4.2 Structure Design

4.2.1 Design Standards for Structures

(1) Design Standards for Structures

The applicable design standards for structures are available in Volume-9 of NORMA STANDR PEDOMAN MANUAL (NSPM) comprising the following codes and manuals (Peratuan Perncanan Teknik Jembatan);

- Bridge Design Code Volume-1 & 2(1992), Ministry of Public Works
- Bridge Design Manual Volume-2 & 2 (1992), Ministry of Public Works.

These codes and manuals were developed under the programme of the "Bridge Management System" conducted with financial assistance from Australia. In principle, the design for bridge structures will be carried out in accordance with the codes and manuals above, however, for certain items which are not clarified therein, the "AASHTO Standard Specification for Highway Bridges" and "Specification of Highway Bridge in Japan" shall be applied.

(2) Length and Width of Structures

Traffic lanes, shoulders and other cross element facilities composing of the roadway width shall be determined by the Design Classification of the road as given in Table 4.1.2.

For the width of structures, it shall be sufficient for the kerbs to be set back a minimum of 500mm from the edge of the adjacent traffic lane measured to the base of the kerb. The typical cross sections of bridge structures for flyovers are given in Figure 4.2.1 and Figure 4.2.1.

For bridge structures with an overall length less that shown in Table 4.2.1, the roadway width of the bridge shall be sufficient to carry the full width of shoulders and pavement including auxiliary lanes where these are provided. No additional widening or setting back of the kerb is required in this case.

Table 4.2.1 Length of Bridge Requiring Formation Width Deck

Road Design Classification		Length of Bridge
Type	Class	
I	I	Less than 20m
I	II	
II	I	
II	II	Less than 15m
II	III	N/A
II	IV	

Source: Bridge Design Code, MPW

(3) Width of Sidewalks

The minimum clear width of sidewalks between railings or barriers shall be 1.5m. Where there is no inner railing or barrier between the sidewalk and the roadway, the clear width of the sidewalk may be reduced to 1.0m in accordance with Code.

(4) Horizontal Clearance

1) Clearance at Rigid Traffic Barriers

The minimum horizontal clearance of 500mm shall be secured between the inside bottom face of the barrier and the edge of the adjacent traffic lane.

2) Horizontal Clearance over Railways

The minimum horizontal clearance to be provided for bridges over railways shall be 15.00m, or as determined by the railway authority.

(5) Vertical Clearance

1) Operational Vertical Clearance

The design vertical clearance during its design life shall be at least 100mm greater than the operational vertical clearance to allow for settlement and road resurfacing. The specified operational vertical clearance shall apply for the full width of the roadway.

2) Vertical Clearance at Road Bridges

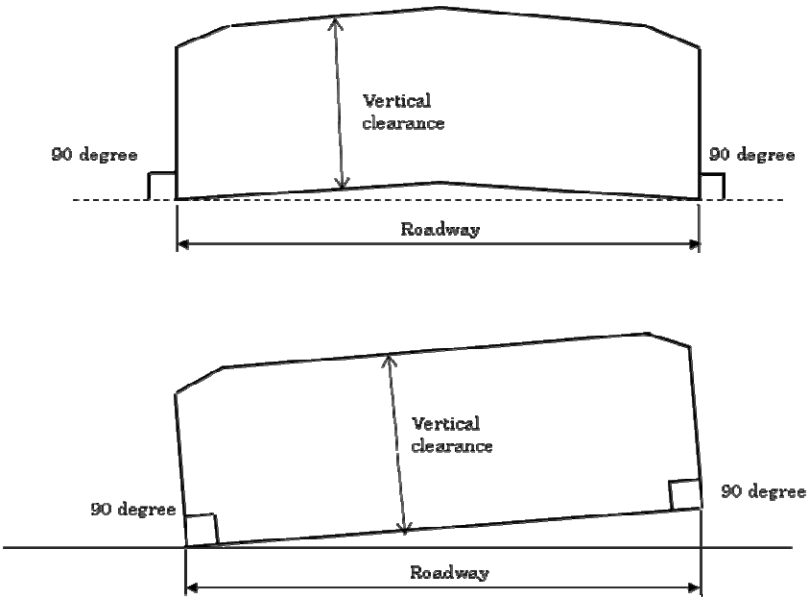
The minimum operational vertical clearance through or under road bridges for each road class is given in Table 4.2.2. The method for determining vertical clearance is given in Figure 4.2.1.

Case-1; parts of a bridge superstructure extending over the bridge roadway (through-type bridges) and Case-2; parts of the superstructure or substructure of a bridge crossing over a road or a railway.

Table 4.2.2 Vertical Clearance of Bridge by Road Class

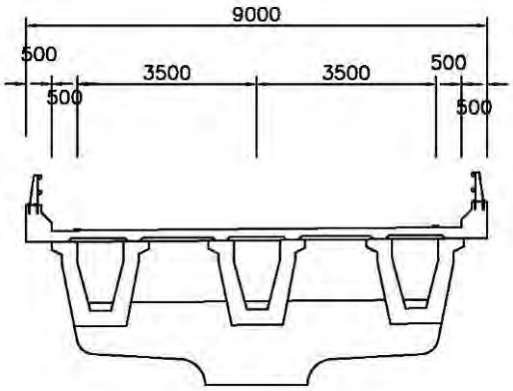
Road Design Classification		Case-1	Case-2
Type	Class		
I	I	5.3m	5.1m
	II		
II	I	5.3m	5.1m
	II		
	III		
	IV		

Source: Bridge Design Code, MPW

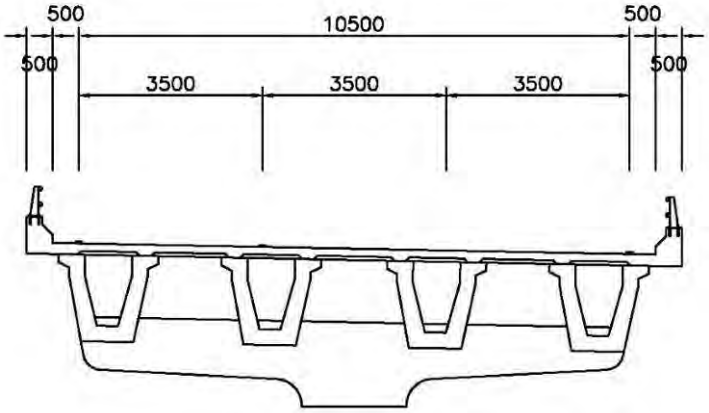


Source: Bridge Design Code, MPW

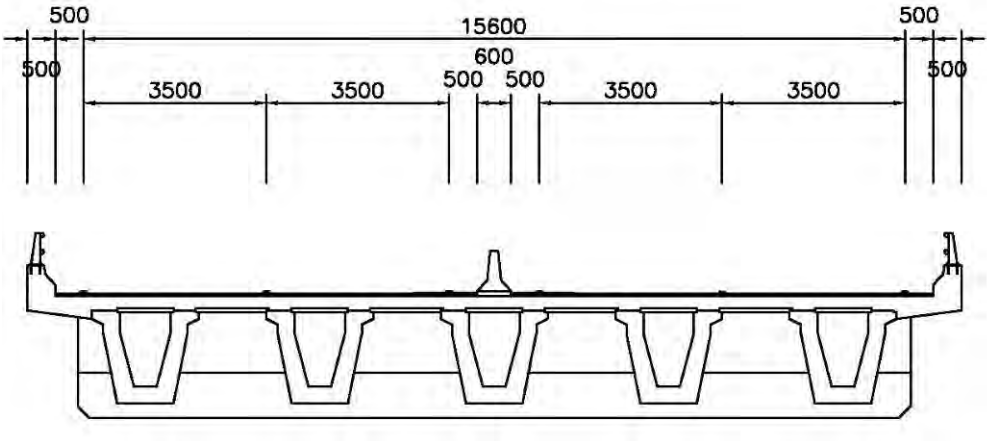
Figure 4.2.1 Determining Vertical Clearance



Two (2) Lane (two lanes one direction)



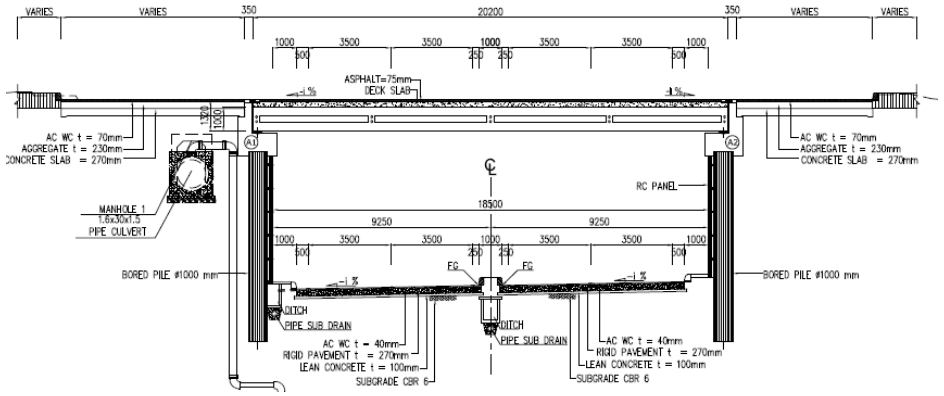
Three (3) Lane (three lanes one direction)



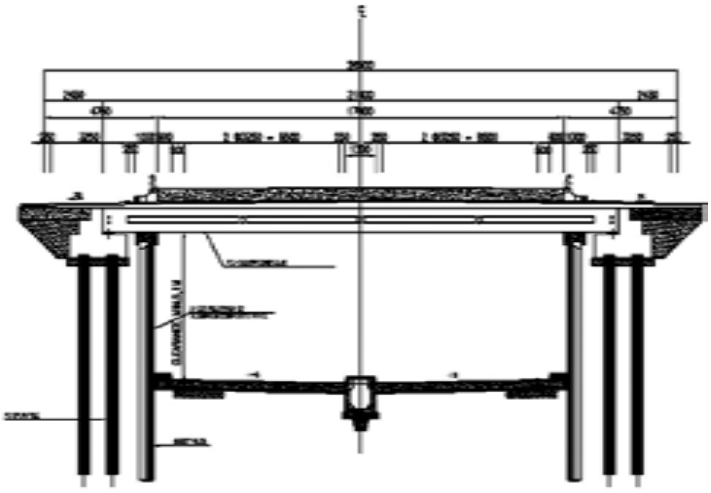
Four (4) Lanes (four lanes two directions, i.e. two lanes each way)

Source: JICA Survey Team

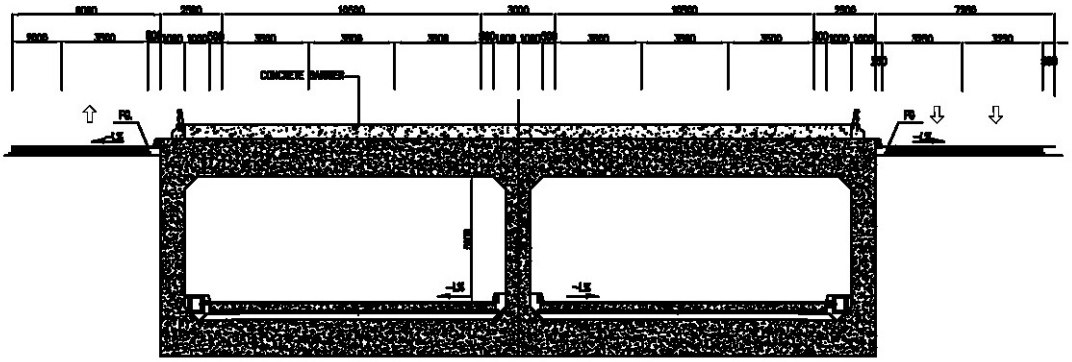
Figure 4.2.2 Typical Cross Section of Bridge Structure (PC-U Girder)



Four (4) lanes at approach section (four lanes two directions i.e. two lanes each way)



Four (4) lanes at tunnel section (four lanes two directions i.e. two lanes each way)



Six (6) lanes at tunnel section (six lanes two directions i.e. three lanes each way)

Source: JICA Survey Team

Figure 4.2.3 Typical Cross Section of Underpass Structure

4.2.2 Flyover (Bridge) Planning

(1) Review of Existing Structure Features

The structural type and standard layout were studied through discussions with relevant government officials, site investigations, review of the related study reports, such as the UARI report, other studies done by MPW and so on. It is considered that the structural type and layout, applied in the UARI project, are generally applicable and acceptable. Using the practices in the previous projects, the bridge planning, such as span arrangement, bridge type, typical cross section, erection methods etc., are considered to be reasonable. The flowchart of overall bridge planning is given in Figure 4.2.5.

(2) General Considerations for Applicable Bridge type, Span Arrangements and Layout

Considering the topographic conditions, adjacent facilities, obstacles and limitation of ROW to be identified at each candidate location, the bridge type and layout will be determined.

1) Bridge Type

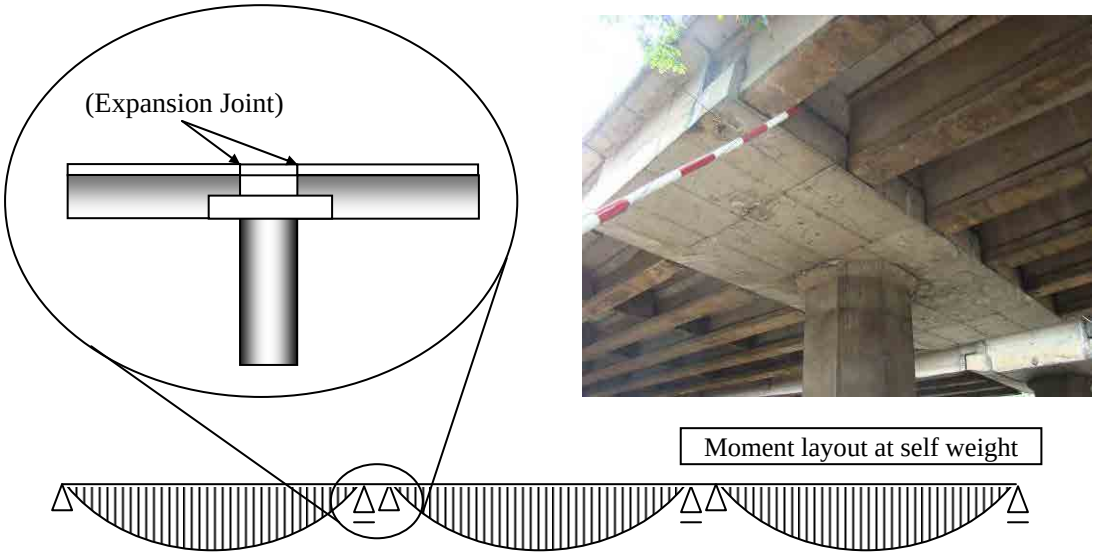
In Indonesia, the practical type of bridge is a pre-stressed concrete girder bridge; to be constructed with cranes or an erection girder in terms of its advantages on the following points, however it should be considered to apply PC box girder or Steel box girder at necessary wide spans and/or curve alignment sections.

- To shorten the erection time affecting the existing traffic stream;
- To minimize the effect to the existing adjacent facilities; and
- To minimize the construction cost by minimizing temporary cofferdams, supports and scaffolding works and to achieve the erection of the girders within the limited area.

As a result of preliminary study, each structural type with its applicable span length is shown in Table 4.2.3.

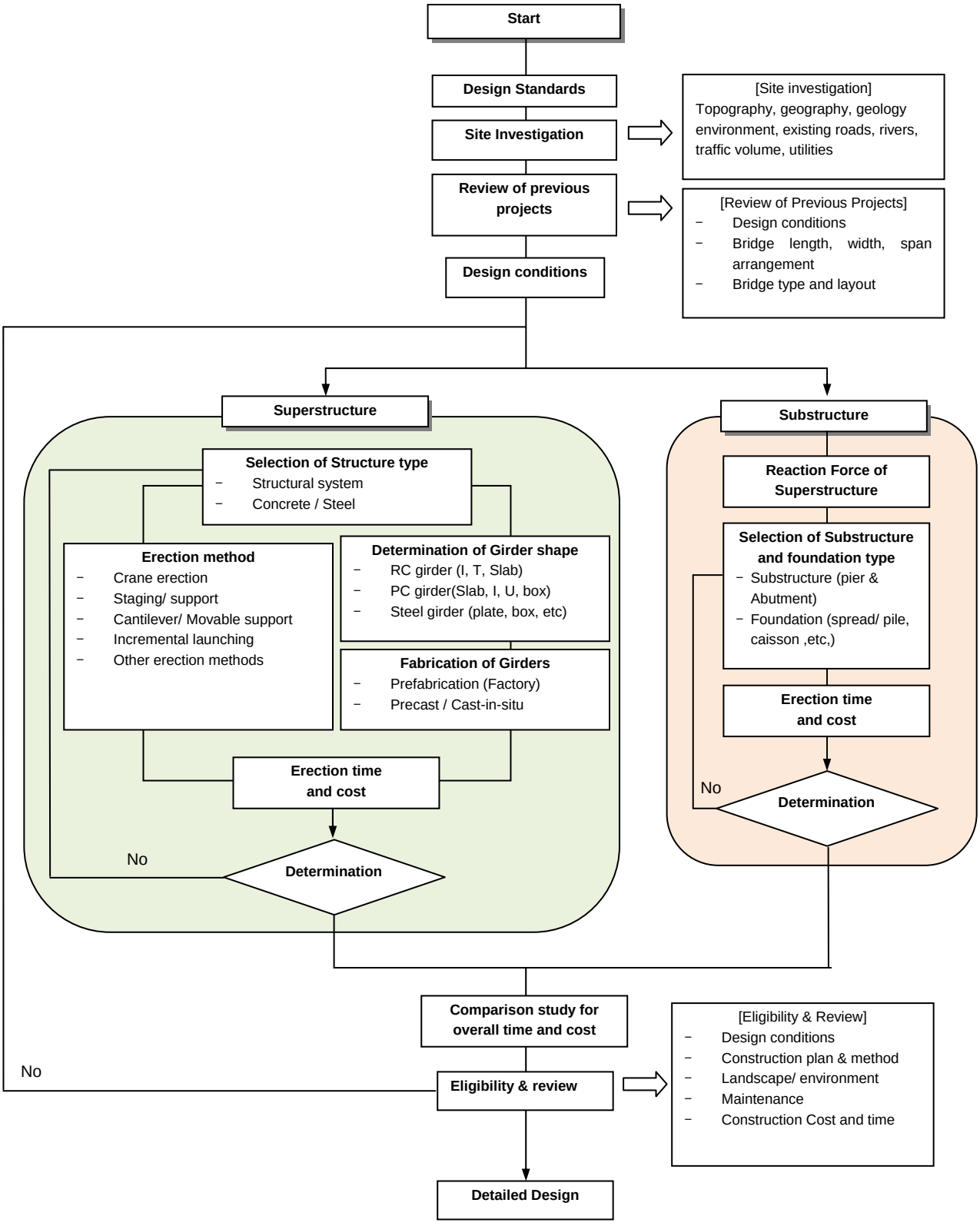
2) Span Arrangement and Layout

In Indonesia, a simple girder bridge with separated joints at the pier head is a conventional structural type for the flyover as given in Figure 4.2.4. The span arrangement and layout of the bridge structure will comply with simple structure systems unless otherwise restricted by site conditions.



Source: JICA Survey Team

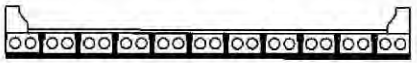
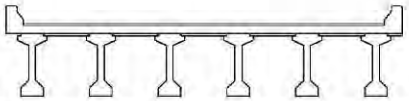
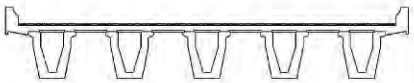
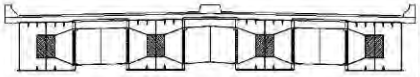
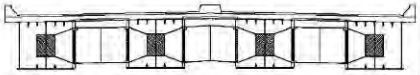
Figure 4.2.4 Typical Side View of Simple PC Girder Bridge

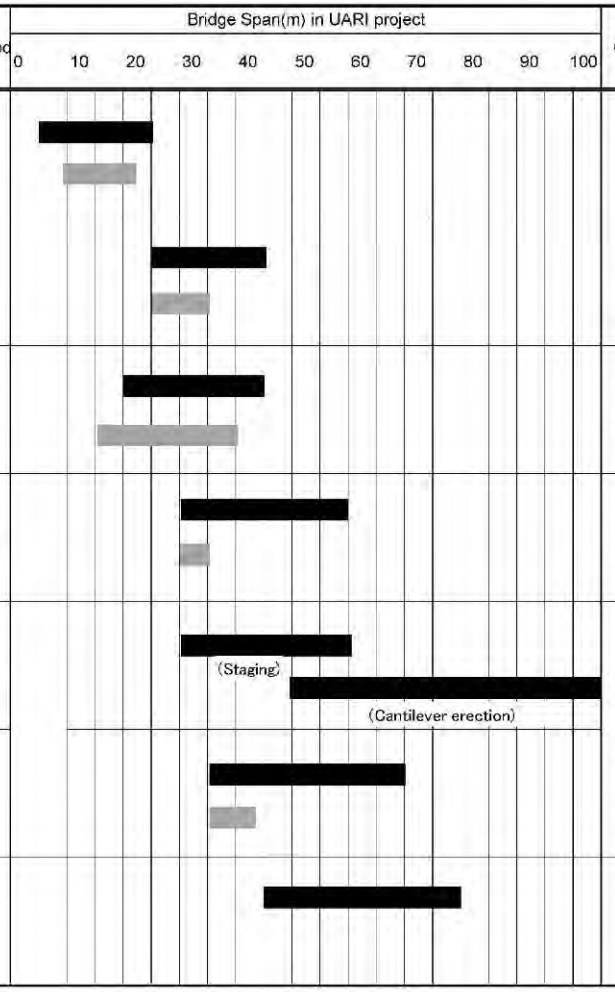


Source: JICA Survey Team

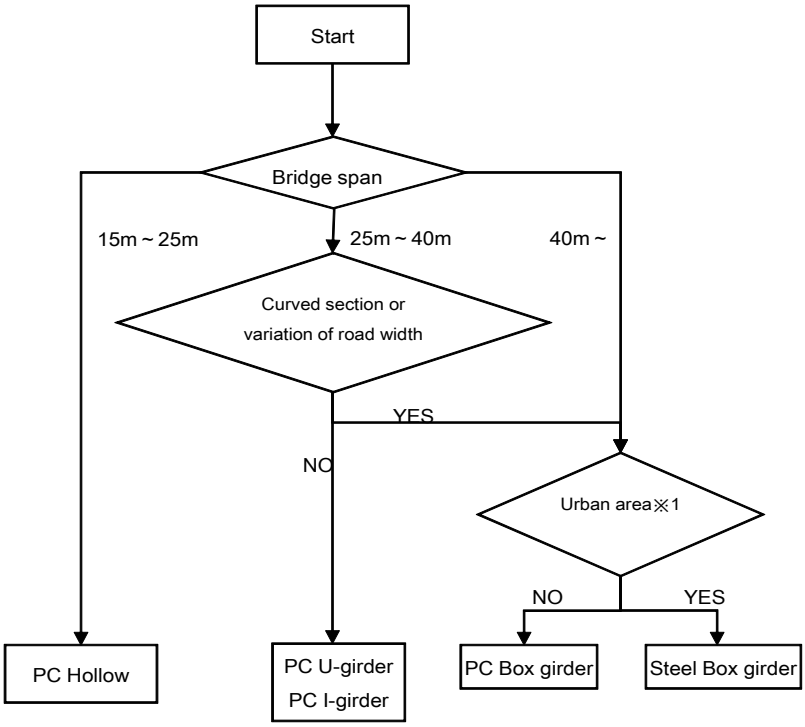
Figure 4.2.5 Flowchart for Planning of Flyover (Bridge) Structure

Table 4.2.3 Bridge Type with Applicable Span Length for Flyover

		Types of girder	Image view of cross section	Typical erection method	Typeical Girder heigh / Span ( ) : UARI project	Practical use In UARI project
PC	Prefabricated girder	PC Hollow Slab girder		Crane erection	1 / 14 ~ 1 / 24 (1 / 19 ~ 1 / 22)	4
		PC I-Girder (Post-tensioned)		Crane erection Erection girder	1 / 13 ~ 1 / 17 (1 / 17 ~ 1 / 18)	5
		PC U-Girder (Post-tensioned)		Crane erection Erection girder	1 / 14 ~ 1 / 16 (1 / 13 ~ 1 / 21)	14
		PC Simple Box Girder		Staging Erection girder (for precast girder)	1 / 17 ~ 1 / 20 (1 / 20 ~ 1 / 21)	2
	Staging girder	PC Continuous Box Girder		Staging Cantilever erection	1 / 14 ~ 1 / 24	0
Steel	Prefabricated girder	Steel Simple Box Girder		Crane erection	1 / 20 ~ 1 / 30 (1 / 20 ~ 1 / 21)	3
		Steel Continuous Box Girder		Crane erection	1 / 20 ~ 1 / 30	0



Source: JICA Survey Team



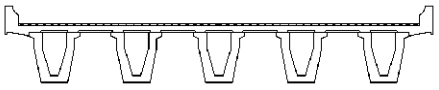
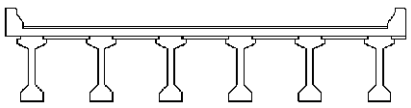
Note;

*1: PC box girder is to be erected by all-staging method which disturbs the current traffic flow therefore its not suitable in view of shortening construction time.

Source: JICA Survey Team

Figure 4.2.6 Flowchart for Selection of Precast Girder Type

Table 4.2.4 Comparison of Typical Precast Girders in Indonesia

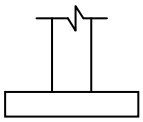
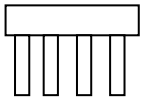
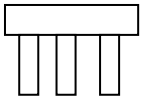
Type	U-shaped Girder	I-shaped Girder
Outline	 - U-shaped girder is typical and popular in Indonesia - Prefabricated girder - Erection method : Crane erection	 - I-shaped girder is typical and popular in the Indonesia but technically out of date. - Prefabricated girder - Erection method : Crane erection
Construction period	- Moderate	- Moderate
Landscape	- Good - (Superior visibility for U-shape)	- Normal
Cost	- Higher - (Need bigger sized crane for erection)	- Moderate
Ease and safety of construction	- Ease and safe	- Risky - (Unstable small bottom flange)
Evaluation	- Recommendable	- Not recommendable

Source: JICA Survey Team

(3) Foundation Structures

Because of its advantages in construction, in terms of cost and time saving, a column type structure with reinforced concrete pile foundations is a conventional structural form, refer to the UARI project, and it is also general in JABODETABEK. Table 4.2.5 shows typical foundation types. Sub-soil conditions are assumed to be similar to those of the UARI project due to the potential project sites being located mostly in JABODETABEK. The planning of foundation type can be therefore referred to that project. In addition, the foundation type may vary according to the site conditions and sub-soil conditions, a spread foundation should be reasonably applied if possible bearing sub-stratum is found at shallow depth.

Table 4.2.5 Comparison of Foundation Types

Depth of soil stratum	Foundation Type	Remarks
Depth varies between 3.0 m to 4.0 m	Spread footing 	- Open cut or cofferdam is required for excavation to the bearing stratum
Depth more than 6.0 m	PC spun pile foundation 	- Precast Pile length and diameter should be selected based on the subsoil conditions
	Cast-in- situ pile foundation 	- Pile length and diameter should be determined based on the subsoil conditions - Piling method should be properly selected in accordance with water level and construction constraint.

Source: JICA Survey Team

For the pile type, precast PC Spun pile and Cast-in-site RC pile should be reasonably selected in accordance with the description given in Table 4.2.6.

Table 4.2.6 Comparison of Pile Types

Pile type	Applicable length, dimensions	Procurement of material	Characteristics
PC Spun pile	5m to 25m φ0.3m toφ1.0m	Available in Indonesia	- Possible mass production at factories - Economical in large numbers - Suitable to small to medium bearing capacities
Cast-in-situ RC pile	10m to 60m φ0.6m toφ1.5m	Available in Indonesia	- Applicable for large bearing forces - No joints and applied for long piles - Common for large bridges in Indonesia - Reasonable cost
Steel round pile	5m to 60m φ0.3m toφ1.5m	Available in Indonesia	- Applicable for large bearing forces - Joints are possible in long piles - Not economical construction cost

Source: JICA Survey Team

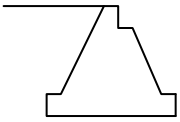
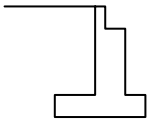
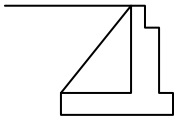
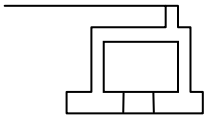
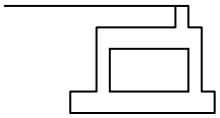
(4) Substructures

1) Abutments

Referring to the UARI project, the abutment type was compared and it was recommended that the Reversed-T type is the most suitable abutment type from the reasons of economy, simple structure and easy construction. In the basic design, Inverted-T Type should be selected as the standard abutment and general formation for initial design is setup from other

local practices. But if a very tall, more than 15m, Inverted T-type would be required, a Box type as given in Table 4.2.7 should be chosen.

Table 4.2.7 Comparison of Abutment Types

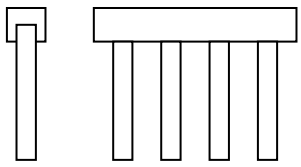
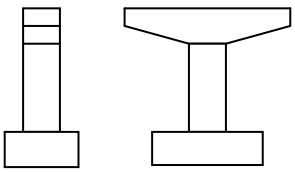
Type	Sketch	Applicable Height (m)	Characteristics
Gravity-type		Less than 5m	- Simple structure - Easy construction - Heavier weight
Inverted T type		More than 5m and less than 14m	- Economical - Easy construction
Counter-forted Buttressed type		Less than 10m	- Economical - Intricate construction - Difficulty in back filling
Rigid-framed type		More than 10m or less than 15m	- Complicated structure - Expensive
Box type		Less than 15m	- Large scale structure - Complicated structure - Expensive

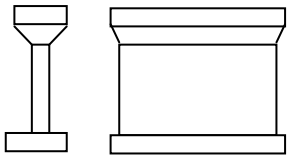
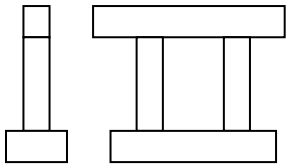
Source: JICA Survey Team

2) Piers

Conventional types of piers are briefly compared as shown in Table 4.2.8. The type of pier should be selected to suite the site condition and working force. In the UARI Project, typical wall and column type piers were selected and these were considered to be applicable and reasonable for this study. Standardising the pier type and simplifying the construction plan for the various practices given from the previous projects would facilitate the bridge planning in a timely manner.

Table 4.2.8 Comparison of Pier Types

Type	Figure	Characteristics
Pile bent type pier		● Simple structure with capped pile head ● Weak horizontal force and flexible structure ● Unsuitable for piers in rivers where scouring is expected ● relatively light-weight superstructure ● Lower cost
Column type pier		● Conventional type of substructure in Indonesia ● Diameter of column is larger ● Large area of river crossing ● Reducing thickness of pier head by prestressing

Wall type Pier		● General type of substructure ● Rectangular shape inappropriate to visibility ● Care must be taken regarding the direction of water flow if constructed in a river ● Pier thickness can be minimized
Rigid framed pier		● Generally used for wide super structure ● Unsuitable piers in rivers due to creation of eddies around the columns

Source: JICA Survey Team

4.2.3 Underpass Planning

The underpass structure was selected based on the comparison study on the possible structural types as given in Table 4.2.9 and Table 4.2.10.

(1) At Intersections (Tunnel Section)

In the optional types of underpass structures, PC sheet piles in combination with a simple girder bridge which was practically applied in the UARI project was considered to be the most economical and appropriate structure. At the intersection, two abutments were located behind the PC sheet piles and the top of the open cut space was covered with simple PC girders. This method will help minimize the construction yards and time needed for construction unless an obstacle exists adjacent to the construction.

However, the structure type depends on the site conditions, obstacles and other limitations at the site. In this project, the proposed underpass structure, for example ("Kuningan intersection"; See photo Figure 4.2.7), must be constructed under the existing flyover. The vertical clearance at the intersection is limited so that the specific piling method under the flyover shall be considered.

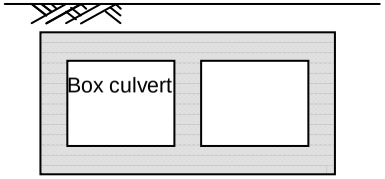
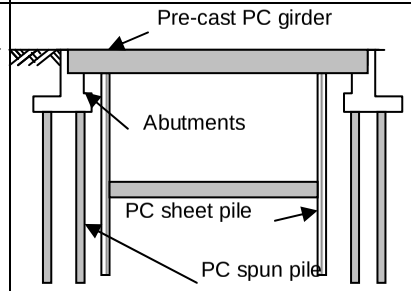
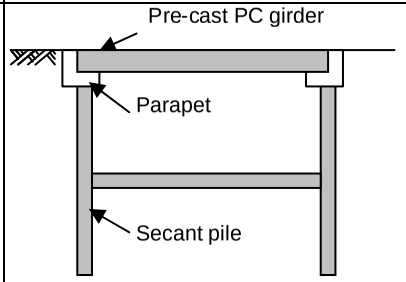
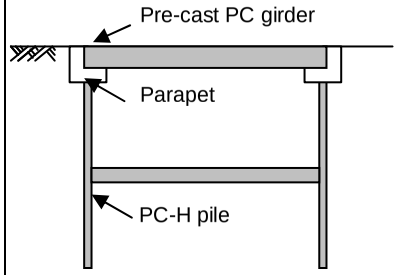
On the other hand, an RC box culvert is considered as a conventional structure for tunnelling under the intersection. However, construction of a temporary cofferdam is required before excavation of the structure which implies similar difficulties under the existing flyover as well as longer construction time. All the potential sites selected are highly congested so that minimizing the construction time which would obstruct existing traffic flow should be considered.

Figure 4.2.7 Kuningan Intersection

(2) Approach Section (Open –Cut and Retaining-wall Section)

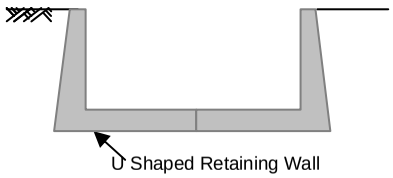
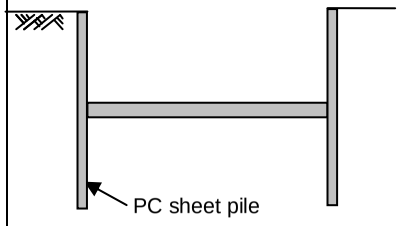
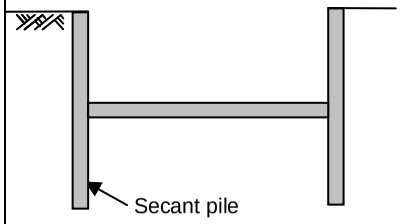
According to the practice in the UARI Project, the PC sheet pile may be a possible type of structure at the approach sections (for open-cut sections) with the advantage of minimizing construction time. Where the approach section is lower than 5m, a retaining wall may be suitable based on the practice in the UARI project.

Table 4.2.9 Selection of Preferable Underpass Structure at Tunnel Section (at Intersection)

	Op - I	Op-II	Op- III	Op- IV
Outline	Box Culvert	PC sheet piles with PC girders	Secant piles with slab	PC H piles with PC girders
				
	The open - cut method requires temporary cofferdams using sheet piles before the construction of the box culvert	Pre-cast PC sheet piles can be used for both temporary and permanent installations. Abutments behind the PC sheet piles for covering the open-top with PC girders are required.	Cast-in-situ secant piles with covering by PC girders. A cosmetic wall is required to cover the rough surface of the secant pile.	Pre-cast H shaped piles can be used for both temporary and permanent installations. Concrete parapet at the top of PC H piles serves as an abutment for setting PC girders.
Necessary width for construction	Widest	Wider	Narrow	Narrowest
Effected Length	Longest	Short	Short	Short
Construction Period	Longest (15 months)	Shorter (9 months) Including piles and abutments	Middle (12 months) Including piles and abutments	Shortest (8 months) Including piles and abutments
Accuracy	High	High	Tolerable	Tolerable
Ease of construction under flyover	Difficult	Difficult	Possible	Difficult
Affect to existing structure	Significant (due to the excavation using temporary coffer dam, it needs a wide construction area)	Higher (due to necessary piling for the foundation of the girder behind the PC sheet piles)	Moderate	Moderate
Cost	Higher	Moderate	Moderate	Moderate
Evaluation	Not recommendable	Not recommendable	Recommendable	Not recommendable

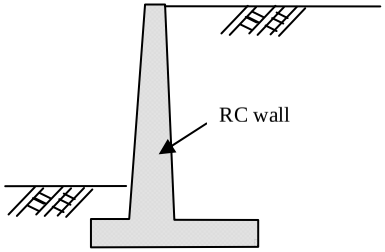
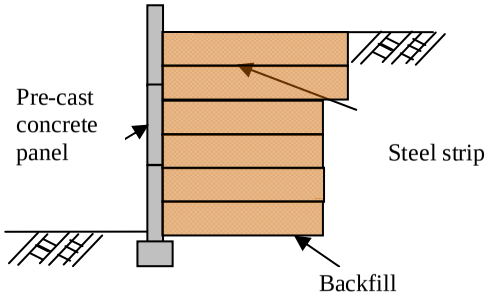
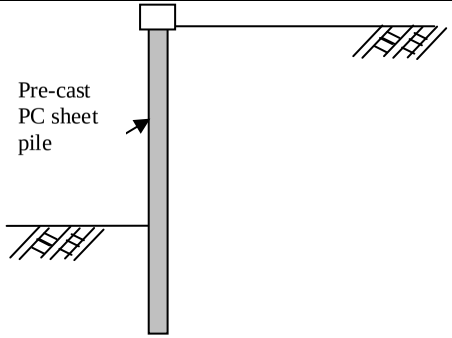
Source: JICA Survey Team

Table 4.2.10 Selection of Preferable Underpass Structure at Approach Sections

Option	Op - I	Op-II	Op- III
Outline	U shaped Retaining Wall	PC sheet piles	Secant piles
			
	The open-cut method requires temporary cofferdams with sheet piles before the construction of the retaining wall	Pre-cast PC sheet piles can be used both for temporary and permanent installations. It is possible to minimize construction time.	Cast-in situ secant piles require more machinery and equipment for casting concrete. A cosmetic wall is required to cover the rough surface of the secant piles.
Necessary width for construction	Wider	Narrowest	Wider
Construction Period	Longest (15 months)	Shortest (9 months)	Longer (12 months)
Accuracy	High	Tolerable	Tolerable
Affect to existing structures	Significant (due to wide area for construction and need for temporary cofferdams)	Moderate	Moderate
Cost	High	Moderate	Moderate
Evaluation	Not recommendable	Recommendable	Not recommendable

Source: JICA Survey Team

Table 4.2.11 Comparison of Structure Type at Approach Section

Option	Op-I	Op-II	Op-III
Outline	Retailing wall  ・ L-shaped RC retaining wall resists the earth pressure as a cantilevered beam. ・ Necessary structural excavation behind RC wall.	Reinforced earth wall  ・ Reinforced soil by pre-cast concrete panels and steel strips resists the earth pressure. ・ Construction period can be reduced. ・ Need careful control for compaction of backfill	PC sheet pile wall  ・ Self standing Pre-cast PC sheet piles resists the earth pressure ・ Construction period can be reduced. ・ High construction noise during pile driving.
Applicable height	3m <h < 10m	3m <h < 18m	2m <h < 8m
Construction space	Narrowest	Widest (Need crane for placing panels)	Narrower (Need crane for piling)
Construction period	Longest (Suitable for suburbs)	Shorter (Suitable for urban area)	Shortest (Suitable for urban area)
Landscape	Normal (Easy to be attacked with graffiti)	Aesthetic	Normal
Cost	Moderate 1.5 Mil.Rp. / m2 (1.00)	Higher 2.5 Mil.Rp. / m2 (1.67)	Highest 3.5 Mil.Rp. / m2 (2.33)
Evaluation	Recommendable for suburbs	Recommendable for urban area	Depend on site conditions

Source : JICA Survey team

4.2.4 Structure Design for Each Subproject

(1) Flyover Structure

This chapter describes of the design conditions and principles for each flyover structure in the subprojects. The selection of structural types in principle follows the local practice in both engineering and financial aspects except those that were determined by the previous study or other projects. In the detailed design, these conditions and principals should be reviewed in accordance with the site investigation and other factors concerned. Table 4.2.12 and Table 4.2.13 show the comparative study for major structures of flyovers or bridges in the subprojects. The details for each subproject are provided in the drawings (See **Vol.4 Drawings**).

Table 4.2.12 Comparison of Bridge Structure for Main Span of Flyover (Span length > 50m)

(confidential)

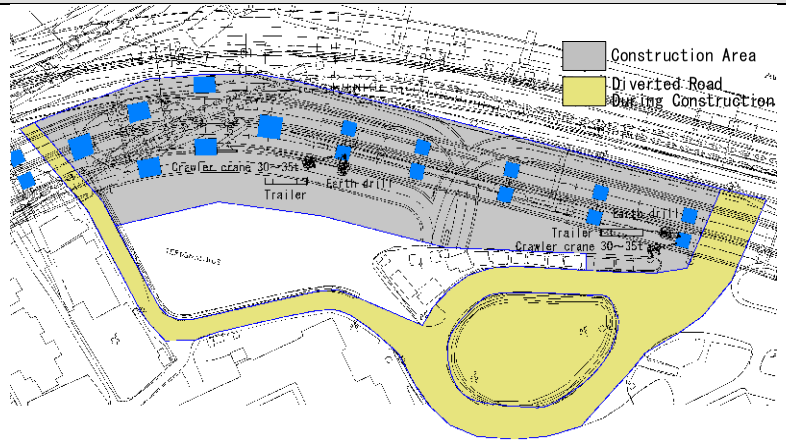
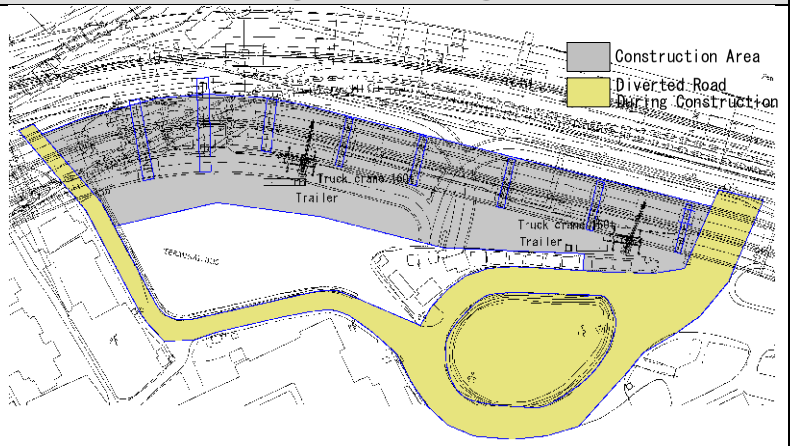
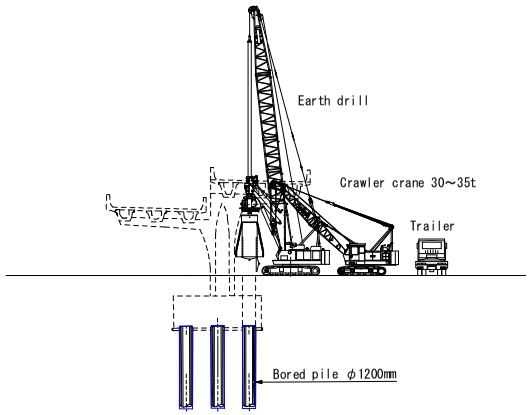
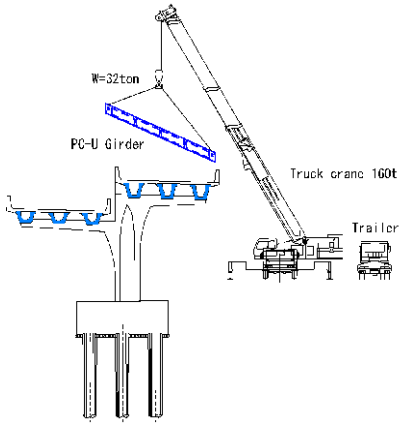
Table 4.2.13 Comparison of Bridge Structure for Side Span of Flyover

(confidential)

(1) 2. R.E. Martadinata

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	24 span PC Precast U girder bridge 24@25-35=720m 2x3.5m (carriageway) + 2x1.0m (barrier +marginal strip)=9.5m Pre-cast girders with Crane erection Alignment : Horizontal Alignment R= ∞ - 150m Vertical Alignment Max 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC Reverse T-type Abutment Pier type : RC rectangular column-type with PC pier head , RC portal type Foundation type : ϕ1.2m cast-in-place RC pile foundations Bearing strata : Depth 10 – 16m , Hard silty clay Bearing support : Rubber bearing device Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder The superstructure is mainly formed by three PC-U girders supporting the RC slab. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girders joint and pier heads apply with expansion joints. c) Erection method Prefabricated PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by either crane or erection girder.	
Foundation/ Substructure/ Others	d) Pier Most of piers are reinforced concrete rectangular column-type piers with the pile caps supported by ϕ 1.2 m RC bored piles. Some of them are rigid frame piers which they are needed to cross over the railway crossing. The outline of pier shape is tapered and the height of some pier heads is minimized by using prestressed concrete. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Piled Slab Piled RC slab is applied at the approach section behind the abutments for the avoidance of differential settlement in the soft soil ground. g) Pile ϕ 1.2 m RC cast-in-situ bored piles are proposed for the foundation. The construction method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.14	

Table 4.2.14 Construction planning for RE. Martadinata Flyover

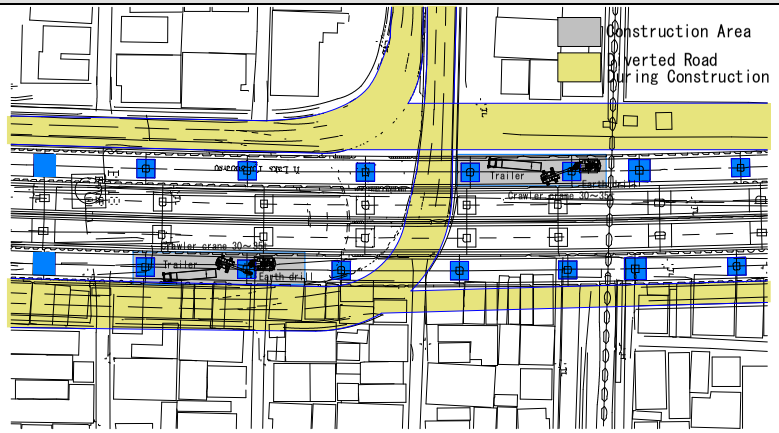
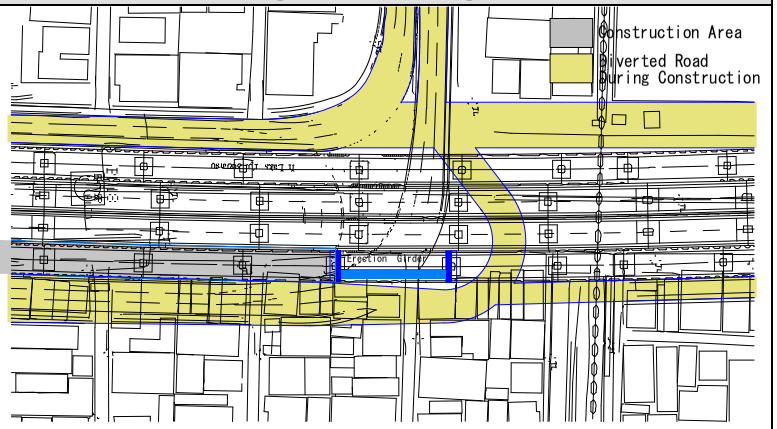
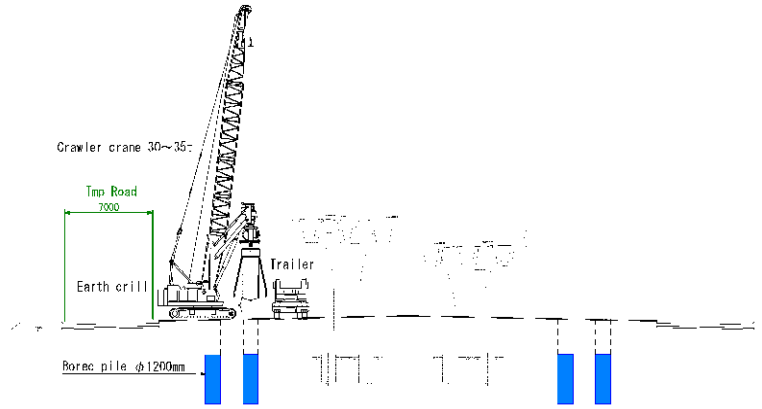
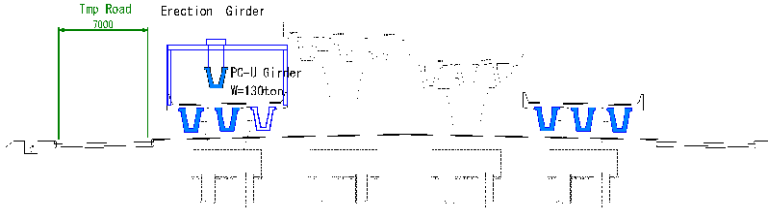
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the bus terminal and no extra temporary yard required during the construction; ● Need temporary removal of bus terminal to use for the construction yard during the construction; ● The existing road should be diverted at each phase of construction ● Need traffic control for the transport of materials and machinery to the site; ● Need temporary facilities to secure the passenger's access to the railway station	

Source: JICA Survey Team

(2) 3. Sulawesi Flyover

Design Conditions		
Bridge type	9 span PC-U simple girders, 1 span steel box (River), 1 span PC hollow slab	
Bridge length Span	28.5+55.0+2@30.0+35.0+31.0+30.0+20.0+2@30.0+27.5=347.0m	
Cross elements	2x4.25m (carriageway) + 2x0.5m (Railing) =9.50m	
Construction method	Pre-cast PC girders with Crane erection	
Alignment	Alignment : Horizontal Alignment R= 2990m Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0%	
Abutment	Abutment type : RC reverse T-type abutment	
Pier	Pier type : RC rectangular column-type pier with PC pier head	
Foundation	Foundation type : ϕ1.2m cast-in-place piled foundations	
Bearing Stratum	Bearing strata : Depth 10 – 16m , Hard silt clay	
Bearing Support	Bearing support : Rubber bearing device	
Expansion Joint	Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder The superstructure is mainly formed by three(3) PC-U girders supporting the RC slab. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girder joint and pier heads apply with expansion joints. c) Erection method Prefabricated PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by either crane or erection girder.	
Foundation/ Substructure/ Others	d) Pier All the piers are reinforced concrete rectangular column-type piers with the pile caps supported by ϕ 1.2 m RC bored piles. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Piled Slab Piled RC slab is applied at the approach section behind the abutments for the avoidance of differential settlement in the soft soil ground. g) Piles ϕ 1.2 m RC cast-in-situ bored piles are proposed for the foundation. The pile driving method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.15.	

Table 4.2.15 Construction planning for Sulawesi Flyover

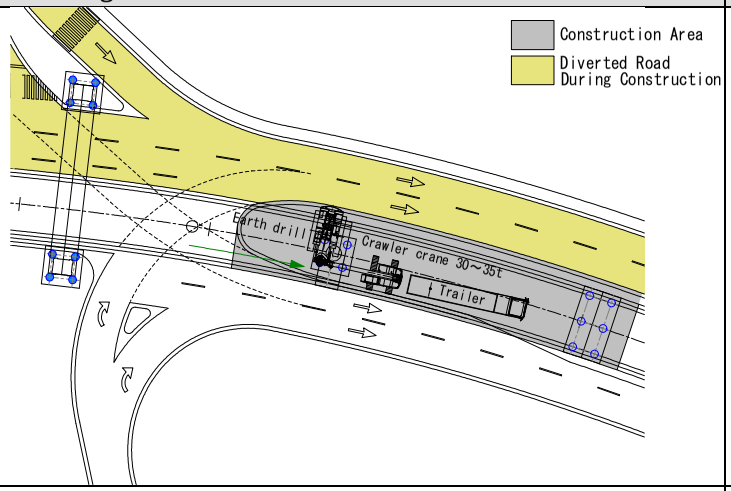
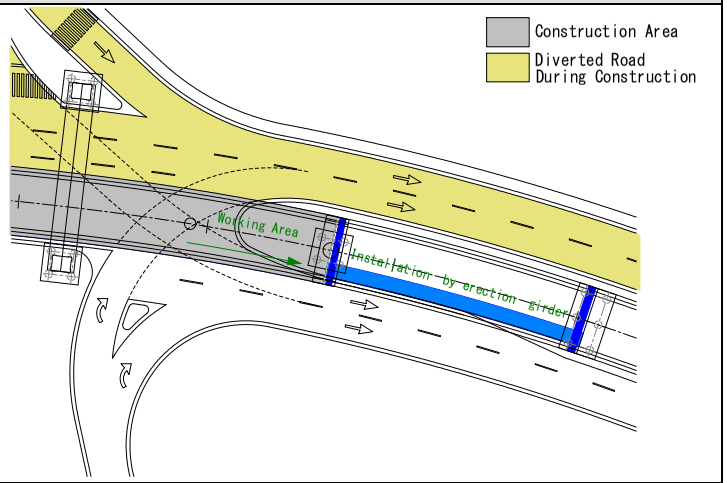
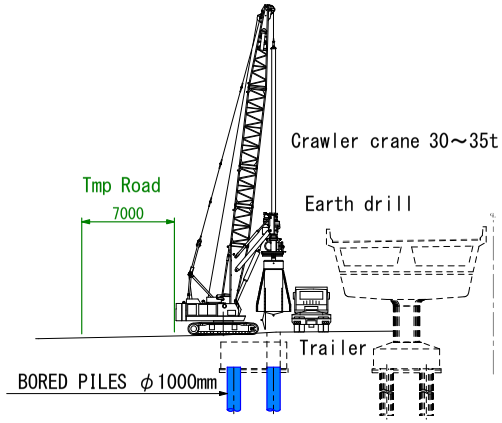
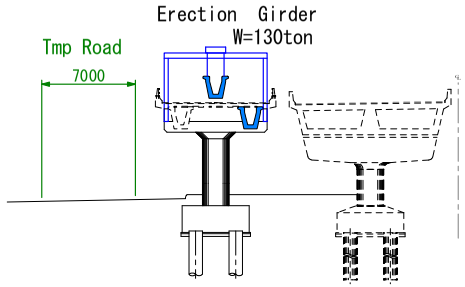
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Need the land acquisition for the permanent improvement and the extra yard required to secure the railway crossing. ● Basically, the existing road can be diverted to the space for frontage road however need temporary diversion during the erection of girder; ● Need a temporary diversion of traffic during the erection of girder using the space of underneath of span after the girders were erected; ● Need traffic control for the transport of materials and machinery to the site; ● Construction planning should be subject to change taking into account the proximity to the structure of TgPA project.	

Source: JICA Survey Team

(3) 5. Pancoran Flyover

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	10 span PC-U simple girders bridge 10@35.0=350.0m 2x3.50m (carriageway) +2x0.5m (Shoulder) +2x0.5m (Railing) =9.00m Pre-cast PC girder with crane erection or erection girder Alignment : Horizontal Alignment R= ∞ - 330m Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC reverse T-type abutment Pier type : RC round column-type pier with PC pier head RC rigid frame pier with PC pier head Foundation type : ϕ1.0m cast-in-place piled foundations Bearing strata : Depth around 20m, hard clay Bearing support : Rubber bearing device Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder The superstructure is formed by three (3) PC-U girders with RC slab. The span arrangement is standardized by allocating 35m length of PC-U girder. b) Support condition for bridge A simple bridge system composed of one side fixed and the other movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by either crane or erection girder.	
Foundation/ Substructure/ Others	d) Pier Most of the piers are reinforced concrete round column-type piers with the pile caps supported by ϕ 1.0 m RC bored piles. Some of them are rigid frame piers which they are needed straddling the width of frontage road around the intersection. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Reinforced Earth Wall Reinforced earth wall is applied at the approach section behind the abutments. g) Piles ϕ 1.0 m RC cast-in-situ bored piles are proposed for the foundation. The pile driving method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.16	

Table 4.2.16 Construction planning for Pancoran Flyover

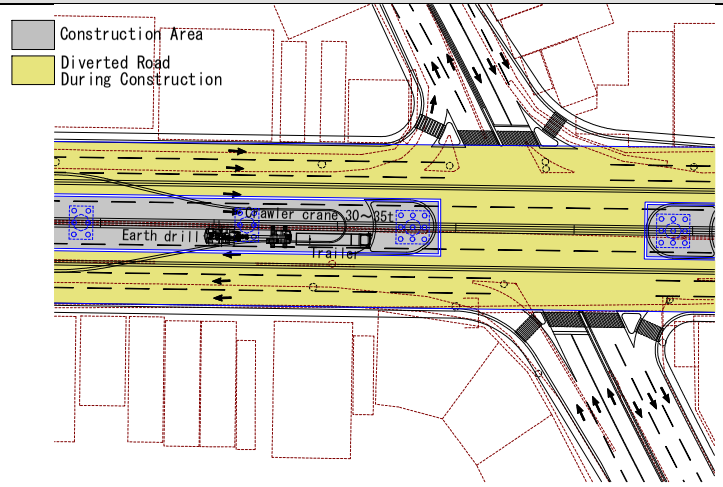
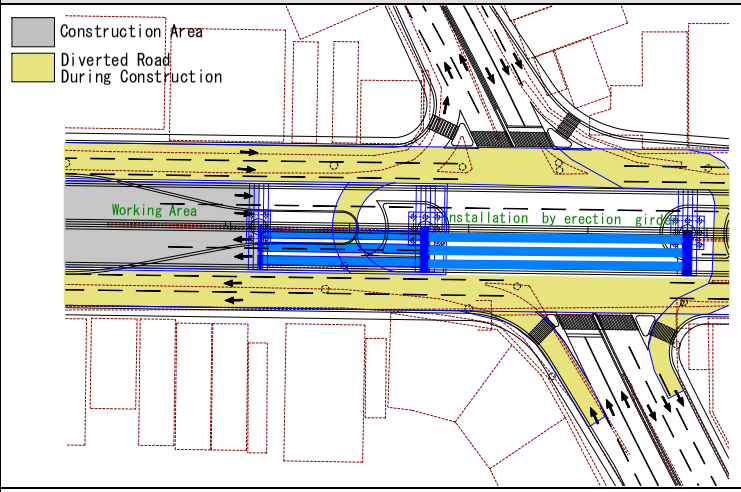
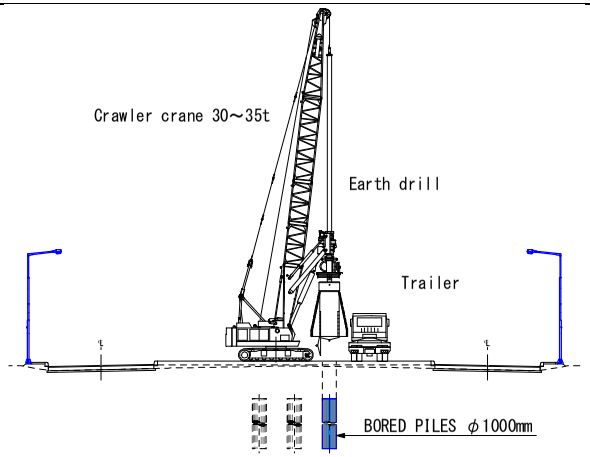
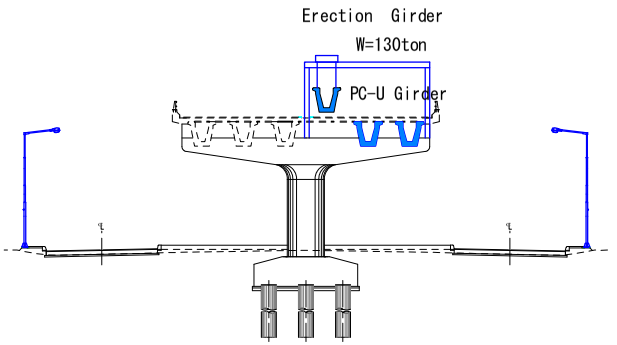
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Need the land acquisition for the permanent improvement however no extra yard required during the construction ● The existing road can be diverted however need a temporary closure for one-lane traffic during the construction; ● Need a traffic control for the transport of materials and machinery to the site; ● Need the temporary facility to secure the passenger's access for the BRT	

Source: JICA Survey Team

(4) 6. Pinan Baris Flyover

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	A steel box girder bridge with 6 span PC-U simple girders bridge 3@35.0+55.0+3@35.0=265.0m 4x3.5m (carriageway) +1.0m(median)+ 2x1.0m (Railing+Strip) =18.00m Steel box girder and pre-cast PC girder by crane erection Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC reverse T-type abutment Pier type : RC round column-type piers with PC pier heads Foundation type : ϕ1.0m cast-in-place piled foundations Bearing strata : Depth around 11m , hard clay Bearing support : Rubber bearing device Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder A simple steel box girder bridge is applied for the main span over the intersection. The superstructure for the side span is formed by six (6) PC-U girders with RC slab. The span arrangement except the main span is standardized by allocating 35m length of PC-U girder. b) Support condition for bridge A simple bridge system composes of one side fixed and the other side movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated Steel Box girder and PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by either crane or erection girder.	
Foundation/ Substructure/ Others	d) Piers All the piers are reinforced concrete round column-type piers with the pile caps supported by ϕ 1.0 m RC bored piles. The height of the pier head is minimized by using prestressed concrete. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Reinforced earth wall Reinforced earth wall is applied at the approach section behind the abutments. g) Piles ϕ 1.0 m RC cast-in-situ bored piles are applied for the foundation. The construction method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.17.	

Table 4.2.17 Construction planning for Pinang Baris Flyover

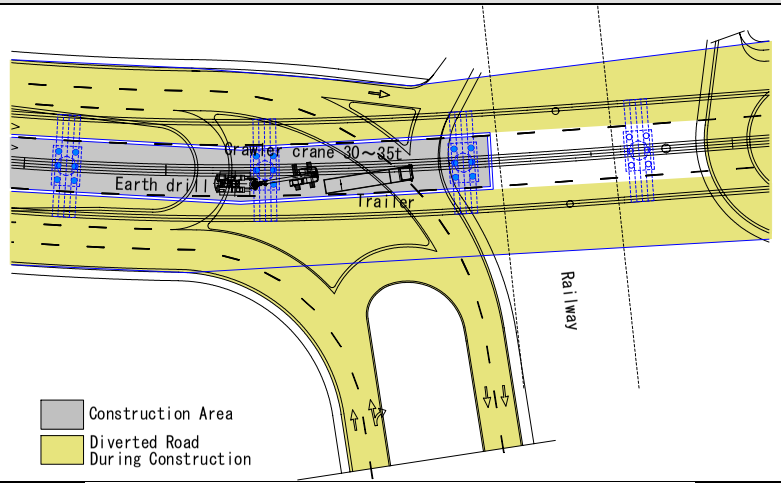
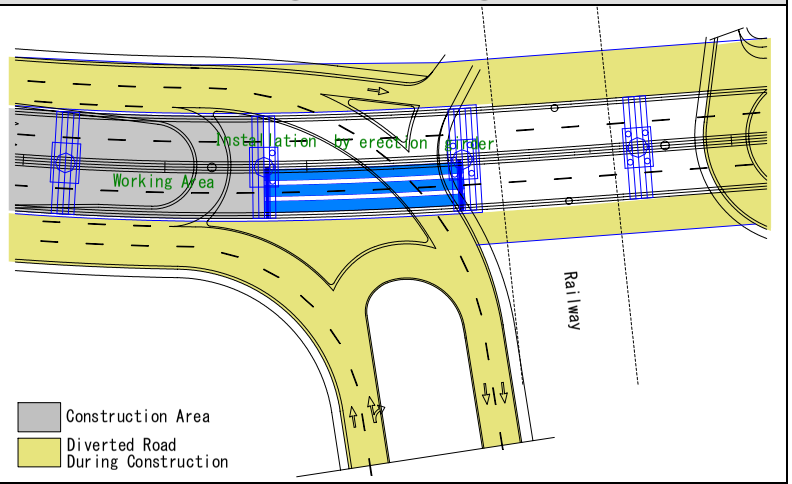
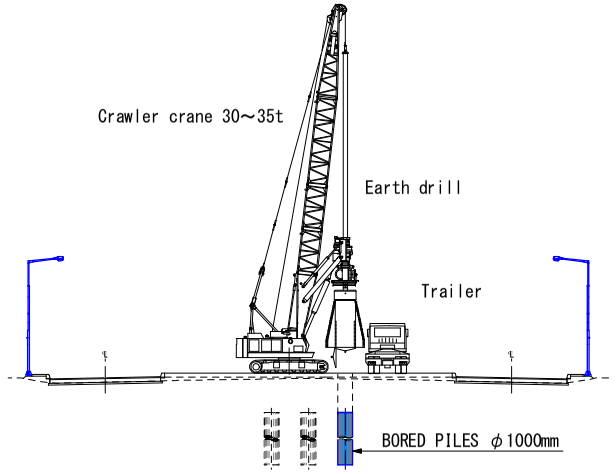
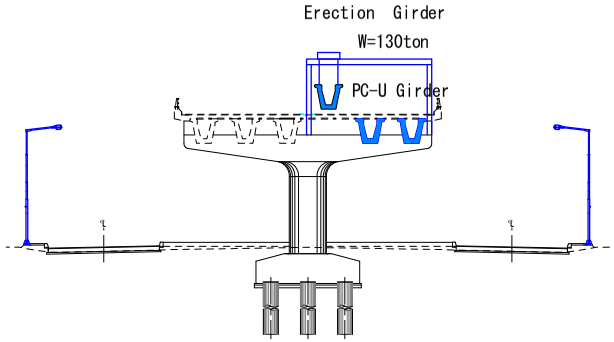
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Need the land acquisition for the permanent improvement however no extra yard required during the construction ● The existing road can be diverted to the outer space for the frontage road during the construction; ● Need a traffic control for the transport of materials and machinery to the site; ● Need temporary closure for the operation of existing road for two(2) nights as well as to divert the exiting traffic to the space beside the intersection during the erection of main girder (steel box girder);	

Source: JICA Survey Team

(5) 8. Sudirman II Flyover

Design Conditions		
Bridge type	8 span PC-U simple girder bridge	
Bridge length Span	4@35.0+31.0+3@35.0=276.0m	
Cross elements	4x3.5m (carriageway) + 1X1.0m(Median)+2x1.0m (Railing+ strip) =18.00m	
Construction method	Pre-cast PC girder with crane erection or erection girder	
Alignment	Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0%	
Abutment	Abutment type : RC reverse T-type abutment	
Pier	Pier type : RC round column-type piers with PC pier heads	
Foundation	Foundation type : ϕ1.0m cast-in-place piled foundations	
Bearing Stratum	Bearing strata : Depth 18m, hard silty clay	
Bearing Support	Bearing support : Rubber bearing device	
Expansion Joint	Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder The superstructure is formed by six (6) PC-U girders supporting the RC slab. The span is standardized by allocating 35m length of PC-U girder except for the span over the existing railway. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by either crane or erection girder.	
Foundation/ Substructure/ Others	d) Piers All the piers are reinforced concrete round column type piers with the pile caps supported by ϕ 1.0 m RC bored piles. The height of pier head is minimized by using prestressed concrete. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Reinforced earth wall Reinforced earth wall is applied at the approach section behind the abutments. g) Piles ϕ 1.0 m RC cast-in-situ bored piles are applied for the foundation. The construction method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.18.	

Table 4.2.18 Construction planning for Sudirman II Flyover

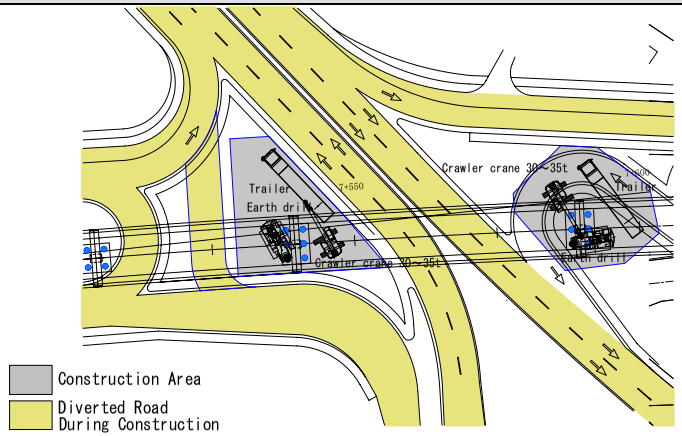
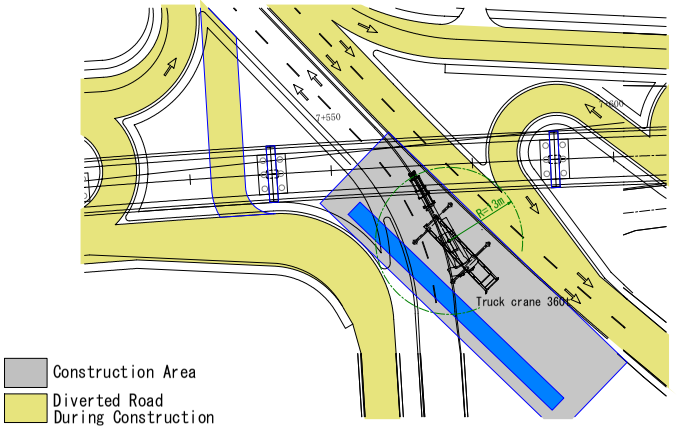
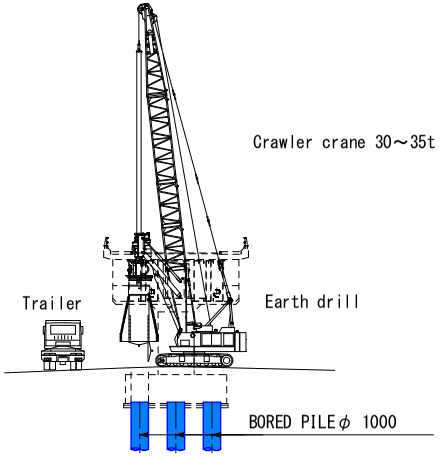
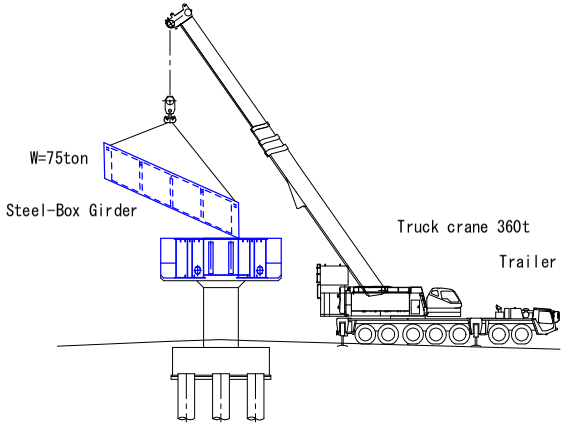
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Need the land acquisition for the permanent improvement and the extra yard required for closing the railways during the construction ● Need the diversion of existing road at each phase of construction using the space for the frontage road; ● Need a traffic control for the transport of materials and machinery to the site; ● Need a temporary diversion of traffic during the erection of girder using the space of underneath of span after the girders were erected	

Source: JICA Survey Team

(6) 9. Cikarang / Tegal Gede Flyover

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	A steel box girder bridge with 4 span PC-U girders bridge 2@35.0+50.0+2@35.0=190.0m 2x3.5m (carriageway) + 2x1.5m (Railing+Strip) =10.00m Steel box girder and pre-cast PC girder by crane erection Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC reverse T-type abutment Pier type : RC round column-type piers with PC pier heads Foundation type : ϕ1.0m cast-in-place piled foundations Bearing strata : Depth around 11m , hard clay Bearing support : Rubber bearing device Expansion joints : Seamless joint type	
Design Features		
Superstructure	a) Main girder A simple steel box girder bridge is applied for the main span over intersection. The superstructure for the side span is formed by three (3) PC-U girders with RC slab. The span arrangement except the main span is standardized by allocating 35m length of PC-U girder. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated steel box girder and PC-U girders are procured from a factory and transported to the site. The erection of girders shall be done by crane.	
Foundation/ Substructure/ Others	d) Piers All the piers are reinforced concrete round column-type pier with piles caps supported by ϕ 1.0 m RC bored piles. e) Abutment Conventional RC T-type abutments are proposed at the end of flyover.	
	f) Reinforced earth wall Reinforced earth wall is applied at the approach section behind the abutments. g) Piles ϕ 1.0 m RC cast-in-situ bored piles are applied for the foundation. The construction method should be either reverse circulation method or earth auger method taking into account the height of groundwater level.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.19	

Table 4.2.19 Construction planning for Tegal Gede Flyover

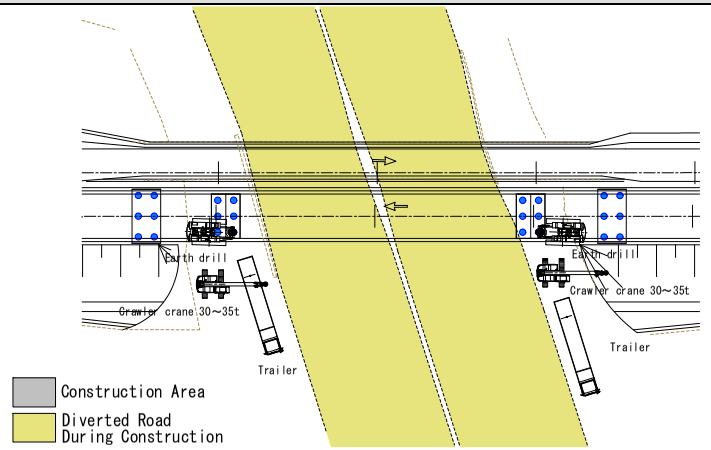
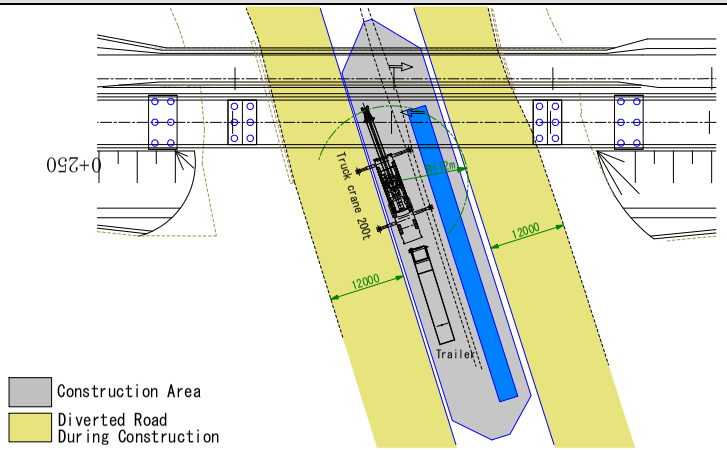
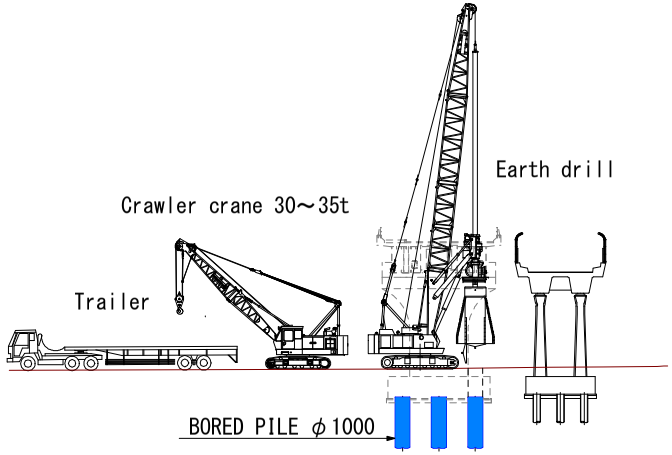
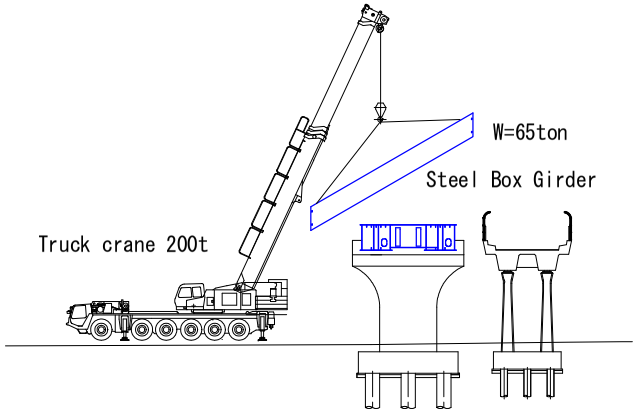
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the ROW and no extra temporary yard required during the construction; ● Possible construction of foundation and substructure using the space for the flyover; ● Need a traffic control for the transport of materials and machinery to the site; ● Need temporary closure for the operation of existing road for two(2) nights as well as to divert the exiting traffic to the space beside the intersection during the erection of main girder (steel box girder);	

Source: JICA Survey Team

(7) 9. Cikarang / Overpass for Toll Road (JL. Bali)

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	A steel box girder bridge with 2span PC hollow slab bridge 11.55+48.0+11.55=71.10m 1x3.50m (carriageway) + 1.50m(shoulder)+2x0.5m (Railing) =8.50m A steel box girder and pre-cast PC girders with crane erection Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC reverse T-type abutment Pier type : RC wall-type pier Foundation type : ϕ1.0m cast-in-place piled foundations Bearing strata : Depth around 6m, hard silty clay Bearing support : Rubber bearing device Expansion joints : Seamless joint type	
Design Feature		
Superstructure	a) Main girder A simple steel box girder bridge is applied for the main span over the toll road. The superstructure for the side span is formed by PC hollow beam. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated steel box and PC hollow slab are procured from a factory and transported to the site. Both the erection of the girders shall be done by crane.	
Foundation/ Substructure/ Others	d) Piers The piers are reinforced wall type piers with pile caps supported by ϕ 1.0 m RC bored piles. e) Abutment Conventional RC T-type abutments are proposed at the end of the bridge.	
	f) Piles ϕ 1.0 m RC cast-in-situ bored piles are applied for the foundation. The construction method should be the earth auger method.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.20	

Table 4.2.20 Construction planning for Jalan Bali Overpass Bridge

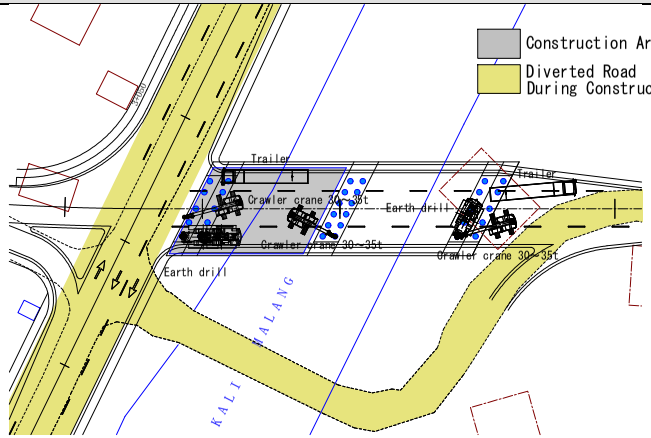
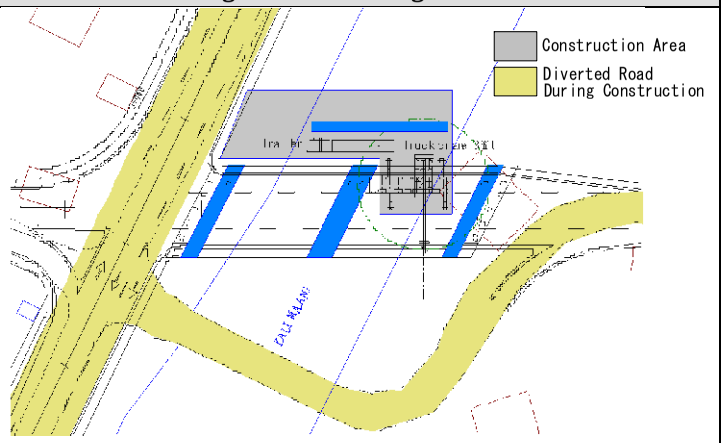
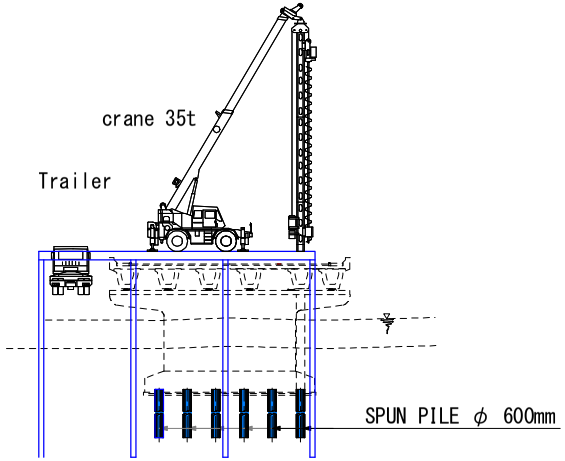
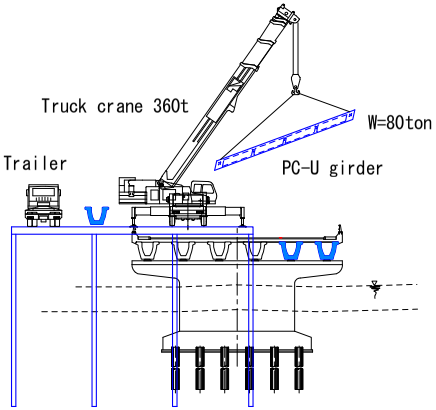
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the ROW and no extra temporary yard required during the construction; ● Possible construction of foundation and substructure using the side space of the toll road; ● The existing overpass can be used during construction however need a traffic control for the transport of materials and machinery to the site; ● Need temporary closure for the operation of toll road for two(2) nights as well as to use inner one-lane of the toll road for on-site fabrication during the erection of main girder (steel box girder);	

Source JICA Survey Team

(8) 9. Cikarang Road / Kalimarang Bridge (JL Imam Bonjol)

Design Conditions		
Bridge type Bridge length Span Cross elements Construction method Alignment Abutment Pier Foundation Bearing Stratum Bearing Support Expansion Joint	2 span PC-U simple girders 2@25.0=50.0m 4x3.25m (carriageway) + 2x1.5m (Railing+ sidewalk) =17.00m Pre-cast girder with crane erection Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0% Abutment type : RC reverse T-type abutment Pier type : RC wall-type piers Foundation type : ϕ1.0m cast-in-place piled foundations ϕ 0.6m PC spun piled foundations for Piers Bearing strata : Depth around 13m, hard silty clay Bearing support : rubber bearing device Expansion joints : Seamless joint type	
Design Feature		
Superstructure	a) Main girder The superstructure is formed by six (6) PC-U girders with RC slab. The span is equally formed by allocating 35m length of PC-U girder. b) Support condition for bridge A simple bridge system composed of one side fixed and the other side movable at each pier. The girder joint and pier heads use expansion joints. c) Erection method Prefabricated PC-U girders are procured from a factory and transported to the site. The erection of the girders shall be done by crane.	
Foundation/ Substructure/ Others	d) Piers The piers are reinforced concrete wall type piers with pile caps supported by ϕ 0.6 m PC spun piles. The thickness of the wall is selected to reduce the disturbance of water flow. e) Abutment Conventional RC T-type abutments are proposed at the end of the bridge.	
	g) Piles ϕ 1.0 m RC cast-in-situ bored piles are applied for the foundation of the abutment. The construction method is the earth auger method. ϕ 0.6 m PC spun piles are applied for the foundation of the piers due to driving the piles over water.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.21.	

Table 4.2.21 Construction planning for Jalan Imam Bonjol Bridge

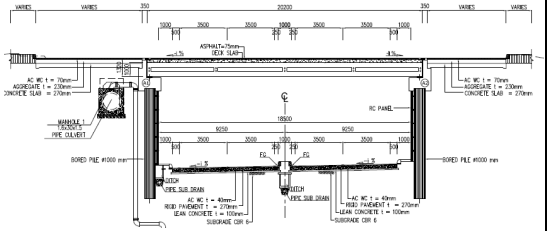
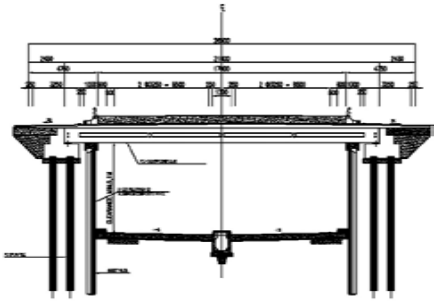
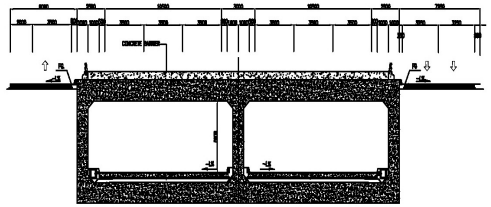
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Need the land acquisition for the construction of bridge however no extra temporary yard required during the construction; ● The existing bridge can be used for the diversion of the existing traffic however need traffic control for the transport of materials and machinery to the site; ● Need temporary stage in the river during the construction of bridge.	

Source: JICA Survey Team

(2) Underpass Structure

This chapter describes the design conditions and principles for each underpass structure in the subprojects. The selection of structural types in principle follows the local practice in both engineering and financial aspects except those that were determined by the previous study or other projects. In the detailed design, the design conditions and principals should be reviewed in accordance with the site investigation and other factors concerned. Table 4.2.22 shows the comparative study for major structures of the underpasses in subprojects. The details for each subproject are provided in the drawings (See **Vol.4 Drawings**).

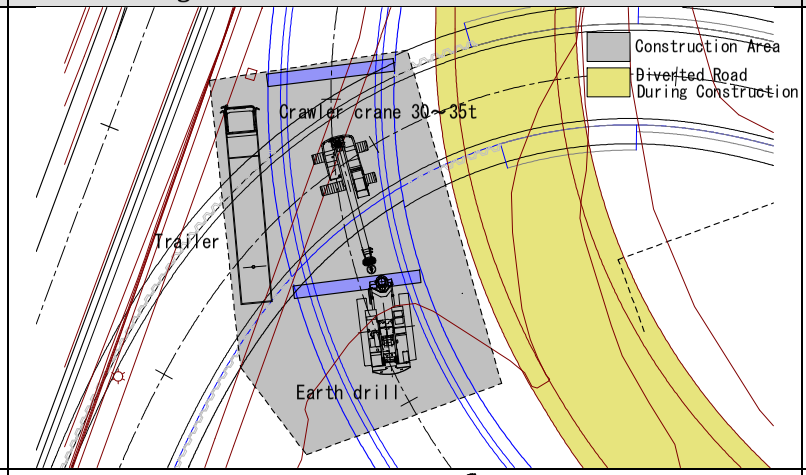
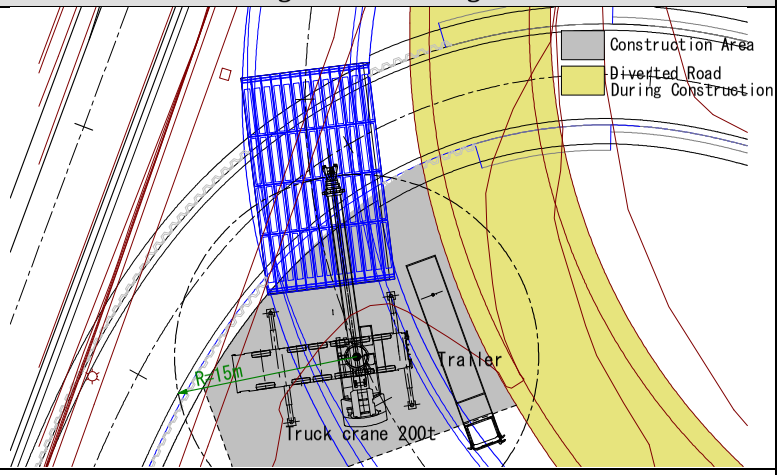
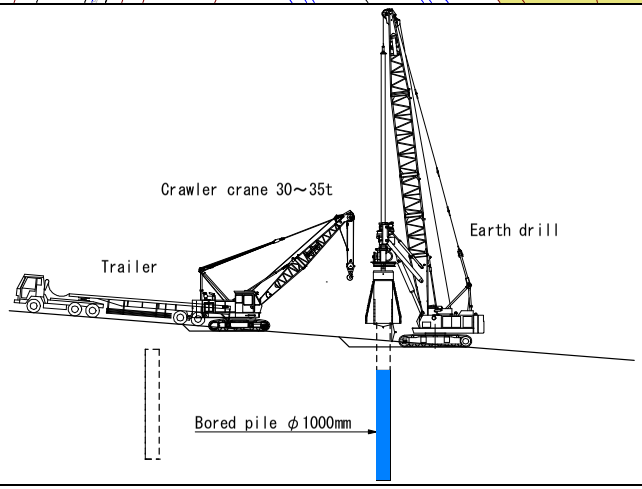
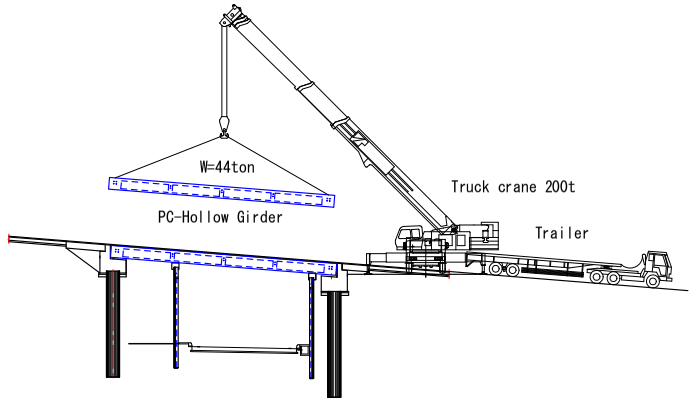
Table 4.2.22 Comparison of Underpass Structure under Intersection (Semanggi, Kuningan and Katamso)

Alternatives	PC Hollow Girder with Piled bent Abutment	PC-U Girder with PC Sheet Pile	RC Box Culvert
Sketch			
Structural type	- PC hollow girder bridge with pile bent (Secant piles) - Applicable span length; 15-25m.	- PC-U Girder bridge with PC Sheet Pile - Applicable span length ; 25- 35m	- RC Box Culvert - Applicable span length; 20-25m
Structural characteristics	- Depth of superstructure:1.0m - Piled foundation supported by RC secant piles	- Depth of superstructure; 1.4m - Piled foundation supported by RC cast-in situ bored piles	- Depth of upper slab: 1.3m - Need ground treatment if the bearing capacity cannot be secured - If the groundwater level is higher, this type has advantage
Construction (Under limited height, etc)	- No temporary cofferdam works required(+) - Possible to drive RC secant pile under the limited height (++).	- No temporary cofferdam works required(+) - Impossible to drive the PC sheet piles under the limited height	- Need temporary coffer dam before construction of box culvert. - Possible to drive steel sheet pile under the limited height (++)
Maintenance	- No particular maintenance required except the pump system of underground reservoir for storm water.	- Ditto to left	- Ditto to left
Construction Cost (Ratio)	- Most economical among the alternatives 1.0 (++)	- Additional abutment behind the PC sheet piles increase construction cost and time 1.3 (+)	- Necessary temporary cofferdam increase the construction cost and time 1.4
Overall evaluation	Most reasonable underpass structure taking into account both technical and financial aspects. ◆Total Evaluation ; +++++	◆Total Evaluation ; ++	· The whole view is inferior. ◆Total Evaluation ; ++

(1) 1. Semanggi Ramp Underpass

Design Conditions		
Underpass Structure	Simple PC hollow slab bridge	
Underpass length	Underpass for Gato Subroto Ramp (west) : L=14.0m Underpass for JL Gatoto Subroto (east) : L=14.0m	
Cross Section elements	2x3.50m (carriageway) + 2x0.5m (shoulder) =8.00m	
Construction method	Pre-cast PC hollow girder by crane erection	
Alignment	Alignment : Horizontal Alignment R= 40m Vertical Alignment Max. ±5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0%	
Abutment	Abutment type : RC pile bent abutment	
Foundation	Foundation type : ϕ1.0m RC cast in situ piles	
Bearing Stratum	Bearing strata : Depth around 13-16m, silty clay	
Expansion Joint	Expansion joints : Seamless joint	
Design Feature		
Tunnel Section	a) Structure The underpass structure is formed by PC hollow girder supported by pile bent abutment. b) Support condition and expansion joint Simple girder system applies with the one side fixed and the other movable uses seamless joint between the girders and the parapet of the abutment. c) Erection method All the pre-cast PC hollow girders to be erected by crane. d) Landscaping The combined simple structure shows a normal aesthetic view.	
Approach section	A retaining wall is to be installed at the approach section. The type of retaining wall should be determined by the proposed height of the wall. If the height is more than 2m, RC L shaped type is selected. If the height is less than 2m, gravity type retaining wall is selected as economically preferable.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.23.	

Table 4.2.23 Construction planning for Sumanggi Junction

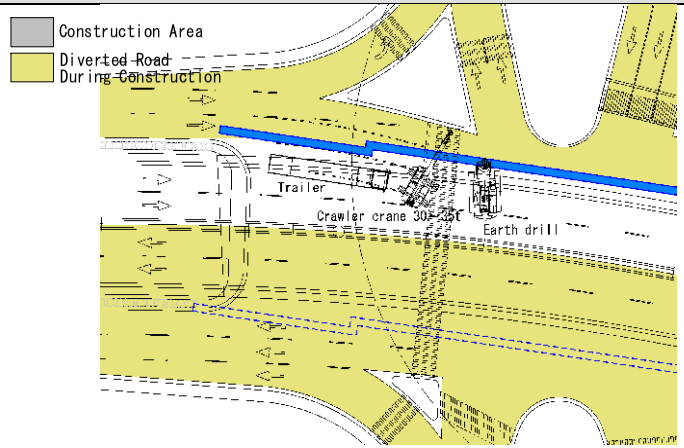
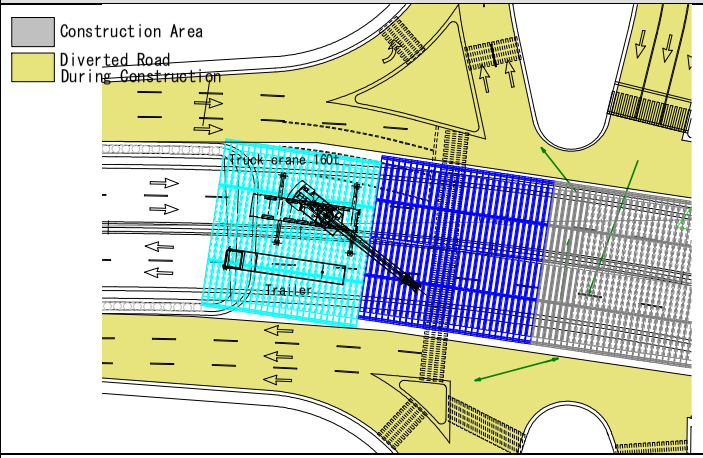
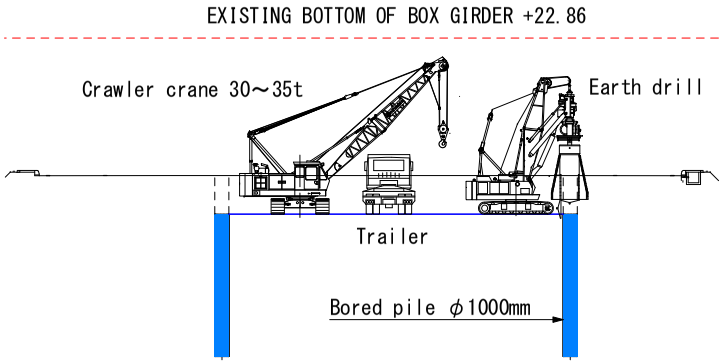
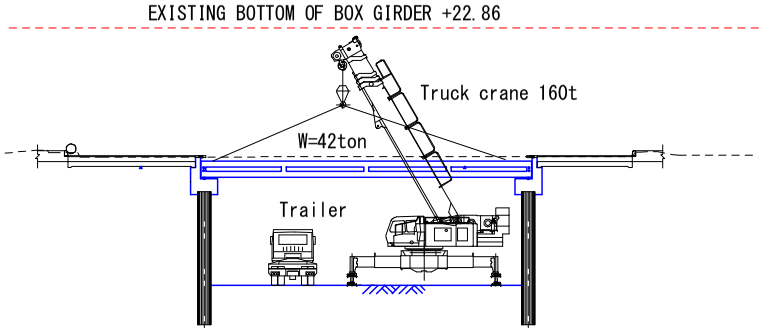
Items	During the construction of foundation/ substructure	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the space between the existing loop ramp and the channeled road; ● No extra temporary yard required during the construction; ● Need a traffic control for the transport of materials and machinery to the site; ● Need a slight traffic closure during altering the operation of loop ramps;q	

Source: JICA Survey Team

(2) 4. Kuningan Underpass

Design Conditions		
Underpass Structure	Single PC hollow slab bridge	
Wall structure	RC secant piles, PC Sheet piles	
Underpass length	Underpass for Mampang intersection: L=250.0m Underpass for Kuningan intersection: L=280.0m	
Cross Section elements Construction method	4x3.50m (carriageway) + 1.0m (median)+ 2x0.5m (shoulder)+2x1.0m (sidewalk) =18.50m Pre-cast PC hollow girder by crane erection	
Alignment	Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. ±5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0%	
Abutment Wall type Foundation Bearing Stratum Expansion Joint	Abutment type : RC pile bent abutment Wall type : ϕ 1.0m RC secant piles and PC sheet piles Foundation type : ϕ 1.0m Secant pile foundations Bearing strata : Depth 14-15m, Silty clay Expansion joints : Seamless joint	
Design Feature		
Tunnel Section	a) Structure The underpass structure is formed by PC hollow girder supported by pile bent abutment (secant piles with pile caps). b) Support condition and expansion joint Simple girder system applies with the one side fixed and the other movable uses seamless joint between the girders and the parapet of the abutment. c) Erection method All the pre-cast PC hollow girders to be erected by crane. d) Landscaping The combined simple structure shows a normal aesthetic view. The wall surface of the secant piles shall be decorated with RC panels.	
Open and cut section	The structure for the open and cut section was applied using self-standing PC sheet piles. The depth of the PC sheet piles and PC sheet piles was determined in accordance with the structural analysis based on the geotechnical model defined by the boreholes. As a result, the lengths of the PC sheet piles are classified into 4 types, which are: Type-I: is the length of around 16m to be driven for the section of the deepest point near the two intersections around the depth of 7 m. Type-II: is the length of 15 m to be driven around the section of excavation depth between 5 m and 7 m. Type-III: is the length of 12m to be driven for the section of excavation depth between 4 m and 5 m. Type-IV: is the length of 10m to be driven for the section of excavation depth between 2 m and 4 m.	
Approach section	A retaining wall is to be installed at the end of the open and cut section. The type of retaining wall should be determined by the proposed height of the wall if less than 2m and more than 0.5m. If the height is less than 0.5m, the gravity type retaining wall is selected as economically preferable.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.24.	

Table 4.2.24 Construction planning for Kuningan Underpass

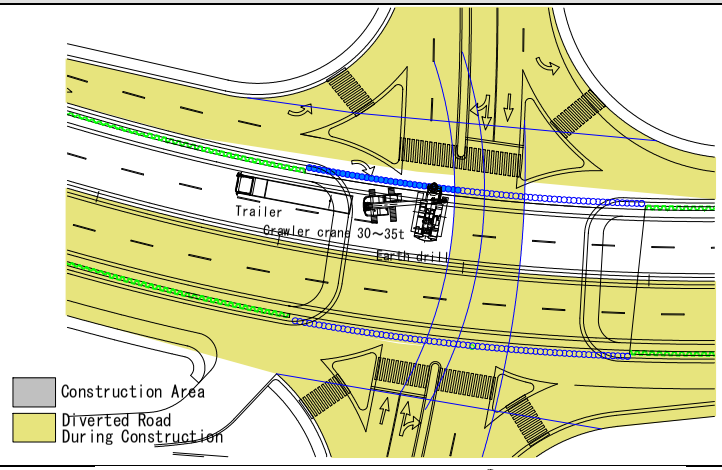
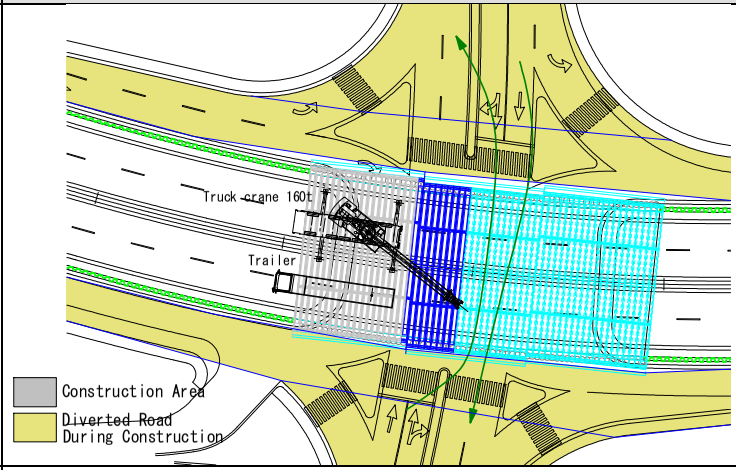
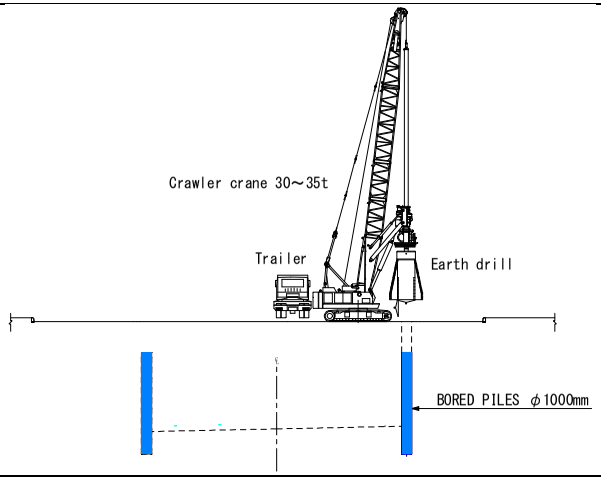
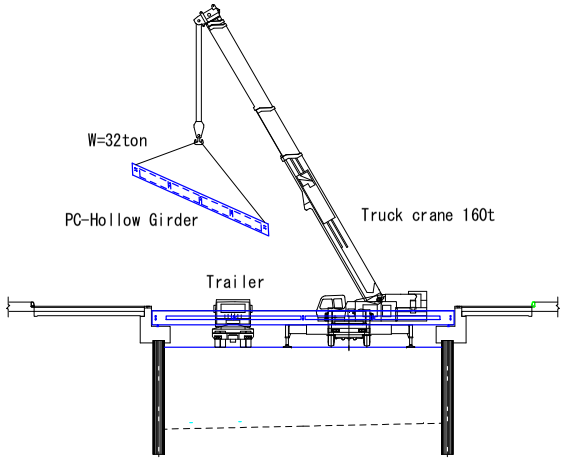
Items	During the construction of foundation (RC secant pile)	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the ROW and no extra temporary yard required during the construction of foundation; ● Possible erection of girder within the area of underpass; ● The existing road can be diverted however need temporary closure for one-lane traffic during the construction of foundation; ● Need a traffic control for the transport of materials and machinery to the site; ● Need the temporary traffic management for the traffic movement of intersection during the erection of girder.	

Source: JICA Survey Team

(3) 7. Katamso Underpass

Design Conditions		
Underpass Structure	Single span PC-hollow slab with pile-bent abutment	
Wall structure	PC piles (Secant pile with H beam reinforcement)	
Underpass length	L=348.0m	
Cross Section elements	4x3.5m (carriageway) +1.0m(median)+ 2x1.0m (Railing+Strip) =18.00m	
Construction method	Pre-cast PC hollow girder by crane erection (Secant piles)	
Alignment	Alignment : Horizontal Alignment R= ∞ Vertical Alignment Max. 5.0% Crossfall of the road 2.0% Crossfall of the side walk 2.0%	
Abutment	Abutment type : RC pile bent abutment	
Wall type	Wall type : PC sheet piles	
Foundation	Foundation type : ϕ1.0m RC Secant pile foundations	
Bearing Stratum	Bearing strata : Depth 14-15m, Silty clay	
Expansion Joint	Expansion joints : Seamless joint	
Guardrail	Guardrail : Concrete barrier	
Lighting Pole	Lighting pole : Corner light	
Design Feature		
Tunnel Section	a) Structure The bridge structure forms an underpass structure accommodating the full width of four traffic lanes plus marginal strip and concrete barrier. b) Support condition and expansion joint Simple girder system applies with the one side fixed and the other movable use seamless joints between the girders and the parapet of the abutment. c) Erection method All the pre-cast PC hollow girders to be erected by crane. d) Landscaping The combined simple structure shows a normal aesthetic view. The surface of the wall formed by the secant piles will be decorated with RC panels.	
Open and cut section	The structure for the open and cut section was applied using self-standing PC sheet piles. The depth of the PC sheet piles was determined in accordance with the structural analysis based on the geotechnical model defined by the boreholes. As a result, the lengths of the PC sheet piles are classified into 3 types, which are: Type-I: is the length of 18m to be driven for the section of the deepest point near the intersection and the excavation depth around 5 to 7 m. Type-II: is the length of 15 m to be driven around the excavation depth between 4 m and 5 m. Type-III: is the length of 12m to be driven for the section of excavation depth between 2 m and 4 m.	
Approach section	A retaining wall is to be installed at the end of the open and cut section. The type of retaining wall should be determined by the proposed height of the wall less than 2m and more than 0.5m. If the height is less than 0.5m, a gravity type retaining wall is selected as economically preferable.	
Construction Features		
Construction plan and traffic diversion.	The construction plan at each critical case is given in Table 4.2.25.	

Table 4.2.25 Construction planning for Katamso Underpass

Items	During the construction of foundation (RC secant pile)	During the erection of girders
Plan		
Side view		
Traffic control and other notes	● Possible construction within the ROW and no extra temporary yard required during the construction of foundation; ● The existing road can be diverted however need temporary closure for one-lane traffic during the construction; ● Need a traffic control for the transport of materials and machinery to the site; ● Need the temporary traffic management for the traffic movement of intersection during the erection of girder.	

Source: JICA Survey Team

4.2.5 Construction Planning for Structures

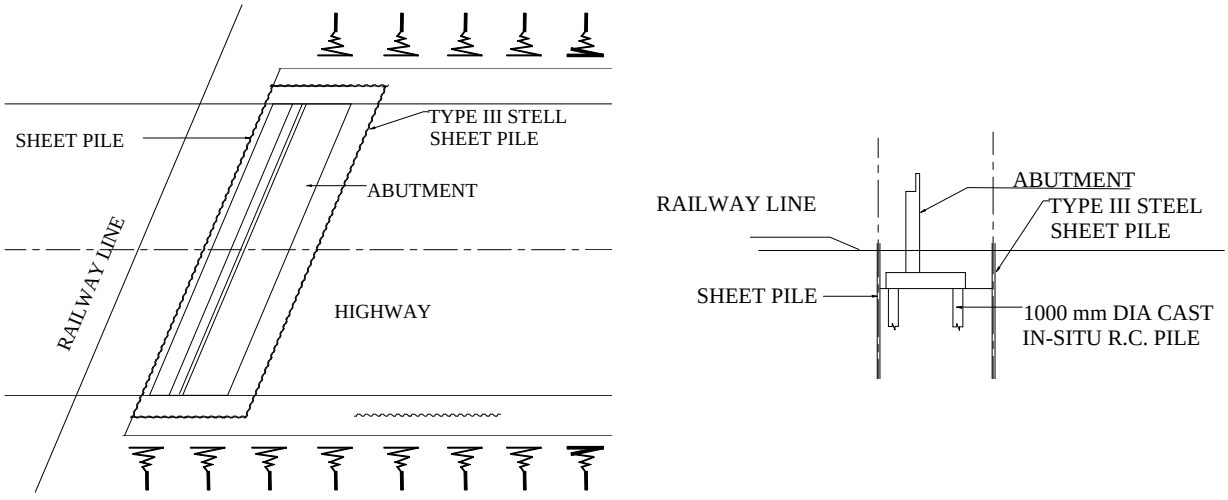
(1) Bridge Construction

Pre-Stressed Concrete (PC) girder bridges are to be selected for the major types of bridge structures in this project. Applicable type of PC bridges are mainly precast PC-I girder and precast PC-U girder (PC or steel box girder bridge may be nominated at the necessary long spans and/or curve sections). The bridge works can generally be subdivided into four components, namely foundations, fabrication of girders (except prefabricated PC girders), substructure and superstructure. The sequence of work varies slightly between the types and/or spans of bridges applied. In this project, the bridge structures are generally of four types of bridges including a single span railway overpass, a single and a double span road overpass and a multi-span flyover. The following provides a description of the construction sequence and the methods proposed for the foundation works, as well as works for the substructures and superstructures.

1) Foundation Works

The foundation works for bridges shall include excavation works down to formation level and the piling works under the pile cap (footing) structures. In the following subsections are descriptions of the work methods employed for excavation, bored pile works and driven PC spun piles.

For foundation works and pile caps/ footings for road bridges and for those crossing over railways and existing roads, where it is required to minimise the size of the excavation due to constraints such as for the maintenance of existing traffic lanes or to ensure the stability of railway tracks in close proximity or for other considerations, the excavation shall make use of sheet pile cofferdams to protect the sides of the excavation as shown in Figure 4.2.8. The use of appropriate type sheet piles shall be determined by examining the depths of excavation and the soil conditions.

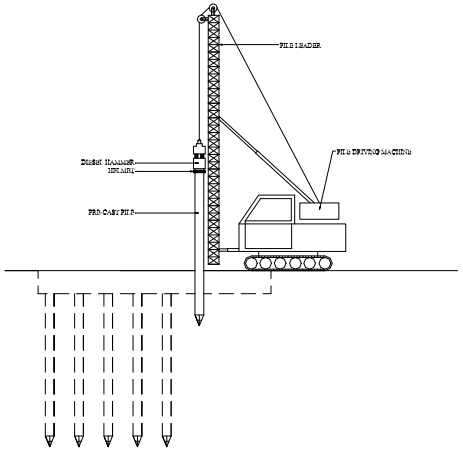
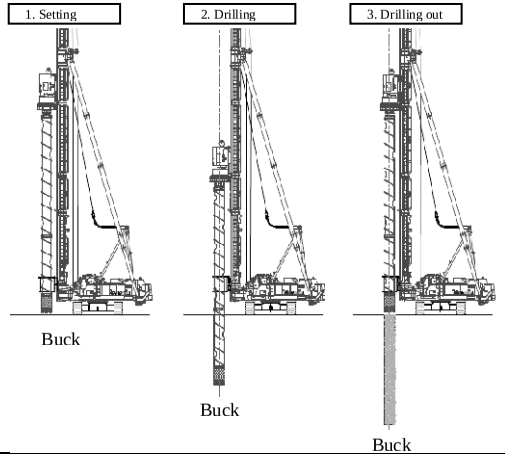
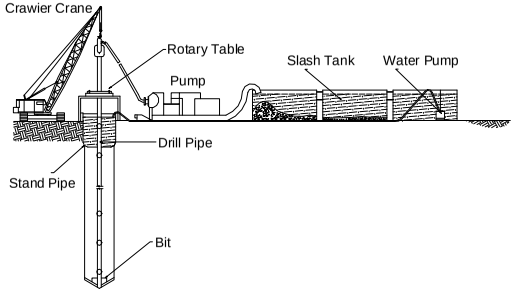


Source: JICA Survey Team

Figure 4.2.8 Sheet Piled Cofferdams for Substructure for Overpasses

In consideration of the duration of the site condition and of the geological conditions, either bored piles or precast PC piles will be selected. For the selection of piling method, the influence on adjacent facilities as well as other constrains such as a height limitation should also be carefully considered. The preferable piling method may be recommended among the various local practices as shown in Table 4.2.26.

Table 4.2.26 Preferable Pilling Method

Pile Type	Precast Pile	Cast in Situ Bored Pile	
Method	Driving Method	Earth Auger Method	Reverse Circulation Method
Outline			
	Expect a most stable bearing capacity by using this method, however, noise and vibration may cause damage to adjacent structures.	Using an earth-augur with a drilling bucket to excavate the soil. Difficult in drilling to rock substratum as well as drilling in underground water.	Circulation of water by air-lift system to stabilise the drilling hole and discharge the excavated soil and rock by screening.
Applicable diameter	φ 300- 800mm	φ 800- 3000mm	Maximum φ1000-3000mm
Applicable depth	Maximum 25 (40m recorded)	Maximum 60m	Maximum 75m (record)
Limited height piling	Not possible	Possible	Possible
Cost	Low	Moderate	Higher
Time	Fast	Moderate	Slow

Source: JICA Survey Team

2) Substructure Works

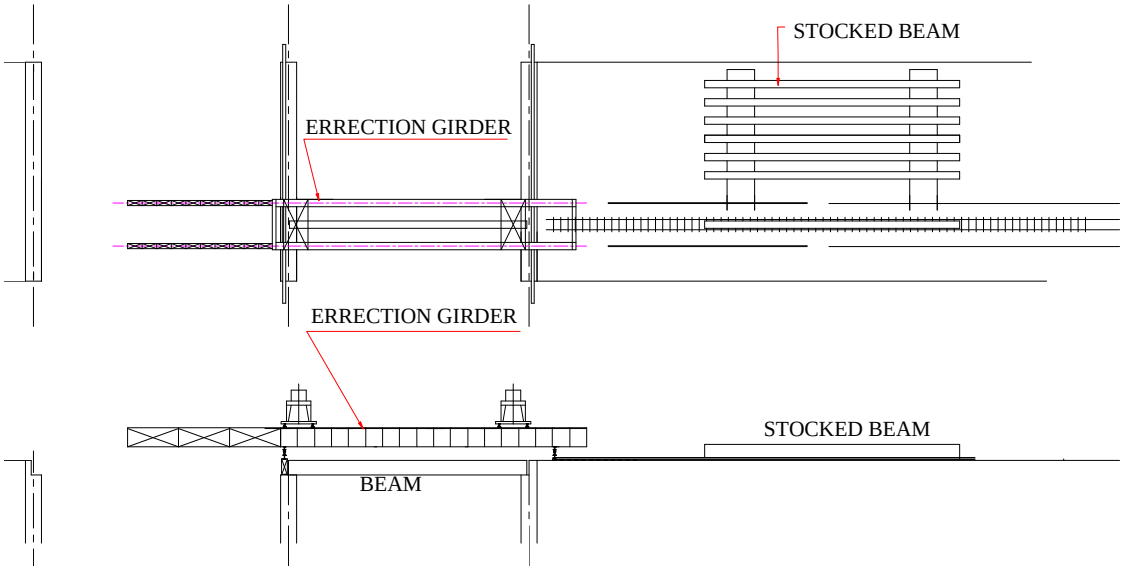
After the completion of the foundation works, substructure works subsequently proceeds with the construction of abutments and pile caps/ footings. The construction of these substructures shall be in conventional reinforced concrete.

3) Girder Erection

i) Pre-cast PC girder bridge (Prefabrication)

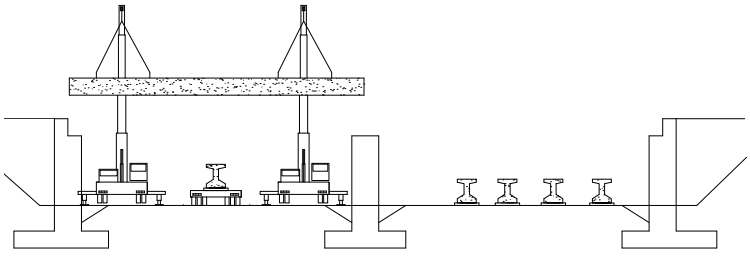
As for the pre-cast post-tensioned bridge available I and U shaped girders, these shall be transported from the manufacturer's factory to the site. In general, the beam is divided into 3-5 segments, which vary from 5 to 7m in length and they will be launched into position by a crane. The tendon inserted into the girder will be tensioned on the temporary launching girder and slide and place the girder on each bearing position at abutment and piers.

Figure 4.2.9 illustrates the arrangement of the temporary girder proposed. Once transported to the span being erected, the beams will be shifted into their final position over the elastomeric bearing pads with the aid of lateral winching system on rollers. Upon completing the erection of the first span the erection girder crane system shall be moved ahead to launch the following spans in series. Once the beams have all been installed the erection girder crane will be dismantled.



Source: JICA Survey Team

Figure 4.2.9 Erection girder for Precast girders



Source: JICA Survey Team

Figure 4.2.10 Erection of Precast PC girders by Mobile Crane

The transverse diaphragm beams will then be cast in-situ and post-tensioned. The construction of the deck slab shall be placed in between the PC girders.

The slab shall have a broom type finish to enhance adherence between the concrete and the wearing course to follow. Finishing works including the approach slabs, reinforced concrete barrier and other miscellaneous constructions shall be completed following the slab construction. The backfilling will be carried out over the embankment at the abutments, followed by all other miscellaneous finishing works associated with the bridge construction.

Photo-1: Precast PC-U girder

Photo-2: Transport of PC-U girder

Photo-3: Erection of PC-U girder

Photo-4: Form works of Diaphragm beam

Photo-5: Precast PC Sheet Piles

Photo-6: Transport of PC Sheet Piles

Photo-7: Driving PC Sheet Piles

Photo-8: Completion of Driven Piles

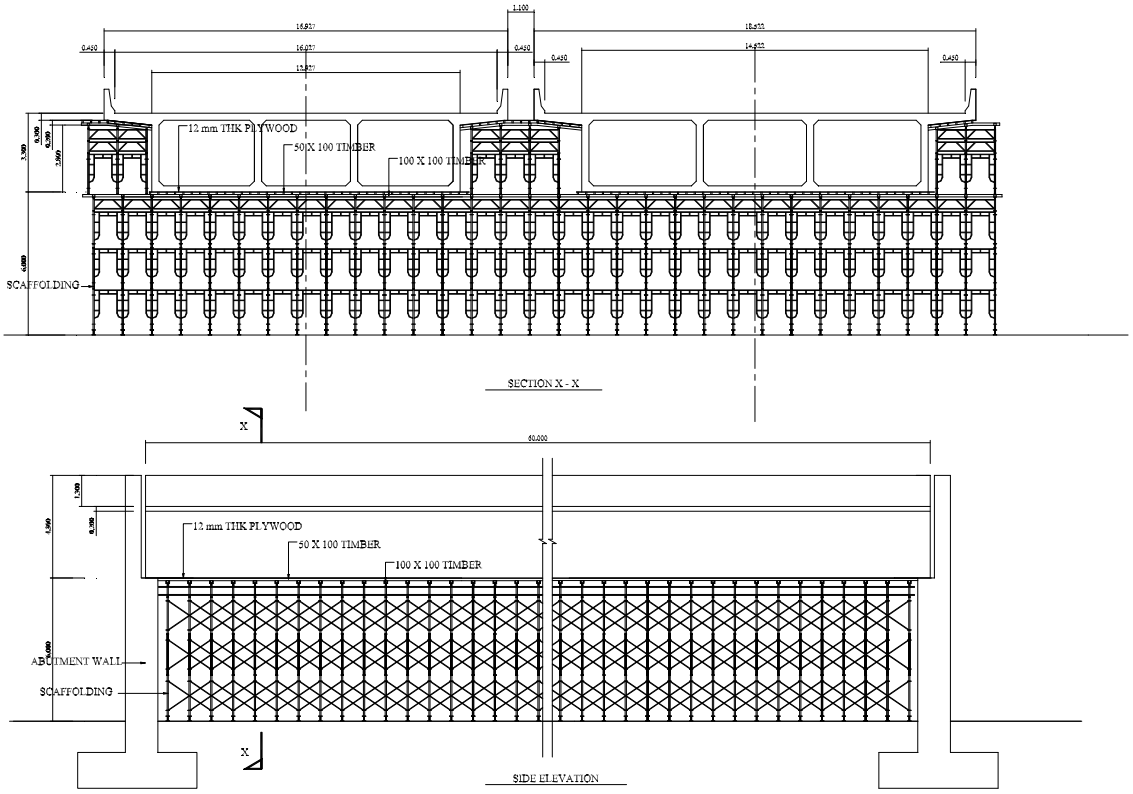
Source: Company profile of KOBE

Figure 4.2.11 Picture of Construction for PC Sheet pile and PC-U girder

ii) Cast In-situ PC Box Girder Bridges

For the cast in-situ post-tensioned box girder bridges, the all staging system is a conventional method for the erection of cast-in-situ box girder bridges. This method can minimize the section of box girder compared to other erection methods without the impact associated with a temporary working force during the erection. In this project, where it is possible to divert the existing traffic during the construction, this method will be reasonably applied.

The superstructure is constructed over a working platform as long and wide as the superstructure and required working space around as shown Figure 4.2.12. This platform is supported by a scaffolding system placed underneath and founded on the ground level below.



Source: JICA Survey Team

Figure 4.2.12 All Staging System for Post-tensioned PC Box Girder

4.2.6 External Conditions

(1) Transportation Facilities

Based on results of the traffic forecast, the number of traffic lanes of the roadway and sidewalks on both sides are considered for public transportation service if necessary.

(2) Public Utilities

As the result of site investigations, several public utilities have been found around the potential sites. The details of each utility have still not been identified. When the layouts of the new facilities are designed, the removal of utilities should be studied and discussed with the concerned authority during the detailed design. The attachment facilities with the bridge and culvert should be appropriately designed for accommodating the utilities. The space and method of attachment shall be given for the facilitation of public utilities inside and/or outside of the bridge, such as communication cables, water supply pipe(s) and power cables etc. This subject however, needs to be discussed more in the course of the detailed design.

Table 4.2.27 Result of study on obstructive materials

Transfer, removal/adjustment of expected obstructive materials			
Item	Pertinent agencies	Description	Concerned Subproject
BRT	DKI	■ Removal of bus lane and shelter	(2) RE. Martadinata (3) Surawesi-Tg.PA (4) Kuningan (5) Pancorang (8) Sudirman II
Electricity	PLN PGU	■ High-voltage wire：22kv, Low-voltage wire 220V to be transferred ⇒Removal of poles and raising/changeover of wire necessary ■ Transfer of electric lamps ■ Transfer of underground electric wire	All subprojects except (10) Senayan
Telephone	Indonesia Telkom	■ Transfer of telephone lines (overhead) ■ Relocation of optical fibre cable	All subprojects except (10) Senayan
Water supply	PDAM	■ Transfer or relocation of water main ■ temporary diversion for water pipes for local water supply	All subprojects except (10) Senayan
Gas	PGN PERTAMINA	■ Transfer or relocation of gas pipeline ■ Temporary diversion for gas pipeline	(1) Semanggi (3) Surawesi-Tg.PA (5) Pancorang (9) Cikarang

Source: JICA Survey Team

CHAPTER 5. IMPLEMENTATION, CONSTRUCTION AND MAINTENANCE PLANS

The Consultant prepares following plans for the project:

1) Institutional arrangements,
2) Implementation program,
3) Procurement of Contractors,
4) Construction plan,
5) Operation and maintenance system
6) Technical assistance and transfer

5.1 Institutional Arrangements for Implementation

5.1.1 Related Institutions

The Consultant identifies how responsibilities are divided and operations are coordinated among the organizations involved in the project.

Organizations involved in project implementation are generally divided into the following groups:

- The Executing Agency directly responsible for implementing and procurement of the project (Directorate General of Highways, DGH in this project);
- Government agencies supervising the Executing Agency (Ministry of Public Works, Indonesia);
- Responsible for City Planning and Master Planning (DKI);
- Environmental Office in each Kotamadya ("city", because project sites are located in different Kotamadya);
- Government agencies or banks involved in disbursement (Ministry of Finance, MOF, Indonesia)

5.1.2 DGH (Bina Marga): Executing agency

(1) Main tasks and functions of DGH (from DGH's Home page)

Directorate General of Highways has the task:

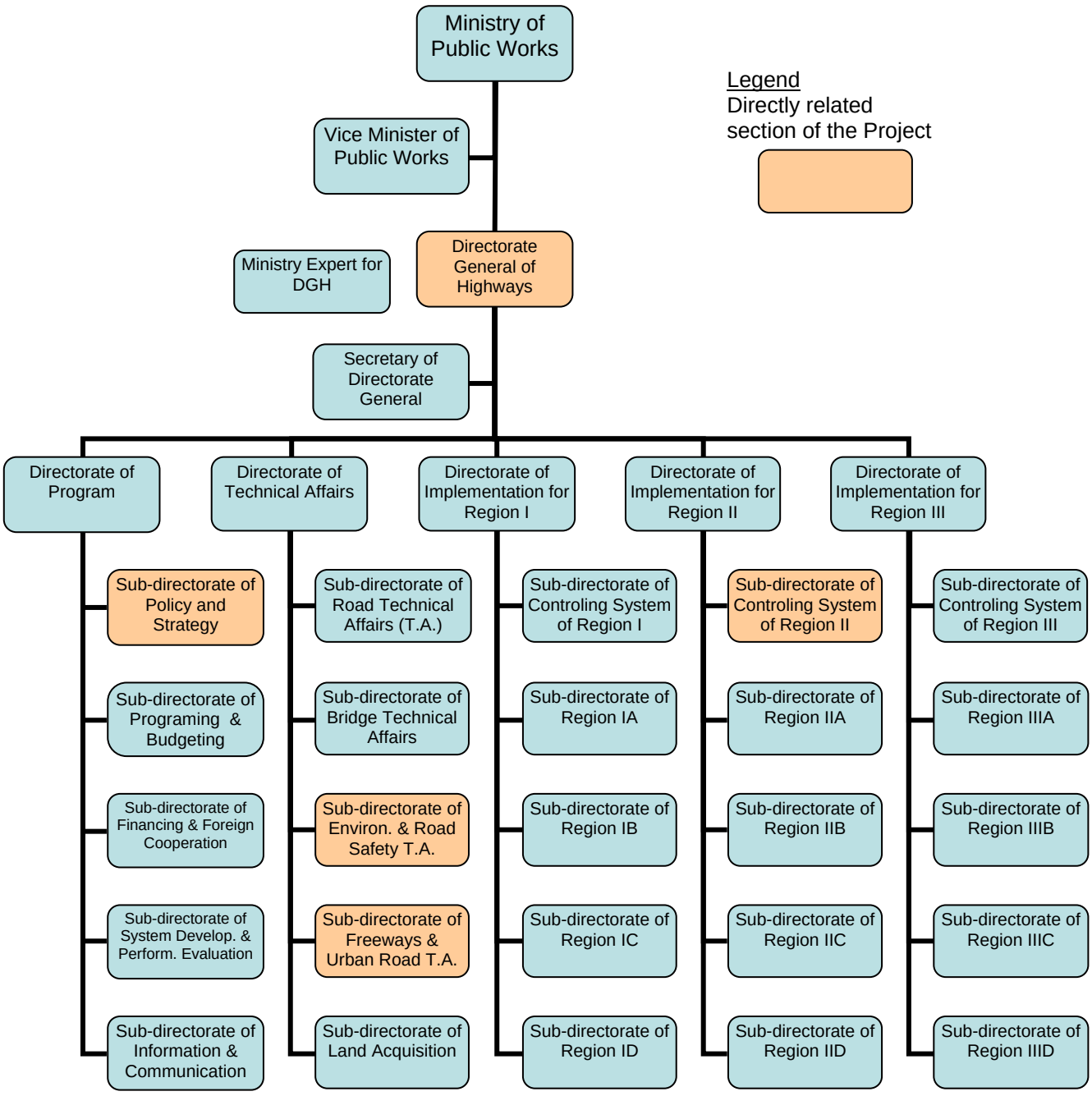
"Formulating and implementing policy and technical standardization in the field of DGH in accordance with the legislation."

In carrying out the task, the Directorate General of DGH has the following functions:

1) Formulation of policy and strategy in DGH, including the implementation of national, provincial, regional, urban, and rural roads;
2) Implementation of DGH's administration policies including programming and budgeting, performance evaluation of the implementation of policies, development financing system and investment patterns as well as emergency response and rehabilitation of road damage caused by natural disasters;
3) Preparation of design codes, standards, guidelines, procedures, and criteria in the fields of DGH;
4) Providing technical guidance and evaluation in DGH, including guidance for road network system in province, districts, urban, and rural areas, as well as capacity building and community empowerment;

5) Development of technical capabilities in DGH, and
6) Administration of Directorate General of Highways.

The organization of the executing agency, DGH, is shown in Figure 5.1.1.



Source: DGH

Figure 5.1.1 Organization of Directorate General of Highways

(2) Managerial, technical and financial capabilities of DGH

Managerial capability

DGH had annual budget of Rp.16.6 trillion in total in 2010, including:

Rp. 8.8 trillion for new construction/improvement and

Rp. 5.6 trillion for road maintenance.

This project requires about Rp. 2 trillion if all nine subprojects are to be constructed. It consists of 1/4 of the annual budget for new construction. Therefore, a staged construction should be carefully planned.

Recently, DGH has carried out successfully four large Japanese ODA loan road projects as shown in Table 5.1.1. That means DGH has sufficient managerial capacity for this project, too.

Table 5.1.1 Recent DGH's Large Road Projects (with Japanese ODA Loans)

Project	Year	Amount provided (million Yen)	Location
Tanjung Priok Access Road Construction Project (II)	2006	26,620	DKI
Tanjung Priok Access Road Construction Project (I)	2005	26,306	DKI
North Java Corridor Flyover Project (Flyovers at six intersections)	2005	4,287	Northern Java island
Urban Arterial Roads Improvement (UARI) in Metropolitan and Large Cities Project	1998	12,558	JABODETABEK

Technical capability

Although the national road network is still insufficient, the quality of new or maintained roads is good. The main problems are congestion, delays, high operating costs, poor safety in urban areas and overloading of vehicles.

Many DGH officers have received JICA's technical training in both Japan and Indonesia. DGH is definitely advancing in technical and management fields. DGH is capable to precede the project and will learn much through executing the project.

Financial capability

In Indonesia, National arterial roads are in a relatively good condition, but almost half of them are congested, pushing up costs for industry and trade, and the network comprises only about 600 km of high-grade toll roads. Overall, out of the estimated minimum annual funding requirements of Rp.31 trillion (US$ 3.3 billion), only Rp. 12 trillion (US$ 1.3 billion) is currently allocated. This underlines the need for additional domestic and foreign financial resources.

5.2 Implementation Schedule

(1) Major activities

The Consultant will prepare the implementation program, in consideration of the following major activities:

- Environmental Impact Assessment period,
- Loan preparation period,

- Selection period of the Consultant for the Design (and supervision),
- Detailed Design (D/D) period,
- Construction tender period,
- Construction period,
- Operation and Maintenance period,

The implementation schedule with the construction plan of the project is discussed in details in Chapter 11.

(2) Implementation Structures

There are three layers of implementation structures, such as PMU, SKS and ULP.

1) PMU (Project Management Unit)

Project Management Unit (PMU) has been established as a permanent office under the Directorate of Program in DGH in accordance with the Director General's decree No.51/KPTS/DD/2009. PMU will coordinate among donors.

2) SKS (Satuan Kerja Sementara, Project Office)

DGH will set up SKS (Project office) for each project in accordance with Law No. 08/PRT/M/2010, under Directorate of Implementation Region II, when the land acquisition is completed. SKS will monitor the project in the following items:

- Progress and quality of the project (in coordination with Directorate of Implementation Region II and Balai (DGH's regional office)),
- Budget and disbursement (in accordance with Directorate of Program),
- Technical matters (in accordance with Directorate of Technical Affairs)

3) ULP (Unit Layanan Pengadaan, Procurement Committee)

ULP has been established since April 2011 and has responsibility of procurement of contractors and consultants in accordance with Presidential Decree No. 54 (2010). ULP consist of at least five persons from all directorates of DGH. The staff should be certified by National Procurement Agency (LKPP) in conducting the procurement.

5.3 Procurement of Contractors

The construction of the project will be carried out by contractors pre-qualified and employed, through International Competitive Bidding (ICB) and unit price contracts.

1) Procurement Procedures

Procurement procedures should follow JICA's guidelines and sample documents such as:

- Handbook for Procurement under Japanese ODA Loans, JICA, March, 2009,
- Sample Pre-Qualification Documents under Japanese ODA Loans, JICA, April 2010,
- Sample Bidding Documents under Japanese ODA Loans, JICA, June 2009,
- Evaluation Guide for Prequalification and Bidding under Japanese ODA Loans, JICA, June 2010
- Guidelines for Environmental and Social Considerations, JICA, April 2010

2) Bidding Package

The Consultant will prepare the bidding package not only in the technical aspect, but also in compliance with the above Guidelines.

5.4 Construction Plan

1) Construction Methods

The Consultant proposes appropriate construction plans in terms of safety, reliability, technical feasibility and environmental impact.

2) Supervision of the Construction

The Consultant prepares supervision responsibility plan applicable to the Executing Agency, contractors and consultant. The plan should include an appropriate supervision system, including monitoring and inspection.

3) Construction Schedule

The construction schedule could affect the project cost, as well as the annual financing plan and disbursements of the ODA loan. The Consultant prepares the construction schedule using the previous performance of similar projects in Indonesia, in consideration of natural and social conditions. The schedule of each project is usually presented by bar chart as shown in Figure 5.4.1.

For the schedule calculation, performance of UARI and similar projects are used as shown in Table 5.4.1.

4) Land Acquisition, resettlement and compensation

When the project involves land acquisition, resettlement and compensation, the Consultant carefully studies the site conditions and plans the necessary procedure for future EIA and resettlement program.

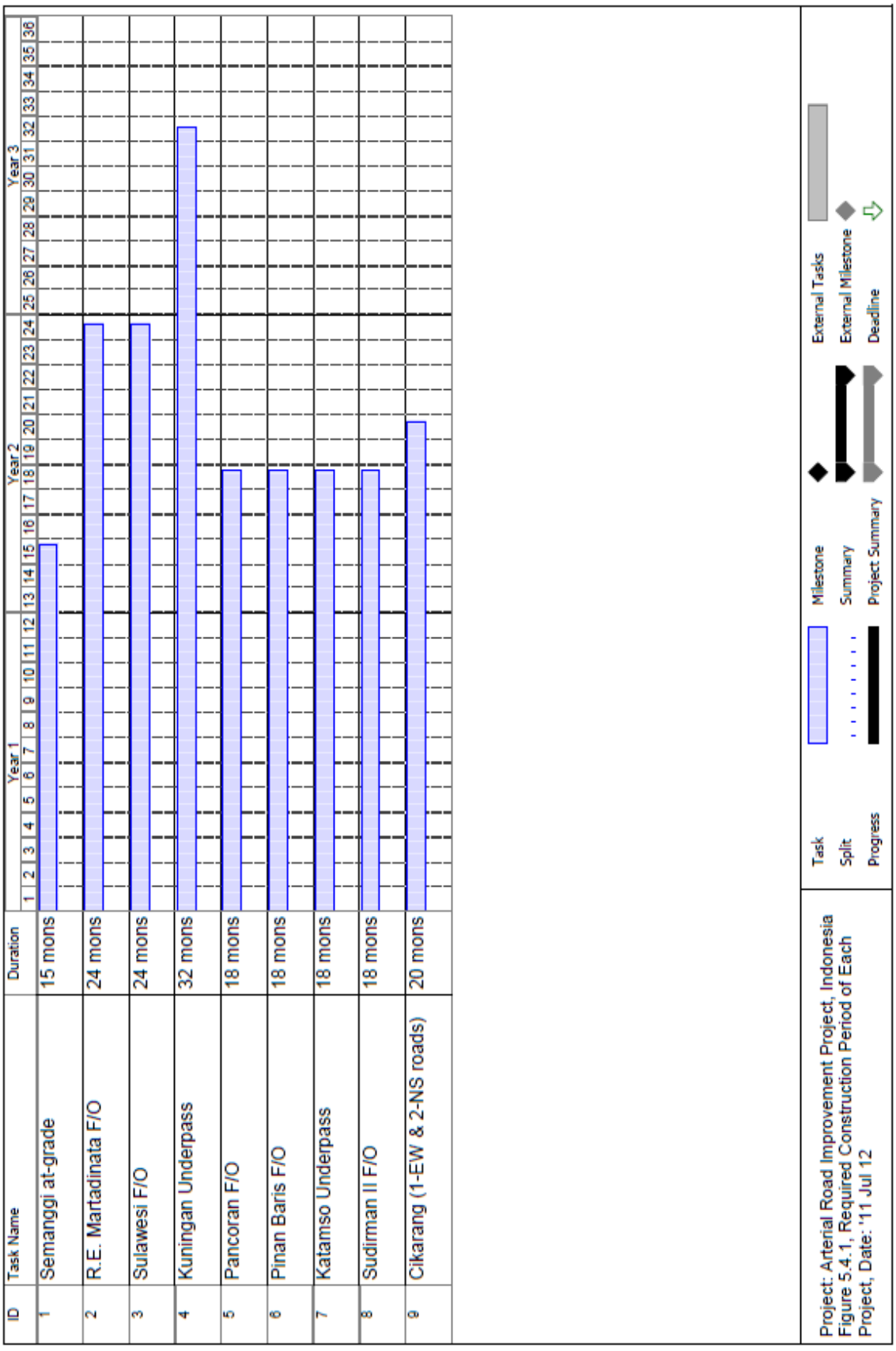


Figure 5.4.1 Required Construction Period

Source: JICA Survey Team

Table 5.4.1 Base Reference Performance for Construction Period Calculation

No.	Work items	Reference performance (UARI and other similar projects)
1	Road works	5,000 sq.m/month
2	Excavation	600 cu.m/day
3	Piling works	2 Nos./day
4	Bridge abutment works	14 days/each
5	Bridge pier works	10 days/each
6	Erection of girders and slabs	800 sq.m/month
7	Retaining wall (H=2 m)	5 m/day
8	Reinforced earth wall (H=4 m)	4 m/day
9	PC sheet piles	4 each/day/machine
10	Secant piles	2 each/day/machine

The detailed construction schedule of each project is included in Appendix.

5.5 Operation and Maintenance System

The Consultant proposes the operation and maintenance methods to ensure:

- Efficient and safe operation of the planned facilities,
- Adequate plan for maintenance,
- The funds necessary for operation and maintenance will be obtained through budgetary allocation or revenues generated from the project.

In the case where the project generates revenues, pricing policy and the tariff collection scheme are analyzed in conjunction with the financial position of the agency responsible for operation and maintenance.

5.5.1 Organization for Construction and Maintenance

For constructoon and O/M of national road/bridge, new administaration Balai System ("Balai" is an Indonesian word as "Center") started in January 2007 and currently 10 Balai regional offices cover 33 provinces. Balai is a regional office of the central government which covers several provinces, takes comprehensive charge of planning, implementation and O&M of regional infrastructure financed by the national budget.

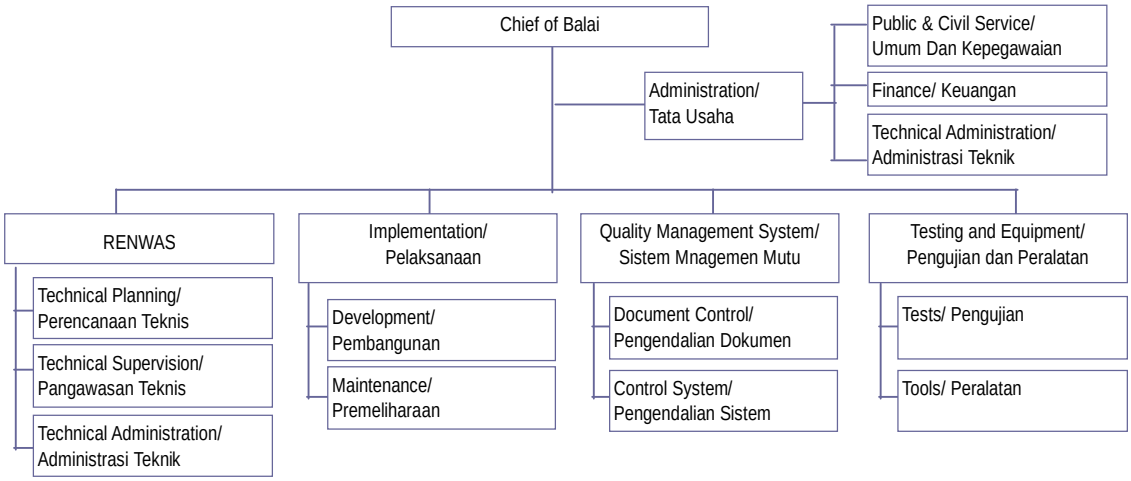


Figure 5.5.1 Organization Chart for Balai System

Under Balai, project unit named “SNVT” do each work of planning, design/supervision, new constrcution, improvement, rehabilitation and routine maintenance.

Table 5.5.1 Responsibility for Each SNVT under Balai

SNVT	Responsibility of Works			
	New Construction	Improvement	Periodic Maintenance / Rehabilitation	Routine Maintenance
Planning, Design/Supervision	Design	Design	Design	
Development	Road Short Bridges	Road (Large)	Large Bridges	
Maintenance		Road (Small)	All Roads Small Bridges	All Roads (Direct) All Bridges (Direct)

5.5.2 Budget for Construction and Maintenance

Directorate General of Highways (DGH) is responsible for National, Provincial and regional roads in planning, construction and maintenance. The annual budget is shown in Table 5.5.2 and Figure 5.5.2. The maintenance budget is increasing but still insufficient because the road conditions are still “15 % not stable”, even in all National roads as shown in Table 5.5.3.

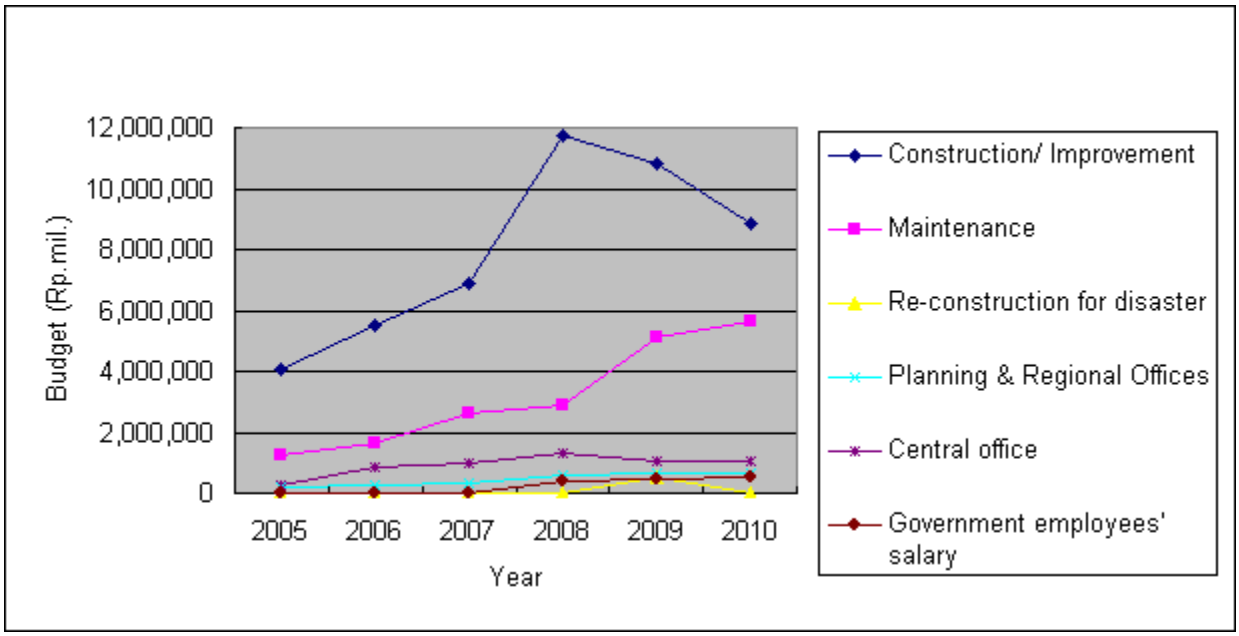
The toll roads maintenance is not included in the DGH budget because it is responsible for the investment company, such as PT. Jasa Marga.

Table 5.5.2 Budget for Maintenance and Construction

Unit: Rp. Million

No.	Description	2005	2006	2007	2008	2009	2010
1	Construction/ Improvement	4,037,588	5,531,495	6,866,413	11,712,311	10,832,498	8,834,539
2	Maintenance	1,260,494	1,616,426	2,645,326	2,875,811	5,096,429	5,614,939
3	Re-construction for disaster	-	-	-	-	550,497	30,989
4	Planning & Regional Offices	171,369	266,650	311,148	569,842	628,910	636,359
5	Central office	291,506	845,133	1,001,061	1,286,279	1,066,427	1,032,603
6	Government employees' salary	-	-	-	382,074	447,200	503,023
	Total	5,760,957	8,259,704	10,823,948	16,826,317	18,621,961	16,652,452
	Situation	Actual	Actual	Actual	Actual	Actual	Planned

Source: DGH



Source: DGH

Figure 5.5.2 Budget for Construction, Maintenance and Others

5.5.3 Existing National Roads and Bridge Conditions

Existing National road and bridge conditions of DKI and all Indonesia are presented in Table 5.5.3 and Table 5.5.4, Figure 5.5.3 and Figure 5.5.4. DKI is chosen for the analysis because JABODETABEK regional data is not available. Following comments can be made:

1) National Roads Conditions

- In DKI, all National roads are “stable”, well maintained.
- In all Indonesia, 15 % is still in “not stable” conditions.
- In all Indonesia, 11 % is still either gravel or earth roads.

2) National Roads’ Bridge Conditions

- In DKI, 13 Nos. (36 %) of bridges out of 36 Nos. are still “heavily damaged”, that means not sufficiently maintained.

- In all Indonesia, 67 % of bridges are “Very good” or “Good” conditions.

Table 5.5.3 Road Conditions in National Roads (2009)

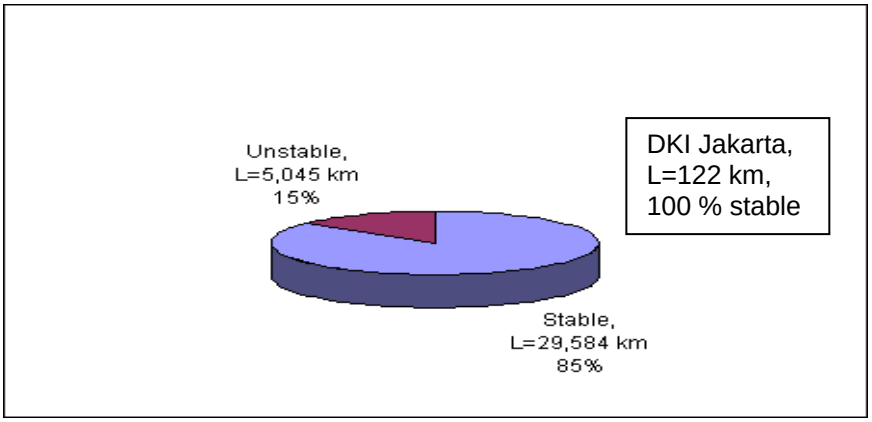
Area	Total Length (km)	Condition		Pavement	
		Stable (km)	Not Stable (km)	Asphalt or concrete (km)	Gravel or earth (km)
DKI	122	122	0	122	0
		100%	0%	100%	0%
Indonesia	34,629	29,584	5,045	30,938	3,690
		85%	15%	89%	11%

Source : Subdit Data dan Informasi, Direktorat Bina Program

Table 5.5.4 Bridge Conditions in National Roads (as of 5 January 2010)

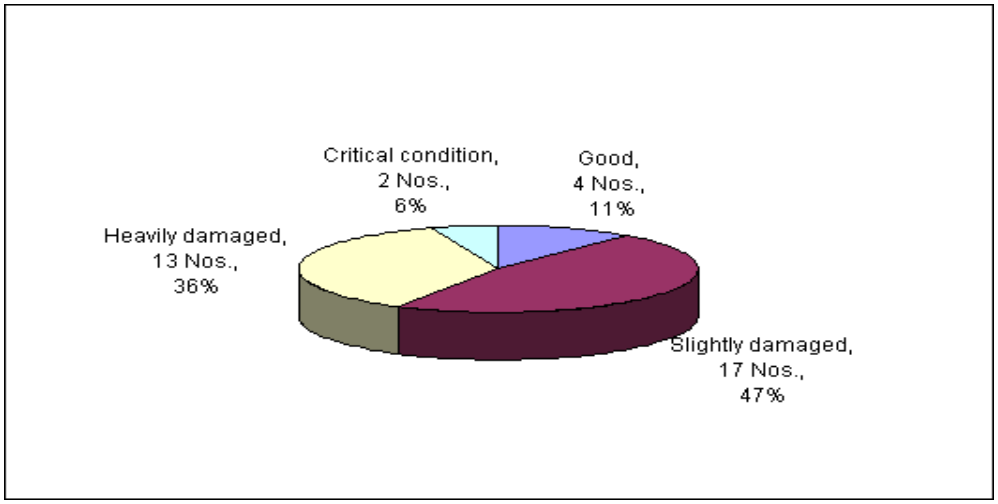
Area	No. of Bridges						
	Conditions					Collapse condition	Total
	Very Good	Good	Slightly damaged	Heavily damaged	Critical condition	No bridges exist	
DKI	0	4	17	13	2	0	36
	0%	11%	47%	36%	6%	0%	100%
Indonesia	7,691	4,348	3,522	1,529	540	344	17,964
	43%	24%	20%	9%	3%	2%	100%

Source : Subdit Data dan Informasi, Direktorat Bina Program, DGH, Dep. MPW



Source : Bina Narge, website

Figure 5.5.3 Road Conditions of National Roads



Source : Bina Narge, website

Figure 5.5.4 Bridge Conditions of DKI (2010)

5.5.4 Maintenance Cost for this Project

Maintenance cost is important in project appraisal, in particular economic analysis. Furthermore, maintenance costs for roads and structures (flyovers and underpasses) are different. In this Project, major facilities are flyovers and underpasses. Therefore, "structure-oriented" maintenance cost is estimated, using past data. The obtained results are as follows:

Table 5.5.5 Maintenance Cost Estimate

Structure	Maintenance cost per year
Flyover (incl. road parts)	0.5 % of civil work cost
Underpass (incl. road parts)	1 % of civil work cost

Source: JICA Survey Team

5.6 Technical Assistance and Transfer

Technical assistance, usually in the form of providing engineering, financial, operational or development expertise, is useful for ensuring the sustainability of benefits and effects generated by the project.

- The Consultant studies whether it is necessary to provide technical assistance or training for the staff of the facilities related to the project executing or operating agency.
- When such assistance or program is deemed necessary, the Consultant will propose the outline of the assistance program.

CHAPTER 6. PROJECT COST ESTIMATE

(confidential)

6.1 Composition of Project Cost

(confidential)

6.2 Estimate of Project Cost

(confidential)

Table 6.2.1 Project Cost Estimate

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Table 6.2.2 Summary of Construction Cost Estimate (May 2011, Unit: Rp. Mil.)

(confidential)

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6.4 Financing Plan

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6.5 Price Escalation

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Table 6.5.1 Price Index in Indonesia

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Figure 6.5.1 Various Price Indices in Indonesia

Table 6.5.2 Weighted Average Increase/year

(confidential)

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Table 7.3.5 Time Value of Trucks

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(confidential)

7.4.1 Semanggi Junction

(confidential)

Table 7.4.2 Summary of Economic Analysis Result for Semanggi Improvement

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(confidential)

Table 7.4.4 Cash Flow of Benefit-Cost Analysis for Semanggi Improvement (Alt. 2-1)

(confidential)

Table 7.4.5 Cash Flow of Benefit-Cost Analysis for Semanggi Improvement (Alt. 2-2)

(confidential)

Table 7.4.6 Cash Flow of Benefit-Cost Analysis for Semanggi Improvement (Alt. 3)

(confidential)

Table 7.4.7 Cash Flow of Benefit-Cost Analysis for Semanggi Improvement (Alt. 4)

(confidential)

Table 7.4.8 Sensitivity Analysis of Economic Analysis for Semanggi Improvement

(confidential)

7.4.2 R.E. Martadinata Intersection

(confidential)

Table 7.4.9 Summary of Economic Analysis Result for R.E. Martadinata FO

(confidential)

Table 7.4.10 Cash Flow of Benefit-Cost Analysis for R.E. Martadinata FO

(confidential)

Table 7.4.11 Sensitivity Analysis of Economic Analysis for R.E. Martadinata FO

(confidential)

7.4.3 Sulawesi - Tg.PA Intersection

(confidential)

Table 7.4.12 Summary of Economic Analysis Result for Sulawesi - Tg.PA FO

(confidential)

Table 7.4.13 Cash Flow of Benefit-Cost Analysis for Sulawesi - Tg.PA FO

(confidential)

Table 7.4.14 Sensitivity Analysis of Economic Analysis for Sulawesi - Tg.PA FO

(confidential)

7.4.4 Kuningan Intersection

(confidential)

Table 7.4.15 Summary of Economic Analysis Result for Kuningan UP

(confidential)

Table 7.4.16 Cash Flow of Benefit-Cost Analysis for Kuningan UP

(confidential)

(confidential)

Table 7.4.17 Sensitivity Analysis of Economic Analysis for Kuningan UP

(confidential)

7.4.5 Pancoran Intersection

(confidential)

Table 7.4.18 Summary of Economic Analysis Result for Pancoran FO

(confidential)

Table 7.4.19 Cash Flow of Benefit-Cost Analysis for Pancoran FO

(confidential)

Table 7.4.20 Sensitivity Analysis of Economic Analysis for Pancoran FO

(confidential)

7.4.6 Pinang Baris Intersection

(confidential)

Table 7.4.21 Summary of Economic Analysis Result for Pinang Baris FO

(confidential)

Table 7.4.22 Cash Flow of Benefit-Cost Analysis for Pinang Baris FO

(confidential)

Table 7.4.23 Sensitivity Analysis of Economic Analysis for Pinang Baris FO

(confidential)

7.4.7 Katamso Intersection

(confidential)

Table 7.4.24 Summary of Economic Analysis Result for Katamso UP

(confidential)

Table 7.4.25 Cash Flow of Benefit-Cost Analysis for Katamso UP

(confidential)

Table 7.4.26 Sensitivity Analysis of Economic Analysis for Katamso UP

(confidential)

7.4.8 Sudirman II Intersection

(confidential)

Table 7.4.27 Summary of Economic Analysis Result for Sudirman II FO

(confidential)

Table 7.4.28 Cash Flow of Benefit-Cost Analysis for Sudirman II FO

(confidential)

Table 7.4.29 Sensitivity Analysis of Economic Analysis for Sudirman II FO

(confidential)

7.4.9 Cikarang Area

(confidential)

Table 7.4.30 Summary of Economic Analysis Result for Cikarang Road Improvement

(confidential)

Table 7.4.31 Cash Flow of Benefit-Cost Analysis for Cikarang Road Improvement

(confidential)

(confidential)

(confidential)

Table 7.4.32 Sensitivity Analysis of Economic Analysis for Cikarang Road Improvement

(confidential)

7.4.10 Senayan Roundabout

(confidential)

Table 7.4.33 Summary of Economic Analysis Result for Senayan Road Improvement

(confidential)

Table 7.4.34 Cash Flow of Benefit-Cost Analysis for Senayan Road Improvement (Alt. 1)

(confidential)

Table 7.4.35 Cash Flow of Benefit-Cost Analysis for Senayan Road Improvement (Alt. 2)

(confidential)

Table 7.4.36 Cash Flow of Benefit-Cost Analysis for Senayan Road Improvement (Alt. 3)

(confidential)

Table 7.4.37 Cash Flow of Benefit-Cost Analysis for Senayan Road Improvement (Alt. 4)

(confidential)

Table 7.4.38 Cash Flow of Benefit-Cost Analysis for Senayan Road Improvement (Alt. 5)

(confidential)

Table 7.4.39 Sensitivity Analysis of Economic Analysis for Senayan Road Improvement

(confidential)

CHAPTER 8. ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

8.1 Environmental Impact Assessment Law and relevant guidelines in Indonesia

8.1.1 EIA Legislation

(1) Major Laws and Regulations

Indonesian Laws regarding Environmental Impact Assessment (hereinafter referred to as "AMDAL") have been established in accordance with "Law No.4 of 1986 Concerning Environmental Management" and operated since 1986. Then Government Regulation No.51 of 1993 concerning Environmental Impact Assessment was established and revised in 1999. Furthermore AMDAL is defined as a measure for the environmental protection and management in "Law No.32 of 2009 regarding Environmental Protection and Management". Relevant major laws are shown in the table below.

Table 8.1.1 Major Laws and Regulations regarding AMDAL

Category of Law/ Regulation	Name of Law / Contents
Law	Law No. 23 of 1997 Environmental Management (Requirements of AMDAL)
	Law No.32 of 2009 regarding Environmental Protection and Management (AMDAL is clarified as one of the measures for environmental protection and management)
Decree of State Ministry for the Environment	No.40 of 2000 (Guidelines for Work System of the Evaluator Committee)
	No.41 of 2000 (Establishment of Regencial/Municipal Evaluator Committee)
	No.42 of 2000 (Establishment of Central Government Evaluator Committee)
	No.17 of 2001 (Types of Business and/or Activity Plans that are Required to be Completed with the AMDAL)
	No.30 of 2001 (Environmental Audit)
	No.11 of 2006 (Types of Business and/or Activity Plans that are Required to be Completed with the AMDAL)
Decree of Head of Environment Impact Management Agency	No.12 of 1994 (Guidelines for Environmental Management and Monitoring Process)
	No.299 of 1996 (Technical Guidelines for social impacts)
	No.105 of 1997 (Guidelines for Environmental Management and Monitoring)
	No.2 of 2000 (Guidelines for AMDAL Document Evaluation)
	No.8 of 2000 (Community Involvement and Information Openness)
	No.9 of 2000 (Guidelines for Preparation of Environment Impacts Assessment)
	No.8 of 2006 (Guidelines for Analysis of Environment Impacts Assessment)
Local Government	No. 2863 of 2001:(Types of Business and/or Activity Plans that Require an AMDAL), DKI

Source : Indonesian environmental laws and relevant regulations

Mandatory list of a full EIA (AMDAL) is presented below.

According to the table, construction of a flyover or underpass which is more than 2km in length or requires more than 5ha land acquisition shall complete the AMDAL process in accordance with the decree.

However the criteria for AMDAL varies with different local governments, for instance, 750m is the criteria for flyovers and underpasses in the regulations of DKI. Therefore, the criteria for AMDAL should be confirmed after project selection.

Table 8.1.2 Mandatory List for AMDAL (Flyover, Underpass and Road improvement)

Regional Infrastructure	a. Toll Road Construction b. **Flyover Road & Underpass Construction**	All scales **≧2km** **(DKI: 750m)*1**
	Construction of Bridge	**≧500m**
	Construction and/or improvement of road with widening to outside of the area belonging to the road **a. Big city/ metropolitan** - Length **- Or extent of areas** b. Medium City - Length - Or extent of area c. Rural - Length	 **≧5km (4km*1)** **≧5ha(2.5ha*1)** ≧10km ≧10ha ≧30km

Source: Decree of State Minister for the Environment No.17/2001 on Types of Business and/or Activity Plans that require an Environmental Impact Assessment
Decree of State Ministry for the Environment No.11 of 2006 on Types of Business and/or Activity Plans that Require an Environmental Impact Assessment
*1: Environmental Regulation of DKI (No. 2863 of 2001: Types of Business and/or Activity Plans that Require an AMDAL)

(2) AMDAL Process

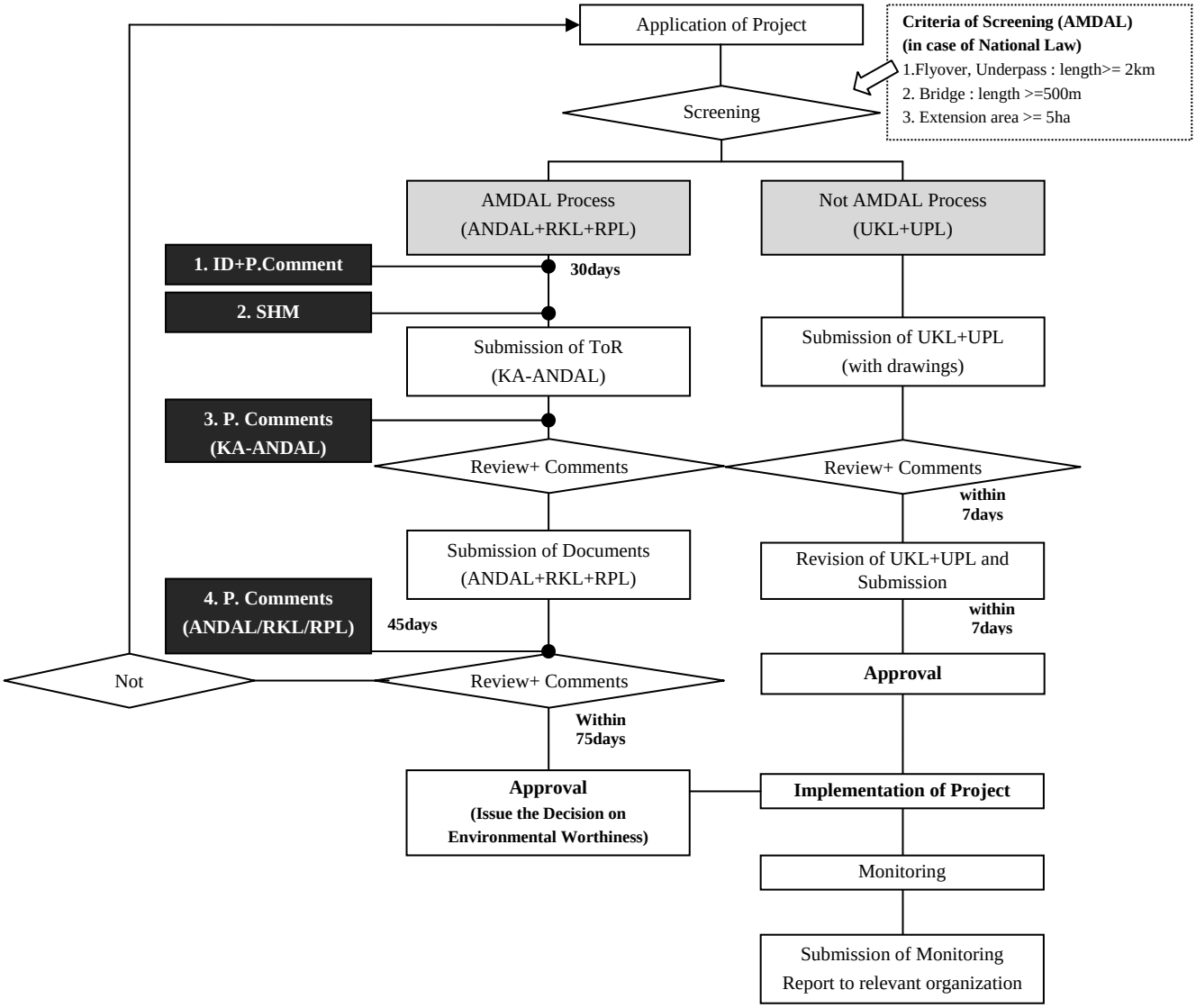
A proponent shall submit a proposal which explains the project outline and forecast impacts such as land acquisition to the Governmental Environmental Authority. The environmental authorized organization will conduct screening in accordance with the mandatory list for AMDAL. In the case of an AMDAL, the proponent shall submit a ToR for EIA (KA-ANDAL) to the AMDAL Committee, and then it will be reviewed and approved. The proponent shall prepare and submit an Environmental and Social Impacts Assessment Report (ANDAL), Environmental Management Plan (RKL), Environmental Monitoring Plan (RPL) and Summary Report. The AMDAL Committee reviews and approves them within 75 days unless significant adverse impacts are predicted.

(3) UKL and UPL Process

The series of UKL and UPL processes are as follows;

- The proponent conducts draft screening based on the relevant laws and submits an application form and project outline to the authorized environmental agency (hereinafter referred to as "The EAA") in City, District or DKI.
- The EAA conducts formal screening based on the documents which were submitted from the proponent and notifies the proponent of the results
- The proponent prepares a draft UKL&UPL report and submits it to the EAA
- The EAA and the evaluation committee reviews the draft UKL&UPL report and makes comments within 7 days
- The proponent finalizes the report in accordance with the comments from the EAA and submits it to the EAA again within 7 days
- The EAA reviews the final report and issues an environmental license

According to interviews with the EAA in Medan and DKI, the duration of the process for UKL/UPL is approximately 2 to 3 months, and 5 to 7 months for an AMDAL.



Source: No.8 of 2000 (Decree of Head of Environmental Impact Management Agency Community Involvement and Information Openness)

1. ID+Public Comments: The proponent shall announce the project outline and schedule through media (newspaper, radio, proponent's and prescribed office and public board prescribed by proponent). The stakeholders (public) have the right to advice, response and send opinions regarding announced business and project for 30days after the announcement
2. SHM: The proponent shall announce a public consultation through media (newspaper, radio, proponent's and prescribed office and public board prescribed by proponent), and hold it. The proponent shall explain project outline, schedule, forecast impacts and items to be surveyed and analyzed.
3. Public Comment: Public comments regarding draft KA-ANDAL shall be submitted to the environmental authorized committee 3 days before the reviewing by the AMDAL Committee
4. Public Comments: Public Comments regarding draft ANDAL/RKL/RPL shall be submitted to the Governmental Environmental Authority within 45 days after receiving draft ANDAL/RKL/RPL

Figure 8.1.1 Law-Based EIA Approval Procedures

(4) Gaps with JICA Guidelines for Environmental and Social Considerations (April 2010)

When comparing the content of JICA Guidelines for Environmental and Social Considerations (April 2010) (hereinafter referred to as "JICA's guidelines") and the requirements of Indonesian relevant laws, no significant differences have been identified. However items in the JICA Guidelines are detailed

A full comparison is provided below in the next table:

Table 8.1.3 Indonesia's and JICA's Guidelines -A Comparison of Requirements-

Scope of Impacts for Evaluation in Environmental Assessments		
Item	JICA Guidelines	Indonesia
Potential	Direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project	Direct/indirect, magnitude and time frame
Affected Area	Environmental impacts on a trans-boundary or global scale, e.g. global warming	Project-related impacts
Target Items	[Social Environment] Involuntary resettlement, Local economy, employment and livelihood, Land use and local resources utilization, Existing social infrastructures and services, Local communities, Benefit and damage misdistribution, Gender, Children's rights, Cultural heritage, Local conflicts of interests, Public sanitation, Infectious diseases such as HIV/AIDS, Water usage and rights, Traffic accidents	Social (Demographics, Economics, Culture and land acquisition) Physical Chemistry (Land use) Public Health
	[Natural Environment] Global warming, Biota and ecosystems, Geographical features, Soil erosion, Underground water, Hydrological situation, Coastal zone (mangroves, coral reefs, tidal flats, etc.), Climate, Landscape	Biology (Fauna and, Flora) Physical Chemistry (Geographical features, Hydrological situation
	[Pollution] Air pollution, Water pollution, Soil contamination, Waste, Noise and vibration, Ground subsidence, Offensive odours, Bottom sediment in sea and rivers	Physical Chemistry (air, water, noise and vibration)

Source: JICA Guidelines for Environmental and Social Considerations （April 2010）
No.9 of 2000 (Decree of Head of Environment Impact Management Agency / Guidelines for Preparation of Environment Impacts Assessment)

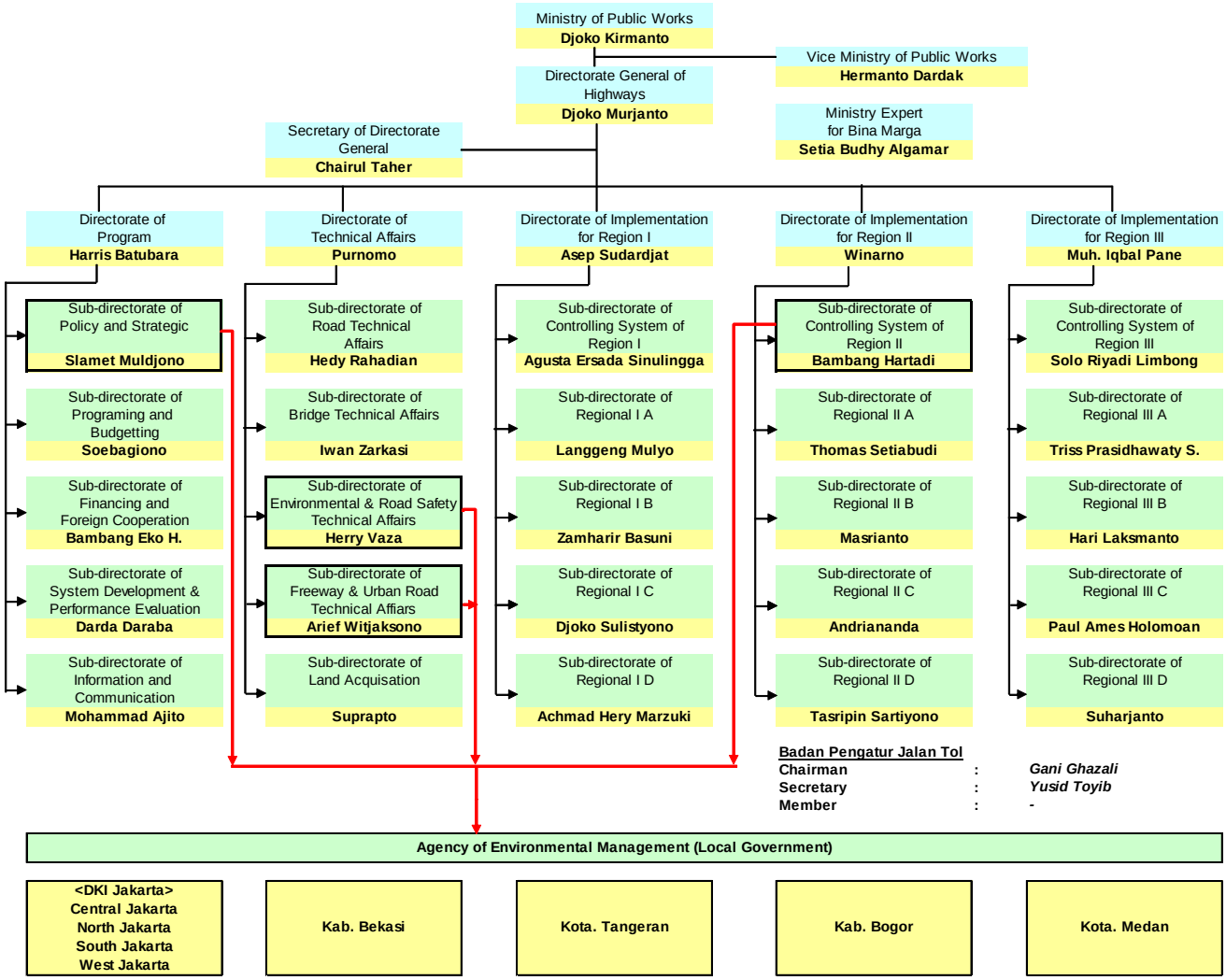
8.1.2 Governmental Environmental Authority

In Indonesia, the Governmental Environmental Authority varies according to character of the project, scale and location. With regard to the target sub projects, since each project site is located in single local government, the governmental environmental authority is in the District (Kabupaten), City (Kota) and DKI respectively. The environmental committee will be setup in Central, West, South and North Jakarta City, Bogor regency, Bekasi regency, Tangerang City and Medan City respectively.

Table 8.1.4 Environmental Authorized Government Agency by Project Type

Name of Committee	Project Type / Character	Environmental Authorized Agency
(a) Central AMDAL Committee	✓ Strategic project regarding National defence and security ✓ Specific project ✓ Project which is located in more than two provinces ✓ Project which is located in conflict area with another country ✓ Project which is located in a marine area (22.2kms range from shoreline)	Minister of Environment
(b) Province AMDAL Committee	✓ Project which has significant environmental impacts to inhabitants over a wide range ✓ Project which is located in more than two districts or cities ✓ Project which has conditions with the exception of (a)	Provincial Governor
(c) District / City AMDAL Committee	✓ Project which has conditions with the exception of (a) and (b)	District Governor / Mayor / Metropolitan Governor

Source: Decree of State Ministry for the Environment No. 40 and 41 of 2000 on Establishment of Municipal Evaluator Committee for Environmental Impact Assessment



Source: Ministry of Public Works (as of February, 2011)

Figure 8.1.2 Organization Chart regarding Environmental Activities

8.2 Initial Environmental Evaluation for Screening of 10 Projects

8.2.1 Expected Facility and Screening based on the Law

The project components are construction of flyovers and underpasses at congested intersections, and improvement of roads.

The candidate sites, project outline and draft screening results are shown below.

Table 8.2.1 Project Outline and Draft Screening

Candidate and Location		Project Outline		
Location	Governmental Environmental Authority	Facility*	Target Structure Length (app.m)	Adjacent infrastructure
1. Semanggi	Central Jakarta City	Road Imp.	217m	Toll road
2. Margonda Cinere	South Jakarta City	UP	730m	-
3. Cililitan	Central Jakarta City	UP	430m	-
4. R.E.Martadinata (TJ Priuk)	North Jakarta City	FO	725m	-
5. Sulawesi- Tg.PA	North Jakarta City	FO	318m	-
6. Latumenten	West Jakarta City	FO	500m	Toll road
7. Sudirman-Daan Mogot	Tangerang City	FO	550m	-
8. Kuningan	Central Jakarta City	UP	1,018m	Toll road
9. Pancoran	South Jakarta City	FO	634m	Toll road
10. Cilandak	South Jakarta City	UP	370m	Toll road
11. Fatmawati	South Jakarta City	FO	450m	Toll road
12. Ciawi-Bogor	Bogor Regency	FO	540m	-
13. Pinang Baris	Medan City	FO	533m	-
14. Asrama-Gatot Subroto	Medan City	FO	530m	-
15. Katamso	Medan City	UP	360m	-
16. Sudirman II	Tangerang City	FO	570m	-
17. Cikarang	Bekasi Regency	FO Bridge Road	Road imp.(without widening) app. 2km (FO: 71m and 190m, Bridge: 50m/ Total 311m)	Toll road
18. Senayan	South Jakarta City	At-grade, FO/UP	Design is not fixed at the moment (L<750m)	-

Source: JICA Survey Team
* FO: Flyover, UP: Underpass

8.2.2 Major Environmental and Social Issues at each Candidate Site

Some environmental and social key issues are picked up through initial environmental examinations at each site. Since most candidate sites are located along urbanized area with residential and commercial areas, land acquisition is the most considerable issue from the view of social impacts. Furthermore, public infrastructure such as schools, hospitals and mosques should be considered.

The results of environmental and social evaluations for project screening are shown below.

Table 8.2.2 Evaluated Index for Project Screening

Indicator		Description
Social Env.	a) Resettlement	Number of affected structures as shown on satellite images based on the provisional design.
	b) Affected Public infrastructure	Affected schools, hospitals, markets and other public facilities
	c) Affected Religious facilities	Affected mosques and churches
Natural Env.	d) Affected planted area(app.(ha))	Affected vegetated area as shown on satellite images
	e) Impacts regarding Landscape	Magnitude of impacts Significant: Flyover unadjacent to another elevated road or facility Low: Flyover adjacent to an another elevated road Low: Underpass
	f) Impact regarding Air Quality, Noise and vibration	Magnitude of impact Positive: decrease of traffic volume, extension of decay distance (noise and vibration) or diffusion distance (air) and increase of traffic speed Negative: increase of traffic volume, shortening of decay distance (noise and vibration) or diffusion distance (air) and decrease of traffic speed

Source: JICA Survey Team

Quantitative analysis and evaluation was given on resettlement such as affected structures, hospitals and mosques and affected vegetated area through initial environmental examination.

Although other items such as landscape may be affected by the project, it has difficulty to analyze quantitatively since the impact of landscape is sensory. Furthermore, construction of flyover unadjacent to another elevated road may give significant impact on common landscape, however there are not any considerable aesthetic landscape such as natural and cultural heritage in the project area.

Thus the number of affected structures is selected as a major indicator for selection of sub project from 18 candidates.

Table 8.2.3 Preliminary Environmental and Social Evaluation

Evaluated Item / Candidate and Environmental Authority		Social Env. Impact			Natural Env. Impact		Pollution
		a) Resettlement *Provisional affected structures and area (as of March 2011)	**b) Affected Public infra.**	**c) Affected Religious facility**	**d) Affected planted area (app.(ha))**	**e) Impact regarding Landscape**	**f) Impact regarding Air Quality Noise, Vib.**
1. Semanggi	Central Jakarta City	0	0	0	3ha	Low	Positive
2. Margonda Cinere	South Jakarta City	100 With squatters	0	0	Negligible	Significant	Positive
3. Cililitan	Central Jakarta City	50	1 Market (compound)	1 Mosque (compound)	0.2ha	Significant	Positive
4. R.E.Martadinata (TJ Priuk)	North Jakarta City	10 (40 fixed stall)	1 Bus St.	0	0.2ha	Significant	Positive
5. Sulawesi- Tg.PA	North Jakarta City	50	0	0	0.8ha	Significant	Positive
6. Latumenten	West Jakarta City	30	1 Hospital (compound)	1 Mosque (compound)	Negligible	Low	Positive
7. Sudirman-Daan Mogot	Tangerang City	70	2 Schools (compound)	0	0.4ha	Significant	Positive
8. Kuningan	Central Jakarta City	10	0	0	0.3ha	Low	Positive
9. Pancoran	South Jakarta City	0	0	0	0.4ha	Low	Positive
10. Cilandak	South Jakarta City	10	0	0	1.2ha		Positive
11. Fatmawati	South Jakarta City	10	0	0	0.3ha		Positive
12. Ciawi-Bogor	Bogor Regency	70	0	0	Negligible	Significant	Positive
13. Pinang Baris	Medan City	80	0	0	0	Significant	Positive
14. Asrama-Gatot Subroto	Medan City	80	0	0	1.2ha	Significant	Positive
15. Katamso	Medan City	50	0	0	Negligible	Significant	Positive
16. Sudirman II	Tangerang City	10	1 Market (compound)	0	0.7ha	Significant	Positive
17. Cikarang	Bekasi Regency	Main Road and Bridge 10	0	0	Negligible	Low	Negative
		Connection Road Sub Total : 10 — 1: 0	0	0	Negligible	Low	Negative
		Connection Road Sub Total : 10 — 2: 10	0	0	Negligible	Low	Negative
		Connection Road Sub Total : 10 — 3: 0	0	0	Negligible	Low	Negative
		Flyover: 0	0	0	Negligible	Low	Negative
		Total : 20	0	0	Negligible	Low	Negative
18. Senayan	South Jakarta City	10	1 (compound)	0	Negligible	Significant	Positive

Note-1: Significant: The target flyover unadjacent to another elevated road or facility, Low: The target flyover adjacent to an another elevated road or target structure is underpass

Note-2: Positive: decrease of traffic volume, extension of decay distance (noise and vibration) or diffusion distance (air) and increase of traffic speed, Negative: increase of traffic volume, shortening of decay distance (noise and vibration) or diffusion distance (air) and decrease of traffic speed

Source: JICA Survey Team

8.3 Screening and Scoping for Environmental and Social Considerations

8.3.1 Project Outline and Screening based on the Law

The project components are construction of flyovers and underpasses at congested intersections, and improvement of roads.

The selected 10 Sub-projects in the 1st stage and their project outline and draft screening results are shown below.

Table 8.3.1 Project Outline and Draft Screening

Candidate and Location		Project Outline			Draft Screening in accordance with Indonesian law *1	AMDAL or UKL/UPL Approval
Location	Governmental Environmental Authority	Facility	Target Structure Length (app.km)	Adjacent infrastructure		
1. Semanggi	Central Jakarta City	Road Imp.	217m	Toll road	UKL+UPL	-
2. R.E.Martadinata (TJ Priuk)	North Jakarta City	FO	725 m	-	UKL+UPL	-
3. Sulawesi- Tg.PA	North Jakarta City	FO	318 m	-	UKL+UPL	Approved (included in TgPA AMDAL)*3
4. Kuningan	Central Jakarta City	UP	1,018 m	Toll road	AMDAL	-
5. Pancoran	South Jakarta City	FO	634 m	Toll road	UKL+UPL	-
6. Pinang Baris	Medan City	FO	533 m	-	UKL+UPL	Expired*4
7. Katamso	Medan City	UP	360 m	-	UKL+UPL	-
8. Sudirman II	Tangerang City	FO	570 m	-	UKL+UPL	-
9. Cikarang	Bekasi Regency	Road imp. FO Bridge	Road imp.(without widening) app. 2km (FO: 71m and 190m, Bridge: 50m/ Total 311m)	Toll road	UKL+UPL	-
10. Senayan	South Jakarta City	At-grade, FO/UP	Unspecified due to under discussion (L<750m)	-	Expected UKL+UPL	-

Source: JICA Survey Team

Note) *1: Refer to Table 8.1.2 Mandatory List for AMDAL (Flyover, Underpass and Road improvement)

*2 : The criteria of AMDAL in DKI is 750m of length for flyovers and underpasses (No. 2863 of 2001: Types of Business and/or Activity Plans that Require an AMDAL, DKI)

*3 : Kuningan under pass is one of facilities in the Tanjung Priok Access Road Project, AMDAL approval of the project had been issued in December 2004 and the project is under construction

*4 : UKL/UPL approval for Pinan Baris had been issued in December 2008, however 3 years validity period after approval without construction activities is expired

All target facilities are required to prepare UKL&UPL except No.8 Kuningan in accordance with relevant regulations at the moment.

Thus implementation of UKL/UPL on the 6 sub-projects and AMDAL on the one sub-project is required.

8.3.2 Analysis of Alternatives

1) With Project

The population of JABODETABEK increased l.4 times over the past 15 years, from approximately 1.7 million in 1990 to 2.4 million in 2005. Along with this increase in population, the volume of traffic from the areas around JABODETABEK has been growing

steadily, and a further increase in the volume of traffic is being predicted. The volume of movement in JABODETABEK is already significant, and it is highly dependent on road transportation (98%). The number of registered motor vehicles in JABODETABEK increased approx. 2.4 times from approx. 3.26 million in 2000 to 7.97 million in 2006, which raised concerns about further traffic congestion. Recently, countermeasures for alleviating traffic congestion have been conducted such as the construction of Jakarta Outer Ring Road, enhancement of road capacity, and a traffic demand management policy, however, traffic congestion in JABODETABEK is still a serious issue and causes significant economic loss on Java island through the deterioration of the investment environment or the delay of access to the port, airport and railway.

Therefore to solve the heavy congestion and secure smooth traffic flow at the bottleneck intersections and roads is required.

Generally alternatives to meet such objective are flyovers and underpasses.

An adequate facility is to be adopted in consideration of constraints such as construction space, social and/or natural impacts, ease of construction and costs.

Major indicators for selection of facility type are shown below:

Table 8.3.2 Project Outline and Draft Screening

Indicator		Alternatives and negative impacts	
		Flyover	Underpass
Social	a) Resettlement	Significant	Low
	b) Affected Public infrastructure	Significant	Low
	c) Affected Religious facility	Significant	Low
Natural	d) Affected planted area (app.(ha))	Significant	Low
	e) Impact regarding Landscape	Significant	Low
	f) Impact regarding Air Quality, Noise and vibration	Positive impact	Significant positive impact
Cost	g) Construction Cost	High	Low
	h) Maintenance Cost	Low	High
	i) Workability of Construction	Advantage	Disadvantage

Source: JICA Survey Team

2) Without Project

The 'without project scenario' will cause heavy congestion, as a result, social losses such as traffic accidents, environmental deterioration and increase of travelling time will be accelerated.

8.3.3 Scoping for full scale EIA based on JICA Guidelines

Items for scoping were picked from the JICA guidelines because items which are indicated in JICA Guidelines are detailed and no significant gaps exist between Indonesian and JICA Guidelines.

Affected activities, items and their degree of adverse impacts are shown in the scoping matrix. Ratings were carried out through the initial environmental survey by the Survey Team.

The Survey Team recommended that items which were rated as A, B and C should be analyzed in the environmental activities such as ANDAL/RKL/RPL and UKL/UPL.

Scoping matrix and rating reasons are shown in the next tables.

Table 8.3.3 Scoping Matrix (No1 Semanggi: FO)

	No.	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement													
	2	Local economy such as employment and livelihood, etc.													
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services													
	6	The poor, indigenous and ethnic people, gender and children rights													
	7	Misdistribution of benefits and damage													
	8	Cultural heritage													
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common													
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape													
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Rating: A: Serious impact is expected. B: Some impact is expected. C: Extent of impact is unknown (serious impacts are not expected, but survey and analysis shall be done) No Mark: Few impacts are expected. Detailed quantitative survey is not necessary.

Source: JICA Survey Team

Table 8.3.4 Rating Reasons (No1 Semanggi: FO)

	No	Likely Impacts	**Predicted Impacts and its reason**	Rating
Social Environment:	1	Resettlement	Resettlement is not caused due to no residential area in the construction area	
	2	Local economy such as employment and livelihood, etc.	This project does not have negative impacts on this item basically	
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Although lines such as gas, water, power and other cables area running underground along the road, such facilities will be replaced in an appropriate way. There are no considerable facilities such as school, religious places or hospitals in the project area. Thus this project does not have negative impacts on this item basically.	
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	This project does not have negative impacts on this item basically	
	7	Misdistribution of benefits and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	There are no monuments, graveyards or sacred places in the project area.	
	9	Local conflict of interests	This project does not have negative impacts on this item due to no resettlement	
	10	Water Usage or Water Rights and Rights of Common	See " 5. Existing social infrastructures and services"	
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There are not any rivers in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Green zone in the space of loop ramp may be cut down by the project	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	This project does not have negative impacts on this item basically due to road improvement	
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersections. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may give positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from construction area and operation of construction machine will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Rating: A: Serious impact is expected. B: Some impact is expected. C: Extent of impact is unknown (serious impacts are not expected, but survey and analysis shall be done) No Mark: Few impacts are expected. Detailed quantitative survey is not necessary.

Source: JICA Survey Team

Table 8.3.5 Scoping Matrix (No2 R.E.Martadinata: FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	B	B											
	2	Local economy such as employment and livelihood, etc.	A	B							A				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services	B	B							B				
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape	B											B	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.6 Rating Reasons (No2 R.E.Martadinata: FO)

	No	Likely Impacts	Predicted Impacts and its reason	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **3 (provisional number)** Major Type of houses: one-storied structures (restaurants & residences)	B
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on movable stalls, shops and restaurants along the target road	A
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Railway and bus station is observed in the affected area. Any other considerable facility such as school and hospital should be identified through interview survey.	B
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this	
	10	Water Usage or Water Rights and Rights of Common	Although no water usage in the river or wells is observed in reconnaissance, these location should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There are no rivers in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	A small garden in the bus station and street trees along the road may be removed	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road. Thus the project has a certain impact on this item.	B
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.7 Scoping Matrix (No3 Sulawesi- Tg.PA: FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	A	A											
	2	Local economy such as employment and livelihood, etc.	A	A							A				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services	C	C							C				
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape	B											B	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.8 Rating Reasons (No3 Sulawesi- Tg.PA: FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **43 (provisional number)** Major Type of houses: one-storied structures (restaurants & residences)	A
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on movable stalls, shops, restaurants and hotel along the target road	A
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Although no considerable facility such as a school, hospital or mosque is observed, these facilities should be identified through interview survey.	C
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although no water usage in the river and wells is observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	Although a canal is running from west to east, the project does not have negative impacts on the river	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Some street trees along the road may be removed by widening of the road	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road. Thus the project has a certain impact on this item.	B
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of the flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.9 Scoping Matrix (No4 Kuningan: UP)

	No.	Affected Activities / Impact Items	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	B	B											
	2	Local economy such as employment and livelihood, etc.													
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services													
	6	The poor, indigenous and ethnic people, gender and children rights													
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water	C					C							
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape	B											B	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination	C					C							
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.10 Rating Reasons (No4 Kuningan: UP)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **5 (provisional number)** Major Type of buildings: one or two story offices	B
	2	Local economy such as employment and livelihood, etc.	This project does not have negative impacts on this item basically because most of the affected area is the compound of a private company such as vegetated area	
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Although no considerable facility such as a school, hospital or mosque is observed in reconnaissance, these facilities should be identified through interview survey.	
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	No slum or other minority group is observed in reconnaissance, thus it is not likely to have a negative impact on this item	
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although no wells are observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	Project activities such as excavation may affect existing underground water level, thus used wells should be identified through interview survey	C
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Vegetated buffer with pathway along the road may be removed by widening of the road	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed at the same level of current toll road, thus the project does not give significant impact on this item	B
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	Excavated soil in the earthwork may be polluted by hazardous matter, thus history of land use shall be verified through interview survey	C
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.11 Scoping Matrix (No5 Pancoran: FO)

	No	Affected Activities / Impact Items	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement													
	2	Local economy such as employment and livelihood, etc.													
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services													
	6	The poor, indigenous and ethnic people, gender and children rights													
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B					B							
	19	Meteorology													
	20	Landscape	B											B	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odor													
	29	Bottom sediment													
	30	Accidents	B						B		B		B		B

Source: JICA Survey Team

Table 8.3.12 Rating Reason (No5 Pancoran: FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **0(provisional number)** Major Type of houses: - (compound of private company and GOI)	
	2	Local economy such as employment and livelihood, etc.	This project does not gives negative impacts on this item basically because most affected area is compound of a private company and GOI	
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Any considerable facility such as school, hospital and mosque is not observed in reconnaissance, thus it is not likely to give negative impact on this item	
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	No slum or other minority group is observed in reconnaissance, thus it is not likely to have a negative impact on this item	
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although no wells are observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Vegetated buffer with pathway along the road may be removed by widening of the road	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road. Thus the project has a certain impact on this item.	B
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of the flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odor	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (inclusive traffic accident)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.13 Scoping Matrix (No6 Pinang Baris : FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	A	A											
	2	Local economy such as employment and livelihood, etc.	A	A							A				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services	C	C											
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)													
	19	Meteorology													
	20	Landscape	A											A	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.14 Rating Reasons (No6 Pinang Baris: FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **80 (provisional number)** Major Type of houses: two or three story structures (shops & residences)	A
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on shops, restaurants, movable stalls and a small market along the target road	A
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Although no considerable facility such as a school, hospital or mosque is observed in reconnaissance, these facilities should be identified through interview survey.	C
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although wells are not observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	There is no vegetated area in the project area	
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road, thus the project has a certain negative impact on inhabitants	A
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover	
	25	Waste	Waste concrete and soil may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.15 Scoping Matrix (No7 Katamso: UP)

	No	Affected Activities / Impact Items	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	A	A											
	2	Local economy such as employment and livelihood, etc.	A	A							A				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services													
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water	C					C							
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)													
	19	Meteorology													
	20	Landscape													
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination	C					C							
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.16 Rating Reasons (No7 Katamso : UP)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: 48 **(provisional number)** Major Type of houses: one-storied structures (shops & residences)	A
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on the commercial area along the target road	A
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	Not observed in the affected area	
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item basically	
	10	Water Usage or Water Rights and Rights of Common	Although wells are not observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	Project activities such as excavation may affect existing underground water level, thus used wells should be identified through interview survey	C
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	There is no vegetated area in the project area	
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	This project does not have negative impacts on this item basically due to underpass	
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	Excavated soil in the earthwork may be polluted by hazardous matter, thus history of land use shall be verified through interview survey	C
	25	Waste	Waste concrete and soil may be generated by clearance work.	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.17 Scoping Matrix (No8 Sudirman II: FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	B	B											
	2	Local economy such as employment and livelihood, etc.	B	B							B				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services													
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape	A											A	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.18 Rating Reasons (No8 Sudirman II : FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **10 (provisional number)** Major Type of houses: one-storied structures (shops & residences)	B
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on shops and restaurants along the target road	B
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	A public fruit market is located in the affected area. Although no other considerable facility such as a hospital or mosque is observed in the reconnaissance, these facilities should be identified through interview survey.	
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although wells are not observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Street trees along the road may be removed by widening of the road	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road, thus the project has a certain negative impact on inhabitants	A
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.19 Scoping Matrix (No9 Cikarang: FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	B	B											
	2	Local economy such as employment and livelihood, etc.	B	B							B				
	3	Land use and utilization of local resources	C	C											
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services	C	C											
	6	The poor, indigenous and ethnic people, gender and children rights	C	C											
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B					B							
	19	Meteorology													
	20	Landscape	B											B	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	B						B		B		B		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			B		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.20 Rating Reason (No9 Cikarang : FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: **20 (provisional number)** Major Type of houses: one storied structures (shops & residences)	B
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on shops and restaurants along the target road	B
	3	Land use and utilization of local resources	Small scale fishing by local people is observed in the main canal along the road. Additionally, irrigation is conducted from the main canal to paddy fields.	C
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	An irrigation system is operated in the project area. Although no other considerable facility such as a hospital, school or mosque are observed in the reconnaissance, these facilities should be identified through interview and site survey	C
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	Although no slum or other minority group is observed in reconnaissance, this information should be collected through interview survey	C
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview and site survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Kali Malang canal is located along the target road, and operated as a main irrigation source by the irrigation authority. Although wells are not observed in reconnaissance, these locations should be identified through interview and site survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Kali Malang canal provides habitats for fish, amphibian and aquatic plants. Construction activities such as widening or earthwork may have negative impacts to the habitat.	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed at the same level as the current flyover, thus the project does not have significant impact on this item	
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have a certain negative impacts since traffic volume will increase along the road.	B
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover and road improvement	
	25	Waste	Waste concrete and soil may be generated by clearance work	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have certain negative impacts since traffic volume will increase along the road.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Table 8.3.21 Scoping Matrix (No10 Senayan: FO)

	No	Impact Items / Affected Activities	Overall Rating	Planning Phase		Construction Phase							Post Construction		
				Land acquisition and Loss of properties	Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of Construction Equipment and Vehicles	Construction of Roads, tollgates, parking lots, Access roads for bridges and other related facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Increase of Through Traffic	Appearance/ Occupancy of Roads and related building structures	Increasing influx of settlers
Social Environment	1	Resettlement	B	B											
	2	Local economy such as employment and livelihood, etc.	B	B							B				
	3	Land use and utilization of local resources													
	4	Social institutions and local decision-making institutions													
	5	Existing social infrastructures and services	B	B											
	6	The poor, indigenous and ethnic people, gender and children rights													
	7	Misdistribution of benefit and damage													
	8	Cultural heritage	C	C											
	9	Local conflict of interests													
	10	Water Usage or Water Rights and Rights of Common	C	C				C							
	11	Sanitation													
	12	Hazards (Risk) and Infectious diseases such as HIV/AIDS													
Natural Environment	13	Topography and Geographical features													
	14	Soil Erosion													
	15	Underground water													
	16	Hydrological Situation													
	17	Coastal Zone	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Flora, Fauna and Biodiversity (Street trees)	B				B								
	19	Meteorology													
	20	Landscape	A											A	
	21	Global Warming	C										C		
Pollution	22	Air Pollution	C										C		
	23	Water Pollution													
	24	Soil Contamination													
	25	Waste	B				B	B							
	26	Noise and Vibration	B						B	B			C		
	27	Ground Subsidence													
	28	Offensive Odour													
	29	Bottom sediment													
	30	Accidents	B						B		B				

Source: JICA Survey Team

Table 8.3.22 Rating Reason (No10 Senayan: FO)

	No	Likely Impacts	Site Check Item	Rating
Social Environment:	1	Resettlement	Number of relocation structures: 10 **(provisional number)**	B
	2	Local economy such as employment and livelihood, etc.	This project has a certain impact on commercial areas along the target road during construction	B
	3	Land use and utilization of local resources	This project does not have negative impacts on this item basically	
	4	Social institutions and local decision-making institutions	This project does not have negative impacts on this item basically	
	5	Existing social infrastructures and services	A school compound is located in the affected area. Although no other considerable facility such as a hospital or mosque is observed in the reconnaissance, these facilities should be identified through interview survey.	B
	6	The poor, indigenous and ethnic people (inclusive gender and right of children)	No slum or other minority group is observed in reconnaissance	
	7	Misdistribution of benefit and damage	This project does not have negative impacts on this item basically	
	8	Cultural heritage	Although no monuments, graveyards or sacred places are observed in reconnaissance, this information should be collected through interview survey	C
	9	Local conflict of interests	This project does not have negative impacts on this item	
	10	Water Usage or Water Rights and Rights of Common	Although wells are not observed in reconnaissance, these locations should be identified through interview survey	C
	11	Sanitation	This project does not have negative impacts on this item basically	
	12	Hazards (Risk) Infectious diseases such as HIV/AIDS	This project does not have negative impacts on this item basically	
Natural Environment	13	Topography and Geographical features	This project does not have negative impacts on this item basically	
	14	Soil Erosion	This project does not have negative impacts on this item basically	
	15	Groundwater	This project does not have negative impacts on this item because earthwork is limited	
	16	Hydrological Situation	There is no river in the project area	
	17	Coastal Zone	There is no coastal zone in the project area	
	18	Flora, Fauna and Biodiversity	Street trees along the road may be removed by widening of the road	B
	19	Meteorology	This project does not have negative impacts on this item basically	
	20	Landscape	Planned flyover will be constructed approximately 10ms above the current road, thus the project has a certain negative impact on inhabitants	A
	21	Global Warming	The project may have positive impacts since driving speed will increase at the target intersection. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
Pollution	22	Air Pollution	The project may have positive impacts since driving speed will increase and exhaust gas from vehicles will be diffused at 10m above the ground. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	C
	23	Water Pollution	This project does not have negative impacts on this item basically	
	24	Soil Contamination	This project does not have significant negative impacts on this item because earthwork is limited in case of flyover	
	25	Waste	Waste concrete, soil and cut trees may be generated by clearance work	B
	26	Noise and Vibration	During construction, noise from the construction area and operation of construction machines will be generated. The project may have positive impacts since driving speed will increase and noise decay distance is extended. However on the other hand, diverted traffic by construction of the facility may give some adverse impacts.	B
	27	Ground Subsidence	This project does not have negative impacts on this item basically	
	28	Offensive Odour	This project does not have negative impacts on this item basically	
	29	Bottom sediment	This project does not have negative impacts on this item basically	
	30	Accidents (including traffic accidents)	Construction works may cause additional congestion during construction due to reduction of traffic capacity	B

Source: JICA Survey Team

Following are recommended methodologies for baseline survey and impact forecast.

Table 8.3.23 Recommended Survey Methodology

Area	No	Item	Physical Site Survey Methodology (Draft) ✓ UKL/UPL, AMDAL	Forecast Methodology/ Contents to be commented on ✓ AMDAL, UKL/UPL
Social Environment	1	Involuntary Resettlement	✓ In principle, refer to the survey results regarding LARAP	✓ In principle, refer to LARAP
	2	Local economy such as employment and livelihood, etc.	✓ In principle, refer to the survey results regarding LARAP	✓ In principle, refer to LARAP
	3	Land use and utilization of local resources	✓ Interview with local authority and rough site survey Note) Use GPS	✓ Describe degree of change of present condition (ex. agricultural area)
	4	Social institutions infrastructure and local decision-making institutions	✓ Interview with local authority (traditional/administrative local decision making system)	✓ Describe degree of change of present condition
	5	Existing social infrastructures and services	✓ List all infrastructures and mapping through interview with local authority and site survey (schools, health centres, public meeting places, religious facilities, power lines and etc) note) Use GPS device	✓ Describe degree of change of present condition (Affected infrastructures such as power, water, gas and access to schools, hospitals and other facilities)
	6	The poor, indigenous & ethnic people, Gender and Children's rights	✓ Interview with local authority, community leaders, NGOs and women's group as required	✓ Describe degree of change of present condition (degree of impacts to ethnic people, women and children)
	7	Misdistribution of benefits and damage	✓ Interview from local authority	✓ Describe degree of change of present condition
	8	Cultural heritage	✓ List all infrastructures and mapping through interview with local authority and site survey (cultural heritage, grave yards, sanctuaries, sacred places and etc) note) Use GPS device	✓ Indicate affected cultural sites such as graveyards, local heritage and sacred places on the map ✓ Cost estimation of displacement Note) Indicate affected places on the GPS map
	9	Local conflict of interests	✓ Interview with local authority and community leaders	✓ Describe degree of change of present condition
	10	Water Usage or Water Rights and Rights of Common	✓ List all infrastructures and mapping through interview with local authority and site survey (Water sources, wells and water rights if any) note) Use GPS device	✓ Indicate affected water sources such as wells, public taps, rivers and ponds on the map ✓ Cost estimation of displacement Note) Indicate affected place on the GPS map
	11	Sanitation	✓ Interview with local authority	✓ Describe degree of change of present condition
	12	Hazards (Risk) Infectious diseases such as HIV/AIDS	✓ Interview with local authority and health centre	✓ Describe degree of change of present condition (Disease name)
Natural Environment	13	Topography and Geographical features	✓ Take pictures if there are any considerable features	✓ Indicate affected sites on the map (if there are any considerable features)
	14	Soil Erosion	✓ Interview with local authority and rough site survey Note) Use GPS device	✓ Describe degree of change of present condition (pick areas predicted for erosion)
	15	Groundwater	✓ Survey ground water level through "Item No.10 Water right"	✓ Number of wells lost and indicate them on the map ✓ Estimation of affected residents

Area	No	Item	Physical Site Survey Methodology (Draft) ✓ UKL/UPL, AMDAL	Forecast Methodology/ Contents to be commented on ✓ AMDAL, UKL/UPL
	16	Hydrological Situation	✓ Rough site survey (location of rivers, river flow, flood frequency and etc) Note) Use GPS device	✓ Describe degree of change of present condition
	17	Coastal Zone	✓ Rough site survey (distribution of mangrove and biota in the mangrove area, if any) Note) Use GPS device	✓ Describe degree of change of present condition
	18	Flora, Fauna and Biodiversity	✓ Literature survey and interview survey with specialists and inhabitants (list considerable species and distribution in the project area) ✓ Rough site survey in the affected area (count the number of trees along the road in the affected area). Note) Use GPS device Reference) Indonesian list, IUCN, CITES	✓ Estimate the number of trees along the road in the affected area ✓ Calculate area of vegetation loss by types in new developed area, and indicate them on the map ✓ Number of considerable species lost and their habitats ✓ Predicted ecosystem after construction of the road
	19	Meteorology	✓ No need for physical site survey	✓ Describe degree of change of present condition
	20	Landscape	✓ Taking pictures from major viewpoints Note) Use GPS device	✓ Indicate affected aesthetic landscape on the map ✓ Make a composite photograph or computer graphic post construction
	21	Global Warming	✓ No need for physical site survey	✓ Calculate degree of change for volume of greenhouse gases (CO2)
	22	Air Pollution	✓ Collect existing measured date ✓ Quantitative measurement of NOx, SOx, CO and Suspended Particulate Matters (SPM) (at least 3 points at each site)	✓ Calculate or estimate air quality at target year (NO2, SO2, CO and SPM)
	23	Water Pollution	✓ Measure turbidity, pH and BOD in the nearest rivers and wells which are used by inhabitants for dinking, laundry or bathing	✓ Describe degree of change of present condition during construction
	24	Soil Contamination	✓ Survey histories of land use along the road in interviews with relevant governmental sections and district office. (Biochemical factory, leather factory and hazardous material existence, etc.)	✓ Describe degree of change of present condition
	25	Waste	✓ Survey solid and liquid waste management and system through interview with local authority	✓ Describe degree of change of present condition
	26	Noise and Vibration	✓ Measure vibration, ambient noise level and traffic noise (road side noise) by sound level meter (equivalent noise dB (A), every 10min for 12 hours) (at least 3 points at each site)	✓ After Construction - Calculate traffic noise level along the road at target year (use estimated traffic volume at the target year)
	27	Ground Subsidence	✓ Survey such phenomenon through interview with relevant organization	✓ Describe degree of change of present condition
	28	Offensive Odour (bad smell)	✓ Survey such phenomenon in interview with inhabitants	✓ Describe degree of change of present condition
	29	Bottom sediment	✓ No need for physical site survey	✓ No need physical site survey
	30	Accidents	✓ Survey in interview with police station and relevant governmental section	✓ Describe degree of change of present condition

Source: JICA Survey Team

Following are recommended mitigation measures and monitoring plans.

Table 8.3.24 Recommended Mitigation Measures and Monitoring Plans

Items		Proposed Mitigation Measures		Monitoring Plan
		During Construction	Post Construction	
Social Environment	1. Resettlement	a) Minimization of affected area in the design b) Formation of consensus through a series of stakeholder meetings on the process of EIA and LARAP c) Carry out appropriate Land Acquisition & Resettlement Action Plan (LARAP)	Refer to the LARAP	[During Const.] [Post Const.] Refer to the LARAP
	2. Local economy, employment and livelihood	Refer to the LARAP	Refer to the LARAP	
	3. Land use and local resources utilization	Minimization of affected area in the design	Not required	Not required
	4. Social institutions and local decision-making institutions	Not required	Not required	Not required
	5. Existing social infrastructures and services	Minimization of affected area in the design	Not required	[During Const.] Interview survey from users
	6. The poor, indigenous and ethnic people, gender and children rights	Refer to the LARAP	Refer to the LARAP	Refer to the LARAP
	7. Misdistribution of benefits and damage	Not required	Not required	Not required
	8. Cultural heritage	a) Minimization of affected area in the design b) Formation of consensus through a series of stakeholder meetings on the process of EIA and LARAP	Not required	Not required
	9. Local conflicts of interests	Construction contractor should hire workers from the nearest communities through a fair process	Not required	[During Const.] Confirm worker list once a month [Post Const] Not required
	10. Water usage and rights	New wells shall be set up to replace affected wells	Not required	[During Const.] [Post Const] Periodical check of availability of water in the wells
	11. Public sanitation	Not required	Not required	Not required
	12. Infectious diseases such as HIV/AIDS	a) Healthcare education for workers b) Provide devices such as masks and helmets to construction workers as required	Not required	[During Const.] Periodical health check for construction workers by construction contractor [Post Const] Not required
Natural Environment	13. Topography and Geographical features	Not required	Not required	Not required
	14. Soil erosion	Setting up appropriate slope protection such as covering with grass and gabions on the embankment	Periodical monitoring and maintenance	[During Const.] [Post Const] Periodical visual monitoring

Items		Proposed Mitigation Measures		Monitoring Plan
		During Construction	Post Construction	
	15. Underground water	In the case of closing down drinking water supply, the proponent shall set up new wells or prepare new water supply	If prepared new well does not have enough volume, alternative well shall be set up by the proponent	[During Const.] [Post Const] Periodical monitoring of water level
	16. Hydrological situation	In case of major change in hydrological situation, appropriate counter measures shall be carried out	In case of major change in hydrological situation, appropriate counter measures shall be carried out	[During Const.] [Post Const] Periodical visual monitoring and maintenance
	17. Coastal zone (mangroves, coral reefs, tidal flats, etc.)	Not required (no impacts)	Not required (no impacts)	Not required (no impacts)
	18. Flora, Fauna and Biodiversity	a) Minimize cutting trees along the road and replant trees along the road based on the Landscape Regulations b) Implementation of environmental education for construction workers (prohibit cutting trees, development and dumping wastes without permission)	Not required	[During Const.] Count the number of cut trees Confirm developed boundary [Post Const] Not required
	19. Meteorology	Not required	Not required	Not required
	20. Landscape	Plant street trees along the road based on the landscape regulations	Not required	Not required
	21. Global warming	Not required	Not required	Not required
Pollution	22. Air pollution	Spraying water near residential areas to reduce dust level by construction contractor	Periodical cleaning of road surface to remove soil	[During Const.] Measure dust level near residential area once a month [Post Const] Measure SOx, SPM, NOx and CO at same current survey points for confirmation of effects
	23. Water pollution	a) Chemical and waste oil shall be managed and stored in an appropriate way, not discharged to river. b) Turbid water from construction area shall be treated by sedimentation tank as required	Not required	[During Const.] Measure turbidity in the nearest rivers [Post Const.] Not required
	24. Soil contamination	Not required	Not required	Not required
	25. Waste	a) Chemical and waste oil shall be managed and stored in an appropriate way, not discharged to river. b) Construction waste shall be managed and disposed of in compliance with the law	Not required	[During Const.] Periodical monitoring once a month [Post Const.] Not required
	26. Noise and vibration	a) Fixing construction work hours (daytime only) b) Consideration for praying times and Sunday c) Setup sound proof barrier on the construction boundary	Not required	[During Const.] Measure sound level near residential area, school and hospital once a month [Post Const] Measure sound level at same current survey points for confirmation of effects
	27. Ground subsidence	Not required	Not required	Not required
	28. Offensive odours	Not required	Not required	Not required

Items	Proposed Mitigation Measures		Monitoring Plan
	During Construction	Post Construction	
29. Bottom sediment in sea and rivers	Not required	Not required	Not required
30. Traffic accidents	a) Education on traffic management control and safety for workers b) Employing staff for traffic control and traffic safety c) Setup diversion for minimization of construction traffic congestion d) Setup of sidewalk along the road e) Contractor shall follow relevant labour law	Installation of traffic safety facilities	[During Const.] Periodical monitoring of accident cases once a month [Post Const.] Not required

Source: JICA Survey Team

Indonesian side in cooperation with JICA is carrying out a series of EIA activities based on above mentioned scoping, recommended survey and forecast methodology as of December 2011. Resettlement and land acquisition is picked up as a major issue in the social environment and the degree of impact are shown in Chapter 9. According to LARAP, any displace of school, hospital, mosque and wells will not be caused in the project. In natural environmental issues, although turbid water may be discharged from construction area to the nearest river or channel, the impact will be minimized by planned mitigation measures.

A proposed methodology for stakeholder meetings is show below.

Table 8.3.25 Recommended Methodology for Stakeholder Meetings

Item	Description
(1) Number of SHMs	Twice a sub project (totally 20 meetings at least) (Number of SHMs is stipulated in JICA's Guidelines)
(2) Timing of Implementation	- The 1st SHM: Scoping Stage - The 2nd SHM: Draft ANDAL/RKL/RPL or draft UKL/UPL stage
(3) Attendance	In principle, attendance shall be determined base on Indonesian laws. Or it will be determined on discussion with MPW, environmental authorized agency and local government. (ex.: Local stakeholders (project affected persons, NGOs), local government and proponent)
(4) Notification of SHMs	Basically the notification shall be done on news paper, radio and other measures, 2 weeks before implementation of SHMs
(5) Draft Agenda for SHM	-The 1st SHM Project outline, predicted positive and negative impacts, survey items and methodology, project schedule and exchange opinions - The 2nd SHM Project outline, analyzed positive and negative impacts, mitigation measures and monitoring plan and exchange opinions
(6) Record of SHM	Preparation of Minutes of Meeting(MM), attendance list **with signature** and photo
(7) Language	All documents shall be prepared in Indonesian and English

Source: JICA Survey Team

Table 8.3.26 Schedule of Stakeholder Meeting

Site	Governmental Environmental Authority	1st SHM (Explanation of Project outlines)	2nd SHM (Explanation of draft AMDALor draft UKL/UPL)
1. Semanggi	Central Jakarta City	25th October, 2011	After April, 2012
2. R.E.Martadinata	North Jakarta City	18th October, 2011	After April, 2012
3. Sulawesi- Tg.PA	North Jakarta City	Conducted in Approved AMDAL*1	
4. Kuningan	Central Jakarta City	After April 2012	
5. Pancoran	South Jakarta City	18th October, 2011	After April, 2012
6. Pinang Baris	Medan City	After April (as required)*2	
7. Katamso	Medan City	19th September 2011	After April, 2012
8. Sudirman II	Tangerang City	19th October, 2011	After April, 2012
9. Cikarang	Bekasi Regency	20th October, 2011	After April, 2012
10. Senayan	South Jakarta City	After April, 2012	

*1: Kuningan under pass is one of facilities in the Tanjung Priok Access Road Project, AMDAL approval of the project had been issued in December 2004 and the project is under construction
*2 : UKL/UPL approval for Pinan Baris had been issued in December 2008, however 3 years validity period after approval without construction activities is expired

8.4 Current Progress and Schedule of Environmental Approval

In ten selected sub-projects, UKL/UPL for six sub-projects (No.1 Semanggi, No2. R.E. Martidinata, No.5 Pancoran, No.7 Katamso, No.8 Sudirman II and No.9 Cikarang) and one AMDAL for No.4 Kuningan are being carried out by the Ministry of Public Works in cooperation with JICA. It is expected that six approvals for UKL/UPL will be issued from relevant governmental environmental authorities after April 2012.

The approvals for No.5 Sulawesi in DKI and No.13 Pinan Baris in Medan City had been issued, however the approval of Pinan Baris had been expired the validity.

On the other hand, a series of environmental process for No.10 Senayang is not started because a concept of design is not concluded at the moment.

The process for AMDAL (No.4 Kunnigan) will be carried out after April 2012.

Table 8.4.1 Current Progress and Expected EIA Schedule (December, 2011)

		2011										2012		
		Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov	Dec.	Jan.	After April	
Out put of the Survey		ITR				DFR(1)					DFR(2)	FR		
Env. Approval Schedule (* : supported by JICA)														
*1. Semanggi	UKL/UPL												Approved after April	
*2. R.E. Martidinata	UKL/UPL												Approved after April	
3. Sulawesi	UKL/UPL	Approved*1												
*4. Kuningan	AMDAL												Approved after April	
*5. Pancoran	UKL/UPL												Approved after April	
6. Pinan Baris	UKL/UPL	Expired*2												
*7. Katamso	UKL/UPL												Approved after April	
*8. Sudirman II	UKL/UPL												Approved after April	
*9. Cikarang	UKL/UPL												Approved after April	
10. Seneyang	UKL/UPL	A series of environmental processes has not carried out due to no design at the moment												
Detailed Schedule for UKL/UPL														
Preparation of Draft Report (UKL/UPL)											■			
SHM										1st			2nd (Approved after April)	
Review and approval by GAE													Approved after April	
Expected Schedule for AMDAL														
Preparation of ToR (KA-ANDAL)													Approved after April	
Preparation of draft Report (ANDAL, RKL and RPL)													Approved after April	
SHM													Approved after April	
Review and approval by GAE													Approved after April	

Source: JICA Survey Team

*1: Kuningan under pass is one of facilities in the Tanjung Priok Access Road Project, AMDAL approval of the project had been issued in December 2004 and the project is under construction

*2: UKL/UPL approval for Pinan Baris had been issued in December 2008, however 3 years validity period after approval without construction activities is expired

CHAPTER 9. INVOLUNTARY RESETTLEMENT

9.1 General

The overall goal of the Metropolitan Arterial Road Improvement Project (MARIP) is that the sustainable growth which the private sector initiates can be realized by the expansion of investment opportunities and the economic growth generated from the improvement of road traffic infrastructure. The construction of grade separated intersections is the project goal to alleviate the traffic congestion at heavily congested intersections on the arterial road network in JABODETABEK and Medan. The Project, which contains road widening for construction of frontage roads would cause involuntary resettlement issues due to land acquisition necessary for the Project.

JICA indicates clearly the basic principle on involuntary Resettlement in the JICA guidelines for Environmental and Social Considerations (April 2010, herein after "JICA Guidelines") that "People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner.".

The JICA requests borrowers to submit the Land Acquisition and Resettlement Action Plan (LARAP) for the development Projects that contain large scale involuntary resettlement prior to the JICA appraisals for the project.

The MARIP consists of ten(10) subprojects. The sub-projects were selected based on the multi criteria analysis in the first stage of the Preparatory Survey. The framework of LARAP (FLARAP) has been developed to clarify the basic principles in term of involuntary resettlement to be applied to the MARIP.

The JICA Preparatory Survey Team (herein after "JST") prepared the draft of the FLARAP which meets the requirements of the JICA Guidelines through discussions with DGH. The draft of FLARAP was submitted to JICA for review in March 2011.

In this chapter, first, the FLARAP prepared in the first stage will be reviewed and then, the LARAPs which were prepared based on the FLARAP for each subproject will be overviewed. It should be note that the LARAP preparation was conducted based on a sub-contract under financial assistance of JICA.

9.2 Legal Framework for Involuntary Resettlement in Indonesia

9.2.1 Related Regulations

The Indonesian regulations on land procurement for infrastructure projects, which have been provided by the central government of the Republic of Indonesia, are as follows:

1) Presidential Regulation No. 36/2005 on Land Procurement for Implementation of Public Interest

2) Presidential Regulation No. 65/2006 on Amendment of Presidential Regulation No. 36/2005

3) Head of the National Land Board (BPN) Regulation No. 3/2007 on Guidelines for Implementation of Presidential Regulation No. 36/2005 on Land Procurement for Implementation of Public Interest as amended by Presidential Regulation No. 65/2006 .

9.2.2 Responsible Agency

The Land Procurement Committee (LPC) and Land Price Appraisal Team conduct land procurement for public facilities construction. The Land Procurement Committee will be established based on the request by the Project Implementer.

(1) Land Procurement Committee

The Land Procurement Committee is the committee for land procurement for public facilities construction established by the Governor/Mayer. The Committee consists of the representatives from the related local government and the National Land Board.

The level of the establishment of the Land Procurement Committee, i.e. district or provincial, will be decided depending on where the land needed for the public facilities is located. The Land Procurement Committee is called Panitia (committee) 9 due to the membership consisting of 9 persons.

(2) Land Price Appraisal Team

Land price appraisal is to be done by a Land Price Appraisal Team based on the request from the LPC.

The Land Price Appraisal Team consists of the following organizations.

a) Agent from the institution responsible for buildings and/or plantations
b) Agent from the central government responsible for National Land
c) Agent from the institution of Land and Building Tax Service
d) Experts or persons with experience in land value appraisal
e) Academic person with the ability to conduct appraisals of land, buildings, plantations and/or other objects built on the land.
f) NGO, if necessary

(3) Compensation System

The kinds of assets to be affected by the Project are stipulated by Presidential Regulation No.65/2006 as follows;

a) Land rights
b) Buildings
c) Crops / Plants
d) Other objects built on the land.

The forms of compensation for the assets affected by the Project are as follows:

a) Cash, and/or
b) Replacement land, and/or
c) Resettlement, and/or
d) Combination of two or more forms of compensation as referred to in 1), 2), and 3)
e) Other forms which are agreed on / approved by the related parties.

Land price appraisal is conducted based on Taxed-Object Selling Value (*NJOP*) or real value by taking into consideration the *NJOP* price of the current year, as well as the following items (Article 28 of BPN Regulation No.3/2007).

a) Location and area of land
b) Land status
c) Land entitlement

d) Synchronization between land and existing spatial planning or city planning

e) Facilities and infrastructure available

Appraisal of building and plantation prices is done by the related government staffs of district government that are responsible for buildings and farming/ landscaping by referring to the price standard, set by laws and regulations (Article 29 of BPN Regulation No.3/2007).

9.3 Comparative Analysis with International Practices on Involuntary Resettlement

The comparative analysis between Indonesian Regulations and international practices including JICA on involuntary resettlement was conducted to identify the gaps between them.

9.3.1 JICA guidelines on Involuntary Resettlement

Regarding the involuntary resettlement, the JICA guidelines for Environmental and Social Considerations (April 2010) indicates the following principles.

- Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected.
- People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. Prior compensation, at full replacement cost, must be provided as much as possible. Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting means for an alternative sustainable livelihood, and providing the expenses necessary for the relocation and re-establishment of communities at resettlement sites.
- Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.
- For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.

Note that the JICA requests that the borrower follows the OP.4.12 of World Bank for addressing individual issues on involuntary resettlement.

The World Bank experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks. The policy includes safeguards to address and mitigate these impoverishment risks. Following are the key principles in the Bank's policy on involuntary resettlement.

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
- Displaced persons are to be provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.

- Resettlement activities should be conceived and executed as sustainable development programs
- Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.
- The absence of a formal legal title to land is not a bar to WB policy entitlements.
- Particular attention is paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation.
- The full costs of resettlement activities necessary to achieve the objectives of the project are included in the total costs of the project.

9.3.2 Comparative Analysis with International Practices on Involuntary Resettlement

The results of the comparative analysis on Involuntary Resettlement between the Indonesian regulations and Operational policy (OP.4.12) of WB based on the review of them are shown in Table 9.3.1.

Table 9.3.1 Comparison Analysis on the Gaps between OP.4.12 and Indonesian Regulation in terms of "Involuntary Resettlement"

Issue	Operational Policy 4.12 of WB on Involuntary Resettlement	Indonesian Regulation on Involuntary Resettlement
Preparation of Resettlement Action Plan(RAP)	A resettlement plan or abbreviated resettlement plan is required for all operations that entail involuntary resettlement unless otherwise specified. （OP.4.12 para 17(a)）	No stipulation on the obligation for preparation of RAP is found.
Minimization of Involuntary Resettlement	Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs（OP.4.12 para 2）	No stipulation for minimization of Involuntary resettlement is found
Impacts Covered	The compensation should cover not only physical aspects such as relocation or loss of shelter and loss of assets or access to assets etc. but also loss of income sources or means of livelihood.OP.4.12 para 3）	The compensation covers Land rights, Buildings, Crops/Plants and Other objects attached to the land （Article 12 of President Regulation No.36/2005）
Compensation for Squatters	Those who do not have formal legal rights to land but have a claim to such land or assets --provided that such claims are recognized under the laws of the country are provided compensation for the land they lose, and other assistance. And also those who have no recognizable legal right or claim to the land and occupy the project area prior to a cut-off date are provided resettlement assistance.（OP.4.12 para 15,16）	No stipulation on the Compensation for Squatters is found.
Estimation of compensation cost	To provide compensation at full replacement cost for losses of assets without depreciation of structures or assets For agricultural land; based on the market value of the pre-project land or pre-displacement, whichever is higher with the cost of preparing the land, plus the cost of any registration and transfer taxes. For land in urban areas ; based on market value of the land with the cost of any registration and transfer taxes. For houses and other structures, based on the market cost of the materials to build a replacement structure or better than those of the affected structure with the cost of transporting building materials, any labor and contractors' fees and any registration and transfer taxes. （OP.4.12 para 6(a)(ii), O.P 4.12 footnote 11, O.P 4.12 Annex footnote 1）	Land value appraisal is done by the Land Value Appraisal Team. Land value appraisal is based on the Selling Value of the Taxed-Object (NJOP) or real/actual value by taking into consideration the NJOP of the current year, as well as the location and area of the land etc. Appraisal of price of building and/or plantations and/or other objects attached to the land is conducted by the Head of the Agency/Office/Body by referring to the price standard, set by laws and regulations. in city/District level.（Article 28 and 29, Head of National Land Affairs Agency Decree No. 03/2007）
Assistance for Restoration of Livelihood and Living Standard	Displaced persons should be supported after displacement for a transition period and provided with development assistance in addition to compensation measures such as land preparation, credit facilities, training, or job opportunities.（OP.4.12 para 6(c)）	No description on assistance for restoration of livelihood and living standard
Paying attention to vulnerable groups	Particular attention should be paid to the needs of vulnerable groups such as those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities etc.（OP.4.12 para 8）	No description on consideration of vulnerable groups

Source: JICA-MARIP Preparatory Survey Team (2011)

9.4 Summary of the Framework of LARAP(FLARAP)

9.4.1 Discussion and Proposals on the FLARAP

(1) Discussion on the FLARAP

The JST initiated a preliminary meeting with the Sub-directorate of Environment & Road safety Technical Affairs of DGH on 2nd March 2011 to clarify issues related to LARAP preparation which will be conducted on the subprojects in the second stage. Main points in the meeting are as follows. (See **Vol. 3 LARAP**）

- It was confirmed by DGH and the JST that the responsibilities for the preparation of LARAP for the Project are under the DGH. The JST will support DGH for conducting related tasks.
- The Framework of LARAP (FLARAP) must be consistent with JICA Guidelines (World Bank OP.4.12)
- DGH will handle the necessary approval process of the FLARAP.
- The LARAP for each sub-project based on the FLARAP should be approved by the related local government.
- The JST submitted first draft of the FLARAP which contained proposed countermeasures necessary to fill the gaps between Indonesian regulations and JICA requirements. DGH will review it and make response on 9th March 2011.

Note that DGH approved the first Draft and it will be submitted to JICA as Draft of FLARAP. (**Vol. 3 LARAP**）

(2) Proposed Countermeasures for Filling the Gaps

The counter measures for filling the identified gaps in the previous chapter were proposed as follows.

a) Preparation of Resettlement Action Plan (RAP)

According to the Minutes of discussion, the DGH agreed to establish LARAP for the Project.

b) Minimization of Involuntary Resettlement

The JST will make every effort to minimize the involuntary resettlement as much as possible in the basic design stage.

c) Impacts Covered

The FLARAP will contain a provision for compensation on the loss of income sources or means of livelihood as well as land, buildings, crops/plants and other objects attached to the land.

d) Estimation of Compensation Cost

The FLARAP will be prepared based on the principle of providing compensation at full replacement cost (RC) without any depreciation. In case of identifying the gaps between the RC and compensation cost calculated based on the Indonesian regulation, the gaps will be filled by the special livelihood restoration program (LRP). As for the LRP, the mechanism will be explained in 9.4.3.

e) Squatters

The FLARAP will include the principle of compensation for those who do not have formal legal rights to land. Note that the compensation is limited to the affected structures only.

f) Assistance for Restoration of Livelihood and Living Standard

The FLARAP will provide assistance for restoration of livelihood and living standard for the displaced persons through the general livelihood restoration program (LRP).

g) Paying Attention to Vulnerable Groups

The FLARAP will pay attention to vulnerable groups such as those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities etc. through providing the general livelihood restoration program (LRP).

9.4.2 Objectives and Principles of the FLARP

(1) Objectives

The LARAP Framework for the MARIP has been prepared to support the executing agency (DGH) for addressing the adverse resettlement-related impacts of the subprojects of the MARIP. The LARAP for each sub-project will be prepared based on the FLARAP.

(2) Principles

The basic principles of the LARAP Framework for the MARIP are as follows.

- Acquisition of land and other assets, and resettlement of people will be avoided or minimized as much as possible by identifying possible alternative project designs and appropriate social, economic, operational and engineering solutions that have the least impact on populations in the project area.
- All affected households(AHs) residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets(IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.
- All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing. Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the AH from entitlements to such compensation and rehabilitation measures or resettlement objectives.
- AHs will be fully consulted and given the opportunity to participate in matters that will have adverse impacts on their lives during the design, implementation and operation of the Project. Plans for the acquisition of assets will be carried out in consultation with the AHs who will receive prior information of the compensation, relocation and other assistance available to them.
- Payment for land and/or non-land assets will be based on the principle of replacement cost (local regulations, where available and applicable, shall be fully followed in the implementation process).
- Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of AHs, will be completed prior to any construction activities taking place
- There shall be effective mechanisms for hearing and resolving grievances during implementation of the land acquisition and resettlement plans.
- Special measures will be incorporated in the LARAPs and in complementary mitigation and enhancement activities to protect socially and economically vulnerable groups at high risk of impoverishment, such as ethnic minorities, women-headed families,

disabled-headed households, landless households, children and elderly people without support structures, and people living in poverty.

- Adequate resources will be identified and committed during land acquisition and resettlement planning. This includes adequate budgetary support fully committed and made available to cover the costs of land acquisition, compensation, resettlement and rehabilitation within the agreed implementation period for the Project; and, adequate human resources for supervision, liaison and monitoring of land acquisition, resettlement and rehabilitation activities.
- The LARAP summary in the form of a Project Information Booklet (PIB) will be translated into Bahasa and placed in the village offices for the reference of AHs as well as other interested groups. A copy of the LARAP in the local language will be placed in Executing agency (DGH) and district offices.

9.4.3 Entitlement Matrix

(1) Entitlement Matrix

The project entitlements developed and presented in the entitlement matrix correspond to the potential impacts identified during the census and inventory of losses. (Refer to Table 9.4.1)

It should be noted that these entitlements may be revised or enhanced, as necessary, following the conduct of a detailed measurement survey (DMS) and consultation with APs to ensure that losses are restored, if not improved. Any revisions/enhancement in the entitlements will be reflected in the updated LARAP for JICA review.

Table 9.4.1 Entitlement Matrix

No	CATEGORY OF IMPACTS/LOSSES	Entitled Persons	PROJECT ENTITLEMENTS	Notes/Implementation Arrangement
A. Impacts on LAND				
1	**Permanent loss of residential/commercial land**	Users/Occupants who have formal legal rights (*hak milik*) and customary and traditional rights (*adat* or *ulayat*) and those whose claim over the affected land is under application for full title	Cash or in kind compensation at replacement cost which is based on market value that reflects recent land sales and in the absence of such recent sales, based on productive value (for productive/agricultural) or based on similar location attributes (for residential and commercial land).	Local regulations, where available and applicable, shall be fully followed in the implementation process.
2	**Temporary loss of residential/commercial land**	Users/Occupants who have formal legal rights (*hak milik*) and customary and traditional rights (*adat* or *ulayat*) and those whose claim over the affected land is under application for full title	• Payment of rent for residential land based on existing or ongoing rental agreement in the area or as per negotiation with AHs. For productive land, rental will be no less than the net income that would have been derived from the affected property during disruption. • Compensation for affected crops at replacement cost for the duration of the impact, and Land will be restored to pre-project condition or better	Contractor will be responsible for returning land to pre-project/better condition Local regulations, where available and applicable, shall be fully followed in the implementation process.
3	**MARGINAL IMPACTS due Permanent Loss of Land Use**	Users/Occupants who have NO formal legal rights (*hak milik*) nor customary or traditional rights (*adat* or *ulayat*) : Marginal impacts:	• No compensation for land, • Compensation for crops and trees based on replacement cost principle	Local regulations, where available and applicable, shall be fully followed in the implementation process. Not their main source of income
B. Relocation of Ahs				
1	**Relocation of Ahs and Shop Owners due to Permanent Loss of Land Use**	Users/Occupants who have formal legal rights (*hak milik*) and customary or traditional rights (*adat* or *ulayat*) and those whose claim over the affected land is under application for full title	• Compensation for crops and trees based on replacement cost principle • Provision of transport allowance based on actual cost of moving to new site (labor, transport cost) or provision of transport assistance will be provided in the form of a program within the LRP. • Provision of transition subsistence allowance will be provided in the form of a program within the LRP. • Entitled to participate in Livelihood restoration program	Local regulations, where available and applicable, shall be fully followed in the implementation process. The LRP allowance shall be based on poverty threshold for an average 5 household members. A single person household will receive 1/5 of said amount.
2	**Relocation of Ahs and Shop Owners due to Permanent Loss of Land Use**	Informal Dwellers but Have Other Land Outside the Project Area	• No compensation for land, • Compensation for structures based on replacement cost principle • Compensation for crops and trees based on replacement cost principle	Local regulations, where available and applicable, shall be fully followed in the implementation process. The LRP allowance shall be based on poverty threshold for an average 5 household members. A single person household will receive 1/5 of said amount.

No	CATEGORY OF IMPACTS/LOSSES	Entitled Persons	PROJECT ENTITLEMENTS	Notes/Implementation Arrangement
			• Provision of transport allowance based on actual cost of moving to new site (labor, transport cost) or provision of transport assistance will be provided in the form of a program within the LRP. • Provision of Transition subsistence allowance will be provided in the form of program within the LRP. • Entitled to participate in Livelihood restoration program	
3	**Relocation of Ahs and Shop Owners due to Permanent Loss of Land Use**	Informal Dwellers but Have NO Other Land Outside the Project Area	• No compensation for land • Compensation for structures based on replacement cost principle Compensation for crops and trees based on replacement cost principle • For house and house-cum-shop, the Project will facilitate finding access to a residential plot (and with commercial advantage for house-cum-shops) within the village or nearby, with affordable renewable lease or lease-to-buy agreement. The area will have similar or better conditions as before and have a latrine • For shops, the Project will facilitate finding access to a place/plot to lease/rent with similar commercial advantage either in existing market sites or a plot of land suitable for putting up stalls/shops (new market). Lease arrangement will be with a provision to renew and shall be facilitated by the project. Provision of transport allowance based on actual cost of moving to new site (labor, transport cost) or provision of transport assistance will be provided in the form of the LRP. • Provision of transition subsistence will be provided in the form of the LRP. • Entitled to participate in Livelihood restoration program.	Local regulations, where available and applicable, shall be fully followed in the implementation process. Individual or small group relocation sites as per AHs' final option. AHs have the option to have access to a place to rent outside the residential plot that will be facilitated by the DGH. The Project will assist AHs in the determination of lease amount. For vulnerable Ahs who may not have the ability to generate much income, the LRP will be designed to increase income levels sufficiently to be able to pay the full local market leases. The LRP allowance shall be based on poverty threshold for an average 5 household members. A single person household will receive 1/5 of said amount.
C. NON-LAND ASSETS				
1a	**Houses/Shops and Secondary Structures**	Owners regardless of whether or not the owner has hak guna bangun (building permit)	• Compensation at replacement cost based on actual current market prices of materials and actual cost of labor for dismantling, transfer and rebuilding	Local regulations, where available and applicable, shall be fully followed in the implementation process.
1b	**Houses/Shops and Secondary Structures**	Renters of Structures (house/shops)	• Assistance to tenants/renters to find a new place to live or do business • Assistance to find new rental property • Entitled to participate in Livelihood restoration program.	Local regulations, where available and applicable, shall be fully followed in the implementation process.

No	CATEGORY OF IMPACTS/LOSSES	Entitled Persons	PROJECT ENTITLEMENTS	Notes/Implementation Arrangement
2	**Public Infrastructure and Facilities**	Owner (Government)	• Rebuild the facilities based on agreement by both parties.	
3	**Crops and Trees**	Owner	Annual Crops. If standing crops are destroyed or cannot be harvested, compensation based on replacement cost principle • Perennial Crops. Compensation based on replacement cost • Timber Trees. Compensation at current market rates based on type of tree and diameter of trunk at breast height	Local regulations, where available and applicable, shall be fully followed in the implementation process.
D . INCOME LOSS				
1	**Significant Impact Due to Relocation of Shops or House-cum-shops**	House-cum-shop and shop-owners whether or not with land outside the Project Area	• Entitled to participate in the Livelihood Restoration Program (LRP)	The LRP allowance shall be based on poverty threshold for an average 5 household members. A single person household will receive 1/5 of said amount.
E . HIGH RISK OF IMPOVERISHMENT /HARDSHIP				
1	Due to loss of resource base	Poor and vulnerable Households even if marginally affected	Entitled to participate in the Livelihood Restoration Program and LRP Allowance	"LRP allowance" will be provided to participants using a poverty threshold for an average 5 household members. A single person household will receive 1/5 of said amount. AHs can take part in the program and in the process of restoring their income.
F. IMPACTS DURING CONSTRUCTION				
1	Non-Land Assets	Owners of affected non land assets	Compensation at Replacement Cost as indicated above	

Source: JICA MARIP Preparatory Survey Team(March 2011) referring to the FLARAP for Upper Citarum Basin Tributaries Flood Management Project (August 2010)

(2) Livelihood Restoration Program (LRP)

In the FLARAP, the Livelihood Restoration Program (LRP), which is the Project Resettlement Policy, was proposed for the MARIP specifically. The LRP will apply to fill the gaps in terms of providing compensation at full replacement cost, to assist in restoration of livelihood and living standard and to consider the vulnerable groups including squatters as mentioned above. The basic compensation policies applied in the FLARAP using LRP are as follows; (see Table 9.4.2).

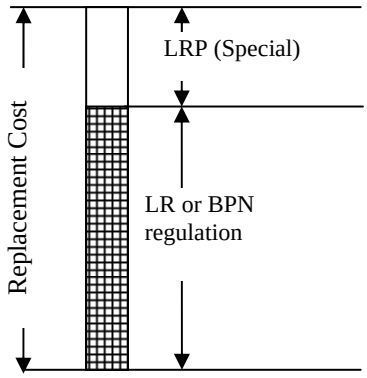
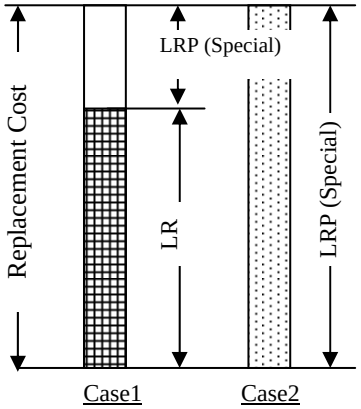
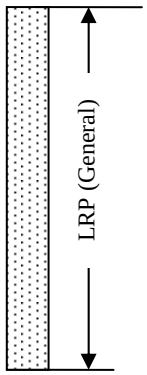
- In the case that there are local regulations available regarding compensation, affected persons (APs) will be entitled to compensation as stipulated in the existing local government regulation available at the time of implementation.
- In the case that there are no local regulations available regarding compensation, APs will be entitled to replacement cost as described in the entitlement matrix.
- In the case that there are any gaps in the compensation cost of local regulations and replacement cost, the gaps will be filled in the form of the special program, the Livelihood Restoration Program (LRP).
- "Assistance for restoration of livelihood and living standard" and "Paying attention to vulnerable groups" will be considered in the form of a general program of the Livelihood Restoration Program (LRP).
- Allowances defined in the entitlement matrix will be provided as cash or in kind or alternatively may be provided in the form stipulated in the LRP.

The concept of the "Livelihood Restoration Program" has been proposed in the Preparatory Survey by JICA for Upper Citarum Basin Tributaries Flood Management Project in Indonesia (2010). Note that the original concept of the LRP came from the "Integral Citarum Water Resources Management Investment Program funded by ADB (2008),

The eligibilities and the contents of the LRP will be decided through consultation with the Aps to be held in the updating of LALAP in the loan implementation stage. The expected contents of the LRP are as follows.

- Training for skills acquisition for job placement
- Micro-finance for small-scale business
- Assistance on land lease agreement for landless Aps who will start small business
- Others

Table 9.4.2 Basic Compensation Policies Applied in the RAP

Compensation Items	Legal Occupant	Squatter
Land	The compensation cost for land will be basically determined based on the BPN regulation/ mayoral decree with several considerations such as land transaction results in the last 6 months, NJOP as well as market price. Note that the cost will be examined in the process of LARAP updating.	None
Property (Crops, Buildings)		
Assistance for Restoration of Livelihood and Living Standard		
Paying attention to vulnerable groups	The eligibility groups and the amount for LRP (General) will be identified in the LARAP preparation Updating.	

Source: JICA MARIP Preparatory Survey Team (March 2011)

- LR: Local Regulation on compensation
- BPN regulation : Compensation cost based on Indonesian Regulation decided by BPN
- LRP (Special): Special Program for Livelihood Restoration Program:
- LRP (General): General Program for Livelihood Restoration Program:
- Case1: Local Regulations available
- Case2: Local Regulations not available

9.5 LARAP Preparation

9.5.1 General

LARAPs for each subproject were prepared based on the FLARAP with a sub-contract under financial assistance of JICA. The terms of reference for the LARAP preparation refer to **Vol. 3 LARAP**.

The selected LARAP Preparation team of the local consultant company (herein after "Survey Team") prepared LARAPs under supervision of the member of JST based on the work schedule as shown below. (Table 9.5.1)

Table 9.5.1 Implementation Schedule for LARAP Preparation

	April				May				June				July			
Preparation			■													
Data Collection			■	■	■	■										
Field Survey				■	■	■	■	■								
Data Analysis					■	■	■	■	■							
Socialization					■	■	■	■	■	■						
Report Preparation									■	■	■	■	■	■		

Source: JICA Survey Team

The LARAPs for three (3) projects out of ten (10) sub-projects were not prepared due to the reasons mentioned below.

(1) Semanggi

This is an existing clover-leaf type intersection. The final improvement plan has not been established although several alternatives for improvement of the existing intersection have been considered. The LARAP will not be prepared for this sub-project because the intersection improvement under any of the alternatives will not require additional land acquisition due to the improvement activities being completely within existing intersection area.

(2) Sulawesi - Tg.PA

The Sulawesi - Tg.PA is a part of the Tanjung Priok Access Road. The LARAP for the Sulawesi - Tg.PA will not be conducted because the land acquisition for the project will be conducted as s part of x Tanjung Priok Access Road Project.

The JST conducted an interview with the Land Acquisition Office Tanjung Priok Access Road to grasp the current status of land acquisition for the Sulawesi section on 23rd June 2011. The summary of the present condition for the project is as follows.

- The inventory of loss survey at Jl. Sulawesi is being carried out now, therefore the data processing for the section has not been completed.
- The Land Acquisition Team will offer the latest NJOP to AH as compensation cost for land.
- The compensation cost for structures and trees will be calculated based on the latest local government regulations.
- They have no plan to provide a livelihood restoration program to the AH's.

(3) Senayan

The LARAP for Senayan must wait for the final conclusions on the improvement plan. As for the intersection, serious traffic congestion in this intersection is predicted by MPW DGH after completion of the Antasari - Block M elevated non-toll project. There are several discussions among many stakeholders on the improvement plan including improvement through soft components for the intersection. The discussion has not come to a conclusion yet.

9.5.2 Project Description for Selected Sub-Projects

The summary of the project component for sub-projects is shown below.

Table 9.5.2 Summary of the project component for sub-projects

No.	Sub-Project	Structure type	Approximately length of structure	Number of lanes	
				Main road	Frontage road
1	Semanggi	Road improvement	217m	-	-
2	R.E.Martadinata	Overpass	725m	2 lanes each way	2 lane each way
3	Sulawesi - Tg.PA	Overpass	318m	2 lanes each way	2 lanes each way
4	Kuningan	Underpass	1,018m	2 lanes each way	2 lanes each way
5	Pancoran	Overpass	634m	2 lanes for 1 direction	2 lanes for 1 direction
6	Pinang Baris	Overpass	533m	2 lanes each way	2 lanes each way
7	Katamso	Underpass	360m	2 lanes each way	2 lanes for 1 direction
8	Sudirman II	Overpass	570m	2 lanes each way	2 lanes each way
9	Cikarang	Road improvement (Jl. Karimalan) and 3 bridges	Road improvement 2km FO: 71m Overpass: 190m Bridge: 50m	1 lane each way	-
10	Senayan	-	-	-	-

Source: JICA Survey Team

9.5.3 Field Survey

(1) Identification of Project boundaries

In order to identify the project boundaries, the corridor of impact (COI) of the Project has been marked on the preliminary designs for each sub-project prepared by JST. The information regarding the ROW was provided by the related Spatial agencies.

(2) Field Survey

The field survey necessary for LARAP preparation consists of a census, inventory of loss (IOL) survey and socio-economic survey. These surveys were conducted based on the results of the preliminary designs for each sub-project. Note that the surveys were conducted for all project affected households (Ahs)

The data collected during the IOL will constitute the formal basis for determining AP entitlements and levels of compensation. For each AP, the scope of the data will include:

- Total and affected areas of land, by type of land assets;
- Total and affected areas of structures, by type of structure (main or secondary);
- Legal status of affected land and structure assets, and duration of tenure and ownership;
- Quantity and types of affected crops and trees;
- Quantity of other losses, e.g., business or other income, jobs or other productive assets; estimated daily net income from informal shops;
- Quantity/area of affected common property, community or public assets, by type;
- Summary data on AHs, by ethnicity, gender of head of household, household size primary and secondary source of household income vis-à-vis poverty line, income level, whether household is headed by women, elderly, disabled, poor or indigenous peoples;
- Identify whether affected land or source of income is primary source of income; and
- AP knowledge of the subproject and preferences for compensation and, as required, relocation sites and rehabilitation measures.

The purpose of the socioeconomic survey is to provide baseline data on APs to assess resettlement impacts, and to be sure proposed entitlements are appropriate, and to be used for resettlement monitoring. The scope of data to be collected includes:

- Household head: name, sex, age, livelihood or occupation, income, education and ethnicity;
- Household members: number, livelihood or occupation, school age children and school attendance, and literacy, disaggregated by gender;
- Living conditions: access to water, sanitation and energy for cooking and lighting; ownership of durable goods; and
- Access to basic services and facilities.

The interview form that covers all issues mentioned above was developed for the field survey in Bahasa Indonesia (**Vol. 3 LARAP**) The interviews were conducted by survey team members by visiting each PAP.

9.5.4 Replacement Cost Survey

The FLARAP of the MARIP stipulated the basic principle for compensation cost that "all compensation for affected land and non-land assets owned by households/shop owners who meet the cut-off date will be based on the principle of replacement cost and existing government regulations for compensation calculations for buildings, crops and trees will be used if available".

Based on the FLARAP policies, the LARAP survey team conducted a replacement cost survey to determine the compensation cost based on the principle of "replacement cost" for affected land and structures. The replacement cost survey consists of data collection from related agencies, comparative analysis and discussion regarding the collected data and decision on compensation cost for MARIP.

(1) Data Collection

a) Existing Local Government Regulations for compensation

As mentioned in the FLARAP, if the local government regulations which stipulate compensation cost for buildings, crops and trees are available, the unit costs will be used as replacement costs.The local governments where the subprojects located are as follows.

Table 9.5.3 Related Local Governments

	local government	subprojects
1	DKI	Semanggi, R.E.Martadinata, Sulawesi - Tg.PA, Kuningan, Pancoran, Senayan
2	Bekasi regency	Cikarang
3	Tangerang City	Sudirman II
4	Medan Cit	Pinang Baris ,Katamso,

Source: JICA Survey Team for MARIP

As the survey results, all the related local governments have their own compensation regulations for public development. The identified local regulations are shown in Table 9.5.4. Note that those regulations stipulate values only for buildings, crops and trees not for land.

Table 9.5.4 Local Government Regulations on Compensation Cost

	local government	Regulations
1	DKI	"Guidelines for Implementation on valuation of Compensation Rates " :Decision of the Head of Housing Department and Local Government Buildings, Province of DKI No.2/2009 **(Vol. 3 LARAP)**
2	Bekasi regency	"Standard compensation rates for buildings and crops affected by government projects 2008" Decision of Governor **(Vol. 3 LARAP)**
3	Tangerang City	"Standard compensation rates for buildings and crops affected by government projects in the 2011 budget year for the city of Tangerang" Decision of Mayor 2011(**Vol. 3 LARAP)**
4	Medan City	"Determining the value of building prices as a basic assessment of the costs of building inspection and assessment of damages in Kota city" Decision of Mayor 2010 **(Vol. 3 LARAP)**

Source: JICA Survey Team for MARIP

b) Interviews on the results of the actual transactions on land and houses to each related Kelurahan.

The Kelurahan, which are the administrative bodies under Kecamatan（Sub-district）, hold the records of market prices for transactions on real estate including the land and houses of the communities.

The sub-projects of the MARIP belong to the Kelurahan as shown below.

Table 9.5.5 List of Related Kelurahan

	Sub-Project	Kelurahan etc
1	Semanggi	Karet Semanggi, Gelora
2	R.E.Martadinata	Tanjung Priok
3	Sulawesi - Tg.PA	Tanjung Priok ,Kebon Bawang, Koja Utara
4	Kuningan	Kuningan Timur, Karet Kuningan, Kuningan Barat
5	Pancoran	Pancoran
6	Pinang Baris	Cinta Damai,M. Helvitia,.Lalang
7	Katamso	Titi Kuning, Johor, Pangkalan, Mashyur, Johor
8	Sudirman II	Buaran Indah
9	Cikarang	Tanjungsari, Cikarang Kota, Karangbaru, Karangasih, Karangharja, waluya, Kalijaya
10	Senayan	Gunung,Selong,Senayan, .Gelora

Source: JICA Survey Team for MARIP

The LARAP Survey team visited all related kelurahan offices to investigate the market prices for land and houses at each kelurahan. The interviews were conducted with the head of the kelurahan. Note that it was not allowed to make photocopies of original data.

The results of the interviews are as shown in Table 9.5.6.

Table 9.5.6 Market Price for land and House through interviews with related Kelurahan

No.	Kelurahan	Land(Rp./m2)		House(Rp./m2)	
		Lowest	Highest	Lowest	Highest
I. DKI					
South Jakarta					
1	Kel.Kuningan Barat	1,573,000	24,625,000	700,000	5,500,000
2	Kel.Karet Kuningan	5,000,000	25,000,000	700,000	5,500,000
3	Kel.Selong	10,455,000	13,125,000	700,000	5,500,000
4	Karet Semanggi	5,000,000	25,000,000	700,000	5,500,000
5	Kuningan Timur	5,000,000	25,000,000	700,000	5,500,000
6	Kel.Senayan	40,000	10,000,000	700,000	5,500,000
7	Kel.Gunung	1,000,000	20,000,000	700,000	5,500,000
8	Kel.Pancoran	1,000,000	20,000,000	700,000	5,500,000
Central Jakarta					
1	Kel.Bendungan Hilir	4,000,000	10,000,000	700,000	5,500,000
2	Kel.Gelora	1,000,000	20,000,000	700,000	5,500,000
North Jakarta					
1	Koja	1,000,000	6,305,000	700,000	5,500,000
2	Tanjung Priok	1,000,000	10,000,000	700,000	5,500,000
II. Bekasi regency					
1	Tanjung Sari – Cikarang Utara	64,000	916,000	595,000	614,000
2	Cikarang Kota – Cik Uatara	64,000	916,000	595,000	614,000
3	Wangunharja- Cikarang Utara	394,000	800,000	834,000	1,200,000
4	Pasir Sari – Cikarang Barat	394,000	800,000	834,000	1,200,000
III. Tangerang City					
1	Tanah Tinggi – Kec.Tangerang	200,000	1,500,000	1,000,000	1,200,000
2	Buaran Indah	200,000	1,500,000	1,000,000	1,200,000
IV. Medan City					
1	Lalang – Kec. Medaan Sunggal	3,000,000	5,000,000	600,000	1,500,000
2	Cinta damai – Kec. Medan Helvitia	3,000,000	5,000,000	500,000	1,000,000
3	Titi Kuning – Kec. Medan Johor	3,000,000	4,000,000	900,000	1,200,000
4	Pangkalan Mashyur – Kec. Medan Johor	1,500,000	3,000,000	800,000	1,000,000

Source: JICA Survey Team for MARIP based on interviews to related Kelurahan offices

c) Investigation on the "NJOP for land and buildings" at each related Tax office

The LARAP Survey team visited all related tax offices to collect NJOP for land and buildings. The team succeeded in obtaining some original copies for NJOP but basically the investigation was conducted through interviews with the persons in charge.

Table 9.5.7 NJOP for Land and Buildings at subproject location

No.	Kelurahan	NJOP(Land) (Rp./m2)		NJOP(Building) (Rp./m2)	
		Lowest	Highest	Lowest	Highest
I. DKI					
South Jakarta					
1	Kel.Kuningan Barat	11,305,000	20,755,000	834,000	1,200,000
2	Kel.Karet Kuningan	18,375,000	24,625,000	834,000	1,200,000
3	Kel.Selong	8,755,000	11,305,000	834,000	1,200,000
4	Karet Semanggi	11,305,000	25,995,000	834,000	1,200,000
5	Kuningan Timur	8,755,000	15,105,000	834,000	1,200,000
6	Kel.Senayan	11,305,000	27,405,000	834,000	2,200,000
7	Kel.Gunung	8,755,000	13,100,000	834,000	1,200,000
8	Kel.Pancoran	13,100,000	18,375,000	834,000	1,200,000
Central Jakarta					
1	Kel.Bendungan Hilir	3,375,000	16,155,000	834,000	1,200,000
2	Kel.Gelora	2,013,000	15,105,000	834,000	1,200,000
North Jakarta					
1	Koja	1,032,000	5,605,000	595,000	968,000
2	Tanjung Priok	1,032,000	6,805,000	834,000	1,200,000
II. Bekasi regency					
1	Tanjung Sari – Cikarang Barat	64,000	916,000	595,000	614,000
2	Cikarang Kota – Cik Barat	64,000	916,000	595,000	614,000
3	Wangun Harja – Cikarang Utara	394,000	800,000	834,000	1,200,000
4	Pasir Sari – Cik Utara	394,000	800,000	834,000	1,200,000
III.Tangerang City					
1	Tanah Tinggi – Kec.Tangerang	394,000	614,000	823,000	1,200,000
2	Buaran Indah	394,000	614,000	823,000	1,200,000
IV.Medan City					
1	Lalang – Kec. Medaan Sunggal	2,013,000	2,508,000	595,000	1,516,000
2	Cinta damai – Kec. Medan Helvitia	802,000	2,352,000	429,000	968,000
3	Titi Kuning – Kec. Medan Johor	1,274,000	1,862,000	823,000	1,200,000
4	Pangkalan Mashyur – Kec. Medan Johor	1,573,000	1,573,000	968,000	968,000

Source: Price tax (NJOP) land and buildings from the Tax Office of Land and buildings

(2) Analysis and compensation cost

The existing local regulations for compensation cost will be respected in consideration of compensation cost based on the principle of "Replacement Cost". However, the cost contained in the regulations should be examined for appropriateness for the replacement cost. The examination for the replacement cost will be conducted for land and buildings separately because the local regulations don't have compensation cost for land.

The collected data for compensation cost for buildings is summarised as shown in Table 9.5.8.There is no information on the building specifications such as permanent or semi-permanent in the information of market price and NJOP. There are considerable

differences in those unit costs depending on the location even in the same Kelurahan. The unit costs of local regulations exceed those of NJOP and show almost the same value as the market prices obtained at related Kelurahan. Therefore, the unit costs of the local regulations are considered as acceptable for replacement costs for buildings.

Table 9.5.8 Comparative Analysis on Compensation Costs for Buildings (Rp./m^2)

	DKI JKT		
	Local Regulation	Market Price	NJOP
Permanent	1,586,000	700,000 - 5,500,000	834,000 -1,200,000
Semi-Permanent	684,000		
	Bekasi		
	L.R	Market Price	NJOP
Permanent	3,685,000	500,000 -2,000,000	595,000 - 1,200,000
Semi-Permanent	1,283,000		
	Tangerang		
	L.R	Market Price	NJOP
Permanent	1,692,000	1,000,000 - 1,200,000	823,000 -1,200,000
Semi-Permanent	807,000		
	Medan		
	L.R	Market Price	NJOP
Permanent	1,685,400	600,000 - 1,500,000	429,000 - 1,516,000
Semi-Permanent	746,125		

Source: JICA Survey Team for MARIP

Table 9.5.9 shows the results of analysis of compensation cost for land.

Table 9.5.9 Results of analysis for compensation cost for land (Rp./m^2)

DKI JKT	
Market Price	NJOP
40,000 - 25,000,000	1,032,000 - 25,995,000
Bekasi Regency	
Market Price	NJOP
50,000 -800,000	64,000 -916,000
TangerangnCuty	
Market Price	NJOP
200,000 - 1,500,000	394,000 -614,000
Medan City	
Market Price	NJOP
1,500,000 - 5,000,000	802,000 -2,508,000

Source: JICA Survey Team for MARIP

The market prices obtained at related Kelurahan sometimes showed considerable differences depending on the location and other conditions even in the same Kelurahan. However, the prices could be considered as most appropriate costs for replacement costs because the prices

reflect the results of actual transactions in terms of land and buildings. The NJOP collected at the same Kelurahan showed lower values than the market prices, excepting special case such as "Semmangi"

The LARAP will be updated after completion of the detailed design for each sub-project. This means that the consideration on the compensation cost at the moment should be based on a conservative attitude. Therefore, the highest unit cost for land and buildings obtained in the related kelurahan will be applied as "replacement cost" in the LARAP preparation. The results of the consideration of the compensation costs based on the replacement costs are shown in Table 9.5.10. Note that the calculation for the budget for implementation of land acquisition in the LARAPs for sub-projects will be conducted based on the unit costs shown below.

Table 9.5.10 List of Unit costs for each Sub-project (references: NJOP)

	Sub-project	Land (Rp./m2)	Building (Rp./m2)		Land (NJOP) (Rp./m2)	Bld. (NJOP) (Rp./m2)
			Permanent	Semi-Permanent		
1	Semanggi	25,000,000	1,586,000	684,000	25,995,000	1,200,000
2	R.E.Martadinata	10,000,000	1,586,000	684,000	6,805,000	1,200,000
3	Sulawesi - Tg.PA	10,000,000	1,586,000	684,000	6,805,000	1,200,000
4	Kuningan	25,000,000	1,586,000	684,000	15,105,000	1,200,000
5	Pancoran	20,000,000	1,586,000	684,000	18,375,000	1,200,000
6	Pinang Baris	5,000,000	1,685,400	746,125	2,508,000	1,516,000
7	Katamso	5,000,000	1,685,400	746,125	2,508,000	1,516,000
8	Sudirman II	1,500,000	1,692,000	807,000	614,000	614,000
9	Cikarang	800,000	3,685,000	1,283,000	800,000	823,000
10	Senayan	20,000,000	1,586,000	684,000	13,100,000	1,200,000

Source: JICA Survey Team for MARIP

9.5.5 Decision on a Full or an Abbreviated LARAP

According to the OP.4.12 of WB, a LARAP is required for all operations that entail involuntary resettlement unless otherwise specified. Note that where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an Abbreviated LARAP will be agreed with the borrower.

(1) Contents of LARAP

The scope and level of detail of the LARAP vary with the magnitude and complexity of resettlement. The LARAP covers the elements below, as relevant.

- Description of the project (General description of the project and identification of the project area)
- Potential impacts (Identification of the project components or activities, the zone of impact of such components or activities etc.)
- Objectives
- Socioeconomic studies (The findings of socioeconomic studies)
- Legal framework (The findings of an analysis of the legal framework)
- Institutional Framework (The findings of an analysis of the institutional framework)
- Eligibility (Definition of displaced persons and criteria for determining their eligibility for compensation and other resettlement assistance)
- Valuation of and compensation for losses

- Resettlement measures (A description of the packages of compensation and other resettlement measures)
- Site selection, site preparation, and relocation (Alternative relocation sites considered and explanation of those selected)
- Housing, infrastructure, and social services (Plans to provide housing, infrastructure and social services)
- Environmental protection and management
- Community participation (Involvement of resettlers and host communities)
- Integration with host populations (Measures to mitigate the impact of resettlement on any host communities)
- Grievance procedures
- Organizational responsibilities (The organizational framework for implementing resettlement)
- Implementation schedule
- Costs and budget
- Monitoring and evaluation

(2) Abbreviated LARAP

In case of an abbreviated LARAP it covers the following minimum elements.

- A census survey of displaced persons and valuation of assets;
- Description of compensation and other resettlement assistance to be provided;
- Consultations with displaced people about acceptable alternatives;
- Institutional responsibility for implementation and procedures for grievance redress;
- Arrangements for monitoring and implementation; and
- A timetable and budget

9.5.6 Summary of LARAP for Sub-projects of MARIP

Table 9.5.11 Summary of LARAP for Sub-projects of MARIP

No.	Sub-project	No. of AHs	No. of PAPs	Affected Land (m2)	Affected Structures (m2)	Remarks
1	Semanggi	-	-	-	-	-
2	R.E.Martadinata	38	132	622	662	**Vol. 3 LARAP**
3	Sulawesi - Tg.PA	-	-	-	-	-
4	Kuningan	117	184	2,096	506	**Vol. 3 LARAP**
5	Pancoran	0	0	487	0	**-ditto-**
6	Pinang Baris	186	320	6,157	2,763	**-ditto-**
7	Katamso	41	61	398	217	**-ditto-**
8	Sudirman II	29	73	5,644	934	**-ditto-**
9	Cikarang	91	292	383	2,027	**-ditto-**
10	Senayan	-	-	-	-	-

Source: JICA Survey Team for the MARIP

9.6 Implementation Arrangement

(1) Executing and Implementing Agencies

The Directorate General of Highways (DGH) of the Ministry of Public Works will have overall responsibility for ensuring satisfactory implementation of the Project. The

implementing agencies, the Project Implementation Unit (PIU) of Balai Basar, together with the Resettlement Working Group (RWG) of each local government, will be responsible for the updating and implementation of the LARAP as per approved FLARAP.

The PIU will assign one (1) senior staff member and 4 assistants who will coordinate with the RWG of the related local governments (DKI, Tangerang City, Bekasi Regency and Medan City).

The functions of the RWG include the following:

a) Carry out the survey investigations for updating of the LARAP;

b) Carry out consultations with the AHs and distribution of the draft and final LARAP document;

c) Update and approve the replacement costs;

d) Prepare relocation plans during LARAP updating and finding relocation areas for AHs with similar or better conditions than before. For affected shops, facilitate finding suitable place/plot to lease/rent (existing/new markets) within/nearby the project site in its villages, with a provision to renew;

e) Provide special attention to poor and vulnerable AHs through consultation and ensure that their concerns and special needs are addressed during LARAP updating and implementation;

f) Design and implement the livelihood restoration program (LRP);

g) Prepare the necessary vouchers and other documentation to facilitate the expeditious processing of the compensation for the AHs and deliver compensation payments to the AHs;

h) Receive complaints, verbal or written, from the AHs and ensure that these are brought to the attention of the Bupati or Walikota for appropriate action;

i) Maintain a record of all public meetings, complaints, and actions taken to address complaints and grievances at the District/City level; and

j) Submit quarterly progress reports on LARAP updating and implementation (payments, relocations, income restoration) to the Sub Directorate Bina Program Directorate General of Highways.

(2) Regency/City/Municipality

The Bupati (Head of Regency) or Walikota (Mayor) will provide the main workforce in the preparation and implementation of the LARAP. The Bupati or Walikota will have the following functions:

a) Issue a Decree for establishing a Land Acquisition Committee

b) Issue a Decree on the unit costs of affected assets based on replacement costs and/or market rates;

c) Manage the funds for paying the compensation to AHs for lost assets; and

d) Assist in the expeditious and judicious resolution of complaints of AHs.

(3) Land Acquisition Committee

Land procurement related to public interest in a Regency/City area is done by the Land Procurement Committee of the Regency/City, which is formed by the Bupati/Mayor.

a) To carry out the survey and inventory of land, buildings, crops and other existing objects, which are attached to the land that will be released or delivered.

b) To conduct the survey regarding the legal status of land that will be released or delivered, and the supporting documents.

c) To estimate and propose the amount of compensation for the land which will be released or delivered.

d) To provide clarification or information disclosure (consultation) to the community that will be affected by the development plan, by means of public consultations, either by meetings, press (print), or electronic media, so that anyone in the community who will be affected by the development plan, will be informed.

e) To deliberate with all landowners and the government and/or local government institutions that need land, in order to stipulate the type and/or amount of compensation.

f) To witness the transferring of compensation implementation to the owners of the land, buildings, crops, and other existing objects on the land.

g) To prepare the minutes of the land rights release or delivery.

h) To file and document all of the land procurement files, and send them to the competent body/institution.

(4) Project Implementation Consultants (PIC)

The PIC will conduct the detailed design and construction supervision. The PIC will assist the executing and implementing agencies to carry out the detailed measurement surveys and replacement costs surveys in the process of the LARAP updating and implementation.

(5) LARAP Updating

The inventory of loss conducted in the preparation of this LARAP is based only on the preliminary design. The information on the concerns, preferences, and suggestions on relocation and rehabilitation options etc. of AHs were collected through initial consultation with AHs in the socio-economic survey. The budget estimated compensation costs based on replacement costs which stands on the safe side.

LARAP updating will be carried out following detailed design during loan implementation so that the LARAP would reflect the final condition of affected land and properties and latest compensation costs based on the replacement costs. The entitlement matrix will be also updated in terms of corresponding entitlements and livelihood restoration programs based on actual impacts to AHs.

Resettlement implementation including disbursement of payment to AHs, land clearance and relocation of AHs can only commence when the updated LARAP has been reviewed and confirmed by JICA.

9.7 Tentative Implementing Schedule for Land Acquisition

Table 9.7.1 Tentative Implementing Schedule for Land Acquisition

（confidential）

9.8 Recommendations and Proposal

(1) Necessary action for Implementation of land acquisition by Executing Agency

In order to commence the land acquisition activities for the MARIP, it is necessary that the Executing Agency （DGH） prepare a proposal 1 year before, at the latest, describing the:

a) Goals and objectives of construction

b) Place and location of construction

c) Required land size/area

d) Financing source

e) Feasibility analysis of the construction planning, also include the construction impact as well as the prevention and controlling efforts towards that impact

(2) Schedule for LARAP Updating

The LARAPs were prepared within a limited time schedule. The landowners or owners of properties were not identified due to their absence in some cases. Therefore, it will be important to ensure enough time for LARAP updating including DMS and replacement cost survey. In order to secure the necessary time for those activities, the selection of the PIC without delay after the loan agreement for the MARIP and the preparation of LARAP updating will be necessary.

(3) Stakeholders Meetings

The appropriate information disclosure and close consultation with the PAPs through stakeholders meetings in the process of the LARAP updating is indispensable. The results of the updated LARAP should be disclosed to PAPs at stakeholders meetings to finalise the appropriate LARAP which incorporate various opinions from PAPs.

CHAPTER 10. EVALUATION OF SUB-PROJECTS

10.1 Evaluation Method

(confidential)

10.2 Multi Criteria Analysis

(confidential)

Table 10.2.1 Multi Criteria

(confidential)

10.3 Evaluation Result

(confidential)

Table 10.3.1 Evaluation Result (Scenario-1)

(confidential)

Table 10.3.2 Evaluation Result (Scenario-2)

(confidential)

Source: JICA Survey Team

Table 10.3.3 Evaluation Result (Scenario-3)

(confidential)

Source: JICA Survey Team

10.4 Project Evaluation

(confidential)

Table 10.4.1 Selection of Sub-projects for each Alternative

(confidential)

Table 10.4.2 Summary of Evaluation Result

(confidential)

CHAPTER 11. IMPLEMENTATION PROGRAM

11.1 Possible Loan Scheme

(confidential)

Table 11.1.1 Possible Loan Scheme

(confidential)

11.2 Alternatives for the Implementation Program

(confidential)

Table 11.2.1 Alternatives for the Implementation Program

(confidential)

11.3 Implementation Schedule

(confidential)

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Table 11.3.1 Implementation Schedule (Alternative-1)

(confidential)

Table 11.3.2 Implementation Schedule (Alternative-2)

(confidential)

Table 11.3.3 Implementation Schedule (Alternative-3)

(confidential)

11.4 Implementation Program

(confidential)

Table 11.4.1 Civil works Cost in Sector Loans

(confidential)

Table 11.4.2 Loan Amount for Each Alternative

(confidential)

Table 11.4.3 Loan Amount Calculation (Alternative-1)

(confidential)

Table 11.4.4 Loan Amount Calculation (Alternative-2)

(confidential)

Table 11.4.5 Loan Amount Calculation (Alternative-3)

(confidential)

11.5 Consulting Works

(confidential)

Table 11.5.1 Cost Estimation for Consulting Services

(confidential)

CHAPTER 12. CONCLUSIONS AND RECOMMENDATIONS

12.1 Conclusions

(confidential)

12.2 Recommendations

(confidential)

(confidential)