bus company operations
- Fare collection and ticketing systems
- A Quality Management System (QMS) are a set of SOP attached to the Bus Operator's Contract which provides the blueprint to guide operations (and a measure of performance) includes a Driver and Management Manual and Vehicle Maintenance Manuals.

Under new integrated public transport service delivery framework, later on determined by the JTA, physical infrastructure development included in the Jabodetabek Transportation Master Plan will be financed through the JTA; yet, detailed engineering design, procurement of contractors, construction supervision will remain under the responsibilities of respective central and local government agencies, i.e. the JTA limits its function to planning and budget, budget allocation, monitoring and evaluation of public transport projects and operations.

The JTA will be established as non-ministerial agency and basically all the finance comes from the central government budget. It is assumed that similar amount of project budgets allocated for the Jabodetabek region in the past at respective ministries will be basically transferred to the JTA, so its indication would be that there is not enough budget to cover all listed projects in the Transportation Master Plan, nor projects and measures for public transportation service improvement. One of the financial resources that the SITRAMP and JUPTI projects proposed is the budget currently allocated for fuel subsidy.

According to the Ministry of Finance, it has been discussing how to utilize the budget once the fuel subsidy is terminated, and the transportation sector would be just one of the sectors that the government is going to allocate from the prospected budget saved by fuel subsidy. Suppose all the budget used for fuel subsidy in the Jabodetabek region is allocated for the transportation sector in next 20 years, the target year of the master plan,

it will be enough to cover all the projects' costs proposed by the JUPTI project in the transportation master plan.

Table 9.1.1 shows the amount of the fuel subsidy and the share of the Jabodetabek to the national expenditure of the fuel subsidy. The amount of fuel subsidy expenditure varies significantly in the indicated three years due mainly to the international market price's fluctuation.

Table 9.1.1 Fuel Subsidy in the Jabodetabek Region

	2008	2009	2010
Fuel Subsidy Expenditure (billion Rp.)	139,106.7	45,039.4	88,890.8
Percentage to the State Expenditure (%)	14.11	4.80	7.89
Subsidy per Capita (thousand Rupiah/year)	640.7	195.3	380.7
Fuel Subsidy (Rp./liter)	3,648.2	1,216.9	2,435.0
Fuel Subsidy Amount for the Jabodetabek Region (billion Rp.)	19,455	6,314	13,195
- DKI Jakarta (billion Rp.)	9,194	2,840	5,730
- Bodetabek (billion Rp.)	10,260	3,474	7,464
- Share to the State Expenditure on Fuel Subsidy (%)	13.99	14.02	14.84

Source: The Indonesia Budget Overview 2010. Director General of Budgeting. Ministry of Finance.
Sales Realization Report for All Product-Daily. Statistic Division of PT. Pertammina UPMS III)

Table 9.1.2 summarizes the functions of the JTA, the BRT agency and the central and local governments

Table 9.1.2 Functions of JTA, BRT Agency and Governments

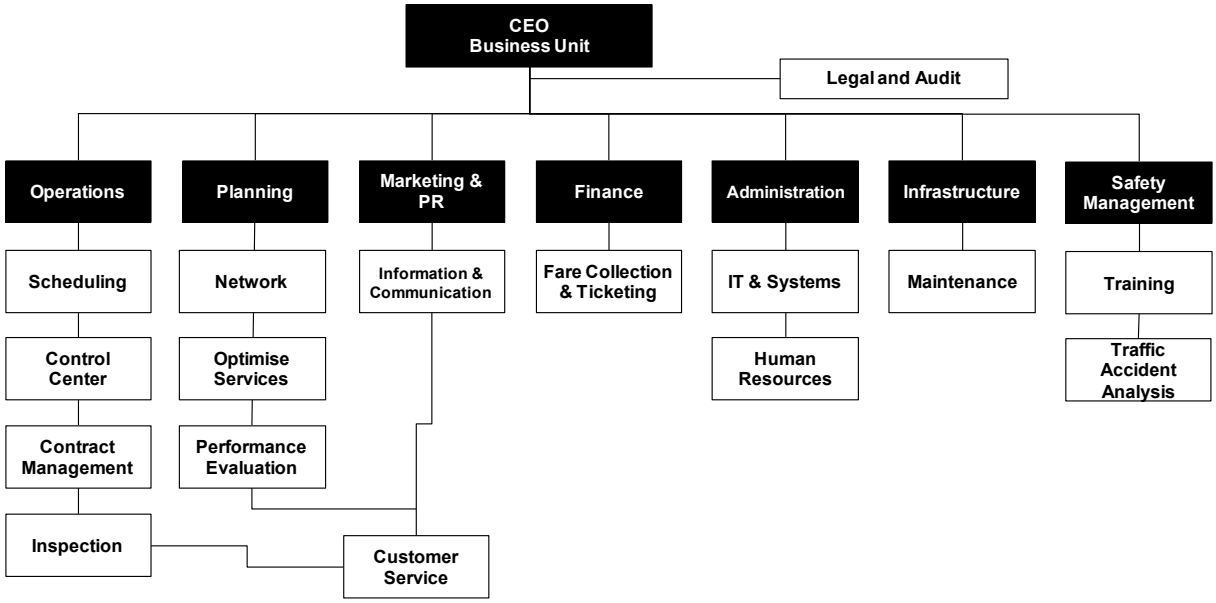
Sector	Sub-sector	Bus Rapid Transit (BRT)		General Bus Transport		
		T/J Busway	Intermediate Bus connecting Busway	Inter-city between Provinces Bus Service in Jabodetabek	Inter-city Bus Service in Province	Intra-city Bus Service (General)
Planning	Strategic transport & urban development planning	JTA	JTA	JTA	JTA	JTA
	Planning route networks and development services	**T/J**	**T/J**	**T/J**	L/G	L/G
	Strategic service planning, bus/railway integration	JTA	JTA	JTA	JTA	L/G
	Planning Public Transport Infrastructure Development	JTA	JTA	JTA	JTA	L/G
Regulation	License and permit approval	JTA	JTA	DGLT	L/G	L/G
	Administrative & Technical Standards, Norms, Minimum Service Standards and Guidelines	**T/J**	**T/J**	**T/J**	DGLT	DGLT
	Fare policy	JTA	JTA	JTA	JTA	JTA
Finance	Financial Arrangement for Business Operation (facilitate loan, subsidy)	JTA	-	-	-	-
	Financing bus fleet procurement	JTA	OPR	L/G	L/G	L/G
Fare/ Marketing	Development of Fare Collection System (ticketing system)	JTA	JTA	DGLT	L/G (Provincial Govt)	L/G (District/City)
	Marketing/Promoting Public Transportation Services	**T/J**	**T/J**	OPR	OPR	OPR
Infrastructure Development	Financial planning, budgeting and procurement (Procurement can be delegated to L/G and/or T/J)	JTA	JTA	JTA	JTA	L/G
	Infrastructure Development (Construction) (Construction can be delegated to L/G and/or T/J)	C/G L/G	C/G L/G	L/G	L/G	L/G
	Construction Supervision & Technical Inspection (Supervision and inspection can be delegated to L/G and/or T/J)	C/G L/G	C/G L/G	L/G	L/G	L/G
Asset Management	Land	L/G	L/G	L/G	L/G	L/G
	Base Infrastructure	L/G	L/G	L/G	L/G	L/G
	Upper Infrastructure (Facility) (bus terminal, bus station, etc)	**T/J**	**T/J**	L/G	L/G	L/G
	Fleets and Equipments	**T/J**	OPR	OPR	OPR	OPR
Contract	Procurement (contract with bus operator)	**T/J**	**T/J**	-	-	-
O&M	Operation and Maintenance of the Infrastructure constructed by JTA			L/G	L/G	L/G
	- truck (routine/periodic maintenance, rehabilitation), barrier, marking	**T/J**	-	-	-	-
	- bus station (access pedestrian bridge)	**T/J**	-	-	-	-
	- control center (intelligent transportation system)	**T/J**	-	-	-	-
	Operation and Maintenance/Management of Facilities and Equipments			L/G	L/G	L/G
	- Fleet maintenance	**T/J**	OPR	OPR	OPR	OPR
	- ITS (intelligent transportation system; bus location system, etc)	**T/J**	-	-	-	-
Business Operation	Business Operation	**T/J**	**T/J**	OPR	OPR	OPR
	- Fare collection	**T/J**	**T/J**	OPR	OPR	OPR
	- Revenue management (revenue reallocation)	**T/J**	**T/J**	-	-	-
	Fleet Operation: operating bus	OPR	OPR	OPR	OPR	OPR
Evalu -ation	Business Operation Performance Evaluation	JTA	**T/J**	DGLT	L/G (Provincial Govt)	L/G (District/City)
Law	Law Enforcement	Police	Police	Police	Police L/G	Police L/G

Source: JAPTraPIS

Note: TJ = TransJabodetabek = BRT Agency, C/G = Central Government, L/G = Local Government

Figure 9.1.2 shows a proposed organizational structure of the BRT Agency, TransJabodetabek.

Figure 9.1.2 Proposed Organizational Structure of TransJabodetabek



Source: JAPTraPIS

The structure is similar to TransJakarta, but more emphases on corporate management and customer oriented operational management. The organization will consist of the following components.

- Board members: representing the shareholders
- CEO/Business Unit: contracting, legal affairs with contracted bus operators, coordination with other transit mode/facilities (railway, MRT, shopping malls). Through its departments the Business Unit will oversee the full range of functions that relate the planning and the operations of the system as well as the Public Relations and safety and security matters.
- Departmental managers: responsible for daily activities and accountable for chief executive officer
  - Operation Department: bus network operation modification/adjustment, formulating operational standards and guidelines, bus operation management, monitoring bus operation
  - The Planning Unit is responsible for business development and network planning, guided by the Strategic Network Plan and the Revenue and Marketing Strategy.
  - Marketing and PR department has dual responsibilities being firstly, to be jointly responsible with the Planning Unit to implement the Revenue and Marketing Strategy and secondly, manage public and media relations to promote the image of the system, and respond to issues that arise which may have the potential of adversely affecting public confidence and acceptance.
  - Finance Department – responsible for revenue management and disbursement fare

collection system, ticketing operations

- Administration department: general administration, human resources, public relations, financial affairs
- Infrastructure department: infrastructure planning and development, asset management (repair and maintenance)
- Safety management department: training and traffic accident analysis

9.1.2 Business Model

The business and management model of the BRT system underpins the sustainability and performance of the entire BRT operation and influences many of its design features.

Commercially-oriented management defines a business-like operation that will survive by winning market share, growing revenue and managing costs efficiently. As it is dependent on revenue to survive and prosper, it has a strong incentive to focus on business development, customer service delivery and ensuring standards are maintained. Operations that are subsidy dependent generally breed complacency and poor service levels as seen in the current TransJakarta system.

1) A Business-like Approach to BRT Management and Operation

The JTA develops the Operational Plan as part of the strategic urban transport policy, which establishes the business case for the system and determines its feasibility. As it scopes the system and the level of service, it is a critical planning element of the infrastructure planning and design (such as stations and fleet sizing and physical conditions on the busway and the fare policy). As a business model, it also estimates the scope of services required and the costs which in turn determines the 'commercial fare level' – being the actual cost of providing services divided by the number of passengers. Where a government social policy wishes to reduce fare levels below the commercial level (either across the board or to target vulnerable groups) a 'user subsidy' is paid – where government compensates the business for the fare discount. The operational plan, fare policy and subsidy policy is discussed further below.

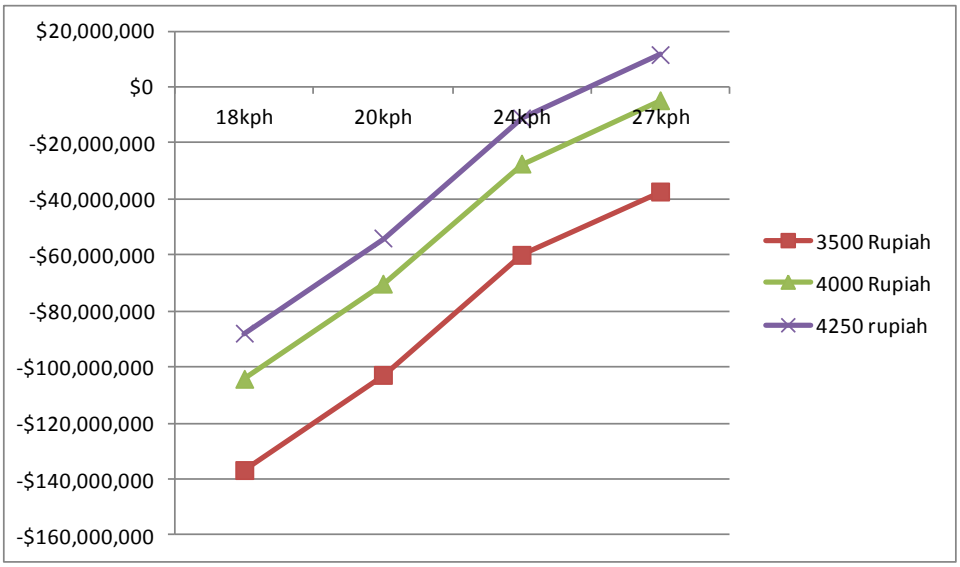
(1) Operational Efficiency

Operational efficiency has a two-pronged impact on the system; being the fleet efficiency (reducing costs) and passenger efficiency (improving service levels, attracting passengers and increasing revenues). Therefore, efficiency is critical to the performance and sustainability of the system.

The average speed of the BRT system (bus speed) has a large impact on the cost of operation and the size of the fleet. The design of the busway and the management of bus priority of intersections is therefore a critical design aspect of the system.

The speed of the system has a direct impact on the level of fares needed to break even as shown in Figure 9.1.3. As shown, the modeling of the 2020 network (on CNG option) tests an average fare level of Rp. 3,500, Rp. 4000 and Rp. 4,250. It shows that 27 kph average bus speed and a fare of Rp.4,250 is required to bring the operation into a financial surplus instead of losses.

Figure 9.1.3 Profit and Loss Forecast based on Fare and Speed



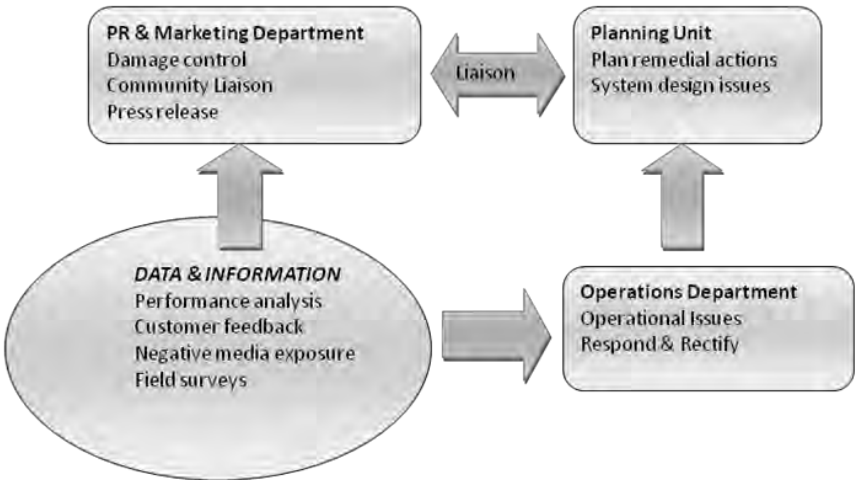
Source: JAPTraPIS

(2) Revenue Development and Marketing

TransJabodetabek would develop a Revenue and Marketing Plan under the strategic policy established by the JTA. This terminology (revenue and marketing) indicates that its business is not just managing a bus system and supplying a service, but actively developing services and growing the business.

Marketing is not just a separate activity but forms an inherent part of how the company functions. Figure 9.1.4 shows the relationship between units and departments in response to a customer service issue, indicating how each unit participates in the response.

Figure 9.1.4 Relationships and Responses to Customer Service Issues in TransJabodetabek



Source: JAPTraPIS

Traditionally government supplied bus services have been supply-oriented which in part has been responsible for poor performance and declining market. Commercial bus operations need to be demand-oriented to survive, thus placing a renewed emphasis on revenue building and marketing.

A marketing strategy would involve the following activities:

a) Stakeholder analysis of each major public transport group (e.g. public transport users, car drivers, motorcycle users, women, students, special needs passengers, angkot, bus operators, business community, schools and universities,)

b) Develop services to meet the customer needs (convenience, reliability, safety, affordability) and primarily to ensure network connectivity (range of easy to reach destinations and easy transfer options).

c) Develop attractive and identifiable system branding

d) Communications strategy and outreach targeted at specific groups

e) Provide good and 'easy to understand' system information to customers

f) Encourage and develop public participation / focus group sessions

g) Develop promotional campaigns to promote service improvements.

However, a marketing strategy is more than just 'doing marketing'- it relates to building business performance and then selling these attributes to the customers. A corporate approach to this task requires a developed business strategy to improve services, and look for opportunities to develop revenue.

A Revenue and Marketing Plan would include the following:

- Achieving business performance by:
  - Understanding customer needs, the competitive environment, and government and stakeholder expectations
  - Training staff to be competent and capable of providing good customer service
  - Ensuring good systems are in place for operations and maintenance, safety and security
  - Reliable service delivery (ticketing and fleet operation)
  - Effective marketing, information, good branding
  - Monitoring and measuring service performance
- Sustaining and improving system performance by:
  - Monitoring customer satisfaction and complaints
  - Monitoring competitors
  - Measuring sales efforts and marketing effectiveness
  - Identify poor performance and failures early and take corrective actions
  - Manage costs and constantly look for opportunities to improve efficiency
  - Seek out opportunities to increase revenues
  - Maintain a cycle of continuous improvement

The Revenue and Marketing Strategy must define:

- The marketing position of its products and services and its segmentation of the market
- Profit strategies (improve efficiency / develop revenue)

- Short and Long term growth strategies
- Brand differentiation by:
  - Knowing the customer and the customer's expectations
  - Know the competitors strengths and weaknesses and understand the rules of the marketplace
  - Differentiating the product through branding (connecting the brand to meeting the needs of the market).

(3) Communicating the Brand through Results-driven Campaign

Results-driven campaigns[1] are revenue and marketing campaigns that:

- Are customer and competition focused
  - Targeting patronage growth
  - Customer and competitor surveys – what are key needs and motivators; how can the product be tailored to fit?
- Ensure effective internal alignments
  - Staff performance and measurement (customer service is a culture, requiring commitment at all staff levels)
  - Executive commitment and resources applied to develop and maintain service quality
- Establish external alliances
  - With outside parties (schools, colleges, shopping centers, tourism bodies and other transport operators)
  - Win-win strategies with external parties
  - A communication plan to develop relationships
  - A consultative 'direct selling approach'
- Get customers to buy more at a higher price
  - Look for new revenue opportunities and use direct marketing
  - Use a creative fare strategy and develop value for the customer
  - Reward and retain loyalty
- Use brand communication
  - Identifying the system with clear attributes such a convenience, reliability, time saving, cost saving.
  - Clear brand identity on fleet and infrastructure, customer service points, ticketing and staff.

[1] Much of this discussion has been influenced by the effective marketing strategies implemented at BTS Skytrain Bangkok by Vision –Skill Limited as presented by Dr. Sara Cheung , Branding Marketing and Service – Return on Investment in Mass Transit Systems; SUT Conference at Brisbane Australia September 2005. The result-drive campaign material is largely quoted from the presentation.

- Measure the effectiveness of marketing
  - Quantitative and qualitative indicators
  - Short and long term benefits
  - Intangible results (side effects and non-measurable benefits)

2) Operational Plan

The JTA sets the strategic policy direction for TransJabodetabek through the development of the Operational Plan which in turn essentially becomes the business model.

The Operational Plan sets out the scope of the business, taking into account political objectives, community needs, estimated passenger demand, defines infrastructure requirements and sets the level of service and performance standards. It defines at a strategic level how the business operates and how it delivers public transport services.

An effective and complete Strategic Plan includes:

- Clear objectives are set in commercial reality (financially sustainable)
- Sets fares that affordable for the user and able to cover cost of operation
- Provide an adequate per km fee for bus operators to provide services to the required quality standard
- Provides adequate funding for TransJabodetabek to manage the business
- Assigns risk where it is best managed

Specifically, the Operational Plan defines:

- Estimated passenger demand (No. passengers)
  - Based on a demand model (peak and estimated off-peak travel)
  - Considers non-working days, public holidays, school holidays
  - Estimates line loadings and passenger turnover per trip
  - Anticipated passenger growth (modal switch %)
- Revenue, based on:
  - Average fare paid multiplied by number passenger trips
  - Non-fare revenue (advertising & rents)
  - A fare policy to enhance revenues & target the market
  - Indirect income support (road /parking charges)
  - Compensated user-subsidy
- System Costs
  - Fleet Costs
  - Management costs (including ticketing costs)
  - System maintenance costs (maintenance and cleaning)
  - Technology and communications costs

- Promotion cost

- Bus kilometer cost (contractors fee)
  - Salaries & add-on costs (social cost, training & uniforms)
  - Fuel, tires and servicing
  - Cleaning & maintenance
  - Insurance and accident
  - Contingencies

In developing an operational model, various operational scenarios can be modelled, including:

- System speed
- Bus size/type and fleet configuration
- Type of fuel / propulsion system
- Level of service
- Fare levels

These modeling results will give a cost per km and a cost per passenger (the commercial fare) which is the basis of revenue and establishes a profit-oriented business plan

3) Fare Policy and User Subsidy

Critical to developing revenue and passenger growth is the matter of a fare policy.

Primarily fares need to be affordable, but affordability has many forms and contexts; it is a mistake to set fares at a static low level and at a level that the poor can afford. Systems where fares are set at the lowest common denominator of affordability are cash-starved systems, heavily reliant on subsidy and performing poorly.

A modern mass transit system must develop it's fare policy according to clear objectives (such as service quality and sustainability) however the affordability issue cannot be ignored.

In establishing a fare policy, multiple objectives exist, being for example:

- Maximizing revenue opportunity, by creating services that passengers are willing to pay for.
- Rewarding and incentivizing volume travel by generous discounting of volume travel to encourage mainstream uptake for commuter travel, making BRT use a lifestyle choice, and ensure affordability and price competitiveness for frequent travelers.
- Targeting discount to more needy groups such as the elderly and students.
- Calculating fares for distance to improve equity and set appropriate payment for distance travelled (flat fares typically penalize short distance travel and under charge for long distance).

Electronic ticketing provides the technology to easily manage a more complex fare policy, user-subsidies (and compensation amounts) and distance-based fares.

4) General Subsidy

Due to its high passenger capacity and efficiency BRT is often thought to be possible as a subsidy free operation. This may be true in ideal circumstances and many efficient BRT systems are operationally self sustaining. However, there are a number of issues which may put pressure on the operation. Notwithstanding the critical necessity to maintain management incentive for good performance (by being revenue dependant), in some cases the government may need to provide support, namely in cases where:

- The system needs to provide a level of service that may not be commercially viable (say late night or weekend services). These services are deemed Public Service Obligations (PSO) and may need funding support. The government may decide to pay outright to have these PSO services provided.
- The government may also decide as part of its wider transport strategy to promote public transport through a price incentive and may compensate for a portion of all fares below the commercial level, or subsidize certain costs, or
- Specific costs may be subsidized, with fuel subsidy being a typical example. If the bus system is required to follow a government directive (e.g. to use CNG in its buses) and extra costs are incurred, the government may decide to subsidize the cost to keep the system competitive. Fuel costs represent about 23% of total system costs so financial support in this area will keep the commercial fare competitive.
- Interim support may be required during the period need for the system to build critical mass or network size to develop a scale of efficiency. In this case a sliding scale of subsidy is negotiated for the establishment period.

9.1.3 Implementation Schedule

The schedule for establishing TransJabodetabek depends largely on the JTA establishment schedule expected to occur during 2012. Once the JTA is established, it is expected to design the institutional structure and prepare necessary budget for 2013, so that TransJabodetabek will be established at the beginning of 2013.

Figure 9.1.5 Implementation Schedule of Establishing TransJabodetabek

Benchmark	Agency	2012	2013	2014	2015-20
Jabodetabek Transportation Authority (JTA) is established		▼			
PerPres of Jabodetabek Transportation M/P is ratified		▼			
PP for "Vehicles" and "Vehicle Inspection" are ratified		▼ Transition Period - 2016			
Other PP scheduled by the MOT are ratified		▼			
GHG Emission Action Plan Target					(2020)▼
TransJabodetabek (T/J)					
- Institutional Design of T/J	JTA	■■■			
- TransJakarta expansion/Bodetabek BRT service starts		■			
- TransJabodetabek established	T/J		▼		
- BRT with Feeder Bus Service starts	T/J	▼			
- Fare Integration (BRT Trunk & Feeder and Railway)	JTA	▼			

Source: JAPTraPIS

There are three possible scenarios for establishing TransJabodetabek.

(1) Scaling up TransJakarta – BUMD

TransJakarta will be first transformed into BUMD from BLU, and be able to extend its

operation as BRT agency to Bodetabek areas. Subsidy issue will be taken care by the JTA or shared with Bodetabek's local governments.

(2) Extensive partnership (district/city owns BRT agency)

Each local government in the Jabodetabek area will establish its own BRT agency under their transportation agency, and then, BRT agencies will form a partnership. The degrees of connectivity and service level integration vary according to the MOU agreed between each BRT agency.

(3) Extensive partnership (district/city owns BRT unit)

Unlike scenario 2, each local government will establish a unit in its transportation agency, which will merely supervise the operation of the BRT. BRT bus operation will take full risks and responsibility by deciding business plan by itself. Local government will facilitate, but not takes major roles for the partnership with other BRTs; but, leaves it to bus operator's decision.

It is suggested that scenario 1, scaling up Transjakarta is the most practical, cost-effective and favorable option to pursue until TransJabodetabek is formally established in 2013. However, there are some vital presumptions, such as 1) TransJakarta will become BUMD by early 2012, 2) local governments in the Jabodetabek areas, except DKI Jakarta province, will hold certain shares of TransJakarta, once it transferred to BUMD, 3) TransJakarta is willing to expand its operation to Bodetabek areas, and 4) Bodetabek local governments will invest for base and upper infrastructure development, i.e. bus shelters, pedestrian bridges, traffic sign, and so on.

The role of the central government, in particular the MOT, will be 1) solving issues related to legal aspects, if necessary, 2) facilitating and coordinating among local governments, and 3) providing financial supports to procure bus fleets and developing infrastructure in the Bodetabek areas.

9.2 Reforming General Bus Management System

In the last decade, general bus services have largely lost their patronage due to poor service quality such as overcrowding, inconsistent service and inconvenient transfers, poor comfort and low security. Some of the poor service quality aspects are attributable to their operation and management system.

Public transport service improvement is a pressing issue, yet for a long time being left out by the authorities, bus operators association and bus operators.

In this chapter, institutional aspects of public transport administration are scrutinized and viable solutions will be suggested. Four variable instruments for improving public transport service delivery are 1) standardizing and enforcing minimum service standards, 2) rejuvenating bus fleets, 3) restructuring general bus license system and 4) capacity development.

9.2.1 Minimum Service Standards (SPM)

Act 22/2009 regulates government agencies to formulate minimum service standards (SPM) for all public services delivery. The Ministry of Transport (MOT) is responsible for formulating minimum service standards for public transportation. Government Regulation

65/2005, ratified prior to the Act 22/2009, imposes government agencies to issue SPM within three years. Even after those laws are endorsed, the SPM for public transportation is not yet ratified; however, some local governments, Bekasi and Bogor district, among others, already have their own minimum service standards for public transport service.

MOT is currently drafting SPM for BRT and general bus services. According to the MOT, the drafts were prepared by technical and legal divisions and still under discussion. Some points to be mentioned are 1) the drafted SPM are mixed with technical requirement and expected service standards. Technical requirements, which also stipulated in law, Act 22/2009, should be separated from minimum service standards. 2) minimum service standards should be achievable targets under ordinal efforts, i.e. a standard, such as a headway in metropolitan is less than five minutes with 24 operation hours should not be in minimum service standards.

Indicators for minimum service standards should be measurable and also defined from the passengers' viewpoint, instead of the public bus regulator's viewpoint. Items that are important for passengers are accessibility, cleanness, convenience, comfort, frequency, reliability, safety, security, customer service quality, and equality, but do not consider boarding and alighting time at bus shelter, which is set out in the draft minimum service standards.

According to Draft Minimum Service Standards prepared by the MOT, boarding and alighting time at bus shelter is one of the indicators and it is set maximum 30 seconds. The standing time at bus shelter varies due to number of passengers and how the shelter is crowded and so on. First the indicator itself is not appropriate, second if standing time at bus shelter must be included in the minimum service standards, the criteria shall be "sufficient time that passengers can safely board and alight, and boarding passengers can safely seated or find space for standing." and means of verification can be the number of accidents or injured incurred/caused during boarding and alighting time.

Minimum service standards, as a national guideline, should contain standard indicators and the means of verification, instead of tangible numerical criteria/standard. Indicators and minimum quality assurance standards must be tangible and clear, while evaluation criteria/standard should be customized according to various factors, i.e. population size, service coverage area, public transport characteristics, mode and so on. Means of verification and monitoring schemes should be explicitly indicated in the minimum service standards, so that national evaluation standard will be established, and later on will be able to use for collecting data and statistical analysis nationwide.

Minimum service standards are to provide established benchmarks to ensure the minimum quality of service to be delivered to passengers and transport user, while existing laws and regulations regulate technical specifications and requirements, which indirectly may have an impact on service quality.

It should be noted that punitive measures to enforce the minimum service standard, may be ineffectual if the underlying causes of poor performance are not addressed. Minimum service standards can be incorporated under performance-based contracts which are financially able to support the improved quality standard.

Using the minimum service standards as a big stick to enforce better quality may be doomed to fail if the business conditions and operator viability issues are not addressed.

9.2.2 Rejuvenation of Bus Fleets

One of major complaints from passengers is old and not roadworthy bus fleets. All stakeholders, even bus operators, realize that old bus fleets must be replaced to new and more comfortable and safety fleets. In order to expedite bus fleet rejuvenation, "carrot and stick" measures are necessary, which are also resulting in the improvement of public transport service level. Some considerable instruments to realize bus fleet rejuvenation are 1) to reform period vehicle inspection along with workshops and automobile mechanics accreditation system, 2) fleet-age restriction measure, 3) financial supports and incentives and improvements to the business model, and 4) strengthening law enforcement.

1) Periodic Motor Vehicle Inspection

Periodic motor vehicle inspection is technically illustrated in Act 22/2009, chapter 3 vehicle, part 3 Motor Vehicle Inspection. Draft government regulations, RPP, for Vehicles and Motor Vehicle Inspection Procedures and Law Enforcement on Traffic Regulations are now undergoing appraisal process at the Administration. The previous law and regulations which stipulate motor vehicle inspection are Act 14/1992 and Government Regulation 42/1993 Motor Vehicle Inspection on the Road and 44/1993 Vehicles and Drivers. Since the last law and regulations, there is not significant change in principle, except some punitive articles in the draft. According to the draft, public transport vehicles which violate the mandatory periodic motor vehicle inspection will be penalized; administrative sanctions, i.e. annulling business operation permit and/or route permit.

Although government regulations for periodic motor vehicle inspection passed in 1993 for all types of vehicle, only in 2001, the inspection for public transport vehicles started; however, due mainly to weak law enforcement and other uncertain reasons, the compliance rate of taking mandatory motor vehicle inspection is very low. According to recent information, close to 80% of public mini buses are not roadworthy, and 70% of Metromini did not take roadworthy test, i.e. motor vehicle inspection, in 2010. Cheating to pass periodic motor vehicle inspection is prevailing for individual bus owners, by renting and replacing spare parts before taking the test and put back old spare parts, which are not roadworthy, after the test.[2] There is no mechanism to randomly check the compliance of taking the inspection and track-down frauds, i.e. cheating by temporary replacing spare parts to pass the test. In the Draft, the periodic motor vehicle inspection is not even defined to verify the indubitable operation at workshops.

There are some suggestions, institutional reform, to enhance periodic motor vehicle operation for public transport.

- Segregation of roles: the regulator should not be the examiner/accredited workshop. Transportation agency is responsible for conducting periodic motor vehicle inspection for public transport fleets, and at the same time the agency is regulator to make sure certain laws and regulation are enforced properly and provide accreditation to workshops. Therefore, it is recommended that the agency limit its responsibility to being regulator and inspector to assure accredited workshops are conducting their tasks properly. It is also to avoid organized fraud and misconduct of examiners at the agency.

[2] DisHub DKI Jakarta. Jakarta Post (2011/7/7) Apr-Nov 2011, only 964 out of 3,308 buses took periodic motor vehicle inspection (roadworthy test), which is mandatory for public bus operators to take every 6 months

- Roadworthiness of bus fleets is not government responsibility, but bus fleet owners: Roadworthiness of bus fleets is now under governments' responsibility by law, but the governments' responsibility should be changed to administer the inspection and to ensure bus fleet owners comply to laws governing vehicle standards and scheduled maintenance. .
- Random road motor vehicle inspection (spot checks), shall be used as tool to cross-check the proper operation at workshops and to prevent mishandling and fraud of motor vehicle inspection administrators.
- As present inspection is lax, and enforcement weak, it may be a worthwhile measure to increase the inspection interval from 6 months to 12 months in line with the annual tax collection and make a concerted effort to channel resources into improving the standard and quality of inspection. Different period varying periods may also apply to different vehicle types for example smaller vehicles with an annual inspection, and heavy vehicles with large passenger capacity a 6 month inspection interval.

Table 9.2.1 Periodeic Motor Vehicle Inspection in Other Countries

	Safety Check	Exhaust Gas Emission Test	Periodical Motor Vehicle Inspection		Inspection & Maintenance	Maintenance Personnel 1/
			Passenger car (year)	Public Vehicle (year)		
Indonesia 2/	√	√	0.5-0.5-0.5-0.5	0.5-0.5-0.5-0.5	unknown	Government is responsible for keeping public transport vehicle roadworthy
Australia 3/	√	√	None (small car)	0.5-0.5-0.5-0.5	unknown	Maintenance is not mandatory of users
Singapore	-	-	Biennially 4/	1-1-1-1	unknown	unknown
South Korea	√	√	3-2-2-2 5/	1-1-0.5-0.5	Maintenance followed by Inspection	Users hold responsibility to keep a car roadworthy
Japan	√	√	3-2-2-2	1-1-1-1	Maintenance followed by Inspection	Vehicle's roadworthy is a mandate of users by law
New York	√	√ 6/	1-1-1-1	1-1-1-1	unknown	unknown
Germany	√	√	3-2-2-2	1-1-1-1	Maintenance followed by Inspection	Vehicle's roadworthy is a mandate of users by law
England	√	√	3-1-1-1	1-1-1-1	Maintenance followed by Inspection	Vehicle's roadworthy is a mandate of users by law
French	√	unknown	4-2-2-2	1-0.5-0.5-0.5	Maintenance followed by Inspection	Vehicle's roadworthy is a mandate of users by law
Switzerland	√	√	4-3-2-2	1-1-1-1	Maintenance followed by Inspection	Vehicle's roadworthy is a mandate of users by law
EU	unknown	unknown	4-2-2-2	1-1-1-1	unknown	unknown

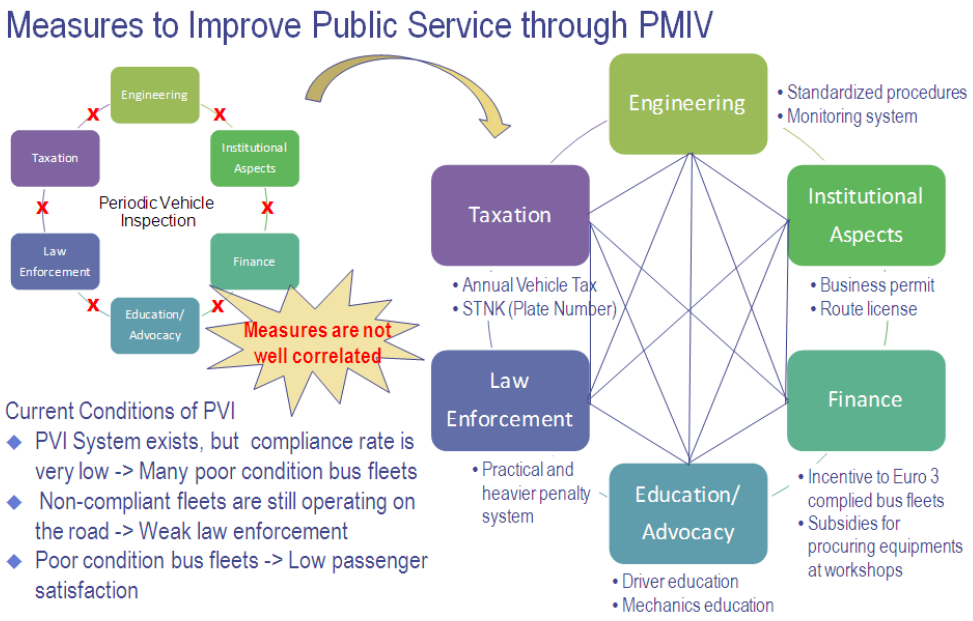
Source: Vehicle Inspection in Other Countries. Ministry of Land, Infrastructure, Transport and Tourism. (http://www.mlit.go.jp/jidosha/kensatoroku/shogaikoku/index.htm)
Note: 1/ No distinction between passenger car and public transport vehicle.
2/ Based on draft government regulation submitted to Secretariat of Cabinet as of November 2011.
3/ South Australia
4/ Below 3 years: Nil. 3 to 10 years: Biennially. Above 10 years: Annually (www.lta.go.sg)
5/ Above 10 years: Annually
6/ New York city and surrounding 10 counties

Figure 9.2.1 below shows the measures to improve public service through the public motor vehicle inspection.

It is suggested to use the periodic motor vehicle inspection as a tool to improve public transport service level; but this would be likely to fail if it is operated separately from other measures. For instance, if the inspection is associated with vehicle registration system and tax payment, it is better to change the inspection from every 6 months to one year, since the tax payment occurs annually but not biannually. If bus operators fail to pass the inspection or even being indentified at spot check that bus fleets are not roadworthy occasionally, the regulator could suspend and/or terminate business permit and/or route license and push non-roadworthy buses out of street. The inspection system can be also used to expedite bus fleet replacement, in accordance with a loan arrangement or subsidy to buy new bus fleets, and/or an incentive to support bus operators to replace old fleets to Euro 3 complied bus fleet. All of measures could be accompanied with much tougher law enforcement and heavier penalizing system.

Public transport control management for improving services is now carried out separately by respective institution, but in order to maximize the efforts, it is suggested all relative agencies to coordinate and formulate one program to improve public transport service.

Figure 9.2.1 Concept of Improving Public Transport Service through PMVI

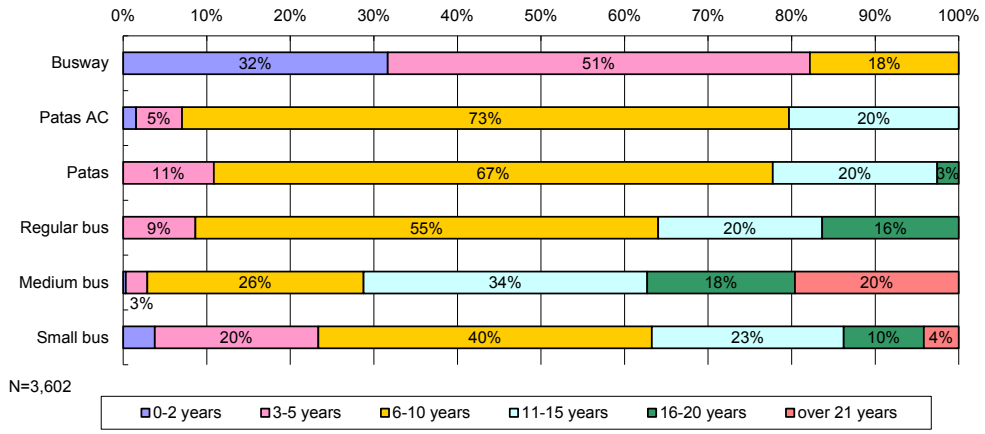


Source: JAPTraPIS

2) Fleet-age Restriction Measures

According to the survey conducted by the Study Team, almost all buses have already passed their replacement date being every five to seven years, due to increasing maintenance cost, lower efficiency and higher fumes and emissions. DKI Jakarta transportation agency quoted a recent newspaper article saying that “close to 80 percent of public minibuses travelling the city’s streets were not roadworthy and could pose a danger to passengers”. It is commonly perceived that the poor condition of the minibuses, small bus, coupled with reckless driving contributes to traffic accidents.

Figure 9.2.2 Fleet Age by Vehicle Type



Source: JAPTraPIS

In the draft minimum service standards being drafted by the MOT, it mentions a fleet age is maximum 7 years; however, the regulation should also be mindful that with good maintenance practices, a high quality bus should be able to serve for up to 1 million km, which is in the vicinity of 10+ years, depending on annual kilometers. The asset life of the vehicle needs to be increased for higher quality/ higher priced vehicles.

Taking the current situations such declining market share and insufficient capital, bus companies and owners face difficulty in replacing their aging fleets. In the past, the Government provided financial support to bus companies through purchasing buses for them. Although Government provides no direct operating subsidy to general bus business, operators benefit financially from being able to purchase fuel at subsidized prices.

The issue of bus fleet renewal is not an isolated matter; it is closely tied to a viable business model, the financial mechanisms and institutional structures. When these issues are addressed, bus replacement issues will be solved

Some possible measures combining the periodic motor vehicle inspection are;

- Subsidy, loan (special loan period and/or interest rate), buyout (old bus fleets will be exchanged for a new bus fleet down payment)
- Discount for the inspection payment and/or longer inspection interval, i.e. 6 months to 1 year
- Impose stiff penalty for violators; not only to ban bus fleets, but also to apply administrative sanctions to bus operators

3) Strengthening Law Enforcement

Role sharing and law enforcement among public transport administration should be defined clearly by function, and at the same time improve coordination and policy synchronization for public transport administration. Act 22/2009 gives a more functional role to the National Police; yet, it is deemed that the Traffic Police does not have enough human resources whose knowledge and skills meet the designated roles. The transportation agency is responsible for overseeing public transport administration and operations in the city, but it does not have the power to enforce laws and regulation, except some certain cases. The agency has to rely on the National Police as the

enforcement agency, even to conduct a spot check road inspection. The following shows the likely role sharing among the agencies.

- Ministry of Industry: workshop and mechanic accreditation, administrative direction to automobile industry to accelerate Euro 3 and 4 adaption and technology adaption for cost and energy effective vehicles
- Ministry of Finance: tax incentive and tax relief policies
- Ministry of Energy and Natural Resources: sustainable CNG and clean diesel supply policy, CNG station development, and fuel quality monitoring
- Ministry of Environment: GHG emission policy, administration and evaluation
- National Police: law enforcement

9.2.3 Restructuring General Bus License System

Typically general bus operators are governed under a licence or route permit system; however this is a poor mechanism for the regulators to control operators as operators carry the business risk. This can work well if the operator has a sound business and a long term perspective for the business, however for struggling operators their survival instinct is a stronger force than the regulations designed to control them, and poor behavior and poor service standards are the result.

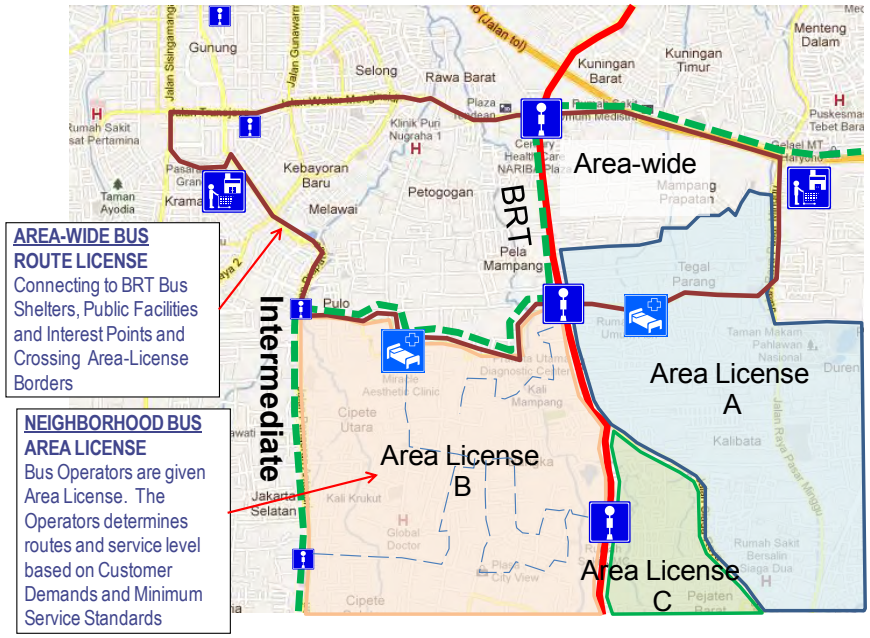
The TransJabodetabek region is also a chaotic transport scene with an excessive number of small operators all vying for business. In Bogor, a shift system assigns operators to odd and even days to ration the amount of work and reduce the chaotic congestion caused by too many operators on the road at once.

The following sections outlines a number of approaches in incorporating incumbent operators into the system network, with services designated as:

- BRT trunk operations being the trunk route operation, with a high level of infrastructure;
- Intermediate bus routes, acting as cross-suburb routes and feeder to the BRT and fully integrated with BRT through fare integration, and connecting to BRT shelter platforms. Intermediate routes always overlap a section of BRT to allow a shelter transfer.
- Area routes operating under local government additional to the BRT network and not fare integrated (but can serve BRT)
- Local feeder and community services also not fare integrated but serving local communities to provide local services and access to the BRT.

Figure 9.2.3 illustrates the service types on a map. Table 9.2.2 shows the comparison between the BRT/Intermediate routes along major routes, to more local area wide service types designed to serve local communities. For the local area services it may be possible to contract Angkot services to act as feeders to the BRT.

Figure 9.2.3 Concept of Bus Lisensing System for General Bus Serices



Source: JAPTraPIS

Table 9.2.2 Concept of Mixed License to Classified Contract System

	BRT	Intermediate	Area-wide	Neighborhood
Strategic Network Planning	JTA	JTA	L/G	L/G
Contract and Permit Approval	JTA	JTA	L/G	L/G
Performance-based Contract	√	√	No	No
- Form of License	-	-	Route	Area
Regulatory Authority	JTA	JTA	L/G	L/G
Fare Setting and Approval	JTA	JTA	L/G	L/G
Integrated Fare System (smart card, etc)	√	√	No	No
Infrastructure Development (Base)	JTA	JTA	L/G	L/G
Fleet Size	Large	Large	Mid	Small

Source: JAPTraPIS

1) Contracting Large Bus Operators into the System Network

Traditionally with the introduction of a BRT there is a program to 'migrate' large bus operators into the system as contracted service providers. What this achieves is the sharing of risk between the system manager and the operators where the risk is assigned where it can be best managed. The inability of operators to manage the risks they are exposed to is the reason why present bus operation struggle to survive.

Under the institutional amendments the JTA will manage political risk, TransJabodetabek with carry management (business) risk and contracted bus operators will carry operational risk. TransJabodetabek will manage the contracts.

Contracting operators into the system will require appropriately sized contract packages to be developed (are large enough and efficient to manage) and having affected operators form companies to bid for, or negotiate to operate these contracts. The benefits of this arrangement are:

- Business permission, rules and conditions, and operations is packaged as one function under the contract which clearly outlines the responsibility of both the operator and the bus agency.
- The bus agency will have a strong hand in guaranteeing service quality.
- The bus agency does need to negotiate amongst route operators as it has the control of routes and can assign operators according to demand (operators have guaranteed kilometers, so can be assigned those kilometers wherever demand exists).
- Bus operators and employees have formal employment with more stable income and benefits.

2) Managing the Transition Process

An atmosphere of change often causes concern and uncertainty amongst bus operators, who see themselves as independent operators protected by a bus operating license. Managing the transition therefore requires government to take on a consultative role and work to create the incentives and a sound business model to manage the transition to an integrated system.

Usually this takes a 'stick and carrot' approach; developing attractive business models against the uncertainty of a future outside the system.

Some principles to guide this transition are:

- The government's decision to expand the integrated bus system will result in the cancellation of individual route licenses, to be replaced by performance-based contracts. This action creates uncertainty for operators who may not initially wish to cooperate.
- On the other hand, the government is offering viable and profitable bus operating contracts to provide services to the system under a business model which has minimal risk for the operator.
- Contracts can be offered through competitive tender or negotiated contract basis and under the latter, operators are assigned company stock according to their level of entitlement (as a form of compensation).
- While negotiated contracts are not a competitive form of tender, it is a transparent process that manages the transition more smoothly. It avoids the complication of managing losers, who are likely then to allege that the competitive tender process was not transparent.
- Incorporation of operators into companies also needs to recognize that bus owners presently earn daily money for their incomes and company ownership may only pay an annual dividend. A scheme to provide an advance on profit dividend may help ease this concern.
- Such a transition process for existing operators will require a committed negotiation process with the bus owners association or representatives nominated by the industry.
- Worldwide experience has shown that as long as government is prepared to address the legitimate concerns of operators, successful outcomes can be achieved.

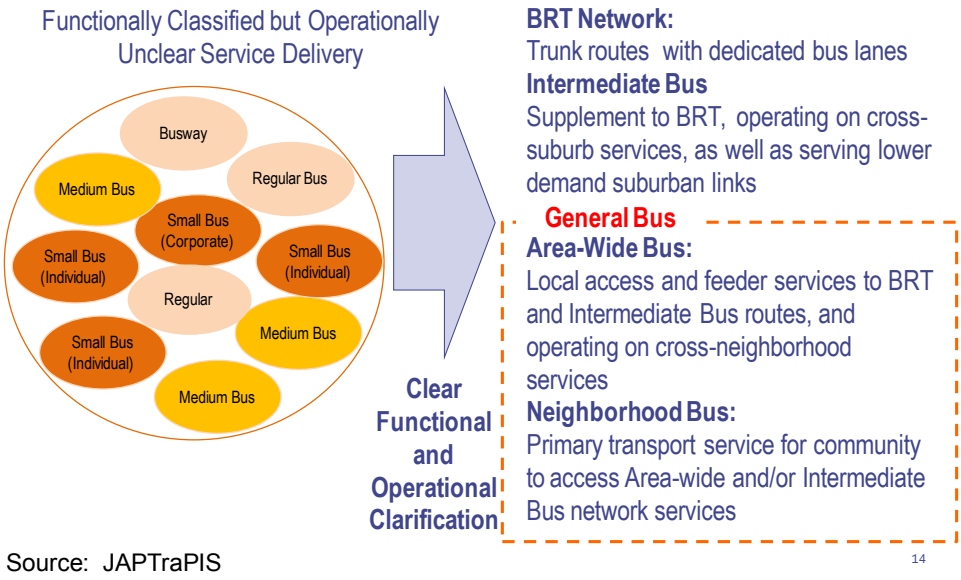
As these contracts are expanded across routes that are part of the integrated system, all buses that operate as intermediate or feeder services will be fitted with ticketing

equipment so all passengers in the system can pay for distance travelled regardless of transfers made.

Figure 9.2.4 shows the change in organization from the present license system to a classified contract system.

Under the current system, bus operations are somehow functionally classified but operationally unclear in its service delivery. Under the new arrangements BRT and the intermediate bus routes will serve as the bus system network under the management of TransJabodetabek, with full fare integration and with bus operations provided under a performance-based contract.

Figure 9.2.4 Concept of Mixed License to Classified Contract System



Source: JAPTraPIS

3) Developing Local Area Services under Local Government

Once a BRT system network is in place it is easier for local governments to manage the remaining services as a large number of these services will serve the BRT trunk route network. There are two ways that this can be managed: by the local government or TransJabodetabek depending on the local situation or local objectives.

These two scenarios are presented as options as both are suitable and workable and the relevant stakeholders can decide how to best approach the issues.

Local governments can take a major role in reorganizing local bus services to serve local communities and serve the major trunk routes such as rail and BRT. They are able to issue licenses and permits, and engage the participation of a local transport forum to determine service needs, standards and expectations. ORGANDA can also assist in organizing and consolidating bus operators and service providers.

There are two types of services that can be arranged locally, being area wide routes along main corridors (through a route permit) and also local area collector services where an area license is issued, usually to a company or a cooperative under which individual smaller operators provide services.

These services are non-fare integrated with the BRT and as the operator collects fares, there is an incentive to develop appropriate service levels to meet the needs of the

community. As there is a level of protection from competition, there is an improved chance for a viable business. The bus operator would consult local communities and relevant stakeholders to determine bus routes and service levels in the area. The local government's transportation agency as the regulator will take a supervision role (to ensure minimum standards are maintained) and can also act as facilitator in developing the relationships within the community.

4) Transition and Rationalization of Bus Operators

The major problem to overcome for local governments is managing the change to a more organized and accountable transport service and to engineer the service improvements so that public objectives are met. This will require the creation of a small and skilled transportation agency (an agent for change) with the necessary skills and understanding of the local transport needs and opportunities, and also will entail a great deal of consultation and engagement with industry players.

Firstly, it should be acknowledged that there are numerous problems that must be overcome, including:

- The difficult and sometimes uncooperative environment for change and service improvement. Operators are likely to want to protect the status quo (perhaps- unless business is poor)
- Traditionally suspicious of government and change and will defend their perceived rights and independence
- Operators depend on a daily income which may not be the case under a formal company ownership.
- Skeptical and lack confidence in uncertain future (the formal business model)
- There will be an automatic demand for compensation
- The lack of capacity and skill in local government to manage change
- The different nature of affected persons, being owners (rent out the bus), owner /drivers, renters/ drivers or employees.

Engagement with the community and affected operators are important. Firstly, to understand local transport needs and community perspectives, secondly to determine the scope and level of service required, and thirdly to build a constructive relationships with affected persons to support the change process.

Such a climate of mutual progress is important, as otherwise the program of service improvement appears to operators as just another 'stick-wielding' exercise which will further disadvantage their situation. Experience has shown that with where there is mutual understanding and trust, (and critically, a viable business model) there is a better chance of the service improvement program succeeding.

5) Compensation Issues

The major focus during an operator rationalization program is the issue of compensation. Expectations of a 'golden handshake' can distract from meaningful negotiations for a role of current operators in a new system.

Compensation should be the last area of discussions as the objective is to focus on industry reform and transitioning operators to a more viable business model. This sets a

more positive environment for change, which is likely to get more support.

Impact on operators needs to be evaluated, for example:

- Is the operator totally displaced by BRT or partly?
- Are their routes eliminated or shortened?
- How can routes be realigned to complement the trunk network?
- Is the operator capable or interested in forming or joining a formal company to operate services?

Furthermore the expectations for compensation should be moderated according to:

- An operator's legal status, level of impact,- potential loss of business or just loss of employment?
- If an operator declines a reasonable offer of alternative business to replace their current operations; are they then entitled to monetary compensation?
- Any compensation for the owner of life-expired vehicles?
- The value in a scrapping policy to remove old vehicles and as a mechanism to compensate? (being paid the scrap the vehicle and using it as a deposit on a new vehicle or to acquire shares in a company structure) What are the cost implications?

ORGANDA should be formally engaged in the process to represent operators as a recognized industry representative player. Expectations for compensation should be moderated, with the main focus on how to reorganize operators to provide local and feeder services.

Without doubt, local feeder operations to service a trunk route can be a more lucrative business than longer routes where buses are stuck in traffic.

Primarily it is the role of the Local Government to manage this role of developing feeder services in cooperation with TransJabodetabek Agency, however the agency is not expected to plan local routes and services.

6) Contracting Angkot as Feeder to the BRT System

There is scope however for local government to engage more closely with the TransJabodetabek Agency. It involves the BRT Agency TransJabodetabek contracting with Angkot to provide feeder services to the BRT.

Instead of migrating operators into formal business, Angkot can be organized as formal feeder services to the BRT, thereby creating a business for displaced operators. Such a partnership would include:

- Mutual benefits as feeder operators have a viable business associated by branding with the trunk line
- Mutual obligations within the partnership – operators keep minimum standards and the Agency assists with brand identification, creating space and suitable conditions for interchanging passengers
- Non-fare integrated. Operators collect a fare off passengers with the possible level of cross-subsidy (top up fare) if required from the trunk operator (who benefits from additional passengers.

Such a partnership utilizes the natural abilities of paratransit to serve local communities (it can include Angkot, Ojek and Bajaj type vehicles. Effectively, the smaller feeder operators will be organized at the 'macro' level of a defined scope of business and minimum standards to keep. They would operate as they normally do (but under the umbrella of a cooperative) to provide a cohesive mechanism to control and manage operations.

Figure 9.2.5 shows the comparison between the traditional method of engaging with operators and this cooperative approach.

Figure 9.2.5 Comparison between Traditional Method and Cooperative Approach.

Traditional / accepted methodology	Feeder bus partnership
▪ Migration /formalisation/ capacity building ▪ Similar to resettlement issue ▪ Forced/ heavy hand of regulation ▪ Lack of choice ▪ Compensation / entitlement ▪ Suspicion /Resistance ▪ Shareholding does not provide daily income	▪ Voluntary/ easy to adapt/ familiar ground ▪ Business opportunity (spreads benefit of BRT operation) ▪ Industry can organise itself ▪ Daily income ▪ More efficient routes ▪ Joint objective with BRT for successful outcome ▪ Equal partnership

Source: JAPTraPIS

9.2.4 Institutional Development and Capacity Building

Institutional development and capacity building is one of the most important factors to achieve consequential outputs. The JTA, planned to be established in 2012, will serve as a new regional transportation authority with new functions and responsibilities, which are combinations of the tasks of existing central and local governments' agencies.

The JTA acts as an umbrella organization at a political level that develops the Strategic Urban Transport Policy to guide the TransJabodetabek in its operations. It is a high level body with all key stakeholders represented at Board level; jointly and equally responsible for Strategic Policy development for the whole Jabodetabek region. The JTA develops as part of the Strategic Policy, the BRT service plan (a financially viable and sustainable 'Operational Plan') that will effectively become the business and operating model for the agency. The JTA will ensure a suitable operating environment for TransJabodetabek free of political issues, so that the interests of the public are well served.

As part of the JTA organization a research and technical capacity needs to be developed in a specialized unit to serve the planning needs of the JTA, specifically in areas such urban transport and BRT planning, urban development, land-use, transit- oriented development, TDM, monitoring and evaluation and so on.

Transportation agencies in local governments should also consider building capacity in their transport departments. As the National Police are given more functional roles in the Act 22/2009, capacity building for the National Police, in association with the transportation agency, should be given more effort to ensure effective and coordinated law enforcement.

9.2.5 Other Public Transport (Taxi, Bajaj and Ojek)

Bajaj are not explicitly stated in law and government regulation, even in ministerial regulation, as it only exist in DKI Jakarta, and is legally recognized as a non-route public transport mode. DKI Jakarta has a regional regulation on Bajaj, including business operation registration; restricted area of operation (some roads off limits) and associated rules; however, the Study Team could not obtain the regulation by the time of preparing this report.

In contrast, no regulation exists for Ojek (motorcycle-taxi); and it is not recognized as public transport mode and has no legal standing despite it collecting a fare for travel which puts in a public transport category. Ojek are therefore informal business and has no controls or any framework to protect passengers.

However, both Bajaj and Ojek are considered useful and practical transport options for the community, especially where public transport is not available or limited, or maybe for short distances.

According to ORGANDA DKI Jakarta, the quota of Bajaj under Governor instruction was set to 6,000 units, but the policy has not been strictly followed, there are now in excess of 14,360 registered Bajaj (as of 2010) but may be much higher when illegal operators are included due to the reported practice of illegal Bajaj use one registered number.

Enforcement is weak and lacks measures to track down the Illegal operators. The Transportation Agency in DKI Jakarta once tried to enforce the conversion from gasoline-based Bajaj to CNG but failed.

The demand for Bajaj is presently unknown, and if at any stage regulators consider including the Bajaj as a functional and recognized role in public transport, a fact-finding study be conducted to understand the current situation and be able to reengineer its useful role. From environmental (emissions) and safety perspectives, the Bajaj must come under a legal framework, so it can be administered and controlled through legal channels. Also improved law enforcement should control the traffic/parking/behaviors of Bajaj.

As for the Ojek, it is clear that regulating such an informal and fragmented industry is highly problematic for regulators. But given the risk to Ojek operators and passengers alike, some form of legal standing and framework would be beneficial.

It is therefore suggested that regulators should consider a legal framework for Ojek, in order to improve industry recognition, legal standing, and better protect passengers. This could include entry requirements (ID/ license, fixed address etc) minimum service standards, periodical and safety mechanical check, registration fee to cover administration of industry, and insurance coverage for passengers. This may also improve working conditions and welfare for Ojek operators.

9.2.6 Implementation Schedule

Figure 9.2.6 shows the implementation schedule of bus service improvement instruments explained in the previous sections.

Figure 9.2.6 Implementation Schedule of Reforming General Bus Management System

Benchmark	Agency	2012	2013	2014	2015-20
Jabodetabek Transportation Authority (JTA) is established		▼			
PerPres of Jabodetabek Transportation M/P is ratified		▼			
PP for "Vehicles" and "Vehicle Inspection" are ratified		▼ Transition Period - 2016			
Other PP scheduled by the MOT are ratified		▼			
GHG Emission Action Plan Target					(2020)▼
Minimum Service Standards (SPM)					
- Formulation of SPM for BRT and General Bus Services	DGLT	■■			
- Transitional Period			Transition		
- Full Application of SPM	JTA/LG			▼	
Bus Fleets Rejuvenation					
- Institutional Design for Periodic Vehicle Inspection (PVI)	DGLT	■■			
- Fleet-age Restriction Measure	DGLT/LG	■■			
- Amendment of Relevant Traffic Regulations	DGLT/LG	■■			
- Transitional Period				Transition Period - 2018	
- Full Application of Rejuvenation Instrument	JTA/LG				(2019)▼
Restructure of General Bus Licensing System					
- Lay out New Bus Hierarchy System	JTA	■■			
- Reform Business Permit & Bus Route License System	JTA/DGLT	■	■		
- Amendment of Relevant Traffic Regulations	DGLT		■■		
- Transitional Period				Transition Period - 2018	
- Full Application of New Bus Service Structure	JTA/LG				(2019)▼
Capacity Development Program					
1. Capacity Building for JTA's Staff	JTA				
- Needs Assessment and Training Program Designing	JTA		■		
- Capacity Building Training Implementation	JTA		■		
2. Capacity Building for DisHubs' Staff	DGLT				
- Needs Assessment and Training Program Designing	DGLT		■		
- Capacity Building Training Implementation	DGLT/LG		■		

Source: JAPTraPIS

9.3 Regional Measures and Impacts

The Integrated Route Network Plan traverses city boundaries improving transport links and spreading the benefits of greater access and connectivity across the region. This improves regional public transport to provide commuters and motorists with a good transport alternative and improve access services, education and employment as well as improve social links across the city.

Of particular significance is the removal of the cross-border issues under the JTA and TransJabodetabek management regime, as the political issues are resolved at JTA level and TransJabodetabek operates commercially without subsidy from any city source. It avoids the situation where one Kota is subsidizing another area's transport.

This section outlines specific issues for each region in the Bodetabek region; how they are impacted by the network planning, and in particular Bogor as it is geographically separated from the integrated network plan and is more autonomous in planning its own transport within the city of Bogor.

In the short term projects of 2012, it has been necessary to concentrate improvements to within the Jakarta DKI area as the present TransJakarta busway is at maximum capacity, with demand in excess of fleet capacity. Adding additional routes to the present system would cause critical overload. The only exception is the cross border implementation of

Route 2b as an intermediate route from Kalideres to Poris Plawad and Tangerang City Mall. This route will initially not be fare integrated but serve as a feeder route to Kalideres.

It is also necessary to have in place the JTA, TransJabodetabek and integrated ticketing, a distance-based fare, and e-ticketing before the longer cross border routes can operate. Prioritization of this institutional issue should be at the forefront of development.

From 2014 additional routes are developed to the adjoining regions.

9.3.1 Tangerang

Following the introduction of Route 2b as an intermediate feeder to Kalideres, the next development is Route 13a and 13b from Tangerang City Mall to Ancol via Kota. This route will provide easy transfer at any shelter from Kalideres to the Grogol Flyover to Route 2 (Harmoni and Pulo Gadung) and Route 25 Blok M via Semanggi).

By 2020 Route 13 will extend to BSD, followed by more direct BRT routes via Tol Serpong, being Route 24 (to Lebak Bulus) and Route 29 to Bank Indonesia.

An intermediate route will cooperate via Pamulang to Ciputat and BRT Route 23 will operate from Ciputat to Dukuh Atas via Kuningan.

While the integrated network operates only to east of the river at Tangerang, the opportunity exists for Kota Tangerang to develop local and intermediate routes to western suburbs to provide good access to the BRT trunk network.

9.3.2 Bekasi

The completion of project package 9 in 2014 introduces Route 16 as the first cross border into the region Bekasi to Harapan Indah. This will provide a direct route to Pulo Gadung continuing through the Ancol and Kota. In the same period, completion of project package 10 sees the BRT extended from Harapan Indah to Bekasi Central and Bekasi Bus Terminal, also to St. Klender Baru. Route 26 will operate from Bekasi Bus terminal to Pulo Gadung will operate from Bekasi Station via I. Gusti Ngurah Rai to Kp. Melayu being able to connect with Route 11 direct to Dukuh Atas. Two intermediate routes (52 & 54) in Bekasi can be introduced also.

By 2020 Route 9 will be introduced along the Kalimalang corridor connecting to Cililitan and the wider network. BRT Route 19 (via tol) will connect Cibubur to Cililitan and Dukuh Atas and BRT Route 17 will operate to Setu. Intermediate Routes 51 and 53 will provide network coverage to the south with a connection to by Route 51 to BRT 19 at Cibibur.

9.3.3 Depok

Depok has a rail connection to Jakarta DKI, but after 2015 three BRT routes will be established, being

- BRT Route 28 from Depok Central along Jalan Gas Alan to Tol. Jagoriwa to Cililitan
- BRT route 10 From Depok Central, University Indonesia via Lenteng Agung, Pasar Minggu, Mangerrai to Bank Indonesia
- BRT Route 18 Jatijalar via Bogor Raya to Dukuh Atas
- Intermediate Route 43 travelling west from Depok to Lebak Bulus.

9.3.4 Bogor

Kota Bogor forms part of the Jabodetabek region, however its location is quite distinct from the urban conglomeration of the Jakarta DKI and its immediate neighbors.

Consequently, the integrated BRT network of the Jabodetabek region has not included Bogor although transport linkages to the wider network are considered.

The satellite nature of the city in relation to Jakarta sees it serviced by a rail corridor and various private bus ventures to connect its citizens to provide the necessary commuter links.

1) Traffic Congestion

Bogor faces a number of serious urban transport challenges with a high level of traffic congestion causing a declining quality of life in the city. Tough decisions needs need to be made at a political level, to develop transport strategies that can balance car use with public transport, recognizing that increasing car use is an unsustainable development trajectory; road widening options are limited, and improving public transport may be the only realistic option.

2) Public Transport Improvements

Kota Bogor has made concerted efforts to upgrade public transport within the constraints of the city. Present efforts are underway to improve public transport through PD JASA TRANSPORTASI (PDJT) a city owned enterprise which manages the TransPakuan bus services. This operation currently has 30 buses operating 3 bus routes with an additional route planned for implementation in 2012. Figure 9.3.1 shows routes 1-3 presently operating and routes 4&5 as planned routes. A recent program to implement electronic fare collection and ticketing has failed due to supplier problems.

Figure 9.3.1 TransPakuan Routes in Kota Bogor

Despite the efforts of PDJT, the bus operation has been less than successful due to a variety of managerial and operational problems, including:

- PDJT carries the operating risk, and has difficulty in generating sufficient revenues to cover cost of operation, yet receives no formal subsidy. It is however expected to provide community based services according to its public service obligations. It has

diversified into other businesses to support its operation.

- Buses operate in mixed traffic and suffer congestion which has a large impact on quality of service and fleet productivity.
- The poor financial base affects the maintenance of the fleet and a large number of buses are off-road due to mechanical failures and lack of repair.
- These conditions place TransPakuan in a poor competitive position against the thousands of Angkot who also provide services and provide direct competition to TransPakuan.

A current plan is underway to upgrade bus services and reduce the number of Angkot by migrating them into formal bus services, however unless a sustainable business model exists, it is unlikely to gain the confidence of operators to agree to change the status quo.

The crux of the problem for PDJT is that TransPakuan carries 100% of the operational and business risk – risk that it cannot manage. It is not a failure of management as such, but a failure of the business model. Due to circumstances largely out of its control it cannot develop sufficient revenues or efficiencies in operation. It continues only with various indirect support from Kota Bogor.

This situation is a poor and uncertain platform upon which to plan an expansion of the formal bus network leading to the conclusion that a more sustainable and feasible approach is urgently needed.

3) A Legal Framework Separating Roles and Functions

Critical to solving the problems of PDJT and TransPakuan and improving public transport, is the sharing of risk amongst all stakeholders, not just the bus operator. The management public transport system needs to be improved. This can be done by establishing a legal framework that clearly separates roles and responsibilities (and improves accountability) according to function. The three separate functions are outlined as follows:

(1) Strategic Level Planning and Policymaking: Government sets a Strategic Transport Policy in line with its vision of the city.

- The government set objectives, assigns resources, develops and coordinates policy for a public transport system that serves the public interest.
- Government manages the political risk, and establishes through its management of the city, a suitable environment in which public transport can operate, for example road priority, passenger facilities, rules of operation and coordination of infrastructure and planning.
- It defines a Strategic Transport Plan (STP) which clearly outlines its aims, policies and objectives for public transport to guide the implementing agencies in their tactical planning and daily management of the system.
- Through the STP it also defines its own responsibilities to assist toward achieving the public transport objectives for the city. At a strategic level it develops a financially feasible Operational Plan to guide the bus management in its business.

(2) System Management: PDJT is reorganized as the system manager of the network, under the Strategic Policy responsible for overall service performance, customer service

delivery and ensuring the sustainability of the system.

- The system manager is responsible for the planning, control, management and administration of public transport services.
- It operates as a commercial company and carries the business-risk (to develop revenues and manage costs).
- Being dependant on revenue will focus its attention on customer service, to 'win the market' and not be reliant on loss-compensating subsidy.
- It contracts operators to provide services at a fixed km-cost basis, paying them to perform services to an agreed standard and specification. Through this contract mechanism, and a sustainable business model for the operators, the agency has a strong hand in controlling quality of service delivery.

(3) Bus Operation: The bus operator as the service provider operating the fleet under contract to the system manager.

- The bus operator is paid under contract to provide services to an agreed standard of quality and can be penalized under the contract for service failures and poor performance (performance-based contract)
- The contract system provides a sustainable business model with a margin for return on investment. Operators are successful when they meet the conditions of the contract and operate efficiently by managing costs.

The above model separates functions and creates clear accountability. The strategic policy identifies objectives and performance standards (the political objective and in the public interest) set in a viable operational model that guides the PDJT in its planning and operations and holds it accountable.

The bus operators are contracted under a sustainable business model (that covers cost and profit) to provide services that meet quality standards. The System manager has a strong hand to control quality under the contract arrangement, and all services are financially supported.

The business model including the operational plan and the management of fare policy and user subsidy is fully described in the previous section,

4) BRT Design and Planning Principles

Essential design principles for public transport and BRT is already discussed. They are summarized as:

Build Quality into public transport, both in infrastructure and fleet to ensure a quality image, able to attract passengers, and an attractive feature of the city.

Build for system performance and efficiency – system viability and business performance relies on sufficient average bus speeds; reducing travel times and reducing fleet costs.

Develop a full network to deliver access and connectivity. Access and seamless connectivity across the network includes:

- Bus corridors connected with 'seamless' transfers across the network
- Feeder routes are well integrated with trunk routes

- BRT is supported by good NMT options (walking space and cycling paths)
- Projects are developed at community (local) level to improve access
- Park and Ride is an integral part of the system to capture car users.
- Active measures are in place to discourage car use, including road user charging fees (which can support public transport funding).

Implement BRT without apology the reduction of road space for cars. A BRT lane can carry 8-10 times the passengers of a car lane. Roads operating at beyond design capacity can improve their carrying load with the introduction of a BRT. A corridor considered 'too narrow' for BRT is often the perfect candidate.

Capitalize on the benefits of BRT. BRT establishes a highly defined trunk/feeder route pattern that allows supporting services to be developed around the BRT system. BRT also absorbs a high level of demand, allowing cities to reclaim space for walking, cycling, and improving inner city public space. Once BRT is in place, pricing mechanisms such as road pricing can be used to balance traffic, and provide revenue to support public transport.

The business model is the key to sustainability. A commercial and business-like approach creates the necessary incentives to deliver good customer service and ensure business development and continuity.

Integrate and coordinate urban transport policy. BRT does not operate in isolation; it is an integral part of the city's transport economy and requires a high level of coordination with the operating environment.

The thrust of the above planning principles is for Kota Bogor to develop BRT as a high quality mass transit option, capable of attracting passengers with a 'more efficient and convenient than car' service level. Such a commercial mass transit system is more financially sustainable and more effective than the present system of buses operating in mixed traffic.

In summary, a bold and decisive approach to build a high quality BRT system is far more likely to succeed than the present timid approach where BRT is squeezed into the presently congested roads. BRT must offer a real travel alternative – replacing angkot and a large percentage of private car commuting trips.

The political approach should be to develop a city-wide mobility strategy which includes large and small steps. BRT creates an opportunity to deliver better capacity along major corridors, improving road utilization and reducing travel times. A range of supporting actions can be initiated to develop a complete network. The test of system performance will be whether citizens can live in Bogor without owning a car or motorcycle.

5) Reforming and Rationalizing Angkot Operators

The rationalization and reduction of angkot on Bogor is a major concern, as to how to manage this undertaking. Previous section outlines strategies to reform the angkot operators into a more formal network, both as route operators and as feeders to the BRT trunk system.

It is essential to acknowledge the complexity and diverse problems that must be overcome, including:

- The sheer scale of the problem with many participants struggling for employment and survival, including vested interests profiting from the present arrangements and who will obstruct change if possible.
- The difficult and sometimes uncooperative environment for change and service improvement. Operators lacking confidence in the new system will fight to protect the status quo, and defend their perceived rights and independence
- Displaced operators are sure to demand compensation for real (or imagined) impacts
- Operators are dependent on a daily income, so transition to a company ownership paying annual dividends will not address their needs.

Local governments must also build its own capacity to manage change, developing the necessary skills and understanding of the local transport needs and opportunities.

The approach with operators during the transition process should be generous in engagement and building relationships. A great deal of consultation and engagement is needed with stakeholders and a local forum that includes contracted operators, local government and community. Such a climate of mutual progress is important, as otherwise the program of service improvement appears to operators as just another forced hand of regulation. ORGANDA can play a key role as a industry representative to assist in developing solutions.

6) Prioritizing Objectives and Managing the Compensation Issues

Typically the rationalization of angkot operators is seen as a government 'stick-wielding' exercise which operators expect will worsen their already precarious situation. Consequently operators respond by either fighting for their perceived rights, or demanding compensation with expectations of a 'golden handshake'.

However, the compensation issue can distract from the real objectives; being meaningful negotiations to find a role of current owners and operators in a new system. Expectations for compensation should also be moderated, and treated as a last resort where operators (who have genuine entitlements) have not been able to take up a new business opportunity under the BRT regime.

Furthermore the nature of the players should be understood to determine their needs, namely: 1) are they owners that hire day labor to operate buses or rent out the vehicle for a set fee? or 2) are they owner/operators who drive their own vehicle? or 3) are they drivers or sub-hirers or 4) are they affected persons (cleaners etc).

Differentiation of players helps to determine future roles such as:

- Whether operators can form into companies or cooperatives,
- Is it a case of finding alternative employment and determining preferential employment and eligibility criteria (and what training needs exist)?

Rationalization of Angkot should follow a set priority according to the following approach:

- Route planning to determine the impact on each operator; are they totally displaced by BRT, can their routes be shortened or amended?
- Identifying the nature of affected operators - what is the nature of their involvement and what impact will they bear by implementation of a BRT?

- Impacts on employment – how many persons displaced or affected (develop an affected persons register that gives them priority of employment)
- Alternative business packages be developed; either consolidation into a company to operate on BRT routes, or forming company /cooperative structures to provide feeder services to the BRT

The last area of discussion is the compensation issue for angkot owners that have not been able to take up alternative options. Some may be unwilling and choose to leave the industry. Compensation entitlements need to be established according to the level of impact; what alternatives were offered, and what monetary compensation is appropriate and acceptable.

This discussion does not aim to set allowances or disallowances for compensation, but raises some issues that may need to be considered, as follows:

- If an operator declines a reasonable offer of alternative business to replace their current operations; are they then entitled to monetary compensation?
- Angkot owners are often transient, operating for as long as the vehicle they operate. Small bus operations are an easy way to generate self employment for the workforce, but may not be a lifetime business. What entitlement of compensation exists for the owner of a life-expired vehicle?
- Can a vehicle scrapping policy be used as a method of removing old vehicles and as a mechanism to compensate? (being paid the scrap the vehicle and using it as a deposit on a new vehicle or to acquire shares in a company structure) What are the cost implications?

7) Contracting Angkot as Feeders to the BRT System

There is clearly no possibility to incorporate all angkot into the formal bus system. An alternative is for smaller operators to take up business opportunities in providing feeder services to the BRT system.

This would be developed along the lines of a formal partnership with the PDJT where the angkot cooperatives are contracted to provide services that comply with minimum standards. It utilizes the natural abilities of angkot to serve local communities.

It is an equal partnership in that it represents a 'win-win' situation; the BRT benefitting from the additional network coverage by vehicles identified and branded as part of the system (and extra passengers) and this also benefitting the feeder bus operators through their association with the BRT system, and by operating shorter and more profitable routes (faster vehicle turnaround). The aim is for Angkot to operate in a manner similar to what they do presently (individual business units collecting their own fares, providing a daily income) but under the umbrella organization of a cooperative that can coordinate their operations and monitor standards and performance. Each such operation must be developed as a viable business, and may require a small top-up subsidy from PDJT in return for the passengers the angkot contribute to the trunk system.

The fact that such a business partnership is mutually beneficial, through joint objectives makes this a workable plan in relative contrast to the heavy hand of regulation normally associated with Angkot rationalization.

8) Transport Connection to DKI Jakarta

A major rail link to Jakarta offers good commuter options and will be supported by an improved bus network at each end of the line, making connectivity easier.

Furthermore private entrepreneurs operate bus and coach services to Jakarta, however these services are not well connected to the Jakarta network because of regulation constraints. Bogor to Cawang connections are in greater demand that Bogor to Kp. Rambutan terminus and to meet this demand some buses operate illegally to meet the demand of travelers. This issue should be addressed in a formal way, so that services are provided to meet demand, ensuring that connections to the wider network are improved.

These private services are a vital part of the overall network connectivity, and although operated under commercial arrangements, they must be considered as part of the network.

Where these services overlap with a BRT line, where a passing lane for shelters is available, and these services should be able to access the busway (by-passing BRT shelters). This improves viability of the services, and improved the utilization of the busway. However, strict monitoring and conditions should be applied to such a service to ensure BRT operations are not disrupted and system safety is not compromised.

10 EVALUATION OF MASTER PLAN

The JAPTraPIS Master Plan is set under the umbrella of the urban transport master plan in the JABODETABEK region. In this connection, another JICA technical assistance, JUTPI, revised the urban transport master plan. The revised urban transport master plan shows development scenario, future network key projects and their justification. The importance of public transport, including road-based public transport, the main arena of JAPTraPIS, is addressed with sufficient justification.

Since JAPTraPIS is limited to road-based public transport in its study scope, it has not a right position to evaluate its impact in the overall metropolitan transport system. Instead, this section evaluates the proposed JAPTraPIS master plan from different viewpoints such as government subsidy, road space utilization and environmental aspects. Those viewpoints are all related to sustainable transport development.

At the end of this chapter, the necessity of external assistance is examined for smooth implementation of the JAPTraPIS Master Plan.

10.1 Impact on Fleet and Operation Subsidy

10.1.1 Relation between Business Model and Subsidy

In the current TransJakarta business model, the Department of Public Works, DKI Jakarta is responsible for BRT infrastructure such as dedicated bus lanes, shelters and pedestrian bridges for shelter access while the province established TransJakarta as a form of public service agency (BLU: Badan Layanan Umum) to provide BRT service through contracted bus operators.

TransJakarta procures BRT fleet directly or pays BRT fleet usage equivalent cost in its contracts with bus operators when they bring their buses into BRT operation. TransJakarta collects fare among passengers while the deficiency between fare revenue and operation costs including fleet is offset by the province. Therefore it is considered that TransJakarta is subsidized in its fleet procurement and operation by the provincial government. For instance, in 2008, TransJakarta reported an operating deficit of 33.4% to the provincial government. It means that actual cost per passenger was IDR 5,255 while it was covered by fare (IDR 3,500) and subsidy (IDR 1,755). As results, DKI Jakarta disbursed IDR 131 billion to offset the operating deficit in 2008.

If the current business model would continue, BRT subsidy must become huge. The JAPTraPIS Master Plan envisages 2.7 million BRT passengers per day on the extended metropolitan network in 2020. Provided that the year 2008 fare and cost structure would remain, the metropolitan economy would have to disburse IDR 1.7 trillion as BRT subsidies. Such a large subsidy is not likely sustainable.

Discussions on government subsidy particularly on public transport are profound in policy agenda and delicate among citizens and stakeholders. The best situation is to realize improved services as the master plan suggests with a self-financing mechanism. It is rarely achieved among big cities in the world. The next best is to demarcate the roles of government and public transport operator and create a market for operators to gain profits by providing better services in the fairly competitive environment.

Taking the 8-year TransJakarta's experience into account, the following milestones are set to evaluate future financial performance of the proposed TransJabodetabek service:

(1) Only BRT infrastructure is provided by the government;

(2) BRT infrastructure and fleet is provided by the government; and

(3) BRT infrastructure, fleet and part of operation cost is provided by the government (TransJakarta business model).

The most favorite business model from a viewpoint of public finance management is (1).

It can draw a clear line between government and operator in the case of (2). It may be modified for route concession bidding – a requested amount of fleet subsidy is specified in a bidding document. In this regard, the JAPTraPIS Master Plan will require $ 635.2 million to procure 1,681 articulated buses and 277 single buses during the period 2012 – 2020.

The case of (3) or the TransJakarta business model is less sustainable as already mentioned. It is considered that targeted operation subsidy for the elder and student is more efficient than just offsetting operation deficit.

Table 10.1.1 Procurement Scgedule of BRT Fleets

	Master Plan Fleet			Addition (A)		Retirement (B)		Fleet in Operation			Fleet in Procurement		
	Single (units)	Articulated (units)	Capacity (persons)	Single (units)	Articulated (units)	Single (units)	Articulated (units)	Single (units)	Articulated (units)	Capacity (persons)	Single ($ Mill.)	Articulated ($ Mill.)	Total ($ Mill.)
2004				56				56	0	3,920			
2005				35				91	0	6,370			
2006				70				161	0	11,270			
2007				145	23			306	23	24,180			
2008				10				316	23	24,880			
2009				87				403	23	30,970			
2010				73	25			476	48	39,080			
2011				0				476	48	39,080			
2012	27	406	50,610	0	150	91	0	385	198	50,710	0.0	50.3	50.3
2013	85	497	65,590	0	165	70	0	315	363	65,610	0.0	55.3	55.3
2014	153	608	83,670	0	259	145	23	170	599	83,780	0.0	86.8	86.8
2015	174	717	98,220	14	119	10	0	174	718	98,340	3.6	39.9	43.5
2016	185	857	115,790	98	139	87	0	185	857	115,790	25.5	46.6	72.0
2017	256	988	136,480	144	156	73	25	256	988	136,480	37.4	52.3	89.7
2018	256	1137	154,360	0	149	0	0	256	1137	154,360	0.0	49.9	49.9
2019	256	1272	170,560	0	285	0	150	256	1272	170,560	0.0	95.5	95.5
2020	277	1366	183,310	21	259	0	165	277	1366	183,310	5.5	86.8	92.2
Total (2012-2020)				277	1681	476	363				72.0	563.1	635.2

Source: JAPTraPIS

Note: 1) bus life time is set at 7 years, 2) 70 passengers in single bus capacity, 120 persons in articulated bus capacity, 3) $260,000 per single bus, $335,000 per articulated bus

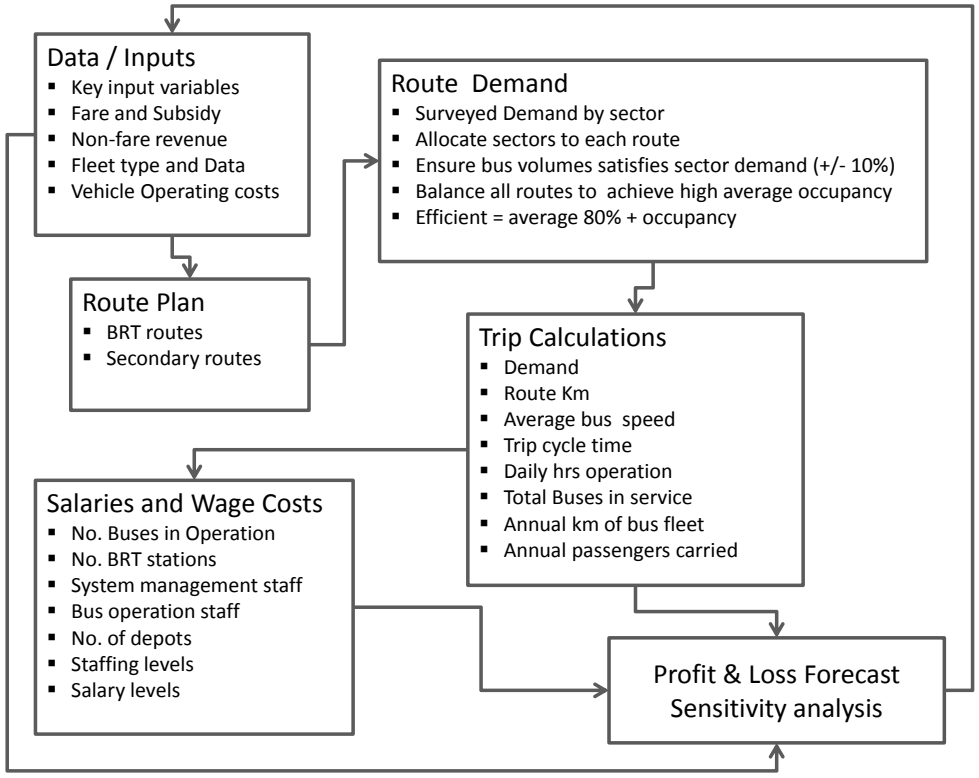
10.1.2 Methodology of Scenario Evaluation

JAPTraPIS has developed a comprehensive Bus Operations Model (BOM) to forecast operational performance for 2014 and 2020 networks under different scenarios. The methodology and inputs to the model are shown in Figure 10.1.1.

The model has used the forecasted passenger demand for the 2014 and 2020 network based on the scenario 'high public transport development' produced by JUTPI.

The service plan is based on the identified demand per route sector so that route design adds more routes to high density sectors so that demand is adequately served and reducing underutilization in low density sectors. This way services are more accurately tailored to demand. Average vehicle occupancy in the BOM across the network is 70%+.

Figure 10.1.1 Methodology of Scenario Evaluation



Source: JAPTraPIS

Assumptions:

The model uses 2012 prices for cost estimates which are present benchmark costs for Jakarta's bus operation. Costs have been checked against international benchmarks.

The modelling includes the cost of the bus fleet and all system and operational management, but does not include cost of infrastructure. A high level of detail is used in the model to reduce the reliance on benchmarks and assumptions in order to increase the accuracy and relevance of the result. However, while the BOM attempts to provide a clear and accurate scenario, it relies on the imprecise science of demand modelling. The BOM is a modelling tool can be used to effectively and quickly test variations and options but is not to be considered a prediction of future results.

Testing Speed and Fare:

The BOM evaluates the 2014 and 2020 network to determine impacts of changes and options specifically to establish the commercial fare (being the average fare need to cover all the cost of operation). The ultimate cost of operating the system and consequently the fare level, is a test of how efficiently the system performs. In particular it will demonstrate the critical impact of speed on system performance.

In the case of the tested speed scenarios, i.e., 20 kph, 24 kph, and 27 kph, the outputs compare yearly profit and loss at the present fare level of IDR 3,500 and at an increased fare level of IDR 4,000.

10.1.3 Results

The scenario evaluation using the BOM on the years of 2014 and 2020 networks shows noteworthy results. The profits or losses in other years during the JAPTraPIS Master Plan between 2012 and 2020 are estimated by linear interpolation.

The results show that the improved efficiency of a BRT system, particularly increasing average bus speeds, pays dividends in reducing operational costs. The passenger benefits of reducing travel time have not been factored into the model but could also contribute to improvements in patronage and revenue.

More specifically, the results imply the following:

- The proposed BRT system would improve financial performance to a great deal in comparison with the present TransJakarta business model. Even travel speed and fare sets at the present level, i.e. 20 kph and IDR 3,500, the aggregated financial deficits amount to $ 506.8 million. If bus fleet could be granted from the government like the TransJakarta business model, operation subsidy would not be required.
- To balance revenue and fleet and operation costs in 2014 at the present fare level, it is suggested to increase average travel speed on the full BRT routes from current 20 kph to over 25 kph.
- Since the year 2020 network is longer and wider and inclusive of less profitable routes rather than the year 2014 network, it is more difficult to keep financial balance without subsidy. To do it, it is suggested to run at 27 kph on the average with an increased fare level of IDR 4,250.

Table 10.1.2 Financial Balance by Travel Speed and by Fare

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Average Fare: Rp 3,500										
20kph	-9.70	-21.35	-33.01	-44.66	-56.31	-67.96	-79.62	-91.27	-102.92	-506.80
24kph	17.45	7.77	-1.92	-11.61	-21.29	-30.98	-40.67	-50.35	-60.04	-191.63
27kph	31.65	23.02	14.38	5.75	-2.89	-11.52	-20.16	-28.79	-37.43	-26.00
Average Fare: Rp 4,000										
20kph	20.83	9.44	-1.96	-13.35	-24.74	-36.14	-47.53	-58.93	-70.32	-222.69
24kph	47.97	38.55	29.12	19.69	10.27	0.84	-8.58	-18.01	-27.44	92.41
27kph	62.18	53.81	45.43	37.06	28.68	20.30	11.93	3.55	-4.83	258.11

Source: JAPTraPIS
Note: 1) Financial Balance = Fare Revenue - Operation and Fleet Costs ($ Million/year), 2) Financial Balance of 2012 -2014 under 2014 Network, of 2015 - 2020 under 2020 Network

It is a big challenge to provide BRT service without subsidy. The scenario evaluation reveals that average bus speed is a critical factor in the sustainability of the TransJabodetabek business model and should mandate the design features of the busway and traffic priority system. Any loss of system speed will need to be directly compensated by government support (or fares will need to increase).

10.2 Impact on Road Space Utilization

10.2.1 Disputable Points

A full BRT system delivers fast, comfortable and cost-effective urban mobility through the provision of segregated right-of-way infrastructure. Since urban road space is limited, BRT is selected to prioritize public transport passengers. However social and, in some sense, cultural disputes cannot be avoided to agree or not agree BRT prioritization on roads.

Urban road users are largely divided into four (4): private motorists, public transport users, pedestrian and NMT users including cyclists, and freight transport. For robust economic activity, freight transport cannot be poorly treated. For livable and environment-friendly city environment, the space for pedestrian and NMT users are encouraged. For efficient people movement particularly peak hours, public transport must be strengthened. And for meeting taxpayers' voice, private cars must be treated carefully.

Since DKI Jakarta started the BRT system in 2004, many disputes have occurred in relation to road space priority. The main point to criticize the BRT system in Jakarta from private car users is that TransJakarta exaggerated road traffic congestion due to its dedicated lanes although its road space utilization in terms of vehicular traffic is low.

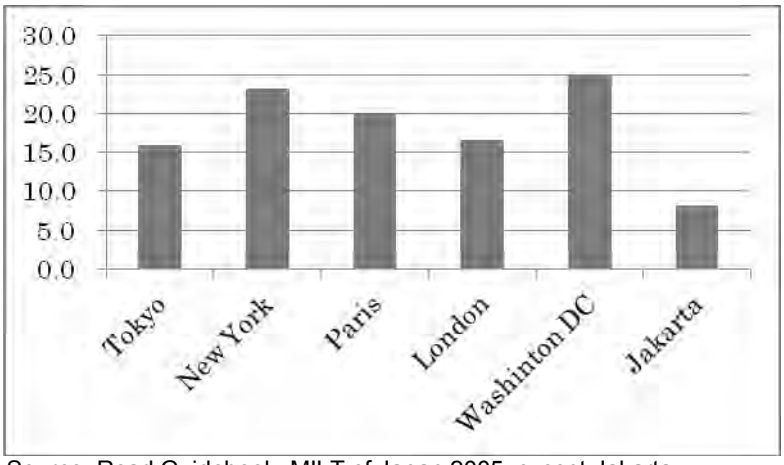
This road space prioritization dispute is a common phenomenon in the world, especially in the process of motorization in a society. For instance, the advanced economies represented by the G8 or the group of 8 industrialized countries own 400 – 600 passenger cars per 1,000 citizens. The car ownership in Jabodetabek is still 78 cars in 2008, even jumped from 29 cars per 1,000 citizens in 1990. There may be a large room to increase car population in Jabodetabek. It is therefore predictable that such a dispute will become more serious in the metropolis in line with increasing vehicle ownership.

Japan experienced acute motorization for about one generation since 1960s. In 1932, 65 cities in Japan operated street cars or old-fashioned LRT. Hot disputes were done whether a street car system remained or was abandoned in each city during the motorization era. As results, large cities having over one million population shifted from street car systems to subway/elevated LRT systems while around 20 cities today have LRT/BRT systems on the road space. Some cities have both the systems.

Jakarta has already decided to introduce MRT as a spine of public transport network. The JUTPI's revised master plan includes not only the initial north-south line but also east-west lines. However MRT network development must be capital-intensive and time-consuming. BRT is considered an economically transitional means. This is one reason that BRT was introduced prior to MRT in Jakarta.

Jakarta has an inherent disadvantage which was brought about by past urbanization – poor road space. The area has been mostly urbanized. However, the road space ratio of Jakarta is as low as 8.1% inclusive of publicly managed roads and others. The figure is much smaller than advanced cities in the world. Surprisingly, the cities in the Bodetabek area show lower road space ratios than that of Jakarta.

Figure 10.2.1 Road Space Ratio by City



Source: Road Guidebook, MILT of Japan 2005, except Jakarta

It is empirically suggested in Japan that a new urban development project is guided to create road space of 20% in the development land. Statutory urban development projects in Japan, by means of land readjustment and new town schemes, must meet this 20% standard. In Tokyo, there are sprawl urban areas and old areas which were developed prior to City Planning Law and therefore the city's road area ratio halts at 16%. Scarce road space is one of urban management issues in Tokyo.

The Jakarta's road space availability is much worse than Tokyo. To address daily traffic congestion at anywhere, there is a stronger need to prioritize public transport on arterial roads. This is another reason to make an extensive BRT network plan in JAPTraPIS.

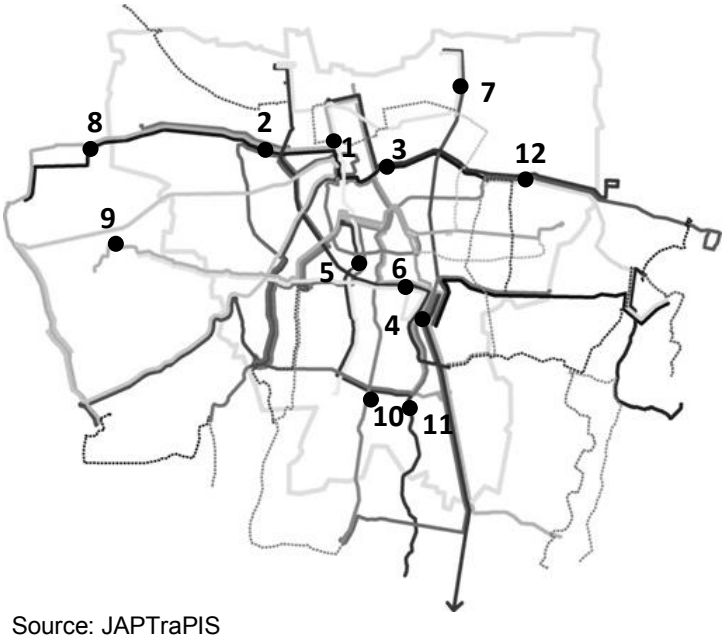
10.2.2 Future Predictions

As of December 2011, TransJakarta operated 11 BRT corridors or 184 km long and carried 380 thousand passengers daily. The JAPTraPIS Master Plan has a network of 876 km (full BRT: 683 km plus intermediate BRT: 193 km) with an anticipated daily ridership of 2.7 million.

With a wider and denser BRT network proposed in the master plan, increased ridership is anticipated under the year 2020 projection. For instance, 12 corridor sections are selected on the existing (No. 1-7) and future (No. 8-12) BRT corridors for a comparison of 2020 BRT ridership and car traffic volume between the "do-nothing" case and master plan case (refer to Figure 10.2.2). As a result shown in Table 10.2.1, in the master plan case all the corridor sections are anticipated more BRT ridership and less car traffic volume than those of the "do-nothing" case. V/C (volume/capacity) ratios of all sections decreased in master plan case. This is significant effect of the anticipated modal shift from private modes to public transport modes to be caused by the intensive development of MRT/BRT network and services.

In conclusion, the proposed BRT network expansion will not only serve for the public transport demand but also enhance space utilization of both lanes for BRT and cars. Therefore, it is strongly suggested that central and local transport administrations be confident to promote the MRT/BRT development strategy in order to realize more efficient road space utilization towards a sustainable and balanced urban transport system.

Figure 10.2.2 Location of Selected Corridor Sections for 2020 Traffic Comparion



Source: JAPTraPIS

Table 10.2.1 Comparison of Traffic Volume on Major BRT Corridors in 2020

No.	Location (Road Section)	Bus Lane	BRT Pax on bus lane ('000 persons)		Road Traffic on car lanes ('000 PCU)		V/C (on car lanes	
			Do Nothing	MP	Do Nothing	MP	Do Nothing	MP
1	Harmoni (Jl. Gajah Mada)	Existing	29	39	94	78	0.9	0.8
2	Grogol (Jl. Daan Mogot)	Existing	47	212	114	77	1.6	1.1
3	Senen (Jl. Letjen Suprapto)	Existing	11	15	112	102	1.1	1.0
4	Cililitan (Jl. Raya Bogor)	Existing	18	26	116	101	1.1	1.0
5	Kuningan (Jl. Rasuna Said)	Existing	9	49	174	136	1.2	1.0
6	Cawang (Jl. Letjen Mt. Haryono)	Existing	19	107	180	118	1.7	1.1
7	Tj. Priok (Jl. Laks. Yos. Sudarso)	Existing	11	62	121	110	1.2	1.0
8	Porisgaga Baru (Jl. Daan Mogot)	Planned	0	143	118	71	1.7	1.0
9	Ciledug (Jl. Ciledug Raya)	Planned	0	31	84	68	1.2	1.0
10	Tj. Barat (Jl. Lenteng Agung)	Planned	0	31	100	79	1.4	1.1
11	Cijantung (Jl. Bogor Raya)	Planned	0	37	106	82	1.5	1.1
12	Cakung Barat (Jl Bekasi Raya)	Planned	0	38	224	146	2.1	1.4

Source: JAPTraPIS
Note: No additional car lanes are planned in each section. On new BRT corridors(No.8-12), bus lane is newly developed in addition to the existing car lanes.

10.3 Environmental and Social Consideration of the Master Plan

In regard of social and environment consideration, a regulation on vehicle emission, greenhouse gas (GHG) emission target and evaluation of the Master Plan projects to

emission reduction, considerations to gender and handicapped, employment and education of drivers are investigated.

10.3.1 Major Environmental Considerations

As the result of provisional scoping of Strategic Environmental Assessment (SEA), the expected negative environmental impacts of the projects are waste water, noise and vibration during construction and change of land use and landscape by development of structures after construction. In contrary, the expected positive environmental impacts are decrease of noise and vibration due to decrease of traffic after construction and decrease of emission of GHG by decrease of traffic after construction.

However, most of the master plan projects are required only for road space adjustment for BRT corridors and park and ride facilities utilizing existing facilities. Therefore, the impact of the study is evaluated by GHG emission reduction which has the most critical impact and measurable indicators of the project.

1) Environmental Impact Assessment (EIA)

Recently, the Ministry of Environment established a regulation related to the introduction of Strategic Environment Assessment (or KLHS) in Decree No. 32 of 2009. It defines the SEA should be carried out in case of establishment of any policy, plan and program based on the principals of sustainable development. However, as the regulation was established only recently, SEA implementation has only a few examples.

Besides the SEA, Indonesian Government requires an Environmental Impact Assessment (EIA).[1] The condition of EIA is defined in national level regulation[2] and provincial level regulation[3]. In addition, the provincial government of DKI Jakarta requires Environmental Management Plan (UKL) and Environmental Monitoring Efforts (UPL) for smaller projects that is not required EIA. The condition of EIA and UPL/UKL are defined as follows.

The master plan projects requires some road widening and land acquisition for new terminals, however, the most of required areas are less than the condition of EIA process. The necessary areas should be further investigated and take necessary action in the implementation stage.

Table 10.3.1 Size of Project the Requires EIA and UKL/UPL

		State Ministry	DKI Jakarta Province	
			EIA	UKL/UPL
New Road Construction with Land Acquisition	Length (km)	>= 5	>1	>0.5 - <1
	Area (ha)	>= 5	>1	>0.5 - <1
Road Widening with Land Acquisition	Length (km)	>= 5	>4	>2.5 - <4
	Area (ha)	>= 5	>2.5	>1.5 - <2.5
Road Widening without Land Acquisition	Length (km)	-	>4	>3 - <4
	Area (ha)	-	>3	>2 - <3
Terminal	Area (ha)	>= 2	>2.5	

Source: Regulation of State Minister for Environment Number 11 of 2006, Governor of DKI Jakarta Decree Number 2863 of 2001 and Governor of DKI Jakarta Decree Number 189 of 2002

[1] Current Environment Law in 1997 No. 23

[2] Regulation of State Minister for Environment Number 11 of 2006 regarding types of business and/or activities that shall be accompanied with Environmental Impact Assessment (EIA)

[3] Governor of DKI Jakarta Decree Number 2863 of 2001 regarding projects and developments which requires EIA and Governor of DKI Jakarta Decree Number 189 of 2002 regarding types of business and/or activities that must be completed with the Environmental Management Plan (UKL) and Environmental Monitoring Efforts (UPL)

2) Greenhouse Gas (GHG) Emissions

The most significant impact to the environment of the projects is the exhaust emission, mainly caused by the type of fuel used. Emissions include greenhouse gases (GHG) mainly CO2 and a number of noxious gases dangerous to human health. GHG are considered a cause of global warming and consequently climate change, and other toxic emissions have a serious impact on the health of society including the development and well-being of the next generation.

The Government of Indonesia has committed to reduce their GHG emissions to 26% in 2020 in Presidential Regulation No. 61, 2011 on Action Plan for National Greenhouse Gas Emission Reduction. It estimates the target volume of emission reduction by transport sector to 38 Mt CO2e. Of which emission reduction by construction of Mass Rapid Transport (MRT) of Jakarta North-South Line Phase I and II is estimated to 2.77 Mt CO2e per year. However, it doesn't include emission reduction by road-based public transport sector. Therefore, emission reduction of the master plan projects can be additional to the governmental commitment.

The project boundary of the master plan projects is covering a) BRT development by upgrading of existing busway corridors and new BRT corridors construction and b) bus fleets rejuvenation of general buses. The estimated trip distance of passengers and number of bus fleets are the basis of the estimation of emission reduction.

The scenarios applied to the evaluation are i) Existing (2010), and ii) Master Plan (2020). The Master Plan case has four scenarios by propulsion system such as continuation of current condition, clean diesel, CNG, and electricity.

As the result, GHG emissions by the master plan projects by scenario are summarized in Table below. It reduces GHG emissions more than 1Mt CO2e from existing condition by master plan with any type of propulsion system.

Table 10.3.2 Emission Reduction of Master Plan Projects by Scenario

Mode	Fuel Type	Existing (2010)	Master Plan (2020)			
			Current Condition	Clean Diesel	CNG	Electricity
Full BRT/ Intermediate	Diesel	0.01	-	0.17	-	-
	CNG	0.02	0.20	-	0.20	-
General Bus	Diesel	1.46	1.74	0.78	0.78	0.78
	Gasoline	1.30	1.53	0.77	0.77	0.77
Total		2.79	3.47	1.72	1.75	1.55

Source: JAPTraPIS

10.3.2 Major Social Considerations

As the result of provisional scoping of Strategic Environmental Assessment (SEA), the expected negative social impacts are a) loss of work changing the economic structure by project implementation (after construction) and b) waste from construction, soil, drainage from facilities, solid waste from urbanized area (during and after construction). In contrast, the expected positive social impacts are a) increase of job opportunities due to Project (after construction), b) upgrading of medical service or educational environment (after construction), and 3) decrease of traffic accidents or congestion after construction or by the use of the transport facility.

The indicator to evaluate the master plan projects is selected to employment which is expected to have major impact.

1) Employment in Bus Transport Sector

During industry reorganization, redeployment of bus drivers and conductors needs to be carefully managed in a considered framework. To manage this effectively requires the scale and scope of the situation to be established to determine both the nature of the work types as well as the extent of affected persons.

The number of drivers and conductors in the road-based public transport sector is estimated based on the number of buses and ratio of drivers and conductors identified by the result of the Public Transportation Operator Interview Survey. The results of estimation for existing and master plan are tabulated in Table below. Total number of drivers and conductors in road-based public transport sector is estimated to 188 thousand persons. The master plan projects require 231 thousand of drivers and conductors. As the result, master plan generates 43 thousand of employments in 2020 only for drivers and conductors.

Table 10.3.3 Estimated Number of Drivers and Conductors

		Busway	Large Bus	Medium bus	Small bus	Total
Existing (2010)	Vehicles	426	3,845	8,219	34,557	47,047
	Driver	852	7,690	16,438	69,114	94,094
	Conductor	511	7,690	16,438	69,114	93,753
	Total Employment	**1,363**	**15,380**	**32,876**	**138,228**	**187,847**
Master Plan (2020)	Vehicles	1,369	4,330	11,707	40,535	57,941
	Driver	2,738	8,660	23,414	81,070	115,882
	Conductor	1,643	8,660	23,414	81,070	114,787
	Total Employment	**4,381**	**17,320**	**46,828**	**162,140**	**230,669**
Change of Number of Employment		**3,018**	**1,940**	**13,952**	**23,912**	**42,822**

Source: JAPTraPIS
Note: Estimated based on the data from DGLT (2011) and Public Transportation Diver/Conductor Interview Survey by JAPTraPIS (2011)

In addition to the increase of employment of drivers and conductors, the master plan projects will expand the sector and may in fact increase employment opportunities and better employment conditions. The expected new employment of the master plan projects are as follows.

- **Driver or conductor of new BRT and renewed bus routes:** The development of BRT requires employment of new drivers and conductors. In addition, renewed bus routes and operation requires the increase of bus numbers and employment.
- **Security guard of new dedicated bus lanes:** New development of dedicated bus lanes requires to secure the operating lanes free from private cars and motorcycles.
- **Fleet maintenance and cleaning of buses:** Cleanliness and internal bus condition is a major concern of users, and under performance-based contracts, cleanliness will take on a new priority, requiring more cleaning personnel.
- **Cleaning and maintenance of new bus stations/shelters:** Cleaning of stations and facilities will also be a key responsibility of the system.

- **Security guard of bus terminals:** One of the requirements from the public transport users is security. Therefore, terminal facilities also should be secured by increased number of security guards.

Those new employment is a good opportunity to qualify the employees to have a mind of service and security. It improves service quality of bus operations.

Especially, the drivers including both current and new should be trained in a Periodical Driver Training Program to improve and keep high level of the driving manner, service and security mind and operation efficiency by Eco Driving. In addition, the contract system should be changed from piece work system to fixed salary according to the experience and no accident condition.

2) Gender and Disabled Issues

Females are more vulnerable users of public space in general and this affects how they use public space, including transport, because they are easy to be targeted for petty theft or sexual harassment. Therefore, they have been less used the public transportation in general. Besides, the disabled persons also have been segregated from the public transport because of the physical constraints.

Based on the result of public transportation passenger interview survey, females have higher evaluation on the issues, such as accessibility, vehicle cleanliness, safety in the vehicle, ride comfort, ease of transfer, bus stop facilities and number of bus stops. Those are relating to security and comfort in the vehicle and bus stop facilities. On the other hand, males have higher evaluation on the issues, such as bus crowding, travel speed and terminal facilities. Those are relating to service level of operation and terminal facilities.

In regard of the service upgrading of the public transport system, the following areas of improvement should be considered at the implementation of the master plan.

- Improvement and Development of Integrated Bus Stations: To improve the user's waiting environment, better facilities are needed. Passenger information should include a bus location information system, timetable information, cycle & motorcycle parking, and bench.
- Security Guards for Bus Terminals and Bus Routes: To secure the environment in bus terminal and along the bus routes, good lighting and security staff around those facilities are required.
- Training of Driver and Conductor to Secure Inside of the Vehicle: The most critical issue of female is security inside of the vehicle from sexual harassment, robber, picker and so on. To avoid these incidents inside of the vehicle, drivers and conductors should learn the basic countermeasures.
- Separation of Passengers by Gender: It has been recently started in existing busway corridors to separate the waiting line and the space inside of buses to respond to the claims by the passengers. It should be expanded to all the public transport and all the users should be educated the manner inside of bus by campaign with posters and signs.
- Application of Universal Design: Universal design is considering both females and disabled persons. It should be applied as the standard of design of terminal and station facilities such as lift, slope and rest space, fleets such as special seats for them and flat

decks, and so on.

10.4 External Assistance for Smooth Master Plan Implementation

10.4.1 Need Identification

The JAPTraPIS Master Plan intends to upgrade the existing BRT system in terms of service quality and network. External assistance such as technical assistance and financial assistance is sometimes effective in some subjects and at adequate implementation timings.

TransJakarta since 2004 was a pioneering undertaking in Indonesia. Upgrading the current system need a lot of technical advancement which has not been practiced in Indonesia. Technical assistance may be effective in those areas.

On the other hand, expanding the BRT system to the Bodetabek area requires close coordination between DKI Jakarta and adjacent local governments. JTA is expected to take such a coordination role with a financing power as a central government agency to be established under a presidential regulation. However a JTA related presidential regulation has not been issued yet. It is uncertain when JTA is established and operationalized for the proposed BRT system development. Since Bodetabek local governments are generally weak in their financial capability, they might be in danger of delayed and slow participation in the BRT system. There is a need to utilize financial assistance so as to develop the proposed BRT system on schedule regardless of JTA's readiness in budgeting arrangement.

Taking those conditions into account, external assistance opportunities are examined among five (5) sub-components to realize the proposed BRT system towards 2020.

Control Center and Bus Location System: It is badly needed to increase BRT fleet on an expanding network in line with improving passengers' satisfaction. The present bus management by TransJakarta should be upgraded by means of the optimum and flexible assignment of available bus fleet. Synergy effect between technical and financial assistance is expected rather than technical assistance alone.

BRT Prioritized Traffic Management: It is a key of software to ensure faster BRT operation. Intersections and roundabouts along the BRT corridors have distinguished characteristics. The best traffic management solution should be considered by site individually while ensuring smooth traffic flows as a whole. In this sense, micro traffic simulation is a potent tool. It is noted that Jabodetabek has a much bigger traffic management issue - a metropolitan-wide traffic management. The existing area-wide traffic management systems are limitedly covered, not coordinated and operated in poor condition. However a new metropolitan system is far beyond the scope of this BRT development. Thus, BRT prioritized traffic management will be implemented on the existing facilities and equipment without intensive investment.

Ticketing System: It is a key technology to support integrated fare collection among full BRT routes and intermediate routes on a distance basis. It will use a rechargeable contactless IC card which has a greater opportunity to evolve into a metropolitan smart card for not only bus but also other public transport services. Synergy effect between technical and financial assistance is expected.

BRT Fleet: Two new organizations are envisaged in the plan. They are JTA as a regulator-cum-financer and TransJabodetabek as an operator. However there is an institutional

uncertainty until when two organizations are established. Likely delay of organization setup would particularly affect BRT network development in the Bodetabek area as mentioned earlier. There would be a need to tap financial assistance to procure BRT fleet to mainly serve between Jakarta and the Bodetabek area and within the Bodetabek area provided that JTA could not finance timely. This financial assistance to support the bus fleet to be assigned on Bodetabek connected BRT fleets[4] is $ 154.5 million.

BRT Infrastructure: It consists of BRT shelters and dedicated lanes. It is assumed that the existing construction mechanism where DKI Public Works Department develops BRT shelters and lanes will continue and expand to the Bodetabek area. Therefore it can be done without JTA's financial arrangement. It is considered technically and financially implementable without external assistance.

Table 10.4.1 Estimated Number of Drivers and Conductors

Sub-Component	Estimated Budget	Assistance Need		Organizational Relation with TransJabodetabek
		Technical	Financial	
Control Center and Bus Location System	$ 13.8 Million	✓	✓	Traffic Police for safety and enforcement
BRT Prioritized Traffic Management	(Negligible)	✓		LG Transportation Unit and Traffic Police
Ticketing System	$ 20.5 Million	✓	✓	Participating Bank(s)
BRT Fleet	$ 635.2 Million inclusive of Bodetabek fleet ($ 154.5 Million)		✓	JTA for budgeting
BRT Infrastructure	$ 284 Million			LG Public Works Unit

Source: JAPTraPIS

10.4.2 Implementation Arrangement

Although the previous section identifies three (3) technical assistance sub-components and three (3) financial assistance sub-components, the most effective way is to package them into one project. The following implementation arrangement is proposed:

Project Title: ***Jabodetabek BRT System Development Project***

Project Objective: As part of an integrated metropolitan public transport system, the existing Jakarta BRT will be upgraded and expanded. It will be done by two new metropolitan organizations of JTA as a regulator-cum-financer and TransJabodetabek as an operator. The project aims at supporting an advanced BRT system development in the Jabodetabek region.

Executing Agency: JTA or TransJabodetabek

In the case of TransJabodetabek, it must be a state-owned enterprise. When considering internal loan repayment arrangement in Indonesia, JTA seems more suitable to act as EA.

[4] 18 full BRT routes and 10 intermediate routes or 379 articulated buses and 106 single buses. If a route is connected between Jakarta and the Bodetabek area, half of buses to be assigned on the route are regarded as Bodetabek fleet.

Loan Amount: $192.8 million inclusive of project loan ($188.8 million) and associated technical service loan ($4.0 million). The project loan is further divided into:

- Control center and bus location system: $13.8 million;
- Ticketing system: $20.5 million; and
- BRT fleet: $154.5 million

Combination of Project Loan (Foreign Loan) and Local Fund: The total project cost of the proposed BRT system development is $953.5 million. Local counter fund amounting to $764.7 million will be used for BRT infrastructure and part of BRT fleet. Thus, the project loan ($188.8 million) accounts for 20% in the overall project cost. The project loan is not a dominant source but it is allocated for technology advancement and service expansion to the Bodetabek area.

Project Period: 5 years between 2014 and 2018

Project Risk: Both JTA and TransJabodetabek have not been established as of February 2012. DGLT/MOT may request this external assistance project. In that case, a project implementation mechanism must be duly scrutinized in the process of project appraisal prior to a loan agreement.

11 PRE-FEASIBILITY OF BRT EXTENSION TO TANGERANG CITY

11.1 Introduction

11.1.1 Scope of the Study

The JAPTraPIS study has developed a comprehensive 2020 'Full BRT' network, supported by 'Intermediate BRT' routes and feeder service for the JABODETABEK area. The 2020 network implementation has been prioritized on the basis of travel demand analysis. Two routes (Route 2 and Route 13) have been identified to serve the Kota Tangerang City area directly, whereas additional routes: 8, 22 and 30 would also serve Kota Tangerang region under the JAPTraPIS Master Plan strategic network by 2020. In the JAPTraPIS Master Plan it has been proposed, that the existing BRT Route 2 (Pulo Gadung to Harmoni) would be merged with the existing BRT Route 3 (Harmoni – Kalideres) to form a single continuous Route 2a (Pulo Gadung-Harmoni-Kalideres). At this stage it is proposed that the Tangerang city area, could be best served by an extension of Route 2, initially by an 'Intermediate BRT' route '2b' from Kalideres to Tangerang City Mall via Poris Plawad. This route (2b) would then be upgraded to a full BRT Line by 2014-2015, and merged with Route 2a to form Route 2: (Pulo Gadung-Harmoni-Kalideres-Poris Plawad-Tangerang City Mall).

In developing the JAPTraPIS Master Plan network, alternative scenarios of serving the Kota Tangerang area were developed and optimized. This analysis showed that at least two routes would be required to serve the Kota Tangerang City area (northern and central part of the Kota) – one via Daan Mogot and another via Terminal Poris Plawad. Both routes would then integrated with the Jabodetabek 'Full BRT' network.

The remainder of the Kota Tangerang, particularly its connectivity to the BSD development (Kota Tangerang Selatan) is proposed to be served by Route 13 which is planned to be extended to BSD, and an additional route via Jakarta-Merak Tollway Route 30). These routes would provide direct link to Central DKI Jakarta. In addition, area of Ciledug would be served by routes 8 and 22, a direct trunk-route linking the Kota Tangerang to Block M terminus and beyond.

11.1.2 Key Objectives

This pre-feasibility study (PFS) has been prepared to provide analysis of operational and financial viability of Kalideres – Terminal Poris Plawad - Tangerang City Mall section (Route 2b) for the years 2014 and 2020, and it is carried out with the following key objectives:

- confirm the alignment & station (bus shelters) locations by making best use of existing road space for Route 2b (as an 'Intermediate BRT' Route until 2014);
- to ensure full integration of Route 2b, with Route 2a and Route 13 beyond 2014;
- to ensure effective use of Terminal Poris Plawad facilities and existing 'bus-lane' facilities along Jalan Benteng Banten;
- assess its (Route 2b) operational and financial viability to 2014,
- confirm its (Route 2b) transition to full BRT and its full integration with Route 2a (for onward connection to central Jakarta) and also its impact Route 13; and

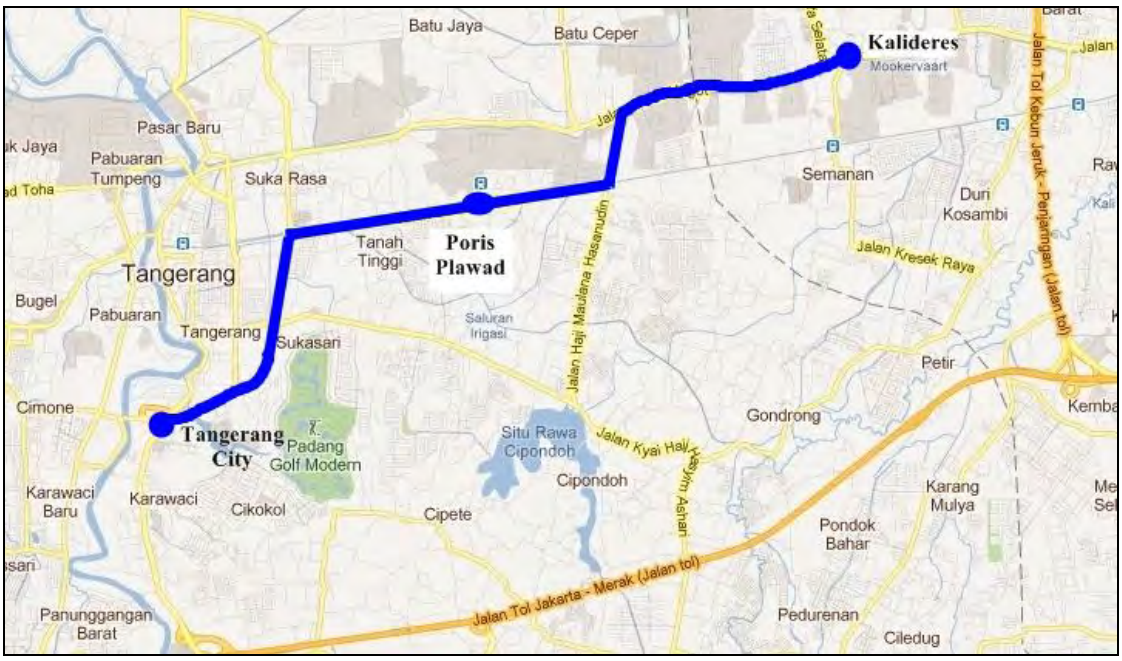
- prepare full operational requirements of Route 2b up to the year 2014.

11.1.3 Kota Tangerang Corridor Study Area and Regional Context

Kota Tangerang is one of the 13 Kota/ Kabupaten areas of the Jabodetabek mega-metropolis region of the JAPTraPIS master plan area. It is one of the most densely populated part of Banten province adjoining DKI Jakarta. It has Indonesia's National Airport. There are numerous major developments, like Karawaci, spilled over from DKI Jakarta. The area's proximity to central Jakarta, and three major east-west routes (Jl Daan Mogot, Merak Tollway and toll road to the Airport) which provide high capacity corridors for travel to/ from Jakarta, requires that special consideration be given to the area when preparing public transport master plan for the Jabodetabek mega-metropolis.

The study area defined for the pre-feasibility study is also in the context of 2020 JAPTraPIS Master Plan Network, with a view to provide (immediately) a-trunk line service, initially as an intermediate and later as a full BRT service between Tangerang City and Kalideres Bus Terminus. The study area is limited to, and comprised of an area west of existing Kalideres terminus to Kota Tangerang City Mall area. The remainder of Kota Tangerang is expected to be served by other BRT Lines (Routes 8, 13, 22 and 30) as proposed in the 2020 JAPTraPIS Master Plan network to be implemented beyond 2014. The pre-feasibility study area and the proposed Route 2b alignment are illustrated below in Figure 11.1.1.

Figure 11.1.1 Kota Tangerang Corridor Study Area and Route 2b Alignment



Source: JAPTraPIS

11.2 Review of Previous Work

11.2.1 Review of Tangerang City Council – BRT Corridor Study

It is important that maximum use is made of the existing information and data for the conduct of the Route 2b pre-feasibility study. It was found (*No date available, from the data and analysis it looks likely to have been conducted Circa 2007~2009*) a study

'Planning of Operational Management of Mass Transportation Service' was conducted by PT. Krabat Inti Pratama for the Tangerang City Council. The study report is quite detailed and presents an adequate database of Kota Tangerang demographic, existing situation, and analysis of alternative scenarios studied.

The study considered three (3) alternative route alignments between Kalideres and Terminal Poris Plawad (TPP). This shows that the study objective was more or less limited to connecting TPP with Jakarta BRT network at Kalideres. The proposed three (3) alternative alignments studied are shown below in Figure 11.2.1. No alignment option was considered to serve the Tangerang area with or without involving TPP. This limits the use of this study to this pre-feasibility study. However, the study did model the travel demand for all three alternative route alignments. Based on the demand forecasts for 2010 & 2020 the study prepared operational scenarios, and investment costs for the three alternatives.

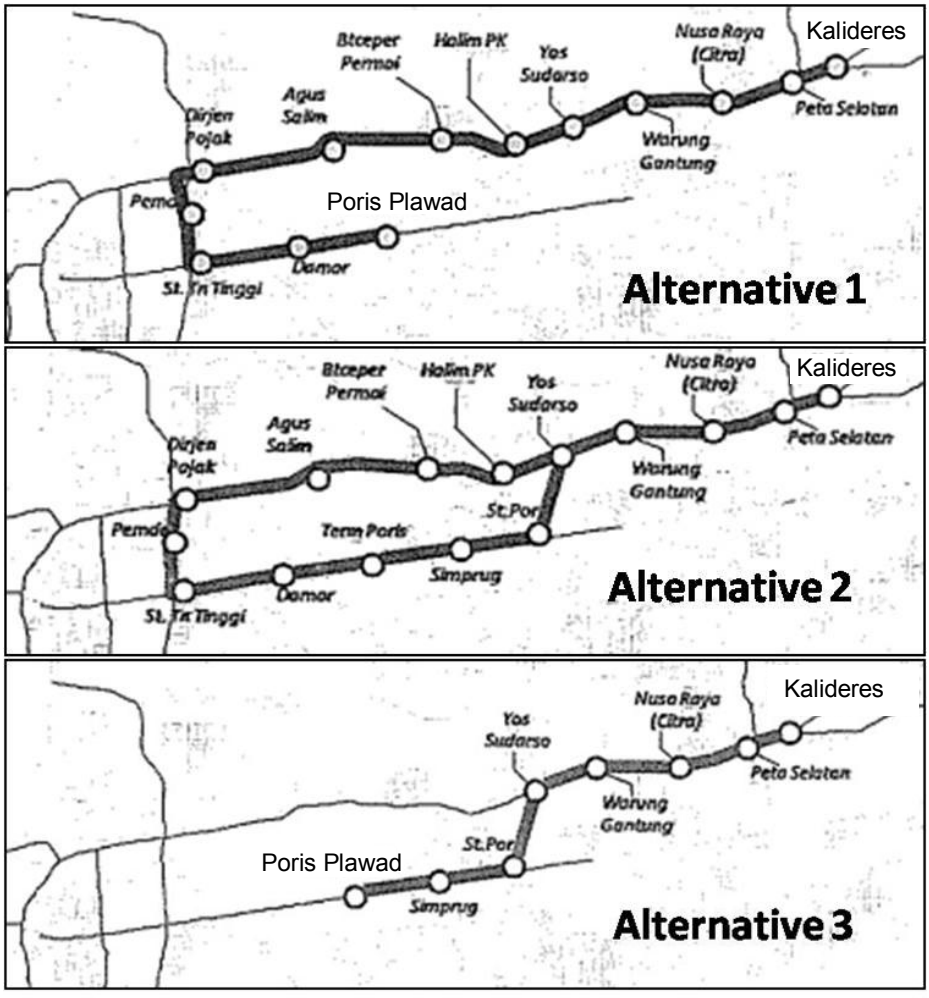
The study concluded that Alternative 1 is the best based on total travel demand in terms of Passenger boarding and the maximum likely line volume along the route. There are some key concerns as to the objectives, analysis, conclusions and recommendations of the study:

- The study base year is not specified;
- The forecasts are based on a full four stage model, yet there is little or no reporting of characteristics of each sub-model; except the assignment model results;
- The model validation against the count data appears to be reasonable, hence the model forecasts could be relied upon as an initial estimate of travel demand.
- The 2020 Do-something demand is the maximum of about 52,800 pax per day boarding, with maximum line load of 36,700. It does not propose any integration with Jakarta BRT System.
- The peak demand is estimated to be 9.8% of the daily demand. The fare is based on Rp. 2,500. flat fare between Poris Plawad and Kalideres; and an additional Rp. 3,500 for onward travel beyond Kalideres. Hence no area-wide or system wide fare integration is considered.
- No passenger boarding by each station along the corridor is reported.
- Number of passengers transferring at Kalideres to/ from Jakarta is NOT reported, hence any revenue sharing in an integrated travel scenario would not be possible.
- *Alternative-1*: according to the model assignment figures there is no demand on the section from TPP to Station Tanah Tinggi. Also route length as per Figure 11.2.1 is 9.57km and not 11.60km as used in the analysis and estimation of fleet size and project costs. It should be noted that most of the demand is to/ from the last Stop/ Station Tanah Tinggi – it is expected that this is the demand from farther west which transfers to the proposed route at Tanah Tinggi.
- *Alternative-2*: The route seems to be a circular system, but it is not explained how it is suppose to operate? The operational route length used for fleet size is reported to be 8.4km for cost estimation. This is less than Alternative-1; how? (see Figure 11.2.1)

- *Alternative-3:* The simplest way to connect TPP with Kalideres terminal of TransJakarta. Obviously the demand is lowest – so is the cost.
- There is no cost / benefit analysis of the three alternatives, hence selection of alternative purely on high demand is erroneous, as costs would also be higher compared to other alternatives.

The study outcome is of little use for this pre-feasibility work, mainly because its analysis is mostly limited to providing a link between Terminal Poris Plawad and Kalideres and none of the three alternatives serves Kota Tangerang area. The best alternative to link the two Class 'A' terminals (Kalideres & Poris Plawad) is by Alternative-3, (short 5.1km route), but it has much lower passenger demand than the other two alternatives. This demonstrates that the passenger demand for travel between the two terminals is limited, and does not warrant a BRT system (maximum 2020 peak hour demand of 2,600 pax/hr/direction) and could be easily met by a good bus service operated at headway of just under 2 minutes, with 85 pax capacity bus (as proposed in the study). In conclusion, *NO* BRT system could be recommended based on the data and analysis presented in the PT KIP final report to the Tangerang City Council.

Figure 11.2.1 Alternative (3) Routes Studied by KIP for Kota Tangerang City Council



Source: Rencana Manajemen Operasional Pelayanan Angkutan Massal Kota Tangerang, 2009

11.3 Existing Situation

11.3.1 Demographics and Land Use

Kota Tangerang is under 3% of the Jabodetabek area, yet its population was 1.76million (6.3% of Jabodetabek) in 2010 at density close to most parts DKI Jakarta. The other 2010 demographic characteristics of Kota Tangerang and Jabodetabek are compared in Table 11.3.1 below. The number of employed residents are almost the same as jobs, and similarly the number of students match the school places. This would indicate that Kota Tangerang is almost 'self-contained' community, but in reality, there is considerable movement of labour and students between Jakarta and Kota Tangerang. This is evident from the heavy congestion during the peak periods on Jl Daan Mogot, Merak Tollway and the toll road to the Airport.

Table 11.3.1 Kota Tangerang & Jabodetbek Socioeconomic Charcteristics - 2010

Socio-Economic Characteristics - Kota Tangerang & Jabodetabek Area - Year 2010.							('000)
Jabodetabek Area	Area (km^2)	Population	Density Pop./km^2	Employed Residents	JOB	Students	School Places
Kota Tangerang	**186**	**1,762**	**9,500**	**545**	**527**	**364**	**380**
DKI JKT	644	10,226	15,900	3,034	3,669	2,420	2,615
Rest of Jabodetbek	5,974	15,923	2,700	4,273	3,502	3,837	3,626
Jabodetabek - Total	**6,804**	**27,911**	**4,100**	**7,852**	**7,698**	**6,621**	**6,621**
Kota Tangerang as % of Total	**2.7%**	**6.3%**	**231.7%**	**6.9%**	**6.8%**	**5.5%**	**5.7%**

Source: JUTPI Database, 2011

In addition to the airport, majority of the areas within Kota Tangerang are either residential (Lippo Karawaci, Bumi Karawaci, Tangerang City) area. It also has commercial areas of Tangerang City Mall and includes industrial areas of Batu Ceper, Cipondoh and along Jl Daan Mogot on both sides of the river. This distribution of jobs and residential/ commercial areas create considerable demand for public transport in the Daan Mogot area, which is not fully catered by the existing bus services.

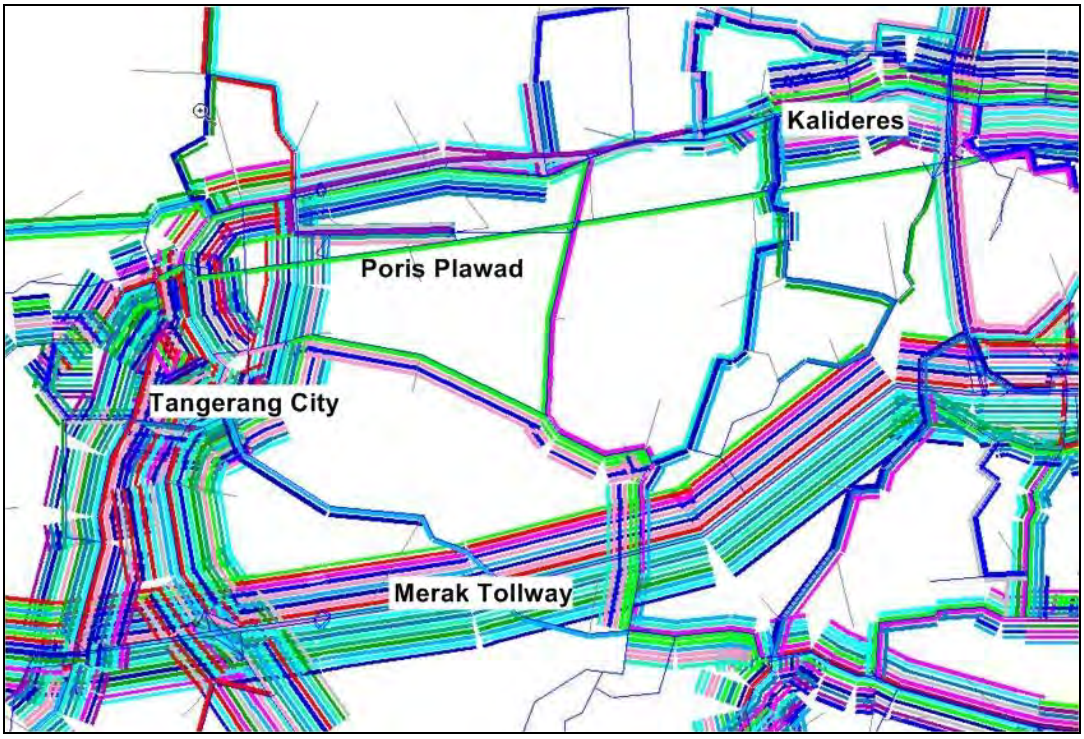
11.3.2 Existing Public Transport Services Kota Tangerang – Kalideres

There are numerous bus routes (AC Patas/ Patas/ Regular/ Medium and Small Bus) which serve Kota Tangerang area. However, no trunk route provides direct link to central Jakarta. Most of the public transport travel is by local buses to Kalideres, and then onward to Jakarta by BRT or Bus. In addition, there are numerous bus routes which connect Kota Tangerang to the western & southern parts of Kota Tangerang, Kota Tangerang Selatan BSD area and the vast area of Kabupaten Tangerang.

Figure 11.3 1 below shows the existing bus routes as incorporated in the JUTPI travel demand model. The limited number of local (non-intercity or inter-provincial) bus routes passing along Daan Mogot from Kota Tangerang to Kalideres is evident. The majority of the Kota Tangerang area travel to/ from Jakarta is currently via Merak Tollway.

In addition, Kota Tangerang is connected by electrified rail with Jakarta main railway station (Kota) via Duri. Currently the line between Duri and Kota Tangerang is a 'single' track. As per the time-table the service on the track is limited to 2/4 trains a day – operating in the morning and evening peak periods. The service on the line is expected to remain limited (due to single track). However, under the JUTPI the line is planned to be upgraded to dual track.

Figure 11.3.1 2010 Bus Network in Kota Tangerang Area



Source: JAPTraPIS Model

11.3.3 JAPTraPIS Transport Surveys in Tangerang Corridor Area

JAPTraPIS conducted a series of public transport services and user surveys in 2011. The surveys included comprehensive surveys of major bus termini in Jabodetabek area, including Kalideres and Poris Plawad Terminals. The results of surveys at the two terminals of interest to this pre-feasibility study (Kalideres and Poris Plawad) are discussed next.

1) Kalideres Bus Terminal

Kalideres terminal is located at the Jakarta (eastern) end of the corridor under study. It is a 'Class A' bus terminal for Inter-City and Intra Jabodetabek services. It is located just to the east of DKI Jakarta and Kota Tangerang border. The terminal handles limited inter-city services to/ from Banten province, mostly to/ from north-west, and intra Jabodetabek bus services to/ from Jakarta, and acts as the last stop for most of these services. There are a limited number services which continue westwards from Kalideres. The terminus is also the end station for the Trans-Jakarta Busway Corridor 3.

The number of intra-Jabodetabek routes recorded during the JAPTraPIS surveys and number of daily buses serving these routes to/ from Kalideres are summarized in Table 11.3.2. In total around 3,800 buses pass through Kalideres bus terminus, mostly serving Jakarta, and the rest of Jabodetabek. There are some inter-provincial services also operated from Kalideres, but these were not recorded during the JAPTraPIS surveys. It is also noted that no regular large bus service operates from Kalideres. The majority of the operation is by medium and small buses, which accounted for 70% of all bus arrival & departures. 20% of the buses (only 2 medium bus routes and 4 small bus routes) operate / pass by the terminus without entering the terminus area. Only Route B01, serviced by

small buses between Cengkareng (Jakarta) airport and Cikokol (now called Tangerang City Mall) serve the Kota Tangerang area. Only a few of the Route B01 services enter the Kalideres bus terminus, and mostly operate from the roadside of Jl Daan Mogot. This is most inconvenient and dangerous for Tangerang passengers changing to/ from other Jabodetabek routes at Kalideres. Only one route, Route R25 (small bus) operates between Kalideres and Poris Plawad – only six buses were counted during the entire survey day.

Table 11.3.2 Bus Operation at Kalideres Bus Terminus

No.	Route No	Route Description to/ from/ Passing Kalideres Terminus			Average (In&Out)	Passing Buses
1	AC02	Patas A/C	Kalideres	Kp. Rambutan	43	-
2	AC29	Patas A/C	Kalideres	Bekasi	27	-
3	AC42A	Patas A/C	Kalideres	Cileungsi	16	-
4	AC125	Patas A/C	Kalideres	Cikarang	24	-
5	AC81	Patas A/C	Kalideres	Depok	10	-
6	DEBOR	Patas A/C	Kalideres	Depok	2	-
1-6	**All Patas A/C Bus Routes to / from / Passing**				**122**	**-**
1	P7A	Patas	Kalideres	Pulo Gadung	16	-
2	P64	Patas	Kalideres	Pulo Gadung	13	-
3	P49	Patas	Kalideres	Bekasi	8	-
4	P73	Patas	Kalideres	Tg. Priok	24	-
5	AJA	Patas	Kalideres	Balaraja	43	-
6	LIMAS	Patas	Kalideres	Bogor	10	-
1-6	**All Patas A/C Bus Routes to / from / Passing**				**114**	**-**
1	B80	Medium Bus	Kalideres	Jemb. Lima	166	-
2	B84	Medium Bus	Kalideres	Kota JKT	137	-
3	B85	Medium Bus	Kalideres	Lebak Bulus	54	-
4	B87	Medium Bus	Kalideres	Muara Baru	44	-
5	B88 *	Medium Bus	Kalideres	Slipi	143	46
6	B93	Medium Bus	Kalideres	Tanah Abang	167	-
7	B95 *	Medium Bus	Tanah Abang	Rawa Bokor	49	210
8	KOMAR	Medium Bus	Kalideres	Tenjo	19	-
9	P12	Medium Bus	Kalideres	Senen	217	-
10	T012	Medium Bus	Kalideres	Rangkas	27	-
1-10	**All Patas A/C Bus Routes to / from / Passing**				**1,023**	**256**
1	B01 *	Small Bus	Cengkareng	Cikokol	15	395
2	B04 *	Small Bus	Kalideres	Meruya Ilir	3	5
3	B07	Small Bus	Kalideres	Serpong	361	-
4	B09A	Small Bus	Kalideres	Dadap	104	-
5	F02	Small Bus	Kalideres	Cadas	49	-
6	G03	Small Bus	Kalideres	Kota Bumi	554	-
7	M13	Small Bus	Kalideres	Kapuk	276	-
8	M48	Small Bus	Kalideres	Ps. Cipulir	13	-
9	BLACK *	Small Bus	*No Info*	*No Info*	-	76
10	R25 *	Small Bus	Kalideres	Poris Plawad	-	6
1-10	**All Patas A/C Bus Routes to / from / Passing**				**1,373**	**482**
32	**All Bus Routes Enetering/ Exit Kalideres Terminus**				**2,632**	**-**
	*** 2 Medium & 4 Small Bus Routes Passing Kalideres**					**738**
1	**Route-3 TransJakarta BRT Kalideres - Daily Buses**					**420**
33	**All Bus Routes Serving Kalideres**					**3,790**

Source: JAPTraPIS Surveys, April 2011.

The majority of the operation is by medium and small bus services. The medium bus services are mostly to Jakarta areas with around 150 buses per day to most areas. The small bus operation account for about 50% of the services to/ from Kalideres, mostly to Kab. Tangerang (Kota Bumi), Kapuk in the north of Kabupaten, and Serpong in the south. Kota Tangerang (Cikokol) is served by small bus route B01, reasonably frequently, from Jl Daan Mogot road-side via Daan Mogot and not via Poris Plawad terminus.

The daily distribution of services to/ from Kalideres bus terminal are illustrated below in Figure 11.3.2, showing operation of a number of intra-Jabodetabek routes recorded during the JAPTraPIS surveys. The number of daily buses by type serving these routes to/ from Kalideres are summarized in Table 11.3.2. The bus volumes shown is the graph is the linear average of buses entering & leaving the terminus, plus those stopping outside on Jl Daan Mogot.

Figure 11.3.2 Daily Frequency of Bus Operation (by Type) at Kalideres Bus Terminus

Source: JAPTraPIS Surveys, April 2011.

The morning peak comes early at Kalideres and is observed to be between 06:00 to 07:00, when around 300 buses enter/ exit the terminus. For the next 10 hours the terminus is fairly busy, with 200 to 250 buses entering/ leaving the terminus per hour (3~4 buses per minute). The majority of the buses are to/ from Jakarta as detailed in Figure 11.3.1 in the JAPTraPIS model bus routes. The survey results further showed that there is need for better and more evenly distributed bus operation between Tangerang and Jakarta – also illustrated in Figure 11.3.1 and confirmed by above data that most of the routes use Merak Tollway and not Jl Daan Mogot or Poris Plawad Bus Terminus.

2) Poris Plawad Bus Terminal

Poris Plawad bus terminal is a 'Class A' inter-city/ inter-province and Intra Jabodetabek bus terminal located about 4km to the west of DKI Jakarta Boundary in Kota Tangerang. It was developed to serve as major hub for Kota Tangerang, Banten province. However, the choice of its location to serve as an inter-city and intra Jabodetabek terminus for Kota Tangerang is less than ideal. It is located far from the centres of population and economic

activity hubs of Kota Tangerang, with serious accessibility issues, as it is located almost at the edge of Kota Tangerang Boundary. The terminus, itself is well designed, equipped and maintained. However, its utilization is limited to services within Kota Tangerang area. Almost 75% of the buses are operated out of Poris Plawad is by small buses (Angkot), 12% by Patas A/C and about the same by Patas and medium buses. No regular bus service was observed to operate from the terminus. The JAPTraPIS study conducted bus operation survey at Poris Plawad terminus in April 2011, and the results are summarized below in Table 11.3.3.

Table 11.3.3 Bus Operation at Poris Palawad Bus Terminus

No.	Route No	Route Description to/ from/ Passing Poris Plawad Terminus			Average (In&Out)	Passing Buses
1	AC62	Patas A/C	Poris Plawad	Senen	13	-
2	AC116	Patas A/C	Poris Plawad	Senen	4	-
3	AC33	Patas A/C	Poris Plawad	Kota JKT	16	-
4	AC34	Patas A/C	Poris Plawad	Blok-M	29	-
5	AC74A	Patas A/C	Poris Plawad	Kp.Rambutan	50	-
6	AC117	Patas A/C	Poris Plawad	Pulo Gadung	55	-
7	AC119	Patas A/C	Poris Plawad	Kp.Melayu	16	-
8	AC133	Patas A/C	Poris Plawad	Tn. Abang	2	-
9	WARGA	Patas A/C	Poris Plawad	Karawang	10	-
10	AGR	Patas A/C	*Tangerang*	Cikarang	56	-
11	AJA	Patas A/C	*Tangerang*	Bekasi	62	-
1-9	**Sub-total**	**Patas A/C**	**Poris Plawad**	**DKI JKT**	**195**	**-**
10-11	**Sub-total**	**Patas A/C**	**Tangerang**	**Bekasi / Cikrang**	**118**	**-**
1-11	**All Patas A/C Bus Routes Average (In&Out) of Pris Plawad**				**313**	**-**
1	P24	Patas	Poris Plawad	Grogol	2	-
2	P25	Patas	Poris Plawad	Senen	2	-
3	P77	Patas	Poris Plawad	Senen	6	-
4	P106	Patas	Poris Plawad	Senen	24	-
5	P157	Patas	*Tangerang*	Senen	34	-
6	P45	Patas	Poris Plawad	Blok-M	18	-
7	P138	Patas	Poris Plawad	Blok-M	35	-
8	P44	Patas	Poris Plawad	Kemayoran	1	-
9	P139	Patas	Poris Plawad	Kemayoran	5	-
1-9	**All Patas Bus Routes Average (In&Out) of Pris Plawad**				**127**	**-**
1	BSL	Medium Bus	Kalideres	Balaraja	85	-
2	BSLR	Medium Bus	Kalideres	Bogor	76	-
3	KMR	Medium Bus	Kalideres	Cikupa	14	
1-3	**All Medium Bus Routes Average (In&Out) of Pris Plawad**				**175**	**-**
1	1	Small Bus	Poris Plawad	Cimone-Jatake	503	59
2	2	Small Bus	Poris Plawad	Cimone-Perum I	449	6
3	B01	Small Bus	Cikokol*	Cikokol	772	29
4	B02	Small Bus	Cikokol	Cipondoh	3	26
5	B07	Small Bus	Kalideres	Serpong	16	35
6	R25	Small Bus	Poris Plawad	Kalideres	15	-
1-6	**All Small Bus Routes Average (In&Out) of Pris Plawad**				**1,756**	**155**
29	**All (34) Bus Routes Enetering/ Exit Poris Plawad**				**2,371**	**-**
	5 Small Bus Routes Passing Poris Plawad					**155**
	All Bus Routes Serving Poris Plawad					**2,526**

Source: JAPTraPIS Surveys, April 2011.

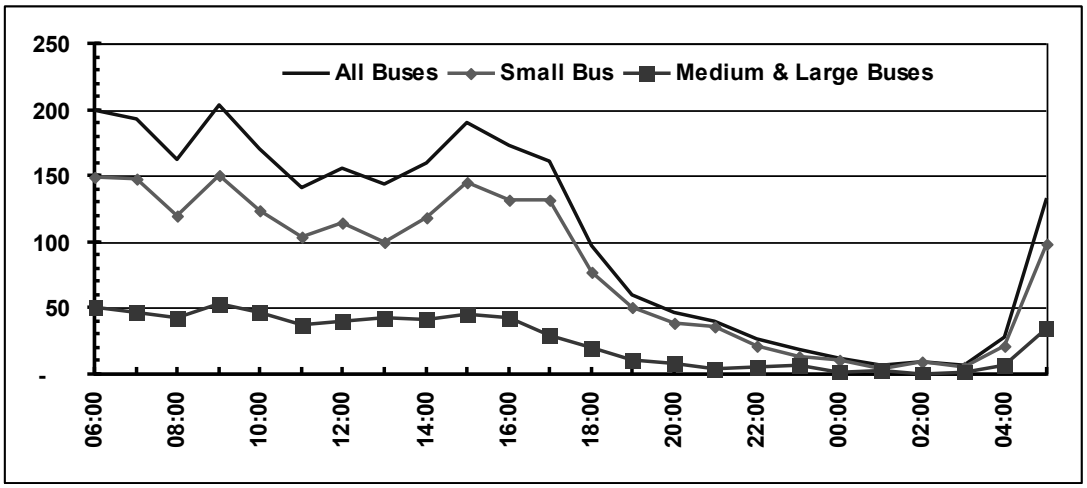
The three medium bus services using Poris Plawad terminus have their origin at Kalideres

and go on to Balaraja, Bogor and Cikupa, and none serve Kota Tangerang area. Only the small bus services Routes 1, 2 & B01 operate to serve Kota Tangerang. Routes 1 & 2 go on to western parts of Kota Tangerang via Cimone to Jatake, and Perim I respectively. Route B01, 32% of all operation at Poris Plawad serves Kota Tangerang, by running a circular route to/ from old bus area of Cikokol and stopping at Poris Plawad. The inter-city and inter-province operation was observed to be very limited, and was not recorded during the JAPTraPIS surveys.

The daily operation at Poris Plawad is illustrated below in Figure 11.3.3. As described above the operation is dominated by small buses of three routes. These operate virtually the same frequency of 100~150 buses per hour between 06:00 and 17:00, after that limited services operate until late at night. The figure also shows the frequency of other (Medium, Patas A/C & Patas) bus operation, which show almost a flat pattern of around 50 buses per hour from morning peak to late afternoon.

This shows that such a large terminal facility is completely under uitilised, and could provide better services to Kota Tangerang by improving its connectivity to Kalideres bus terminus, and the newly developed area of Tangerang City Mall. The passenger interview surveys also revealed similar response from passengers of lack of services between Poris Plawad and Kota Tangerang.

Figure 11.3.3 Daily Frequency of Bus Opertaion at Poris Plawad Bus Terminus



Source: JAPTraPIS Surveys, April 2011.

11.4 Proposed Tangerang Corridor

The JAPTraPIS survey data analysis and review of previous studies show that a good quality bus operation as a trunk route is very much required between Kalideres and Kota Tangerang, via Poris Plawad. The proposed trunk route (Kalideres – Poris Plawad – Tangerang City Mall) is therefore defined as the corridor for this Pre-Feasibility Study.

The current (2010) demographic and socio-economic characteristics have been discussed above and given in Table 11.3.1. The future development potential of the Kota Tangerang and the corridor area is evident from the JUTPI forecasts. The 2020 forecast data and its comparison is analyzed and presented in Table 11.4.1.

Table 11.4.1 Kota Tangerang & Jabodetbek Socioeconomic Charcteristics and Growth

Socio-Economic Characteristics Kota Tangerang & Jabodetabek Area - Year 2020.							('000)
Jabodetabek Area	**Area (km^2)**	**Population**	**Density Pop./km^2**	**Employed Residents**	**JOB**	**Students**	**School Places**
Kota Tangerang	**186**	**2,108**	**11,300**	**880**	**838**	**502**	**435**
DKI JKT	644	10,044	15,600	4,029	5,015	2,195	3,851
Rest of Jabodetbek	5,974	18,928	3,200	7,284	6,316	4,464	2,850
Jabodetabek - Total	**6,804**	**31,080**	**4,600**	**12,193**	**12,169**	**7,161**	**7,136**
Kota Tangerang % of Total	**2.7%**	**6.8%**	**245.7%**	**7.2%**	**6.9%**	**7.0%**	**6.1%**
Development Growth - Year 2010 to 2020							('000)
Jabodetabek Area	**Area (km^2)**	**Population**	**Density Pop./km^2**	**Employed Residents**	**JOB**	**Students**	**School Places**
Kota Tangerang	**-**	**346**	**1,800**	**335**	**311**	**138**	**55**
DKI JKT	-	(182)	(300)	995	1,346	(225)	1,236
Rest of Jabodetbek	-	3,005	500	3,011	2,814	627	(776)
Jabodetabek - Total	**-**	**3,169**	**500**	**4,341**	**4,471**	**540**	**515**
Percentage Growth Year 2010 to 2020.							
Jabodetabek Area	**Area (km^2)**	**Population**	**Density Pop./km^2**	**Employed Residents**	**JOB**	**Students**	**School Places**
Kota Tangerang		**20%**	**19%**	**61%**	**59%**	**38%**	**14%**
DKI JKT		-2%	-2%	33%	37%	-9%	47%
Rest of Jabodetbek		19%	19%	70%	80%	16%	-21%
Jabodetabek - Total		**11%**	**12%**	**55%**	**58%**	**8%**	**8%**

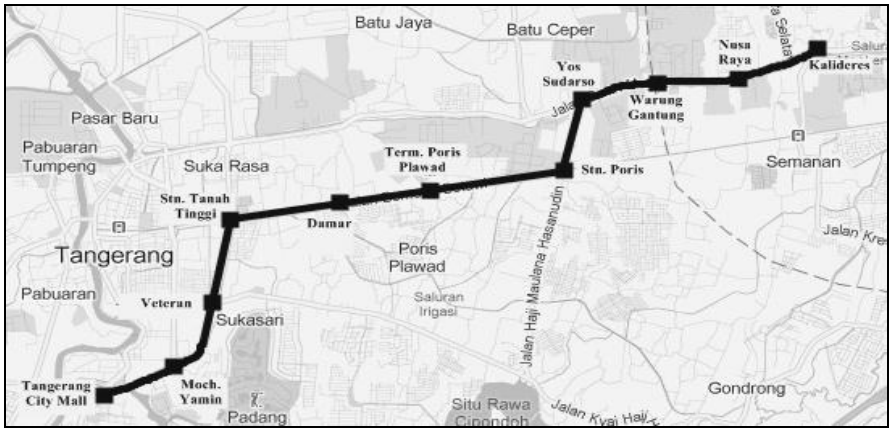
Source: JUTPI Database, 2011

The table shows from 2010 to 2020 the population and population density is expected to grow twice as much as in the rest of the Jabodetabek area, and expected growth in the number of students & school places would be even higher than Jabodetabek. The employment (Jobs) growth is also forecast to be almost 50% more than DKI Jakarta. This further strengthens the case under study of linking Kota Tangerang with DKI Jakarta to provide additional trunk route public transport between the two areas.

11.4.1 Kalideres – Poris Plawad – Kota Tangerang Alignment of Route 2b

The alignment proposed for the pre-feasibility study is shown above in Figure 11.1.1, and is further illustrated in Figure 11.4.1. The alignment is 10.58km long, starting from Kalideres Bus terminus along Daan Mogot, and would turn to south on Jl Haji Maulana Hasanudin. At Poris railway station alignment turns west on to Jl Benteng Banten & Benteng Betawi up to Jl Jenderal Sudirman, from here it turn south and continues up to Tangerang City Mall. Key topographic characteristics of each road section of the corridor are summarized in Table 11.4.2, with possible constrains and opportunities.

Figure 11.4.1 Klaideres – Porisplawad – Kota Tangerang Corridor Alignment



Source: JAPTraPIS

Table 11.4.2 Kalidres - Kota Tangerang Alignment, Topographic Characteristics

No	Corridor Section	Section (km)	Existing No of Lanes	Comments (Constarints / Opportunities)
1	Kalideres to Yos Sudarso Jl Daan Mogot	2.51	2x2	• Jl Daan Mogot runs north of Canal (Saluran Mookervaar). Eastbound carriageway has limited side friction; west bound carriageway is parallel to the canal. No sidewalk on any section. There is room to expand to 3x3 lanes, with side walk and eliminate side friction as traffic volume is high, with high percentage of goods vehicles most of the time. • Turing west from Kalideres would require signalized junction on Daan Mogot.
2	Yos Sudarso to Stn. Poris Jl. H Maulana Hasanudin	1.06	2x2	• There are two seprate canal crossings.These junctions need to be improved. • Better lane dividers need to be built. • Considerable encroachment need to be removed • Sidewalk to be provided
3	Stn. Poris to Stn. Tanah Tinggi Jl. Benteng Banten & Benteng Betawi	3.54	2x2	• Newly built road, with limited divider. • Railway track all along north limits pedestrian access • Limited or no encroachments on either side need to be maintained. • Access to Kareta Api stations at Poris, Poris Plawad and Tanah Tinggi need to be improved • Existing bus lane marking in the center of the carriageway are not obeyed. May be removed, until possible to enforce • Entrance & exit to/ from Terminal Poris Plawad in both directions would need to be signalized. • Park & Ride facility is not used, the community need to be made aware of this, and could be used if a better link to Kalideres is established. • Junction with Jl Sudirman would need to be better planned.
4	Stn. Tanah Tinggi to Tangerang City Mall Jl. Jenderal Sudirman	3.47	3x3	• Newly built road, with limited encroachment, particularly north of Veteran • Junctions with Veteran & Moch. Yamin need to be improved. • Bus turn back facilities at Tangerang City Mall need to planned and carefully designed as not to cause too much dead mileage, or circuitous routing. • At Tangerang City Mall there is no need for terminal, only turn back facilities are required. • Overnight parking and bus maintenance could be carried out at Terminal Poris Plawad. There is sufficient space, and it is under utilized.
1-4	***Klaiders – Tangerang City Mall***	***10.58* (km)**	**-**	***A good opprtunity to provide a high capacity trunk public transport route, and to integrate it with Jakarta Busway system***

Source: JAPTraPIS

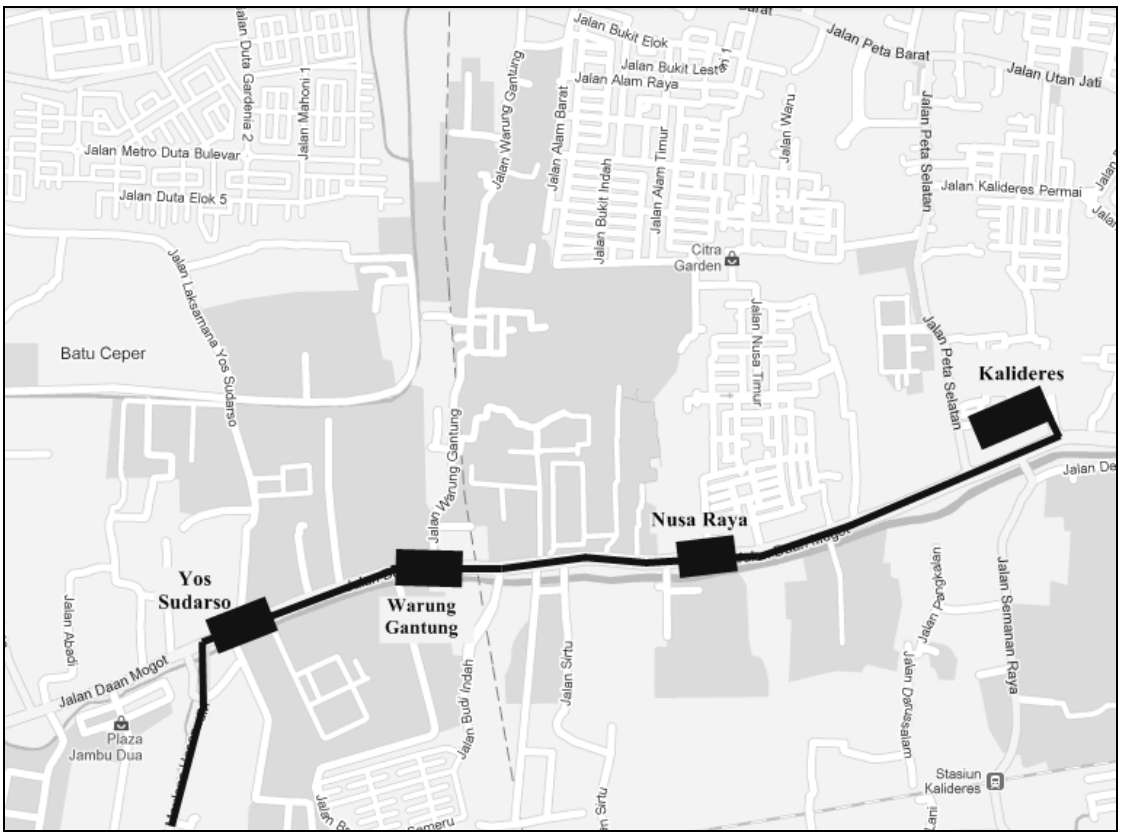
11.4.2 Route 2b Station Locations and Accessibility

It is proposed that there would be eight new additional stations (Full Busway/ BRT stations, Bus Stops/ Halte – here refereed to as stations) along the proposed corridor in addition to the two termini, Kalideres & Tangerang City Mall, and Terminal Poris Plawad. These stations are placed at key locations for easy and good accessibility to local community, integration with other transport services (for transfer from other routes and possible new feeder routes to the proposed trunk service).

1) Kalideres, Nusa Raya, Warung Gantung & Yos Sudarso

The approximate location of these four stations is depicted in Figure 11.4.2. All four stations would be located along Jl Daan Mogot. Kalideres would continue be the terminal up until 2014, and beyond, until Route 2b is merged with Route 2a (Pulo Gadung – Harmoni – Kalideres). Stations Nusa Raya, Warung Gantung & Yos Sudarso are located at almost equal intervals to have system catchment (average walk distance to station is less than 0.50km) area of about 0.5km radius. Nusa Raya, Warung Gantung and Yos Sudarso all (3) stations have large residential areas to the north of Daan Mogot, which could link up to the trunk line by feeder Angkot services, rather than to travel to Kalideres and change. However, access to industrial area to the south of the Canal would be limited. There are a few pedestrian bridges over the canal, but additional foot-bridges would needed for direct access to the Industrial areas from the stations.

Figure 11.4.2 Nusa Raya, Warung Gantung & Yos Sudarso Stations



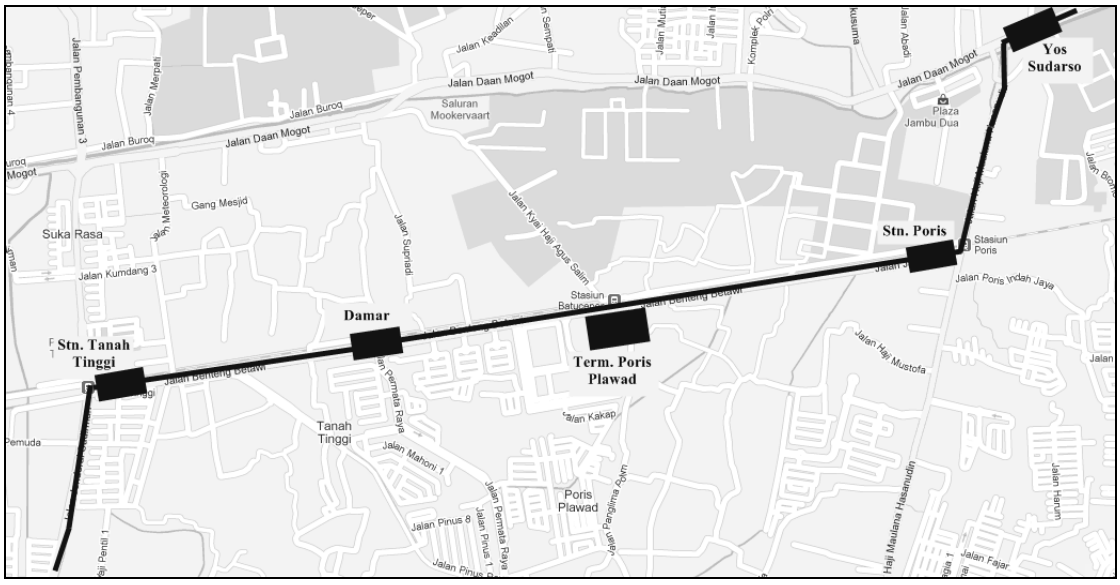
Source: JAPTraPIS

2) Stn. Poris, Terminal Poris Plawad, Damar & Stn. Tanah Tinggi

These four stations are located along Jl. Benteng Banten & Benteng Betawi straight stretch of 3.5km. Stations Poris, Poris Plawad and Tanah Tinggi also have Kareta Api railway stations on the Tangerang-Duri-Kota line. There is little or no competition from the railway as it is only a single track line, with very limited services. Therefore any integration with the railway would be a long term (beyond 2014) option. However, each of the four stations have their own catchment area both to the south and to some extent also to the north of the corridor. The approximate location of these four stations is depicted in Figure 11.4.3. Additional feeder services could be provided from areas like Petir to Stn. Poris via Jl. Poris Raya, from Porisgaga to Terminal Poris Plawad via Jl Panglima Polim & from the north via Augus Salim. Office complexes of PEMDA Tangerang and PEMASYARAKATAN could be served by shuttle services to/ from Stn Tanah Tinggi.

The terminal facilities for the Route 2b fleet could be located at Terminal Poris Plawad, as there is unlikely to be space at Tangerang City Mall, and issues of jurisdiction/ ownership at Kalideres. In addition, once a regular and dependable service (Route 2b) is operational from Poris Plawad, its inter-city and inter-provincial services could be expanded. This expansion does not have to be at the expense of Kalideres, instead, this could be future growth which could no longer be accommodated at Kalideres. Or in an ideal world, the Inter-city and Inter-provincial operation could all be operated, with as much convenience to the passenger from Poris Plawad, rather than from the congested Kalideres, which was the original goal in establishing Terminal Poris Plawad. This option need further analysis, and it is considered to be beyond the scope in this pre-feasibility study. This would strengthen the case for a trunk BRT route operation 2b and its integration with Route 2a to form Route 2 (Pulo Gadung – Harmoni – Kalideres – Poris Plawad – Tangerang City).

Figure 11.4.3 Stn. Poris, Terminal Poris Plawad, Damar & Stn. Tanah Tinggi



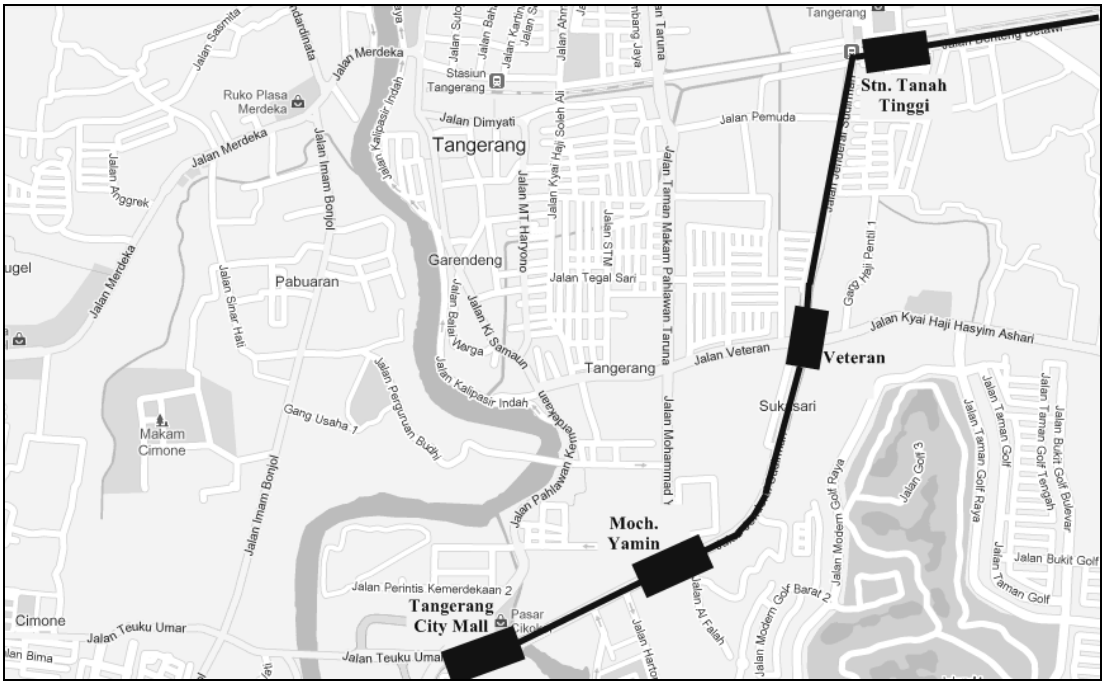
Source: JAPTraPIS

3) Veteran, Moch. Yamin & Tangerang City Mall

The approximate location of these three stations is depicted in Figure 11.4.4. All three stations would be located on Jl. Jenderal Sudirman. Veteran and Moch Yamin stations would be close to the intersections of roads of the same name. All three stations surround the Kota Tangerang area on the east and south, and could provide direct access to the line. There are numerous Angkot services which could provide feeder service to all three stations depending upon the origin or destination of trips. The last stop is intended to be located in the high density commercial area of Tangerang City Mall. Given the limited space, the station does not need to be a large station to hold buses, it could be just a turn-around facility.

Additional feeder routes from west of the River could also be directed to connect with any of the these three Route 2b station, or even at Tanah Tinggi in the north. The routing of feeder services from the west is mostly dependent on the one-way traffic circulation system operated around Tangerang City, as it would be a massive traffic engineering and management task to re-work the one-way operation.

Figure 11.4.4 Veteran, Moch Tamin & Tengerang City Mall



Source: JAPTraPIS

11.4.3 Kota Tangerang Corridor (2b) and BRT Network Integration

The proposed route (2b) is conceived and planned according to the 2020 JAPTraPIS Master Plan network. Route 2b is considered to be of highest priority, and could commence operation as soon as late 2012. Route 2b would initially start as an 'Intermediate BRT' type route (operating between Kalideres and Tangerang City Mall) and would only be converted to 'Full BRT' some time after 2014, when the alignment and station infrastructure is in place. Up until then route 2b would be acting as a very good direct local service for the area, would act as a feeder to BRT network at Kalideres, and also to Terminal Poris Plawad for Inter-city and Inter-provincial travel. The Route (2b) would have limited competition with any of the existing routes as no route offers the service to be provided by Route 2b. In summary Route development and its integration

with the full BRT network would be as follows:

- Route 2b to commence as 'Intermediate BRT' (priority lanes along Daan Mogot, Jl. H Maulana Hasanudin, Benteng Banten, Benteng Betawi and Jl Jenderal Sudirman up to Tangerang City Mall, with standard/ regular size A/C bus fleet.
- In parallel, merge existing Corridor 2 & 3, and establish it as Route 2a.
- Build segregated Busway and stations along the alignment as per standard specified elsewhere in the report, and commence BRT operation. This should be completed by 2014.
- This need to be coordinated with the construction of Route 13a/13b & its opening.
- At the stage when 'Full BRT' system is in place, start integrated operation of Route 2 from Tangerang City Mall – Kalideres – Harmoni – Pulo Gadung.
- Route 13a/13b would be extended to BSD at some time after 2014, at that stage route 2 headways could be reviewed and coordinated with Route 13, to operate as a fully integrated BRT system.

In future, beyond 2014 (refer Figure 6.3.1), Route 2b would be merged with Route 2a to form Route 2, which would have limited competition for patronage with the remainder of 'Full BRT' network except Route 13a/13b. The route 13a/13b is planned to operate from Kota – Pesing – Kalideres – Dirjen Pojak – Tangerang City Mall via Daan Mogot and Jl Jenderal Sudirman. It has some sections common with Route 2, as it supplements the supply of buses along the corridor and offers other destination in Jakarta. In later years when Route 13a/13b would have been extended to BSD, and in fact could act as feeder to Route 2 for patronage to the center and east of Jakarta.

11.5 Tangerang Corridor Demand Forecasts

11.5.1 Patronage Forecasts for Tangerang Corridor Scenarios

The JUTPI transport model is a strategic travel demand forecast model of Jabodetabek area. The JUTPI model has been recently calibrated and validated to the traffic surveys conducted in 2010. The model has been used to prepare Jabodetabek 2030 JUTPI Master Plan, based on the travel demand forecasts for the years 2020 & 2030. The model was adopted for the JAPTraPIS study by checking and further refining/ updating the Public Transport (PT) assignment sub-model. The key features of the model and its outputs in relation to Jabodetabek area have been discussed in Chapter 3. The model refinements and updates made specifically for the JAPTraPIS study are detailed in Chapter 5, Section 5. This involved preparing travel demand for the intermediate year of 2014, by interpolating the 2010 and 2020 Do-something (Full JUTPI Master Plan) scenario.

The PT assignment sub-model was therefore, used to make patronage forecasts for three scenarios of this pre-feasibility study. The there scenarios are:

Scenario 1, 2014 Non-Integrated: 2014 demand forecast – Alignment Tangerang City to Kalideres; operating as Route 2b; as an intermediate BRT, operating as a non-integrated service between the two stops, and passengers transfer to Route 2a or other routes at Kalideres.

Scenario 2, 2014 Integrated: 2014 demand forecast – Alignment Tangerang City to Pulo Gadung, operating as 'Full' BRT Route 2a and 2b, integrated as Route 2. Passenger continue on the same bus all the way to Pulo Gadung. The remainder of the BRT 2014 network in operation.

Scenario 3, 2020 Integrated (Full Network): 2020 demand forecast – Alignment operating as 'Full BRT' Route 2, between Tangerang City Mall and Pulo Gadung via, Terminal Poris Plawad, Kalideres, Harmoni. It is also assumed that in 2020 a 'Full BRT' network as proposed by JAPTraPIS Master Plan and shown in Figure 6.3.1 would be operational, with full fare integration within the BRT/ Bus network, and feeder bus routes.

11.5.2 Scenario-1: 2014 Non-Integrated Service – Route 2b

The patronage forecast is summarized below in Table 11.5.1 and illustrated in Figure 11.5.1. These patronage forecast results show that there would be a considerable demand for the service. The total daily boardings will be 70,000 per day after normalizing the daily station boarding and alighting.. The maximum boarding occurs at Kalideres to Kota Tangerang direction. Other than the terminal stations, stations with large volumes of passengers are Poris Plawad, Damar, and Stn Poris. Maximum demand occurs between Terminal Poris Plawad and Stn. Poris of about 22,400 pax per day.

The volume transferring at Kalideres is estimated to be 33,600 (2-way), less any local demand at Kalideres. This is a considerably high transfer volumes, and in the morning peak hour (12% of daily) could be as high as 2,000 pax/hr. This would require considerable station capacity, cross platform transfer facility, and coordination between the arrival of Route 2b buses and departures of Route 2a and other routes to the city.

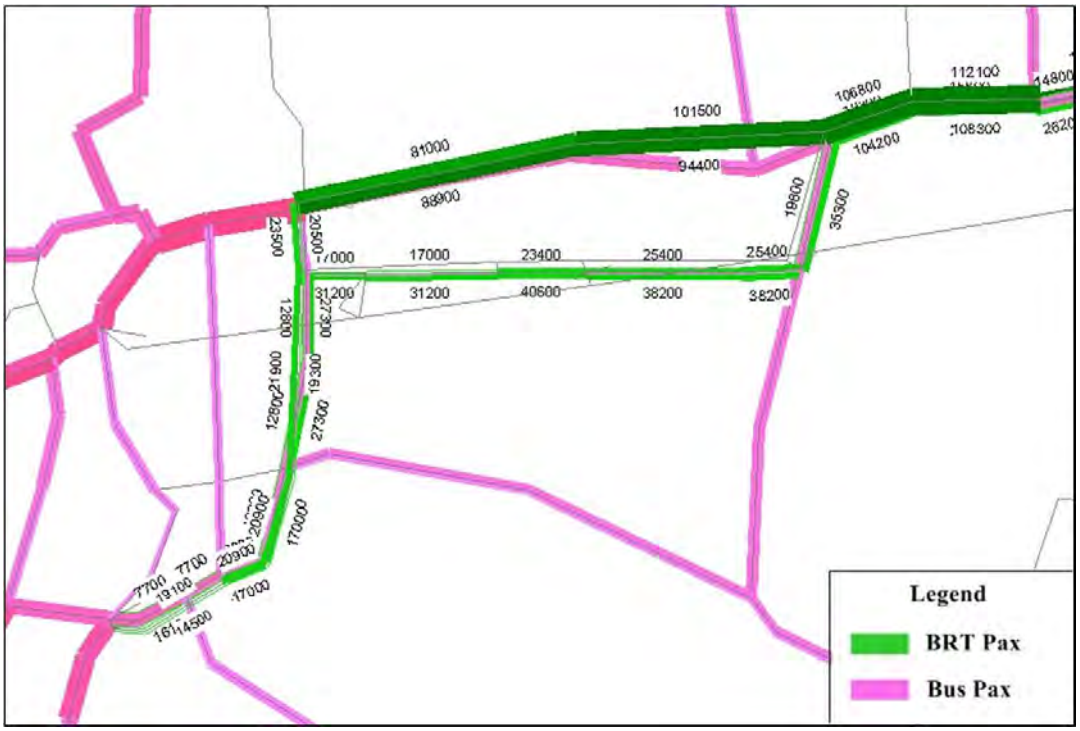
The maximum line volume occurs between Terminal Poris Plawad and Stn. Poris of 25,000 daily pax or about 3,300 passengers per hour per direction in the morning peak hour (10% of daily). This would require an operation of 40 buses per hour per direction with capacity of 85 ax per bus. The line volume on either side of Poris Plawad is close to the maximum line volume between Poris Plawad and Stn. Poris, this indicates that Benteng Banten is a high demand corridor and this is the busiest section.

Table 11.5.1 Scenario 1, 2014 Intermediate BRT Daily Patronage Route 2b

No.	Station/ Stop	Code	Boardings TCM to KLD	Boardings KLD to TCM	Max Line Volume (1-W) After Station
1	Tangerang City Mall	TCM	8,600	-	8,600
2	Moch. Yamin	MYN	3,000	600	11,000
3	Veteran	VTN	3,000	400	13,500
4	Stn Tanah Tinggi	STT	4,100	400	17,000
5	Damar	DMR	4,400	1,300	20,100
6	Terminal Poris Plawad	TPP	7,000	5,600	**22,400**
7	Stn. Poris	SPS	3,500	4,800	21,100
8	Yos Sudarso	YSD	500	800	20,800
9	Warung Gantung	WGN	400	2,800	17,500
10	Nusa Raya	NRY	500	1,500	16,600
11	Kalideres	KLD	-	16,800	-
1-11	**Total All Stations**	**-**	**35,000**	**35,000**	**max= 22,400**

Source: JAPTraPIS

Figure 11.5.1 Scenario 1: 2014 Intermediate BRT Demand Route 2b



Source: JAPTraPIS

The figure shows almost constant demand between Kalideres to Tangerang City Mall. The demand along Daan Mogot is also similar, but higher than Benteng Banten, but this demand is local to the Daan Mogot area on BRT Route 13a/13b, and does not compete with Route 2b.

11.5.3 Scenario-2: 2014 Integrated Service – Route 2

The patronage forecast is summarized below in Table 11.5.2 and illustrated in Figure 11.5.2. only for the section between Tangerang City Mall and Kalideres of Route 2. These patronage forecast results show total daily boardings will be 202,000 per day after normalizing the daily station boarding and alighting, and taking account of volumes continuing onwards from Kalideres to Harmoni (not including boardings at Kalideres towards Harmoni - not part of the pre-feasibility study section). The total boardings are almost three times as much as was the case on Route 2b (Integration at Kalideres).

This increase in demand is directly attributable to the fact that passenger would choose a direct BRT for longer trips to the city, rather than having to transfer at Kalideres (or take alternative route), this volume is about 114,000 pax/day, an increase of 3.5 time more than the non-integrated scenario. The internal-internal demand in the corridor also increases by about 16,000 pax/day (+23%) due to higher operating frequency, which would attract more passengers to this line due to reduced waiting time.

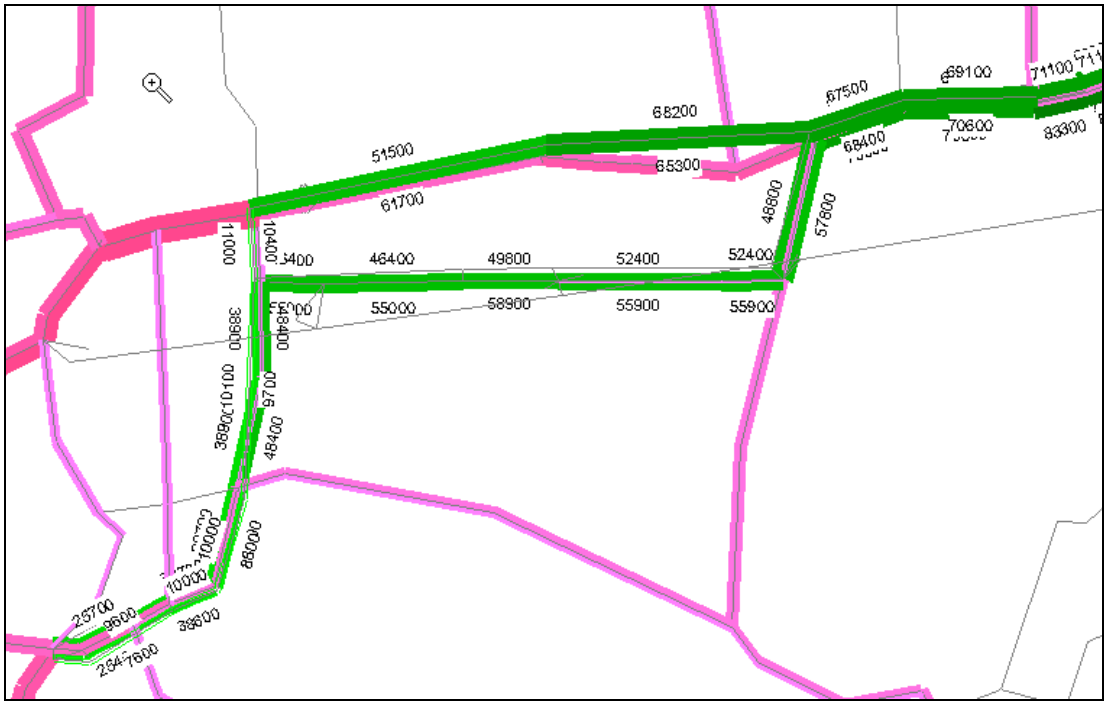
The maximum line volume (61,000 pax/day/direction) would be between Kalideres and Nusa Raya i.e. just after Kalideres station. This demand may even be lower than the volume on the remainder sections of the line between Kalideres and Pulo Gadung. Therefore the estimate could be used only a guide for calculation of headways, estimation of additional fleet, and not for the base line calculation of fleet requirement (of Route 2), as that would be determined by the highest line volume along the entire section of Route 2.

Table 11.5.2 Scenario 2, 2014 BRT Daily Patronage Route 2 (Between TCM & KLD)

No.	Station/ Stop	Code	Boardings TCM to KLD	Boardings KLD to TCM	Max Line Volume (1-W) After Station
1	Tangerang City Mall	TCM	25,400	0	25,400
2	Moch. Yamin	MYN	5,100	700	30,100
3	Veteran	VTN	9,500	400	39,400
4	Stn Tanah Tinggi	STT	7,900	400	46,700
5	Damar	DMR	8,000	6,600	47,700
6	Terminal Poris Plawad	TPP	14,100	14,500	47,700
7	Stn. Poris	SPS	9,200	7,900	48,300
8	Yos Sudarso	YSD	7,800	1,800	54,600
9	Warung Gantung	WGN	8,800	5,600	58,400
10	Nusa Raya	NRY	4,300	1,200	**61,000**
11	Kalideres	KLD	0	4,000	57,000
	Arriving at Kalideres from Harmoni			**57,000**	
1-11	**Total All Stations**	**-**	**100,100**	**101,100**	**max= 61,000**

Source: JAPTraPIS

Figure 11.5.2 Scenario 2: 2014 BRT Demand on Integrated Route 2



Source: JAPTraPIS

The figure shows almost balanced demand between Kalideres to Tangerang City Mall. The demand along Daan Mogot is higher, but this demand is local to the Daan Mogot area using BRT Route 13a/13b, and does not compete with Route 2. This demand also includes large volume of passengers from farther west transferring to Route 13a/13b at Daan Mogot.

11.5.4 Scenario-3: 2020 Full BRT Route 2, Integrated Service with Full network

The patronage forecast results are summarized below in Table 11.5.3 and modelled demand is illustrated in Figure 11.5.3. These patronage forecast in 2020 of 260,000 pax daily show a significant patronage increase from 2014 (integrated Scenario-2). The increase over the six year period is estimated to be about 29%.(~4.3% pa) almost the

same as the overall growth in PT travel demand in Jabodetabek area. This confirms the earlier discussion of higher than average growth in the western part of Jabodetabek, and the reasons for selecting this western corridor as the 'Priority' corridor for this pre-feasibility study.

The busy stations would be on the same section as in 2014. Growth at Terminal Poris Plawad could even be higher than forecast if all the Inter-city and Inter- provincial transfers of Kalideres are moved to this terminus. A very preliminary estimate suggest this could add another 20~30 thousand passengers per day to the existing volume of about 15,000 per day.

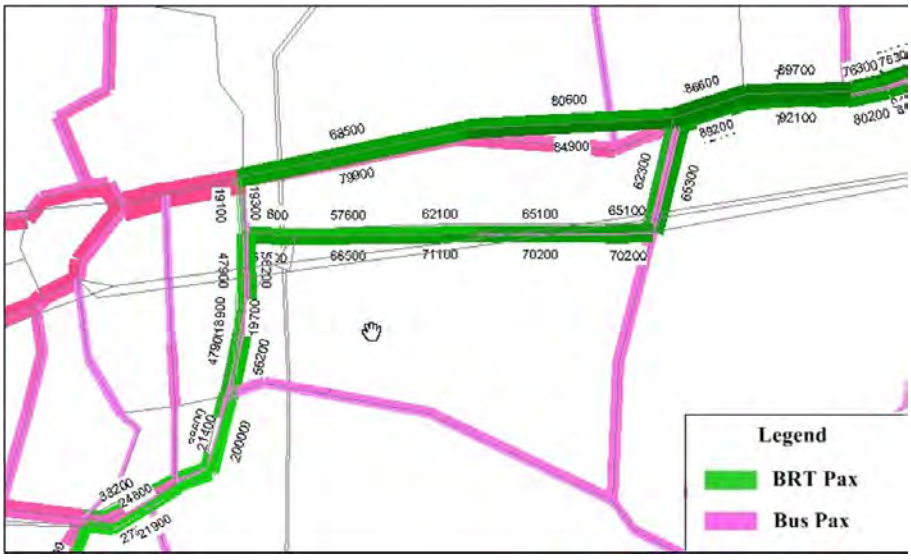
The line volume is again highest between Kalideres and Nusa Raya of about 80,000 pax per day in each direction, an increase of 29% over 2014 Scenario-2. This indicates that in future the line will be used by passengers with longer O-D than in 2014. This is feature of overall demand model, which shows increase in over PT trip length of about 0.5 to 1.0 km.

Table 11.5.3 Scenario 3, 2020 BRT Daily Patronage Route 2,(Between TCM & KLD)

No.	Station/ Stop	Code	Boardings TCM to KLD	Boardings KLD to TCM	Max Line Volume (1-W) After Station
1	Tangerang City Mall	TCM	27,500	-	27,500
2	Moch. Yamin	MYN	11,000	1,000	37,800
3	Veteran	VTN	18,900	1,100	55,600
4	Stn Tanah Tinggi	STT	11,700	3,300	64,800
5	Damar	DMR	12,100	10,500	66,400
6	Terminal Poris Plawad	TPP	14,900	14,800	66,500
7	Stn. Poris	SPS	10,200	10,100	66,600
8	Yos Sudarso	YSD	7,800	2,700	70,700
9	Warung Gantung	WGN	9,600	5,900	74,400
10	Nusa Raya	NRY	6,300	1,100	**79,500**
11	Kalideres	KLD	-	5,000	74,500
	Arriving at Kalideres from Harmoni			**74,500**	
1-11	**Total All Stations**	**-**	**130,000**	**130,000**	**max=79,500**

Source: JAPTraPIS

Figure 11.5.3 Scenario 3, 2020 Full BRT Demand on Route 2



Source: JAPTraPIS

The travel demand Figure 11.5.3 shows almost balanced demand between Route 2 and Route 13, which would start to operate between Kota and BSD by 2020. This is also apparent from the travel demand on BRT (Green Colour) continuing to the south onwards to BSD after Tangerang City Mall station. The demand along Daan Mogot is almost similar to that along Benteng Banten, this indicates the need for both Route 2 and Route 13 in the western corridor to handle different origin/ destinations, and also caters for the local demand of Kota Tangerang.

11.5.5 Impact and Role of Other Public Transport Services

The travel demand forecasts presented above are estimates based on a number of network and operating assumptions. This section provides further detail of these assumption and the likely impacts on other public transport services under the three forecast scenarios.

1) Scenario-1 Route 2b – Intermediate BRT 2012-2014 & Other Services

- It is essential that the existing Trans-Jakarta Route 2 & Route 3 are combined and operated as route 2a, as a continuous service between Kalideres and Harmoni;
- Timetable of Route 2a and 2b would need to be coordinated for easy and quick transfer.
- Existing small bus Route B01 operating between Terminus Poris Plawad and Tangerang City Mall (Cikokol) may be withdrawn, and fleet directed to local feeder operation.
- Existing small bus Routes 1 & 2 operating between Terminus Poris Plawad and Jatake & Perum-I respectively, via Cimone and Tangerang City, may be terminated at Tangerang City Mall to act as feeder services.
- Several Patas (A/C & Non A/C) routes between Poris Plawad and Senen may be limited.
- Existing bus service terminating at Stn Poris and Damar may be directed to terminate at Terminal Poris Plawad for easy and quick transfer to Route 2b.
- Additional feeder routes or the existing one with enhanced frequency may be introduced along Nusa Raya, Warung Gantung and Yos Sudarso.
- It is anticipated that railway would have no impact on Route 2b in this time duration (2012-2014), therefore no integration with rail is proposed.

2) Scenario-2 Route 2 – BRT 2014-2020 & Other Services

- It is anticipated that by end 2014 or as early as possible there after, Route-2b would be operated as 'Full BRT' Route 2 between Tangerang City Mall, Kalideres, Harmoni and through to Pulo Gadung.
- All existing services operation described under Scenario-1 would apply to Scenario-2.
- Until the introduction of Route 13a/13b, existing bus services along Daan Mogot may be terminated at Yos Sudarso, rather than to continue up to Kalideres, to

reduce congestion at Kalideres terminus.

- After the introduction of Route 13a/13b and before its extension to BSD,the headways of these two routes should be coordinated to provide equally spaced services.
- Role of Poris Plawad may be enhanced as a 'Class A' terminal for west Jakarta in Jabodetabek, and at the same time role of Kalideres as a 'Class A' terminus may be down-graded to local intra-Jabodetabek services.
- After the double-tracking of Tangerang-Kota rail line modal integration should be improved at Tanah Tinggi, Poris Plawad and Poris stations. This may have the impact of reducing patronage on Route 2, but would be of overall benefit for the enhancement of public transport services.
- Introduction of MRT east-west line impact on Route 2, is expected to be minimal, and is to far in the distant future, given the uncertainty of MRT systems getting built on-time.

3) Scenario-3 Route 2 – BRT Network After 2020 & Other Services

This long term scenario should be considered in the overall full public transport context when BRT/ MRT/ Rail have been developed as proposed by JUTPI and implemented as recommended by JAPTraPIS. The demand analysis has proven that there is dire need for fare integration, route integration (like Rout 2 & 3) and introduction of new routes like 2b, 13a/13b and to all other directions to/ from DKI Jakarta.

This would require further pre-feasibility/ feasibility and operational integration study – only through such detailed examination of each corridor, would emerge a good and feasible route (s).

11.6 Tangerang Corridor Implementation and Assessment

The travel demand estimates have shown that there is, and would be a need in the near future for a higher capacity bus system to link Kota Tangerang area to western Jakarta, along an additional corridor other than Merak Tollway. The alignment study and demand analysis has confirmed that Daan Mogot, Benteng Banten and Jl Sudirman are the most suitable corridor and could be implemented immediately:

- The level of demand warrants a better and higher capacity system – an Intermediate BRT;
- The implementation of an Intermediate BRT along the corridor is a 'natural' extension of the existing BRT route terminating at Kalideres;
- It is important that Kota Tangerang has an additional alternative corridor to West Jakarta other than Merak Tollway.
- To make the best and effective use of Class A Terminal Poris Plawad by linking it to both in the east with Jakarta via Kalideres and a direct route to Tangerang City centre.
- For the immediate implementation of an Intermediate BRT, most of the roadway

and terminal/ bus stop infra-structure exists, or could be provided, where necessary without major capital expenditure.

- Some rationalization of existing small bus route (1,2 & B01) would be required, to make system sustainable, as discussed above.
- These small buses could be deployed as feeder services to the new Intermediate BRT – this would make no one redundant.

11.6.1 Bus Fleet , Infrastructure and Implementation

The travel demand forecasts presented above provide passenger boarding/ alighting and volume along the route (line loading). The boarding volumes are used to estimate the need, capacity and operation of stops/ stations, whereas the line volume provides the operational requirement and bus fleet size. These calculations are detailed in Table 11.6.1 and are based on travel demand data presented in previous sections.

Table 11.6.1 Fleet Size Calculation (All Scenarios)

Scenario	1a	1b	1	2	3
Corridor Length (km)	10.58	10.58	10.58	10.58	10.58
Average Speed (kph)	25	25	25	25	25
Layover Time (mins) at Each End	2.5	2.5	2.5	3.5	3.5
Bus Capacity (max. crush load)	85	85	85	150	150
Headway Based on Bus Size (min)	5.7	3.3	2.3	1.5	1.1
Headway (Seconds)	342	195	137	89	68
Fleet = 2[((Len * 60)/V)+Lay]/[Headway]	9.8	17.2	24.5	39.2	51.0
Contingency	*5%*	*5%*	*5%*	*5%*	*5%*
Total Fleet Size = Number of Buses	**10**	**18**	**26**	**41**	**54**

Source: JAPTraPIS

The fleet size calculation based on the corridor length, average travel speed, bus size, required headways to meet peak (10% of daily) demand, assumed lay-over time at each end and contingency of 5%. Scenario 1 2014, non integrated required 26 buses to meet the peak demand. The calculation showed that intermediate bus services could be operated with regular bus size (crush load of 85 pax). Given that the service could not be started 'tomorrow', as procurement of fleet, building of infrastructure, and set up of operating contract/ company would require time; two additional Scenarios (1a & 1b) were developed for immediate implementation of the bus services in the corridor.

The two scenarios are: Scenario 1a, it is based on analysis that if the service were to start – by July 2012, the demand would be about 40% of Scenario 1, and could reach 70% by the end of 2012 or early 2013 (demand 'ramp-up' to 2014 Scenario-1 demand would take time). Under Scenario 1a, the fleet size is estimated to be 10 buses, and would need to be increased to 18 buses by 2013, and finally 26 buses would be required by end 2014, before the start of the 'Full BRT' operation with large articulated (Artic) buses along Route 2.

1) Scenario-1a, Route 2b – Intermediate BRT Initial Phase Implementation

Preparation for the building of infrastructure could start in parallel with the initial launch of Route 2b operation. This would involve:

- *Regular Buses* (not requiring elevated stations) along specified bus lane (already marked out on Jl Benteng Banten, Benteng Betawi);
- Prepare Bus Lane along Daan Mogot, Jl Hasanudin and Sudirman.
- Prepare Bus stop, bus terminal facilities for bus lay over (2~5 minutes) and bus turn around facility (may require local traffic engineers to develop/ revise 1-way system) at Tangerang City Mall area;
- Allocate special bay (initially one) at Kalideres terminus;
- Allocate dedicated bus bays at Poris Plawad for quick and easy transfer with other services;
- Additionally build eight (8) dedicated bus-stops at Nusa Raya, Warung Gantung, Yos Sudarso, Stn. Poris, Damar, Stn. Tanah Tinggi, Veteran, and Moch. Yamin.
- Prepare overnight parking, bus cleaning & maintenance and staff reporting etc facilities at Poris Plawad.

With the above specified infrastructure in place, Kota Tangerang municipality could start Route 2b phase 1a, bus operation with the 10 buses they already have.

2) Scenario-1b, Route 2b – Intermediate BRT Consolidation

Once the route is operation procurement for eight (8) additional regular buses should have been started early on in Phase 1a, to ensure on time delivery as the demand builds up, and frequency need to be increased to match peak demand. It would be essential to provide good start-up service, to make the system, attractive, reliable, dependable and safe. At the same time work could proceed to:

- Ensure that all 'Intermediate BRT' infrastructure is in place, particularly bus stop shelters, are built, timetables are displayed at each bus stop,
- Facilities at Poris Plawad are ready to receive additional fleet,
- Bus lane prioritization is working, enforced and adhered to by other road users particularly in peak periods;
- The demand analysis showed high loading at Poris Plawad, indicating a considerable transfer passengers to/ from feeder routes and other inter-city and inter-provincial routes. These transferring passengers are not met with inconvenience, and transfer is easy, quick and safe, and all within the bus terminus. No road-side boarding/ alighting is to be permitted.
- Staff is motivated, and operation is running without delays, and interface at Kalideres is safe, quick and easy with Route 2a (Route 2a, should be operational by 2013/14).

3) Scenario-1b, Route 2b – Intermediate BRT Consolidation

It is intended that Scenario 1b, could be in operation until the demand has reached the capacity available with 18 buses. The next phase of the implementation would need to be dove-tailed with the planned construction of 'Full BRT' routes 2 & 13 beyond Kalideres. If

these are progressing on schedule, and 'Full BRT' could be implemented before 2014, then there would be little or no need for additional regular bus fleet to be increased to 26 buses as estimated and shown in Table 11.6.1. However, it is anticipated that the merging of Route 2b with Busway Route 2a, would most likely to be by end 2014. In that case additional fleet of eight (8) buses would be required to augment the existing fleet of 18 buses to meet the estimated Scenario 1 (un-integrated) demand.

Under this 'likely' scenario, operation could continue as Route 2b, with total fleet of 26 buses until 'Full BRT' Route 2 is operational. Procurement of additional eight (8) regular buses should be affected as early as mid-2013, so that the 2014 Scenario 1, demand is not affected.

Once the 'Full BRT' service is built, operation could move over to the larger buses and the existing regular fleet could be deployed elsewhere. The integration of Route 2a and 2b is also dependant on other public transport integration aspects such as:

- Setup of JTA, and its functioning,
- Setup and operation of integration of fare system
- Integration and rationalization of other routes in Jabodetabek.

It is essential that pedestrian facilities (safe footpath, road crossings, footbridges for at least around 1km radius of stations) are planned and built to encourage patronage.

11.6.2 Fare System and Operational Assessment

1) Fare Structure

It is proposed that a flat fare of Rp. 2,500 per passenger be charged from the start of the service until operation changes to the 'Full BRT' system. The fare is set at competitive level to attract passengers to the new service. Te fare will be collected as it is done currently, requiring no extra capital cost expenditure on any new fare collection system. The fare is also estimated to be around Rp. 500/km (average trip length of passengers between Kalideres and Tangerang City is about 5km under all scenarios). Therefore, after the system integration, if distance based fare is to be implemented, the average passenger would not be worst of/ paying more than they are paying on Route 2b – this is also one of the reason to set the fare at Rp. 2,500 to avoid any future grievances.

2) Institutional Consideration

In institutional terms, Tangerang City Council should start the process for the appointment of an operator/ contractor for the operation of Route 2b. This should follow the institutional plans laid out in the JAPTraPIS Master Plan and in the interim should also be in accordance with the existing rules and regulations. It is stressed that this contract/ operational arrangement should be considered as a pre-cursor to the integration of Route 2b, with Route 2a. and ultimately to be operated as Route 2 as part of Jabodetabek BRT system. Therefore in setting up of any contract to start up the route, the ultimate goal of this Route 2 (2a & 2b) integration into the Full BRT system must not be forgotten.

3) Operational Assessment

Table 11.6.1 provides the bus fleet requirement. Table 11.6.2 details the bus fleet

performance for the peak, Inter-peak and off-peak periods. JAPTraPIS surveys at Poris Plawad and Kalideres surveys provided the traffic volume through out the day. It was estimated that the maximum peak is short lived and also fluctuates between location.

However it was estimate the peak period lasts over a total of 7 hours during the morning and evening time – from 06:00 to 20:00 and was estimated to be 52.5% of the traffic. The intervening period (inter-peak) was estimated to be about 35% of the daily traffic, and the remainder of the 4 hours off-peak (assuming 18 hour operation) was found to be much less busy and carried only 12.5% of the traffic. The table also shows the fleet requirement during the peak, Inter-peak and off-peak period. The fleet deployment and performance (Load Factor) have also been calculated and were found to be 75% during the peak and inter-peak, and average daily load factor was estimated to be comfortable 72%. This indicates that with the proposed headway some 75% of the passenger would get a seat during the 18-hr operation. This assessment also yielded the daily Km operated by each type bus under all five scenarios.

Table 11.6.2 Operational Assessment of Fleet Deployment

Description	Unit/ Value	Scenario-1a 2012	Scenario-1b 2013	Scenario-1 2014	Scenario-2 2015-20	Scenario-3 2020->
Total Daily Boardings		**28,000**	**49,000**	**70,000**	**200,200**	**260,000**
Daily Maximum Line Load 1-way		**8,960**	**15,680**	**22,400**	**61,000**	**79,500**
Peak Demand Pax/Hr PPHPD (@ ***Maximum*** Peak Factor **10%**	**10%**	896	1,568	2,240	6,100	7,950
Buses Required Per Hour Based on Bus Capacity		11	18	26	41	53
Fleet Size - Operated Including **5%** Contingency = Buses	**5%**	**10**	**18**	**26**	**41**	**54**
Bus Capacity – Peak Crush Load		**85**	**85**	**85**	**150**	**150**
Max Peak Headways ~ Minutes		**5.7**	**3.3**	**2.3**	**1.5**	**1.1**
Peak Period AM + PM Peaks Total 7 Hours						
Average Peak Hour of 7-Hour Peak Period = **52.5% of Daily**	**7.5%**	672	1,176	1,680	4,575	5,963
Peak Period Demand @ Duration of **7** Hours	**7.0**	4,704	8,232	11,760	32,025	41,738
Number of Buses During 7-Hour Peak Period		74	129	184	285	371
Capacity Pax Peak 7-Hour		6,272	10,974	15,679	42,712	55,654
Load Factor During 7 Hour Peak Period		**75%**	**75%**	**75%**	**75%**	**75%**
Inter Peak Period Total 7 Hours Daily						
Average Inter-Peak Hour of 7-Hour Int-Pk Period = **35.0% of Daily**	**5.0%**	448	784	1,120	3,050	3,975
Inter-Peak Period Demand @ Duration of **7** Hours	**7.0**	3,136	5,488	7,840	21,350	27,825
Inter-Peak Headways @ Factor of **1.5** of Peak Headways	**1.50**	**8.5**	**4.9**	**3.4**	**2.2**	**1.7**
Number of Buses During Inter-Peak Period		49	86	123	190	247
Capacity Inter-Peak 7-Hour - Pax		4,181	7,316	10,452	28,475	37,102
Load Factor During 7 Hour Inter-Peak Period		**75%**	**75%**	**75%**	**75%**	**75%**
Off Peak Period Total 4 Hours Daily						
Average Off-Peak Hour of 4-Hour Off-Pk Period = **12.5% of Daily**	**3.1%**	280	490	700	1,906	2,484
Off-Peak Period Demand @ Duration of **4** Hours	**4.0**	1,120	1,960	2,800	7,625	9,938
Off-Peak Headways @ Factor of **1.75** of Peak Headways	**1.75**	10.0	5.7	4.0	2.6	2.0
Number of Buses During Off-Peak Period		24	42	60	93	121
Capacity Pax Per Peak 7-Hour		2,048	3,584	5,120	13,947	18,173
Load Factor During 4 Hour Off-Peak Period		**55%**	**55%**	**55%**	**55%**	**55%**
Daily Average 18 Hours Operation						
Daily **18** Hour of Operation - Number of Bus Trips	**18.0**	**147**	**257**	**368**	**568**	**740**
Daily No of Buses/ Hour		8.2	14	20	32	41
Daily Average Headway		7.3	4.2	2.9	1.9	1.5
Daily Capacity Operated		12,501	21,874	31,250	85,133	110,929
Average Daily Load Factor		**72%**	**72%**	**72%**	**72%**	**72%**
Daily Bus Km 2-Way Operated over **18** Hours		**3,423**	**5,990**	**8,557**	**13,210**	**17,213**
Average Bus km/ day		**342**	**333**	**329**	**322**	**319**

Source: JAPTraPIS

11.6.3 Evaluation – Financial Assessment

1) Capital and Investment Costs

For financial evaluation purposes only Bus fleet cost has been taken into account, cost of road infrastructure, stations, and all other equipment is not considered. The estimation of engineering costs such as road-widening has been broadly estimated elsewhere in the report, but could not be used for this specific case. However, Bus fleet investment cost has been estimated, and even for these estimations the major source of information was Tangerang City Mass Transits Study (Circa ~ 2009). To bring all costs and % costs to a common base the bus costs has been increased by 30% (increase in cost from 2009 to 2012), where as all other costs (as most of these are linked to bus costs have been kept almost constants). Table 11.6.3 provides the capital cost estimates for a single 'Regular' Bus investment costs – which gives the estimated current price of the bus and associated recurring costs per annum.

Table 11.6.3 Investment Cost Estimate

Finance Components - General	Unit	IDR ('000)
Price of Bus	**1**	**1,200,000**
Depreciation Period		**7**
Period of Loan		**5**
Residual Price	20%	240,000
Finance Components - Investment Cost		
Depreciation Value of Bus per Year **(Price - Residual)/7=**	7	137,100
Provision Cost (legal & admin) 0.5% Each	1.00%	12,000
Insurance per Bus	1.50%	18,000
Interest Cost on Capital per Bus per Year ~ 17.5%pa Decreasing	10.00%	120,000
Investment Cost per Bus per Year		**287,100**

Source: JAPTraPIS; and Bus Price is +30 of the Price quoted in Tangerang City Council Study (2009)

2) Bus Operating Costs

Again these are mostly based on the Bus price (source described above) and all associated fix operation costs per annum are related to the bus price, and are taken from the Tangerang City Bus Study. Where necessary adjusted to take account of the current study for example, corridor length, bus fleet requirement etc.

Fuel price is based in the current fuel price (Not Subsidized), and applied to Regular bus scenario. For Scenario 2 & 3 (Large bus operation, regular bus operating costs are factored up, to take account of higher operational & fuel consumption costs. Table 11.6.4 gives the full operating costs for the fleet under all five scenarios.

Table 11.6.4 Bus Operating Cost Estimate

Description		% of Price	IDR ('000)
I	**Capital Cost of a Bus**		
2	Maintenance Cost and spare parts per Bus per Year	33.0%	396,000
3	Driver Cost per Bus per Year	12.0%	144,000
4	Mechanical Cost per Bus per Year	6.0%	72,000
5	Terminal Cost per Bus per Year	1.0%	12,000
1-4	**Total of Operational Cost per Bus per Year**	**52.0%**	**624,000**
II	**Overhead Cost O-M**		
11	Workshop Cost for Human Resources and Pool per Bus	6.75%	81,000
12	Management Cost for Human Resources and office per Bus	0.50%	6,000
13	Office Operating Cost per Bus	0.75%	9,000
14	Workshop Operating Cost per Bus	1.00%	12,000
15	Tax and Feasibility Test (KIR) for Bus	0.65%	7,800
16	Maintenance Cost for Office, Pool, and Workshop Equipment per Bus	0.15%	1,800
17	Depreciation Cost for Office, Pool, and Workshop Equipment per Bus	1.10%	13,200
18	Maintenance Cost for Office, Pool and Workshop Construction per Bus	0.35%	4,200
19	Depreciation Cost for Office, Pool and Workshop Construction per Bus	0.75%	9,000
11-19	**Total of Overhead Cost per Bus per Year**	**12.00%**	**144,000**
1-19	**Total of Operational Cost and Maintenance per Bus per Year**	**64.00%**	**768,000**
20	**Contingency per Bus per Year**	**10.00%**	**76,800**
21	**Income Tax at Article 23 per Bus per Year 15%**	**15.00%**	**126,720**
1-21	**TOTAL OF OPERATING COST PER BUS PER YEAR**	**89.00%**	**971,520**
	Fuel Cost Consumption	**Unit**	**IDR**
	Fuel Cost Per Litre	4,500	4,500
	Fuel Consumption per 100km = Litre	47	-
	Fuel Cost per km - No Subsidy		2,115
	Fuel Cost per km + Contingency 10% & Taxes 15% - No Subsidy		**2,675**

Source: JAPTraPIS; and Bus Price is +30 of the Price quoted in Tangerang city council Study (2009)

3) Financial Assessment

Table 11.6.5 details the financial assessment of all five scenarios. The indicator used is the 'Revenue Surplus' i.e. The revenue left after payment of investment and operating cost including fuel costs and taxes. It has been estimated that there will be operating surplus under each scenario. Which is 'Good' news that No Subsidy would be required right from the opening of the bus operation. Under Scenario 1a (opening in say mid-2012) as the fleet of 10 buses exists, no fleet cost has been assumed, also this fleet is sufficient to meet the current demand. Scenario 1b, would require an addition of 8 buses to the existing fleet of ten buses to meet the demand. to operate the system with 18 buses.

It has been estimated that under Scenario 1a, the operator could make a profit of about US$730,000/year and for ½ year (2012) operating profit of up to 40% US$730,000 could be realized. This is because in the beginning, the demand would be difficult to move to the new operation, and also the operator has to see off the competition from Route 1,2 & B01. This would not be an easy task. To ensure profitability, it is proposed that all institutional arrangements to eliminate duplication of services are in place, and are operating effectively and enforcing the rules and regulations with regard to any illegal operation of Angkot and other buses.

Table 11.6.5 Financial Assessment

Description	Unit/ Value	Scenario-1a 2012	Scenario-1b 2013	Scenario-1 2014	Scenario-2 2015-20	Scenario-3 2020->
Total Daily Boardings		**28,000**	**49,000**	**70,000**	**200,200**	**260,000**
Daily Maximum Line Load 1-way		**8,960**	**15,680**	**22,400**	**61,000**	**79,500**
Daily Bus Km		**342**	**333**	**329**	**322**	**319**
Operating Fleet Size		**10**	**18**	**26**	**41**	**54**
Bus Size Operating Cost Factor		1.00	1.00	1.00	**1.75**	**1.75**
Bus Fix Operating Cost / Year ('000)	**971,520**	971,520	971,520	971,520	1,700,160	1,700,160
Fleet Fix Operating Cost IDR ('000)		9,715,200	17,487,360	25,259,520	69,706,560	91,808,640
Fleet Fuel Cost / Year IDR('000) ~ 325 Operating Days	325	2,976,100	5,207,500	7,439,600	20,098,400	26,188,300
Total Operating Cost (Fuel for 325 Days) + Fix Annual Costs		**12,691,300**	**22,694,860**	**32,699,120**	**89,804,960**	**117,996,940**
New Fleet Required		**-**	**8**	**16**	**41**	**54**
Bus Size Operating Cost Factor		**1.00**	1.00	1.00	**1.75**	**1.75**
Investment Cost per Year - IDR ('000)	**287,100**	287,100	287,100	287,100	502,425	502,425
Fleet Investment Cost per Year - IDR ('000)		-	2,296,800	4,593,600	36,048,994	47,479,163
Total Annual Cost (Investment + Operating) - IDR ('000)		**12,691,300**	**24,991,660**	**37,292,720**	**125,853,954**	**165,476,103**
Annual Revenue @ Fare = 2,500 IDR/Trip ('000) 275 Days	**2.50**	**19,250,000**	**33,687,500**	**48,125,000**	**137,637,500**	**178,750,000**
Profit / Loss US$ / Year - US$ ('000)		**730**	**1,000**	**1,200**	**1,300**	**1,500**

Source: JAPTraPIS; and Bus Price is +30 of the Price quoted in Tangerang city council Study (2009)

11.7 Conclusions and Recommendations

11.7.1 Conclusions

The pre-feasibility study has been conducted to ascertain financial feasibility of BRT operation along one of the busiest, and fastest growing corridor of Jabodetabek. The analysis showed that the public transport travel demand in the corridor does warrant a high capacity system, which is more than, an un-controlled and poorly planned bus operation of all size of buses. The estimated level of travel demand could sustain an intermediate level BRT (Bus operation with priority on the road, and specific, and not too frequent bus stops) at the outset. It is anticipated that the public transport travel demand in the corridor would grow at rate faster than the population and economic growth, as 'better' frequent, reliable, affordable and dependable service is in operation. Therefore, it is planned that as the demand grows, the intermediate BRT operation could be easily, and without interference to operating services be converted a 'Full BRT' operation, which would be integrated with the Jabodetabek BRT system.

The proposed fare in the short corridor is set at affordable level of Rp. 2,500. (flat/trip) and would make the system attractive. Once the corridor is integrated with the Jabodetabek Transport system, the fare would need to be distance based, as many (60%) of the passenger demand would have one end of the trip beyond Kalideres in DKI Jakarta.

The operational assessment shows that frequent headway would be required to meet the peak demand, this should be ensured for system credibility, and reliability. This is the only way to achieve the proper public transport mode share and the patronage. The level of bus operation would be operated at 75% 'Load Factor' for 14 Hours of the day. This would ensure comfortable ride, and would ensure a seat for at least 60% of passengers.

The road infrastructure required for operation is almost available at the outset. This need minor improvement, not requiring major capital expenditure to start the Intermediate BRT operation. The Bus priority lane marking need to be further improved. The station/ bus stops would need to properly designated, and bus stop shelter built before operation. could commence. Full and effective use must be made of Poris Plawad terminus as a quick, convenient, efficient and safe transfer point between local feeder service, inter-city and inter-province operation and the 'home' of proposed BRT Route 2b.

There is a fleet of 10 buses already available with the Tangerang City Council. This sleet is estimated to be adequate for initial operation up to the year 2013. That is when the fleet would need to be increased by eight buses per year, until full and integrated BRT system is in operation with larger buses.

The financial analysis shows that in the first year of operation, the operation would be profitable, and profit could be as high as US$ 730,000 per annum or up to 40% of it if the operation is in place for the later half of 2012. Beyond 2012, it is estimated that for the same fare (would need to be increased in line with inflation) the operation would be profitable, albeit at reduced level (as profit per bus) as the additional fleet investment costs would have to be absorbed by the operator. The fare level assumes that with integrated operation distance based fare should be applied. The average trip length on the corridor area is about 5km, a fare of Rp. 500/km at 2012 prices could be charged, without loss of patronage, revenue and profit. The key to the success of the system, is time savings for passengers, at an average speed of 25kph, which must be maintained for both to attract patronage and keep operating cost low, due to low fuel consumption.

11.7.2 Recommendations

The pre-feasibility study has been based on limited survey data, and a strategic model not developed & validated or for such detailed patronage forecast. However, the 'bench marking' of the travel demand against similar system elsewhere in Jabodetabek confirm that the demand estimates are reasonable, but could be more robust for each station and for better control of operation during peak, inter-peak and off-peak periods. It is therefore recommended that further model validation should be performed after refining the model zone system and network in the study area corridor.

The investment and operating cost data need o be further checked and refined for better and more reliable costs and revenue estimates, and hence profit level. The capital cost of the system infrastructure has not been estimated or taken into account. This should be done, and a full economic/ social cost benefit analysis should be performed for the corridor before committing to major infrastructure expenditure, despite the fact that the system is profitable (excluding capital cost).

For the success of the system, pedestrian facilities to/ from bus stops, at station/ bus stops should be provided and maintained. Integration of Poris Plawad and Kalideres bus terminals for inter-city and inter-provincial services must be carried out to make effective use of facilities at Poris Plawad. The bus right-of-way maintenance and enforcement (bus lane or Full BRT) is absolutely essential to maintain proposed headways during peak and other time period and an average speed of 25kph must be achieved for the successful and profitable operation of the system.

12 CONCLUSION AND RECOMMENDATIONS

12.1 Conclusion

- The study area – JABODETABEK is the greater capital region of Indonesia with population of 28 million. In order to sustain functions and roles as a capital region, the current transport system of JABODETABEK needs to be upgraded to support varied social and economic activities.
- The current transport situation in the study area shows chronic traffic congestions due to delay of transport infrastructure development in comparison to the year-by-year increasing traffic demand. Particularly, the development of key urban transport network such as arterial roads and urban rail is very slow, while increase of car and motorcycle use is significant.
- A number of transport master plans formulated by local governments show the absence of consistency between central and local, and have no legal guaranty in its implementation. Therefore, the JUTPI is providing the supports to the government in updating and legalizing the urban transport master plan, and establishing the JTA for the implementation of the master plan.
- The comprehensive urban transport master plan revised by the JUTPI deployed the intensive public transport system development scenario which network has intensive investment focused on the development of rail and BRT system. This will promote a modal shift from cars and motorcycles to public transport and realize the reduction of loss caused by traffic congestions. In the JUTPI, it is estimated that the modal share of public transport will increase from 27% in 2010 to 34% in 2020. In order to transport this increasing public transport demand efficiently, the role of road-based public transport including BRT and general buses studied in the JAPTraPIS is very important and significant development is necessary.
- The current busway operation as key system of road-based public transport is partly affected by road traffic conditions and obstructed in its high-speed and punctual operation in some sections. This causes the decrease of operational frequency and long waiting time for passengers. Furthermore, the increase of operational subsidy weight on the public finance of DKI Jakarta government. In this way, the current busway operation needs to be improved to the BRT standard with high-speed and high-frequency operation. Also the extension of the network to the surrounding commutable areas in the study area is desired.
- On the other hand, it is pointed out that the issues and problems of general bus services supplementing the key transport system of busway are identified as follows: low operational service level, low quality of bus vehicles by aging and inadequate maintenance, competition between different type of buses, unbalance of demand and supply, lack of law enforcement and so on.
- As previously described, in order to meet with the issues of road-based public transport system in the study area, the hierarchical and integrated bus service network is necessary to develop and a comprehensive master plan is needed formulated.

12.2 Recommendations

- The JAPTraPIS formulated the road-based public transport master plan for JABODETABEK. The master plan and implementation strategy targets to the year 2020 with intermediate year of 2014. The structure and main components of the master plan is described as follows and the outline and implementation schedule is summarized in Figure 12.2.1. Outline of the master plan projects are listed in the Appendix 3.
- **Integrated Public Transport Network and Services:** Development of future BRT network up to 2020 including improvement of the current busway and restructure of the supporting general bus service network are proposed. By 2020, 30 full BRT routes and 15 intermediate bus routes will be developed and the BRT network will transport 2.7 million passengers per day. The proposed BRT and railway network will meet with the increasing future traffic demand projected by JUTPI. In order to implement the proposed BRT network, 1,681 articulated buses and 277 single buses are to be newly procured by 2020.
- **Infrastructure Development:** In order to develop the proposed road-based public transport network with core network of BRT, the necessary development of related infrastructure up to 2020 is proposed with project scale and implementation schedule. They include the following components: i) BRT corridor development (31 project packages), ii) bus location system and control center, iii) bus ticketing system, iv) Park & Ride facility (19 locations), v) integrated/multimodal terminal (20 locations) and vi) cycling and walking facilities.
- **Establishment of TransJabodetabek:** In order to develop and manage the proposed BRT route network, an establishment of TransJabodetabek as regional BRT management agency under JTA is proposed. The organization and functions, successful business model and implementation schedule of TransJabodetabek are identified.
- **Reforming General Bus Management System:** In order to upgrade the current general bus services more efficiently and more convenient and comfort with passengers, the following institutional reform on the bus management system and implementation schedule are proposed as follows: i) minimum service standards, ii) rejuvenation of bus fleets, iii) restructuring general bus licensing system, iv) institutional development and capacity building and v) other public transport.
- **Evaluation of the Master Plan:** Since JAPTraPIS is limited to road-based public transport in its study scope, it has not a right position to evaluate its impact in the overall metropolitan transport system. Instead, the proposed JAPTraPIS master plan was evaluated from different viewpoints such as government subsidy, road space utilization and environmental aspects. Those viewpoints are all related to sustainable transport development.
- **External Assistance for Master Implementation:** the necessity and project package of external assistance is also examined for smooth implementation of the JAPTraPIS Master Plan.
- **Formalization of the Master Plan:** It is strongly recommended the proposed JAPTraPIS Master Plan shall be formalized by the government as a part of the

Comprehensive Transport Master Plan revised by JUTPI and being formalized as the presidential policy in order to ensure its implementation by various related agencies and stakeholders.

Figure 12.2.1 JAPTraPIS Master Plan and Implementation Schedule

Components	Implementation Period		Implementing Agency	Cost ($ mil.)
	2012-2014	2015-2020		
1. Integrated PT Network and Services				
A1. Full BRT Routes	15 routes	15 routes	TJ	-
A2. Intermediate Routes	8 route	7 routes	TJ	-
B1. Articulated Bus for full BRT Routes	574 buses	1,107 buses	TJ	563
B2. Single Bus for Intermediate Routes	0 buses	277 buses	TJ	72
2. Infrastructure Development				
A. BRT Corridor Development Projects	Project 1-12	Project 13-31	LG/TJ	284
B. Bus Location System and Control Center	1,100 buses	1,400 buses	TJ	13.8
C. Bus Ticketing System	260 stations	180 stations	TJ	20.5+a
D. Park & Ride Facility	9 locations	10 locations	LG/TJ	n.a.
E. Integrated/Multimodal Terminal	8 locations	12 locations	LG/TJ	n.a.
F. Cycling and Walking Facilities	→	→	LG	n.a.
3. Establishment of TransJabodetabek				
A. Establishment of JTA	2012	-	CG	-
B. Institutional design	2012	-	JTA	-
C. Establishment and operation	2013 →	(operation)	JTA	-
4. Reforming Bus Management System				
A. Minimum Service Standards	2014 →	→	DGLT/JTA/LG	n.a.
B. Rejuvenation of Bus Fleets	2012(amendment)	2019 →	DGLT/JTA/LG	n.a.
C. Restructuring General Bus Licensing	2013(amendment)	2019 →	DGLT/JTA/LG	n.a.
D. Institutional and Capacity Building	2013	-	DGLT/JTA/LG	TA

Source: JAPTraPIS
Note: JTA: JABODETABEK Transportation Agency, TJ: TransJabodetabek (Regional BRT Agency under JTA), CG: Central Government, LG: Local Government. TA: Technical Assistance (funded by Official Development Assistance)

<Pre-F/S on BRT Extension to Tangerang City>

- **Overview:** The high demand corridor from Kalideres to Kota Tangerang has been identified as the corridor for immediate action plan, and selected for the pre-feasibility study (PFS). The key objective of the PFS is to prepare an assessment for a stepwise implementation of a BRT system. This involved review of existing work, analysis of JAPTraPIS recent survey data, travel demand forecasts, assessment of route suitability, proposals for station locations & terminal facilities, timing of its integration into the JABODETABEK BRT network, and its operational & financial performance.
- **Corridor Alignment and Station Locations:** The proposed route is 10.6km long with 11 proposed stations, including two existing bus terminals (Kalideres & Poris Plawad), eight new stops/stations and a final station at Tangerang City Mall.
- **Corridor Demand Analysis and Operational Assessment:** The demand forecast and assessment of existing infrastructure in including available 10 bases, showed that an 'Intermediate BRT' system may start operation in the corridor, after some preliminary preparation as early as mid-2012.
- **Financial Assessment and Sustainability:** The result of financial analysis shows revenue surplus form the opening year operation, and could be as much as US$730 thousand per annum, prior to the requirement of investment cost future bus fleet. The profit is estimated to increase with time as the patronage build up. The financial success of the system is dependent on considerable planning for smooth operation, convenient and safe passenger boarding/ alighting and cross platform transfer at Kalideres.