



# Pre-Feasibility Study for Urban Transport Project in Palembang, Indonesia

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March 2011  
Executive Summary

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## A. Background

1. This report has been prepared by consultants engaged by CDIA and ADB to conduct a pre-feasibility study of urban transport in Palembang. The study took place between August 2010 and February 2011.
2. CDIA's main objective in carrying out such studies is to bridge the gap between city transport plans and actual investment in transport infrastructure projects. The emphasis is therefore to provide investors with sufficient background information to make effective investment decisions.
3. The focus of this document is to provide such information for a 1st phase priority investment project, within the context of a longer-term 5-year action plan and investment program.

## B. City Profile

### Context

4. The projects identified are in Palembang, Indonesia. Palembang is the capital city of Indonesia's Sumatera Selatan (South Sumatra) Province. Geographically, it is situated on either side of the Musi River, about 80 kms from the open sea.

### Demography and land uses

5. The current population of Palembang city is estimated to be about 1.5 million. In recent years this population has been growing steadily at around 2% per annum. If this trend continues, the population in 2015 will be around 1.63million and in 2030 will be around 2.20 million.
6. The total area covered by the city is 400.61 Km<sup>2</sup>. However, large areas of the city are still undeveloped. The predominant pattern of urban land use is for commercial premises to line the main road network, with residential areas being located behind these premises. The same pattern can be detected in the city centre.
7. Development in the surrounding area is expected to be focused in the south and east, where suburbanisation is already taking place. The areas to the north and west are largely agricultural, and are likely to remain so. There is also a move to recognise Palembang as part of a wider metropolitan area. However, much of the surrounding area is classified as rural or is at a very early stage of urbanisation at the present time.

### Economy

8. The city's gross regional domestic product (GRDP) for the five years to 2008 grew at a rate between 7% and 8% (in constant price terms). In 2008 the average GRDP per capita was Rp29.8 million – or \$3,300 – including oil and gas, and Rp 20.2 million – or \$2,200 – excluding oil and gas.
9. About 37% of the GRDP was associated with processing and manufacturing, of which 12% was associated with oil processing. The remaining 63% of the GRDP was contributed by the service and trading sector (including 8.5% from transportation).
10. Palembang is also a centre of government, with around 153,000 government employees, and a centre for state and private university education. In all there are around 48,000 university-level students in the city.

11. As in most Asian cities, there is a thriving informal sector. In Palembang it has been estimated that about 47% of the working age population are engaged in such activities.

#### **Road network**

12. Palembang's road network is based on radial routes, supported by a series of ring roads. The main radial road runs from the Ampera Bridge, which crosses the Musi River, north-westwards towards Alang-Alang Lebar and onwards to Jambi Province.

#### **Public transportation**

13. Motorised public transport in Palembang is provided by buses, angkots (mini-vans), ojeks (motorcycle taxis) and taxis.

14. In February 2010, a new Trans-Musi bus service commenced on two corridors, using a fleet of 25 high-floor, air conditioned buses. Three more corridors are due to be implemented by early 2011, and the remaining three corridors are expected to be operational before 2013.

#### **Non-motorised transport**

15. Non-motorised modes, including becaks (traditional tricycles with seats for two people), bicycles, and walking, play a very important part in the city's transport system.

### **C. Core Urban Transport Issues**

16. Based on the above review, the following core urban transport issues have been identified. These have shaped the medium term action plan and investment program, and are also reflected in the contents of the priority investment project.

#### **An increasing population and the need for integrated land use/transport planning**

17. The rapidly increasing population of the city will require more careful consideration of future land use patterns and integrated transport systems. However, because of uncertainties in the land use planning system, a 'process-driven', rather than a 'plan-driven' approach to developing the future urban transport system is recommended.

#### **A rapidly increasing use of private transport modes**

18. With increased economic prosperity, the ownership of private cars and motorcycles in the city has risen rapidly in recent years, with annual increases often exceeding 10%. This has resulted in a continuing rise in the use of private vehicles, leading to increased road congestion, increasing emissions of greenhouse gases, an increased incidence of traffic accidents, stagnation (or slow decline) of the public transport system, and a dramatic reduction in walking and the use of non-motorised modes for travel within the city. The increasing number of parked cars and motorcycles has also led to deteriorating environmental conditions in some parts of the city (notably the city centre). For all these reasons, the current trends in private vehicle use are considered to be unsustainable.

#### **The limited capacity of existing bridges across the Musi River**

19. The main bridge serving the centre of the city is the Ampera Bridge. Another bridge (Musi II) 5 kms upstream serves as a western bypass for regional traffic. In 2009, morning peak hour traffic on the Ampera Bridge exceeded 9,000 vehicles (passenger car units) – 70% more than the theoretical capacity calculated using the Indonesian Highway Capacity Manual, and more than twice the volume recorded in a similar survey 5 years earlier. This traffic volume represents the movement of about 40,000 people. In the next 5 years, peak hour passenger volumes across the bridge are expected to increase by a further 4,000.

### **The risk of the urban poor being further marginalised**

20. In 2008, according to the City Statistics Office, some 6% of families in Palembang were identified as being 'very poor', 13% as being 'poor' and a further 13% as being 'nearly poor' – amounting to some 32% of all families. In some districts, notably in riverside communities, almost 60% of families fall within this definition. Strategies that focus investment on support for an ever-increasing number of private motor vehicles represent a serious risk that the poorest communities will be further marginalised. To ensure that this is not the case, the consultants recommend strategies that focus on planning for people.

### **The critical role of inter-agency cooperation and coordination**

21. The institutional arrangements required to develop and implement sustainable urban transport policies are not strong enough and the policy objectives of the various national, provincial and city agencies involved do not always coincide. There are also major difficulties at all three levels of government caused by uncoordinated planning and budgeting.

### **The lack of systematic transport planning**

22. There is an obvious requirement for more detailed analytical and strategic planning of Palembang's transport system. The current lack of information about travel patterns, the apparent lack of understanding of public transport passenger requirements, and the absence of any analytical transport planning tools, coupled with the absence of systematic data collection and monitoring procedures, means that decision-making is often uninformed and ineffective.

## **D. Key Urban Transport Strategies**

23. In response to these core urban transport issues, the consultants and local government officials have agreed on the following key strategy responses:

24. promote increased use of public transport, by improving bus services and infrastructure for public transport passengers and operations – focusing on the core Trans-Musi bus network and establishing an effective network of feeder services (using angkots, becaks and ojeks) – and managing on-street and off-street parking in major transport corridors;

- 24.1. ensure that all new land use and roadspace provision (including new bridges) has in-built facilities for public transport and non-motorised modes;
- 24.2. provide at least one more bridge across the Musi River – to include bus priority measures, pedestrian and non-motorised transport facilities;
- 24.3. strengthen the institutions responsible for strategic transport planning and delivering of sustainable urban transport projects, including establishment of a dedicated Urban Transport Project Implementation Unit; and
- 24.4. ensure that transport improvements provide benefits to all sections of society, by focusing project design on the needs of the most disadvantaged members of society.

25. Further details of the actions required in the medium term (2011-2015) are set out in the Medium-Term Action Plan and Investment Program included in the study's Final Report. The most urgent of these actions are included in the priority infrastructure investment project described later in this report.

## **E. Stakeholder Consultation**

26. During the course of the study the consultants have held many routine and specific meetings and discussions with stakeholders involved with urban transport in Palembang. These have included:

### **Meetings and Discussions:**

27. Regular working meetings with planning and transport officials, to obtain data, understand issues, discuss findings and provide briefings on study progress;

28. Steering Committee meetings at key stages in the project, to present findings, and seek guidance and approval for proposals (including selection of a priority investment project);

29. Discussions with transport operators, university staff and NGOs, to seek views, gain a better understanding of local issues and ensure that all available information is known.

### **Public Consultation:**

30. An event organised by the consultants (in September 2010) to begin to explore key urban transport issues with local residents, district officers and transport operators, and to listen to their concerns and suggestions.

### **Stakeholder Workshop:**

31. A further opportunity (in December 2010) to discuss and confirm key urban transport strategies with stakeholders from a wide range of government and non-government organisations.

### **Project-specific meetings and discussions:**

32. meetings with district officers and village chiefs in the project corridors, to provide information about project proposals and to explore issues;

33. informal conversations with owners of small businesses and informal transport operators in the project area, to gain an understanding of likely economic and social impacts of the project proposals;

34. discussions with transport terminal managers to confirm the arrangements for the operation of park-and-ride facilities.

### **More structured interviews among:**

35. 62 parking attendants, 129 shop keepers and 180 parking users along Jl. Sudirman (Component 1), to investigate parking characteristics and understand potential impacts on local businesses; and

36.

37. 411 residents of Trans-Musi Corridor 4 (Components 3 and 4), to understand their travel behaviour and travel needs, and to gain their opinions about the availability and quality of transport services.

38. A number of traffic surveys and bus loading surveys were also carried out in the project area to complement the information already available from other sources.

## **F. Project Location and Rationale**

39. Based on the key urban transport strategies identified, and in consultation with key city officials and other stakeholders, the consultants have identified an integrated project

area for priority action, which could form the first phase of an overall Medium Term Action Plan and Investment Program. This would include:

39.1. the southern part of Trans-Musi Corridor 1, within the city centre (Jl. Jend. Sudirman, between Sp. Charitas and Air Mancur). This is the main commercial area of the city. However, the urban environment is relatively poor: there is chronic traffic congestion as traffic is funnelled into the Ampera Bridge approach, the current bus priority lanes are made ineffective by adjacent on-street parking, and the sidewalks are too narrow to be attractive to pedestrians. A project that addresses these issues would be of great benefit to the operation of Trans-Musi buses and the environment of the City Centre generally.

39.2. a new Musi River bridge (Musi IV). The existing Ampera Bridge across the Musi River is 48 years old and is very congested, with about 40,000 people crossing in the peak hour alone. If an additional bridge is not constructed soon, this will become a real constraint on city development. There have been several attempts to implement a new bridge to relieve this constraint, but these have failed for a variety of reasons. The most recent feasibility study is now six years old, and is considered to be out of date and in need of review. Furthermore, there is no evidence that it ever included an economic or financial viability analysis, a social and environmental analysis, or considered the area-wide impact of the new bridge on the city's road network. The next step would be to prepare a new feasibility study that would help to move the process forward.

The new bridge is envisaged as having a dual 3-lane carriageway, with one lane in each direction reserved for bus priority, sidewalks and non-motorised traffic lanes. To be effective, these facilities will need to be integrated into a network of busway, pedestrian and non-motorised vehicle lanes on either side of the bridge. It is also envisaged that the river frontage on either side of the bridge, and along both banks of the river, could be improved as part of the bridge project, to provide important recreation and leisure space, as well as economic opportunities for informal traders and a pedestrian and cycleway to the city centre.

39.3. Trans-Musi Corridor 4, where Trans-Musi buses are due to commence operations early in 2011 and bus shelters (halte) are currently being constructed. This is located on the southern (Ulu) side of the Musi River, and runs parallel to the river, east and west, for about 15 kms. The corridor passes through some of the poorest communities in Palembang, with almost 60% of families in the area being classified as 'very poor', 'poor' or 'nearly poor'. The roadway over much of the corridor is in a poor condition, which is not conducive to efficient

39.4. Trans-Musi bus operation: there are no sidewalks (or drainage), there is widespread encroachment into the road right-of-way, and roadside activities often force pedestrians to share the roadway with passing traffic.

39.5. the Musi River provides a traditional means of everyday transport for the communities that line its banks. Consequently, there have long been aspirations to develop and promote this mode of transport to a wider section of the travelling public. There is now a renewed opportunity to re-visit this aspiration, with a view to possibly integrating some form of river transport into the Trans-Musi network.

39.6. Park-and-Ride facilities at Terminals: Analysis of parking supply in the city centre indicates that it may not be feasible, or economic, to replace the current on-street parking with an equivalent number of off-street parking spaces. In any case, parking tariffs will need to increase in the centre of the city to deter the increasing

volume of travel to that area by private vehicles, with more people being persuaded to travel by bus. One measure that could contribute to this policy objective is the provision of park-and-ride facilities at strategic locations in the bus network. Initially, these could most easily be provided at the existing bus terminals, which are all served by Trans-Musi buses (at Alang-Alang Lebar, Karya Jaya, Jakabaring, Plaju and Sako).

The location of the project area is illustrated in Figure 1.

- 39.7. In addition, two capacity development components have been added, which form an essential part of project delivery:
- 39.8. technical assistance to the newly-formed Project Implementation Unit, including development of its managerial and technical capabilities; and
- 39.9. strengthening the city's road maintenance capabilities, including provision of equipment for the city public works department (which will maintain many of the elements included in the priority project components), and associated training for its staff.

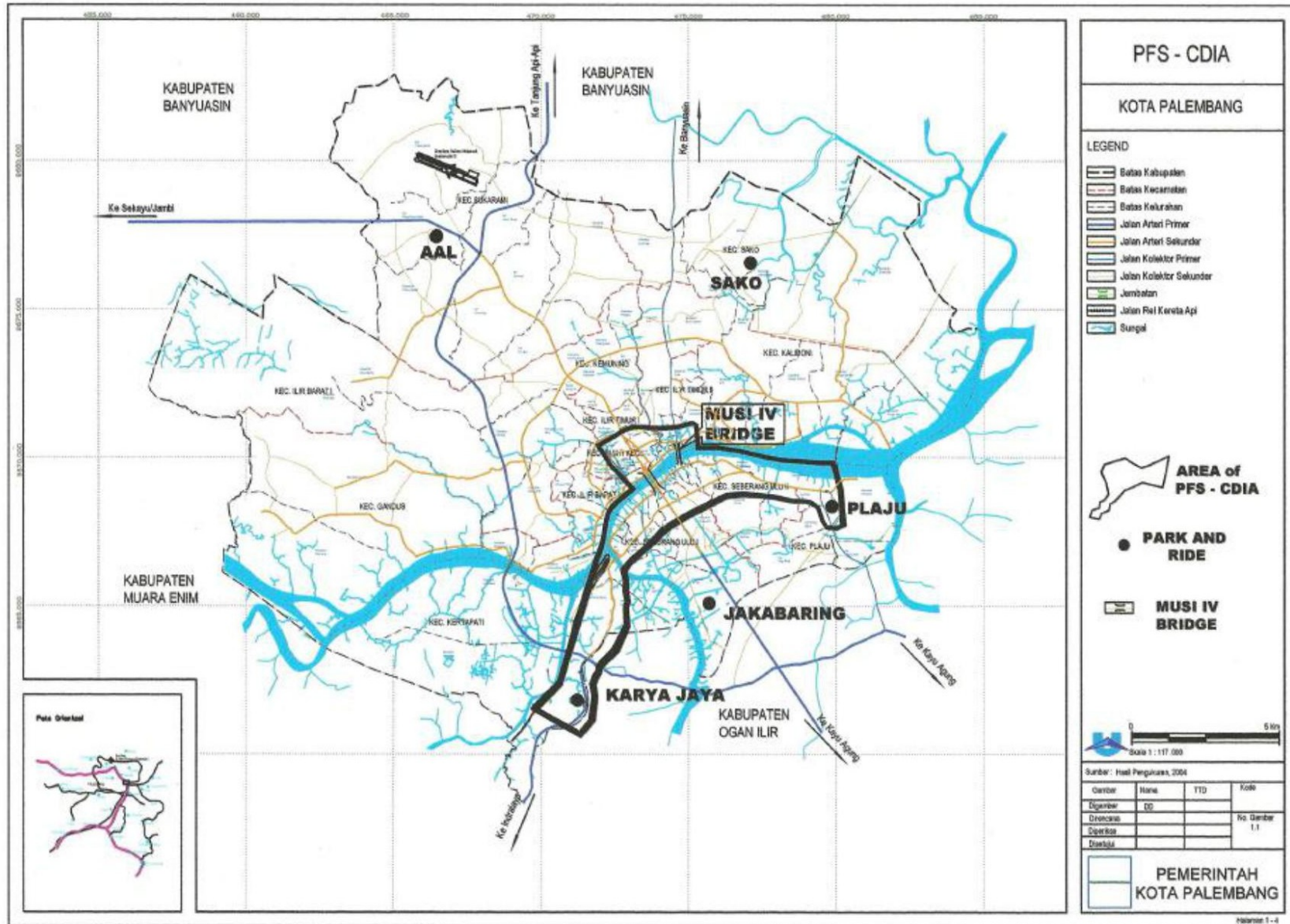
## **G. Summary of Project Analysis – Vehicular and Passenger Traffic**

### **Vehicular traffic**

40. Information about traffic volumes has been taken from routine traffic counts conducted for the City Transport Department during 2009. Two additional counts were made, at Kertapati (Ogan River Bridge) and Plaju (Jl. Panjaitan) to supplement those available from the 2009 survey. Examination of this information indicates that:

- 40.1. peak period traffic volumes on the Ampera Bridge exceed the theoretical capacity of the roadway;
  - 40.2. peak period traffic volumes are also close to the roadway capacity in the surrounding road network (particularly along Jl. Sudirman and Jl. A.Yani);
  - 40.3. on average, about 78% of vehicular traffic is motorcycles;
  - 40.4. the number of public transport vehicles (buses and angkots) operating in the project area is relatively high (3,926 buses and 655 angkots, 2-way in 12-hours, on Jl. Sudirman; 1,191 buses and 2,073 angkots on the Ogan River Bridge; 1,592 buses and 1,957 angkots on Jl. A.Yani); and
  - 40.5. there is a significant number of non-motorised vehicles on the main roads in the area (246 bicycles and 158 becaks, 2-way in 12-hours, on Jl. Sudirman; 227 bicycles and 240 becaks on the Ogan River Bridge; 423 bicycles and 775 becaks on Jl. A.Yani).
41. Similar information for the main road junctions in the area indicates that peak hour congestion is likely to be particularly acute at the Charitas and Jakabaring intersections.

Figure 1: Location of Proposed Priority Project





### **Impact of implementing the Musi IV Bridge**

42. While a comprehensive analysis of the traffic impact of the proposed Musi IV bridge has not been possible during the present study, the consultants have made a preliminary assessment based on observed turning movements at key intersections. The results show that in most cases significant reductions in the level of congestion on the area's road network might be expected following implementation of the new bridge. The consultants suggest that the road capacity released by these traffic reductions should be used to provide priority for buses and pedestrians, rather than allowing the volume of private vehicles to increase to fill the space. Bus priority lanes, pedestrian and non-motorised facilities are therefore recommended as essential design features of the new bridge. Changes in traffic patterns would also allow bus priority lanes to be added to the existing Ampera Bridge.

43. The consequences of doing nothing have also been considered. These include:

- 43.1. increasing congestion and delays for vehicles and passengers in the city centre and around the bridge approaches, extending over a greater proportion of the working day and affecting an ever-increasing number of travellers;
- 43.2. deterioration of public transport services because of unreliable service times and increased operating costs;
- 43.3. further deterioration to the physical and economic environment in the city centre.

44. For all of these reasons, the provision of a new bridge that can be integrated with the operation of the city centre road network is recommended as a high priority.

### **Public transport passengers**

45. Further examination of the traffic information, using measured and estimated average vehicle occupancies, indicates that public transport passenger flows in the project area are also particularly high, with the overall proportion of public transport passengers in the project corridors being around 28%. Along Jl. Sudirman, the number of medium-sized Trans-Musi buses required to carry these passengers during the peak hour is around 120 in each direction, and over a 12-hour period, is around 75 per hour in each direction. A similar calculation at the Ogan River bridge indicates a need for 50 buses in each direction, in the peak hour, and an average of 35 buses per hour in each direction over a 12-hour period. Unless Trans-Musi can respond effectively to this level of passenger demand, there may be serious social and economic consequences for travellers in this area. The use of larger buses is also recommended wherever possible to make the situation more manageable.

### **Parking**

46. The survey of parking conditions in Jl. Sudirman, carried out by the consultants in January 2011, indicated that there are 62 parking attendants controlling a total of 1,616 metres of roadside. If these spaces are all used by cars, the equivalent number of spaces would be around 646. Other information, provided by parking attendants during the survey, about the duration of parking and use of parking spaces, indicated a need for 300 car spaces and 331 motorcycle spaces.

### **Pedestrians**

47. No specific surveys of pedestrian movement have been undertaken during the study. However, visual inspections have revealed significant numbers of pedestrians, including school children, sharing the carriageway with moving vehicles.

## H. Summary of Project Analysis – Financial and Economic Issues

### Project Costs

48. Initial cost estimates for infrastructure components have been derived from broad estimates of the quantities involved, based on a schedule of project components. For construction, unit costs have been derived from recent (2010) contract prices in Palembang. Costs associated with the Musi IV bridge have been established with reference to experience of other bridges of similar size and complexity. For other items, costs have been based on discussions with local government officials and suppliers.

49. The cost of the components envisaged for the first phase priority project (including tax, design and supervision), in 2010 prices, are expected to be as follows:

	Rp million	US\$ million
Component 1 (City Centre/Jl. Sudirman) :	25,898	2.9
Component 2 (Musi IV Bridge) :	1,395,000	155.0
Component 3 (Corridor 4 - West) :	44,489	4.9
Component 4 (Corridor 4 - East) :	55,054	6.1
Component 5 (Musi River Transport)	1,500	0.2
Component 6 (Park and Ride)	1,000	0.1
Component 7 (Capacity Development)	48,000	5.3
<i>Total</i>	1,570,941	174.5

50. A further breakdown of these costs, and their derivation, is contained in the main report

### Economic Analysis

51. Initial economic analysis has been undertaken for those infrastructure components where benefits can be quantified in monetary terms – Components 1, 3 and 4.

52. The main benefits included are those arising from the increased speed of vehicles, resulting from clearance of the sides of the carriageway and consequent reduction in side-friction effects. These benefits will be experienced by all people travelling in the corridors concerned, with the significant cumulative time savings involved representing an effective stimulus to the city's economy.

53. Economic evaluation of the main corridor treatments indicates economic internal rates of return between 31% and 51%.

54. Another benefit of increased bus speeds is the smaller number of buses required to provide the same level of service. In Trans-Musi Corridor 4 the range of speeds considered would involve a difference of 11 buses. This represents a capital cost of some Rp 6,600 million (Rp1.8 million / day over 10 years) and the additional cost of employing drivers and conductors for these buses would be Rp 2.7 million / day.

55. Because of its area-wide impact, on the city centre road network and beyond, the economic assessment of the proposed Musi IV bridge is considerably more complicated. Economic benefits are likely to arise from the following sources:

- 55.1. shorter journey lengths and journey times for traffic diverting to the new bridge;
- 55.2. reduced general congestion and/or need to re-time journeys, with consequent benefits for transport users and local businesses (formal and informal); and improved efficiency in public transport operations, leading to reduced capital investment and operating costs.

56. Further data collection and analysis to confirm the magnitude of these economic factors more precisely will need to be included in a subsequent feasibility study. However, at this stage, the consultants expect that the proposed bridge will be found to be economically viable, although not strongly so. In any case, the large number of people likely to be affected and the strategic nature of the project provide compelling arguments for the project to proceed.

57. Economic assessment has not been undertaken for other project components because either i) their anticipated cost is so low that such scrutiny is probably not required, or ii) the details of their implementation is not sufficiently clear at this stage. Technical assistance and capacity development support to the PIU underpins all of the investments and has, again, been excluded from the analysis.

### **Financial analysis**

58. Financial analysis has been undertaken for the proposed off-street parking areas in the city centre, where there is likely to be a revenue stream to offset construction costs. Three options have been considered:

**Option 1:** city purchases sites and construct multi-storey garages;

**Option 2:** city purchases sites and construct surface car parks; and

**Option 3:** site owners permitted to construct surface car parks and retain parking fees (after tax and possible profit sharing).

59. Considering the high cost of land in the city centre, the relatively high cost of constructing multi-storey parking buildings, and the low level of parking tariffs in Palembang, the third option is recommended. The pay-back period for such an arrangement would be around 4 years, and the net cumulative profit is estimated to be around Rp11.7 billion in 10 years and Rp 25.0 billion in 15 years, in current monetary values. Some of this, together with the associated parking tax revenues, might be available to cover the proposed infrastructure investments in Jl. Sudirman.

60. Consideration has also been given to whether the proposed Musi IV bridge could generate revenue from toll charges, and the extent to which this might be beneficial in terms of its impact and overall project financing. The full analysis is complex and is beyond the scope of this pre-feasibility study. However, the relatively high cost of a new facility, and the perceived difficulties of financing this type of infrastructure, mean that this approach could be an attractive proposition. Assuming that the toll is set at Rp4,000 per crossing (for a passenger car) and 35% of existing traffic would use the new bridge under these conditions, initial estimates indicate that toll revenues alone are unlikely to be insufficient to support the

full construction cost of the bridge and approach roads. At the same time, implementation of a toll regime would reduce the attractiveness of the bridge and thus also reduce its economic viability. One solution would be a private-public partnership (PPP) arrangement in which the cost of the project is financed partly by the private sector (out of toll revenues) and partly by the public sector (to the extent that the project would benefit the wider travelling public in Palembang, including public transport users) – assuming, of course, that legal and administrative constraints could be overcome. Further analysis is required in a subsequent feasibility study to enable this proposal to be fully quantified.

### **City financial capability**

61. An analysis of Palembang's city finances for 2009 shows that the City is highly dependent on higher levels of government (national and provincial) for its income, with only about 14% of its total revenue coming from its own resources. Other revenue streams included tax sharing by the Province (predominantly motor vehicle taxes) and General Allocation Fund (DAU) and Special Allocation Fund (DAK) payments from national government. The level of support from national government has stayed at about the same, in percentage terms, over the past 5 years.

62. About 56% of expenditure was for the salaries of government officers, while only 17% was spent on capital items.

63. Using figures for 2010 provided by the City Income Office, the maximum loan amount that may be incurred by the city under current Ministry of Finance regulations is about Rp 435,000 million, and the city's current debt service capability is around Rp 131,000 million (subject to any ongoing debt service commitments).

64. Examination of the city's APBD accounts for previous years indicates that it has not been willing to use its full borrowing capacity to finance project expenditure. The reason for this is not clear.

### **Expenditure on transport**

65. Over the next 5 years, national government plans to spend Rp 3,259,350 million (USD 362 million) in Palembang – mostly on road improvements and new bridges; provincial government is likely to be able to invest around Rp443,450 million (USD49 million) – again on roads and bridges, and the city is likely to have about Rp 225,550 million (USD.25 million) available – although the majority of this will not be spent on capital items (see below). Despite this apparently high level of investment in transport infrastructure, there is chronic under-investment in infrastructure for public transport passengers, pedestrians and non-motorised transport, all of which are city government responsibilities. For this reason, these feature prominently in the priority investment project described in this report.

66. Partnership arrangements with the private sector are already being used to invest in the Trans-Musi bus network, with the city investing some Rp 16,000 million (USD 1.8 million) in new buses and PT SP2J borrowing the remaining Rp 39,000 million (USD 4.3 million against future fare revenues). This provides an encouraging basis for further investments using this modality.

### **Sources of Investment**

67. Given the magnitude of the investment funding required, and the limited financial capabilities of the Palembang City government, discussed above, it is clear that additional, external assistance will be required to achieve the city's policy objectives.

68. Following consideration by the consultants, and discussion with local government officials, two main investment schemes have emerged as possibilities:

- 68.1. A conventional public sector approach, in which national government is asked to provide funding - possibly through APBN Special Allocation Funds
- 68.2. An innovative approach, which would involve a wider range of stakeholders in a public-private partnership (PPP) arrangement.

69. Conventional Public Sector approach: This would involve different agencies from the city, province and national government, implementing project components that fall within their respective areas of responsibility, using the budget funding allocated to them. However, the availability of such funding is likely to be limited, and its timing is uncertain.

70. Public-Private Partnership (PPP) approach: A possible alternative involves the creation of a 'public-private partnership' operating through a Special Purpose Vehicle (SPV) – a non-government entity that:

- 70.1. brings together elements of the public and private sectors in a coordinated effort to implement a particular project or projects;
- 70.2. has the capability to borrow, from both local and international sources;
- 70.3. can commission and implement project components, and any associated preparatory studies that may be required; and
- 70.4. provides the framework for the management of funds, including loan applications, debt service (repayments), receipt and distribution of project revenues, utilisation of equity investments, and payment of dividends to equity investors.

71. The structure of such an entity is illustrated in Figure 2.

72. Each party would bring expertise and funding to the partnership according to its abilities. This approach is being actively considered in Palembang in relation to the projects currently being proposed.

73. The SPV would need to:

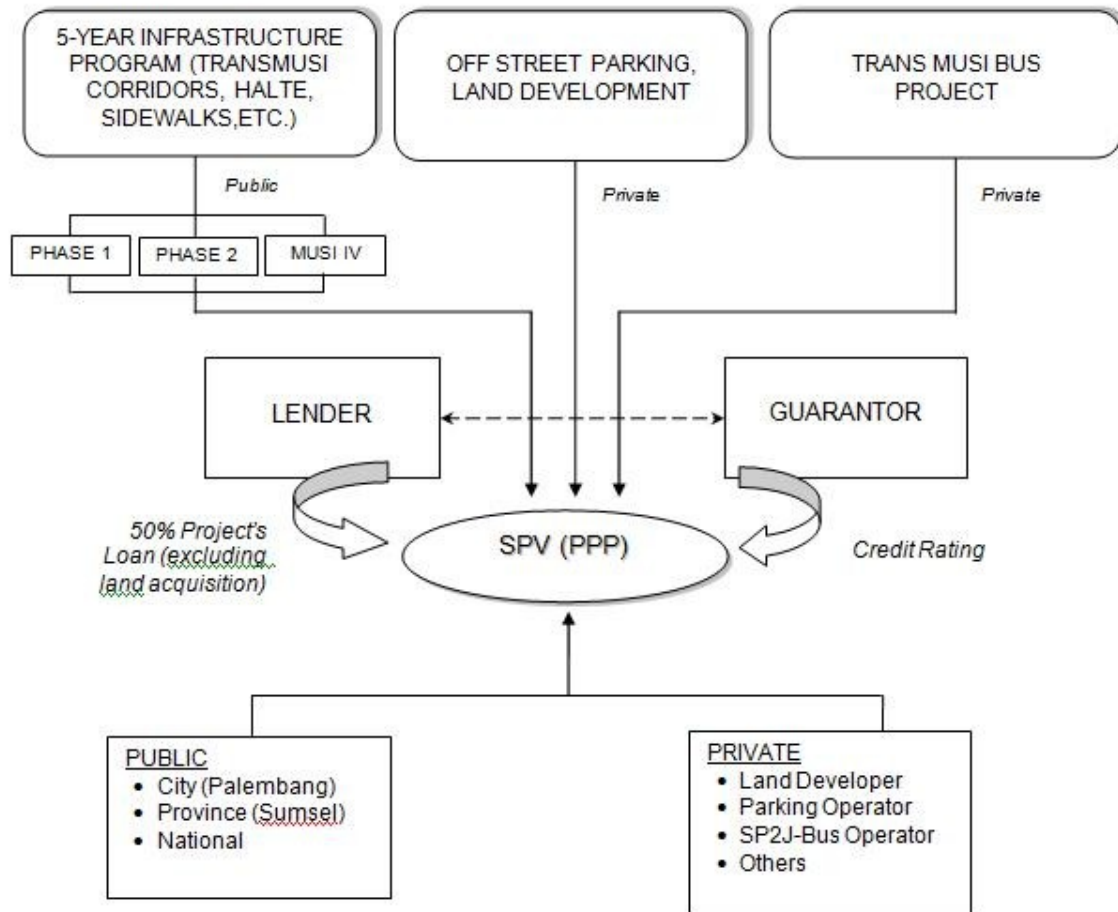
- 73.1. be established as a separate legal (and commercial) entity;
- 73.2. decide on its composition and membership;
- 73.3. appoint a Board and a Chairman; and
- 73.4. prepare a viable Business plan.

74. Further work will be required if this suggested funding mechanism is to be put in place. There might also be a need to add other Trans-Musi corridors to the investment package and/or combine the priority infrastructure projects with the ongoing bus investment programme.

## **I. Summary of Project Analysis – Social and Environmental Issues**

75. The infrastructure projects identified in the Pre-Feasibility Study Report are intended to benefit a wide range of individuals who live and work in Palembang, as well as visitors to

**Figure 2: Structure of SPV (PPP) for Palembang Sustainable Urban Transport**



*Note that:*

- 1) Some lenders to SPVs may have limitations on the proportion of project cost that they can finance. The 50% figure shown on the above diagram may vary from lender to lender
- 2) The SPV would potentially be capable of implementing a series of phased projects over the course of its life. In the above diagram: Phase 1 refers to priority public transport infrastructure projects; subsequent projects in other Trans-Musi bus corridors would form a second phase of project implementation (Phase 2), and the Musi IV Bridge project is considered to be a separate project. The current priority investment project, that is the subject of this pre-feasibility study, includes the Phase 1 infrastructure investments and the Musi IV Bridge.

the city. They are therefore expected to have largely positive social impacts in providing improved mobility and accessibility, and in invigorating local communities.

**Informal sector/street traders**

76. In most cases, informal (and formal) businesses along the project corridors should benefit from a more orderly street environment that encourages an increased number of pedestrians. The proximity of bus stops and public transport passengers should also provide better economic conditions. However, adverse impacts may be experienced by street traders – mostly in the informal sector – whose businesses are located within the areas to be improved for pedestrians. In Jl. Sudirman, space can easily be reallocated to these traders in the expanded pedestrian areas created by removing on-street parking and closing side roads. In Corridor 4, between Karya Jaya and Plaju, it has been estimated that some 379 businesses might be affected; 29 on state land, 44 on owned land, 244 on rented land, and 62 located on the sidewalk. Relocation of these businesses will need to ensure that impacts

on incomes are minimised. In all cases, care will be required to deal sensitively with those that depend critically on staying in their existing location.

### **Informal transport operators**

77. The design of the project will include specific facilities to allow transport operators who provide feeder services (becaks and ojeks) to wait at or near Trans-Musi bus stops. Suitable facilities will also be provided for interchange to and from angkots. Increased use of public transport, and safer and more convenient pedestrian infrastructure, should enhance the attractiveness of these modes and the economic potential of their operators.

### **Parking attendants**

78. With the removal of on-street parking the 62 parking attendants in Jl. Sudirman will have to be re-deployed to other areas nearby, or to new off-street parking facilities. Parking attendants in other areas are unlikely to be affected because they operate almost exclusively on private land.

### **Businesses on Jl. Sudirman**

79. The project is designed to improve the pedestrian environment along this street and to enhance economic prospects for the businesses involved. Any negative reactions regarding the removal of frontage parking will therefore need to be dealt with during consultations with each frontage owner.

### **Area of proposed Musi IV Bridge**

80. Because of the scale of the work involved, the present consultants have not been able to undertake a detailed investigation into the impacts of the proposed Musi IV Bridge project. However, from the dimensions of the project envisaged it has been estimated that around 220 families might need to be relocated. Considerable assistance and support will need to be given to the families affected, and this should be built into the project's land acquisition costs.

81. New economic opportunities for the informal sector would be created by the proposed improvements to the riverside, which would also provide additional leisure and recreation space for the city.

### **Gender issues**

82. The emphasis of this project on providing improved conditions for pedestrians, as well as the open, well-lit and air-conditioned design of the new Trans-Musi buses, should provide a more welcoming environment for women, allowing them to access both local facilities and wider economic possibilities in the city more easily. All aspects of the proposed project are designed to be accessible equally to women and to men.

### **Impacts on poverty reduction**

83. The number of very poor, poor or nearly families living in the project area is almost 60,000, or 58% of the population. Any improvement to public transport facilities and the urban/pedestrian environment will almost certainly have a positive impact on all members of the communities involved, including those from the poorest households - increasing accessibility to markets and other economic and employment opportunities in the city and providing space for social interaction. Increased accessibility to labour markets should also encourage investment in new business opportunities.

### **Environmental impacts and climate change**

84. Potential environmental impacts from transport projects include disruption during construction, road safety, traffic noise and air quality (particularly in relation to the emission

of greenhouse gases such as CO<sub>2</sub>). The sustainable urban transport policies adopted by the city of Palembang seek to mitigate all of these impacts. In particular:

- 84.1. Care will need to be taken to minimise the impact of project construction on local communities and local businesses. This will be achieved through good management of each construction site, including appropriate signing and alternative routes for pedestrians. There will also need to be careful management of the use of any heavy equipment used during construction to ensure safe operation and reduce nuisance from noise, dust and vibration.
- 84.2. Improvements to sidewalks and pedestrian crossings proposed for the priority projects are expected to improve road safety for vulnerable road users in the project corridors.
- 84.3. Traffic noise levels in the city centre and on the approaches to the Ampera Bridge will be improved significantly by re-distribution of traffic to the proposed Musi IV Bridge. In other locations, the increase in traffic noise above current levels will be mitigated by promoting greater use of public transport, thus limiting growth in traffic volumes.
- 84.4. Air quality and emission levels are currently below acceptable thresholds. The proposed project components seek to minimise the impact of increased vehicle emissions by reducing the rate of private vehicle use. It is also anticipated that, in future, increasing use will be made of 'clean' fuels to power the city's fleet of public transport vehicles.

85. In Palembang, it has been estimated that in 2005 total emissions of CO<sub>2</sub> amounted to some 186,421 kg / hour, and as much as 67% of the total CO<sub>2</sub> emissions were from motor vehicles. These CO<sub>2</sub> emissions are expected to increase by 25% over the next 10 years. This is one of the main reasons why the urban transport strategy developed by this study – and the priority infrastructure projects documented in this report – place such great emphasis on climate change mitigation.

86. Where appropriate, mitigation measures have been reflected in the proposed priority project:

- 86.1. support for the Trans-Musi bus network is a central feature of the project proposals;
- 86.2. cycleways are proposed in Jl. Sudirman, along the riverside, and over the Musi bridges; and
- 86.3. becahs are promoted as a feeder mode.

87. In addition, there are a number of trees lining Jl. Sudirman and other project corridors, and these should be retained (albeit they may need to be trimmed where they obstruct the passage of buses along the busway or at bus stops, or where their roots are causing serious damage to the sidewalks or road pavement).



## J. Implementation Arrangements

### Project implementation

88. The arrangements for implementing the project components recommended in the Pre-Feasibility Study Report are yet to be determined exactly. However, it is anticipated that:

- 88.1. construction of sidewalks, drainage and other minor items of physical road infrastructure would be the responsibility of the City Public Works Department, which would prepare designs and contract documents, and oversee construction, with the assistance of consultants;
- 88.2. parking management, including the development of off-street parking facilities, traffic management, the regulation of public transport services, and the operation and regulation of transport terminals, would be the responsibility of the City Transportation Department (Dinas Perhubungan Kota Palembang).
- 88.3. national and provincial highway authorities would need to be consulted about any proposed changes to the road layout, and may opt to undertake some of the project components themselves.

### Land acquisition and clearance

89. Apart from the construction of a new Musi River bridge, and its associated approach roads, it is not envisaged that major land acquisition will be required. Along project corridors, while there may be an unavoidable need to acquire parts of some frontages and to remove or relocate encroachments, it is not envisaged that any permanent buildings will need to be demolished. Where necessary, designers should be prepared to make minor compromises to ensure that the projects can be implemented as soon as possible. It is strongly recommended that urgent consideration is now given to the land clearance activities that will be required to take the proposed urban transport projects forward.

### Operation and maintenance

90. Routine maintenance of project facilities, particularly sidewalks and drainage, will be the primary responsibility of the City Public Works Department (which will undertake physical repairs) and the City Cleaning Department (which will undertake routine cleaning). It has already been noted that the first of these is poorly organised and equipped for the task, and both capacity development and new road maintenance equipment have been included as specific project components.

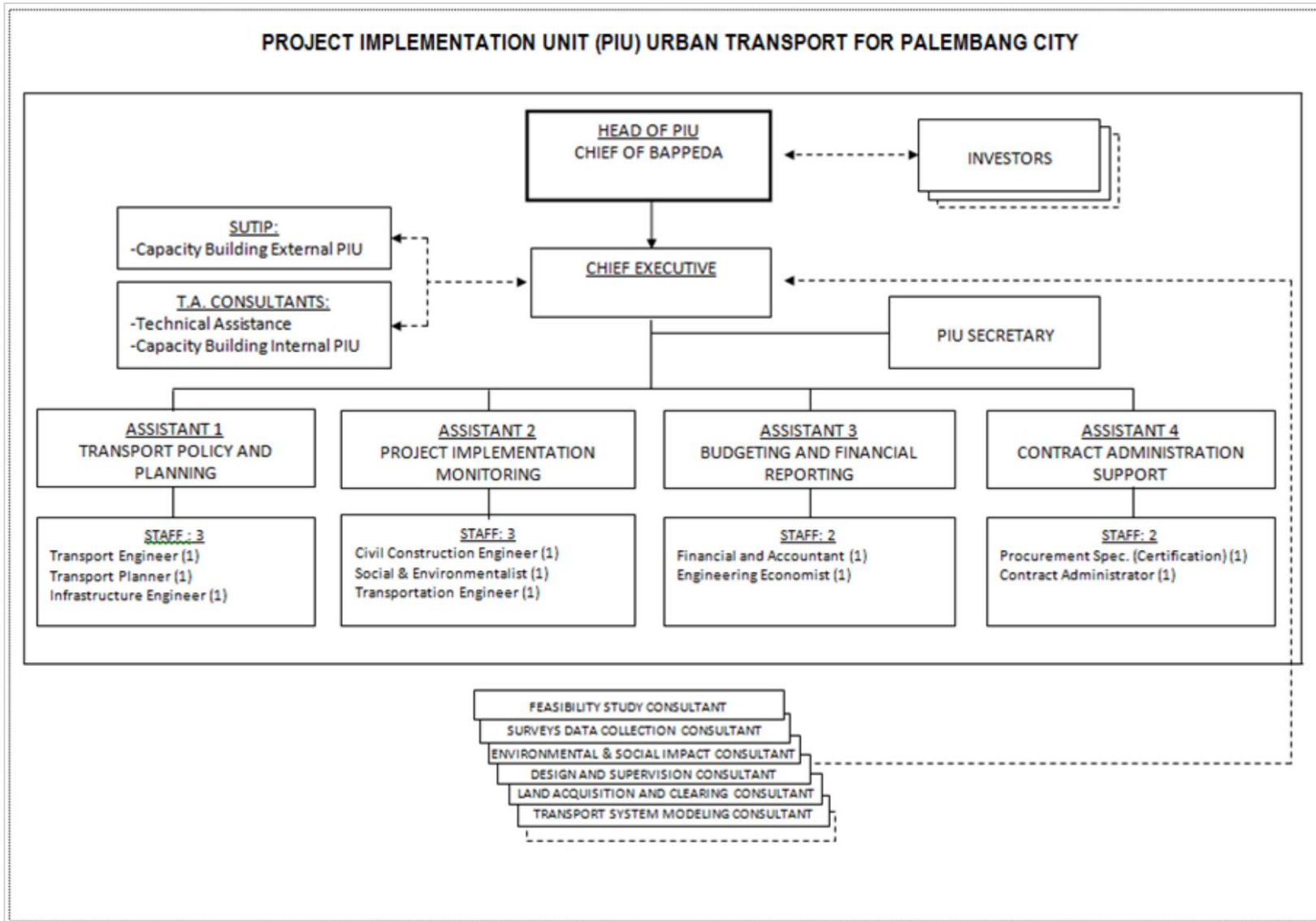
91. Constant attention will also need to be paid to any occurrence of informal on-street parking along project corridors.

### Project Implementation Unit (PIU)

92. The present consultants have worked with the Mayor's Task Force to Foster the Implementation of Sustainable Transportation Improvements in Palembang (FISTIP). However, it has now been accepted that this part-time Task Force is insufficient to take forward the projects that are being proposed, and that a full-time team of government officials is now required who can concentrate their efforts on this important task. To this end, a Project Implementation Unit is being formed.

93. This will be located in the City's Development Planning Agency (Bappeda) and will have responsibilities for coordinating efforts to accelerate project implementation. The proposed structure of the Unit is illustrated in Figure 3.

**Figure 3:** Structure of Proposed Project Implementation Unit (PIU)



94. The existence of such a unit would strengthen the City's participation in a public-private partnership, should this become the preferred modality for financing sustainable urban transport projects in Palembang. However, it would need considerable technical assistance support, including the ability to commission technical studies, in order to undertake its work. Provision for such support has been included as a separate project component.

### Overall timescales

95. It is anticipated that the projects put forward in this report, with the possible exception of the Musi IV Bridge, should be implemented within the next three years. The corridor improvements are urgently required because Trans-Musi buses will already be operating from February 2011. Steps should therefore be taken to move towards implementation of these components without further delay.

### Risk analysis

96. The main risks to achieving project objectives have been identified as follows:

- 96.1. **Political risks:** The existing policies of the present Mayor are strongly supportive of the development of sustainable urban transport systems in Palembang. However, his term of office expires in 2013 and the views and interests of the next incumbent are unknown. To overcome any difficulties that might arise during the transition period the consultants recommend that projects are based on strong technical arguments and that public (and political) support is generated for their implementation. Continuity of policy will also be enhanced by a strong Project Implementation Unit and wider involvement of private sector interests.
- 96.2. **Legal risks:** Legal challenges to the implementation of projects are not expected, neither are there obvious gaps in the legislation required to support project implementation. However, the comprehensive treatment that is proposed in Jl. Sudirman, for example, would benefit from a Decree of the Mayor of Palembang to give it further legitimacy.
- 96.3. **Administrative risks:** Administrative risks include the sometimes lengthy processes for project implementation in Indonesia. These will need patience and perseverance on the part of all concerned to see projects through to their conclusion. There is also a risk that officials from different government agencies and different levels of government will not be able to work together to solve problems and plan and implement projects with common policy objectives. The existence of a PIU with a strong focus on coordination and consensus will also help to overcome these administrative constraints and so mitigate these risks.
- 96.4. **Social risks:** While there has been a great deal of public interest in the development of the City's sustainable urban transport strategies, in recent months, there is still strong pressure for the continuation of unsustainable transport behaviours, and the use of unsustainable transport modes. This will need to be overcome by public information about the consequences of such trends and by the successful implementation of demonstration projects. The risk of social unrest caused by the impacts of the projects themselves is probably less serious, because they are aimed at improving conditions for all sections of society.

- 96.5. **Environmental risks:** Environmental risks are expected to be minimal, because the projects are founded on principles of sustainability, and are designed to enhance the urban environment.
- 96.6. **Technological risks:** Technological risks are also expected to be minimal, since the majority of project components are based on tried and tested construction techniques, which are commonplace in Palembang. Only construction of the Musi IV bridge would require specialist design and construction expertise, which should be readily available in Indonesia and the South-East Asian region.

### Requirements for Further Study

97. As part of the wider study, the consultants have identified a priority work programme for the Project Implementation Unit (PIU), covering all urban transport initiatives in the city. Actions that relate to the proposed priority infrastructure projects proposed in this report, include:

- 97.1. identifying funding sources and ensuring adequate 2012 budget allocations for priority projects, not just by City government, but also by Provincial and national agencies;
- 97.2. seeking project investors and/or participating in the formation of an SPV;
- 97.3. preparing land for off-street parking in the city centre, including negotiations with land owners;
- 97.4. preparing more detailed designs, and inventories for improvements along Jl. Sudirman; consulting with businesses on impacts of proposals; confirming costs;
- 97.5. commissioning a feasibility study of Musi IV Bridge project; confirming costs; initiating land acquisition procedures; commissioning more detailed designs, and inventories of land requirements and relocations along Corridor 4 (Components 3 and 4); confirming costs;
- 97.6. commissioning environmental impact assessments for priority projects; and implementing park-and-ride facilities at terminals; monitoring usage and designing improvements.

### K. Conclusions and Recommendations

98. The projects highlighted in the Pre-Feasibility Study Report have been developed in response to a review of urban transport policy in Palembang. This found that while there has been a strong emphasis on sustainability, and on development and operation of a modern bus system, very little emphasis has been placed on the infrastructure needs of pedestrians, non-motorised transport and public transport passengers.

99. The projects are focused on the city centre and an east-west corridor to the south of the Musi River. In both cases the objective is to improve conditions for public transport operations, by reducing side friction along the roadway (and providing bus priority, wherever possible), while at the same time improving the urban environment for pedestrians and public transport passengers. In the city centre, there is a need to provide off-street parking facilities, to enable parked vehicles to be cleared from bus priority lanes. Proposals are also

made for a new Musi River bridge, which would form an integral part of the projects' rationale, and for other facilities that would form part of a multi-modal urban transport system.

100. During the study, the consultants have consulted a wide range of stakeholders to determine the appropriateness of the project to everyday travel needs. The local government Steering Committee, headed by the Mayor of Palembang, has confirmed the project components as being of high priority for the city, and provincial and national governments have also expressed their support.

101. The project corridors are located in some of the poorest communities in Palembang, with almost 60% of families receiving income support of some kind. They are also major public transport corridors, with around 30% of travellers being carried on buses or angkots. From this perspective, the proposed projects may be regarded as being both 'pro-poor' and 'sustainable'.

102. It should be noted that this package of priority infrastructure projects is intended to be the first phase of a more extensive series of similar projects that will eventually be rolled out across the whole city. It is therefore regarded as a means of demonstrating what can be achieved and how it should be implemented.

103. A Project Implementation Unit (PIU) is being established to oversee the planning, design, implementation and monitoring of urban transport projects throughout the city. As such, it will be the 'owner' of urban transport policy and the focus for coordinating project planning and implementation. A component has been added to the package of infrastructure measures to provide technical assistance support to this unit and others involved in project maintenance activities.

104. The total cost of this project package is estimated to be around Rp1,571 billion (\$175 million) of which Rp1,395 billion (\$155 million) is for the new bridge and approach roads. Economic evaluation of the main corridor treatments indicates economic internal rates of return between 31% and 51%. There is insufficient information at present to enable a similar assessment to be made of the proposed river bridge.

105. In view of the chronic under-investment in public transport infrastructure that prevails in Palembang, it is recommended that steps now be taken to advance these projects as a matter of urgency. This will require identification of funding sources, further feasibility studies, preparation and implementation of land clearance plans, and project implementation.

106. Consideration is currently being given to the formation of a Special Purpose Vehicle (SPV) that can act as a financial focus for the project, and unite local public and private sector resources in a Public Private Partnership (PPP). If such an arrangement is considered to be viable, it would enable revenues from non-infrastructure activities to be used to subsidise infrastructure components. It might also require adjustment of the project package to include the procurement of buses and a second phase of infrastructure components. At the same time, it is recognised that the new Musi River bridge might require separate funding. The first task of the SPV will therefore need to be preparation of a viable business plan.