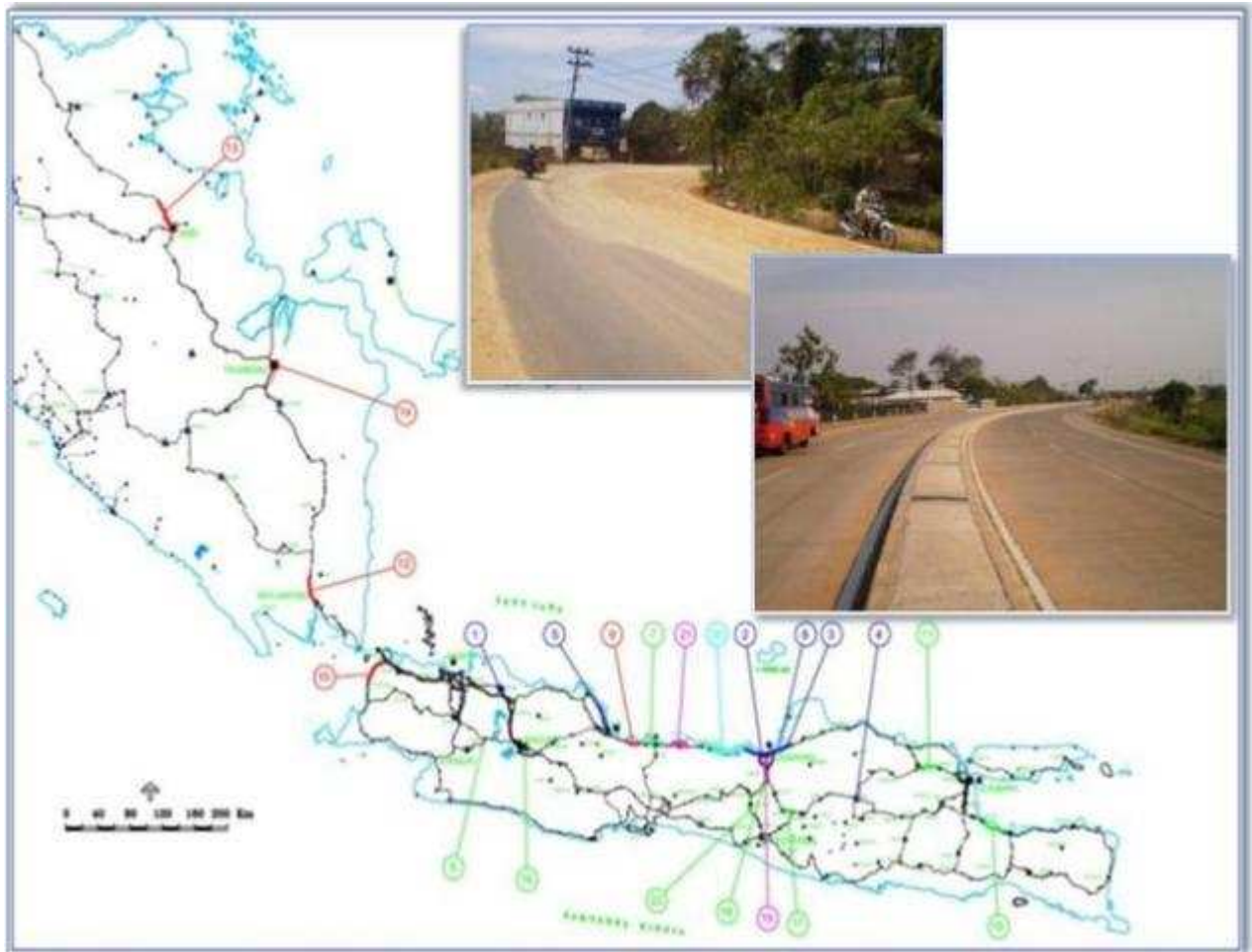




**REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS
DIRECTORATE OF PLANNING**



**KARANG AMPEL - CIREBON
ROAD SAFETY AUDIT REPORT
As Constructed**

January 2011

THE PROJECT MANAGEMENT UNIT
STRATEGIC ROADS INFRASTRUCTURE PROJECT
Under IBRD Loan 4834 / 7786 ID



Republic of Indonesia
Ministry of Public Work
Directorate General of Highways

Strategic Roads Infrastructure Project (SRIP)

Technical assistance for Core Team Consultant (CTC)
To Support the Management Unit
Under IBRD Loan No. 4834-IND



PACKAGE KARANG AMPEL - CIREBON ROAD SAFETY AUDIT REPORT Existing Road Stage - As Constructed June 2010



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Summary of Problems and Recommendations

Junctions

Problems

Designs for Intersections were not constructed according to drawings
Many of buses are stopped blocking the junctions
Some traffic signals were not working
All the traffic signal were not bright enough
No Rumble strips installed all approaches to the intersections.

Recommendations

- **Add rumble bars to all approaches**
- **Ensure all broken signal equipment repaired promptly**
- **Upgrade main signal head on each approach to large high visibility specification**

Road Signs

Problems

Signs are missing or incomplete. Others are positioned in the wrong place and inappropriate signs are recommended for installation.

No advance warning at U Turn, Pedestrian crossing and put the pedestrian in hazard condition.

Recommendations

- **All traffic sign should be reviewed and detailed shop drawing produced to show all signs need to be installed and their exact location on large scale plans.**
- **Avoid placing traffic signs on narrow median, blocking footpaths, hiding signals or hidden by trees**

U Turn / Gaps at Median

Problems

There are many gaps in median are likely to result in serious accident patterns. The U turns do not have a taper and all have narrow median.

And all gaps in median lack highly visible advance warning signing and there are no speed reduction measure

Recommendations

- **Improve signing at all U turns**
- **Add rumble bars in advance of all gaps**
- **Paint curbs with high quality reflective paint at all gaps**

Speed Limits

Problems

The design speed for the road is 60 Km/H, but there is a great lack of speed limit signs throughout the project and an correct speed limit approaching School

Recommendations

- **Review the whole length of the project and use an appropriate speed limits at commercial areas etc.**
- **Ensure reduce speed limits are installed on school zone.**

Guard Rails

Problems

There are many lengths of guard rail installed, but they do not all follow standard drawings and they are poorly connected to bridges. There is also lack of maintenance for damaged rails, see photos examples below:

Recommendations

- **Review all guard rail installations & maintenance procedures**
- **Repair all damaged rails as a matter of urgency**
- **There should be no exposed end of guard rails**
- **Their should be a strong connection between flexible guard rail and a rigid bridge parapet**

School Zones

Problems

No school zones have been installed - unlike all other projects - although there are several locations where hundreds of pupils have to cross the dual carriageway, see photos below.

Recommendations

- **Urgent consideration needs to be given to adding standard school zone markings, speed limits rumble bars etc. at all schools**

Pedestrian Facilities

Problems

There are many safety hazards for pedestrians on the project with blocked or damaged footways, and there are no traffic calming measures at the crossings.

Recommendations

- **Review all footways and pedestrian crossings on the road project**
- **Clear blockages on pedestrian footpaths**
- **Review maintenance of footways and repair all defects**
- **Add traffic calming such as rumble strips, speed limits or flashers at crossings**

Bus Stops & Parking Areas

Problems

Many Vehicles are parked at the shoulder on the project, causing sudden braking or nose-to-tail shunts and also blocking visibility for any road user;

Similar problems are caused by buses picking up or dropping their passengers

Little or no effort has been made to design parking or waiting areas or bus stops. In consequence the road is blocked congested and dangerous at busy locations.

Recommendations

- **Review need for bus stops, parking and loading areas and design and install appropriate facilities**

Road Lighting

Problems

Street lights had been installed but were not working and no new lightning at intersections.

- **Ensure all street lighting is working correctly and repair and maintenance procedures adequate**
- **Review need to increase lighting at all junctions**

1 INTRODUCTION

1.1. Audit Process

Road Safety Audit (RSA) can be defined as a formal examination of a highway or traffic project in which an independent qualified auditor or team of auditors reports on the road safety problems associated with the designs or construction of the project and makes recommendations on improvements.

It started in the UK some twenty years ago and is now common practice around the world. There are several Road Safety Audit Guidelines that are used as standard practice for Audits around the World, an adapted of the Australian Guidelines are actually used in Indonesia

Audits can be carried out at various stages and arguably the earlier the better:

- Feasibility
- Preliminary Design
- Final Design
- Construction
- Pre-Opening
- Existing Road

This Audit covers the Existing Road or As Constructed stage

1.2. SRIP

The Strategic Roads Infrastructure Project (SRIP) was developed to meet the increasing traffic demand and institutional requirements following easing of the 1997 financial crisis in 2001. SRIP, which is supported by the World Bank under IBRD Loan 4834-IND, is being implemented by the Directorate General of Highways within the Ministry of Public Works over the five-year Loan period following its effectiveness date of 01 November 2007. Project implementation is expected to continue through to end 2012, with a possible extension to 2014 to accommodate implementation of the Performance Based Contract component of the Project.

SRIP is composed of twenty two (22) Civil Works packages of road betterment capacity expansion and new roads / bridges, including a trial Performance Based Contract (PBC), encompassing urban and inter-urban National Roads in 7 provinces (4 provinces on Java and 3 provinces on Sumatra). Details for these packages are given in Appendix A. The Implementation Support Component includes two (2) road safety

components: Integrated Road Safety Management System (IRSMS) for Directorate General of Land Transport (DGLT) and Directorate of Traffic Police.

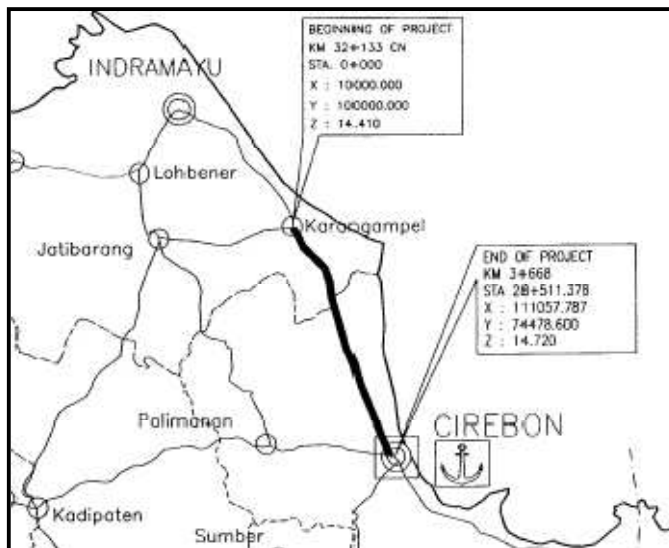
SRIP project implementation will be supported by four key consulting assignments: **(i) Core Team Consultants (CTC)**; (ii) Construction Supervision Consultants for non-Metropolitan roads (CSC-1); (iii) Construction Supervision Consultants for Metropolitan roads (CSC-2); and (iv) Procurement Advisor.

The Core Team Consultants responsibilities include the following: , the CTC has to ensure this Karang Ampel – Cirebon package have been reviewed by qualified Road Safety Audit.

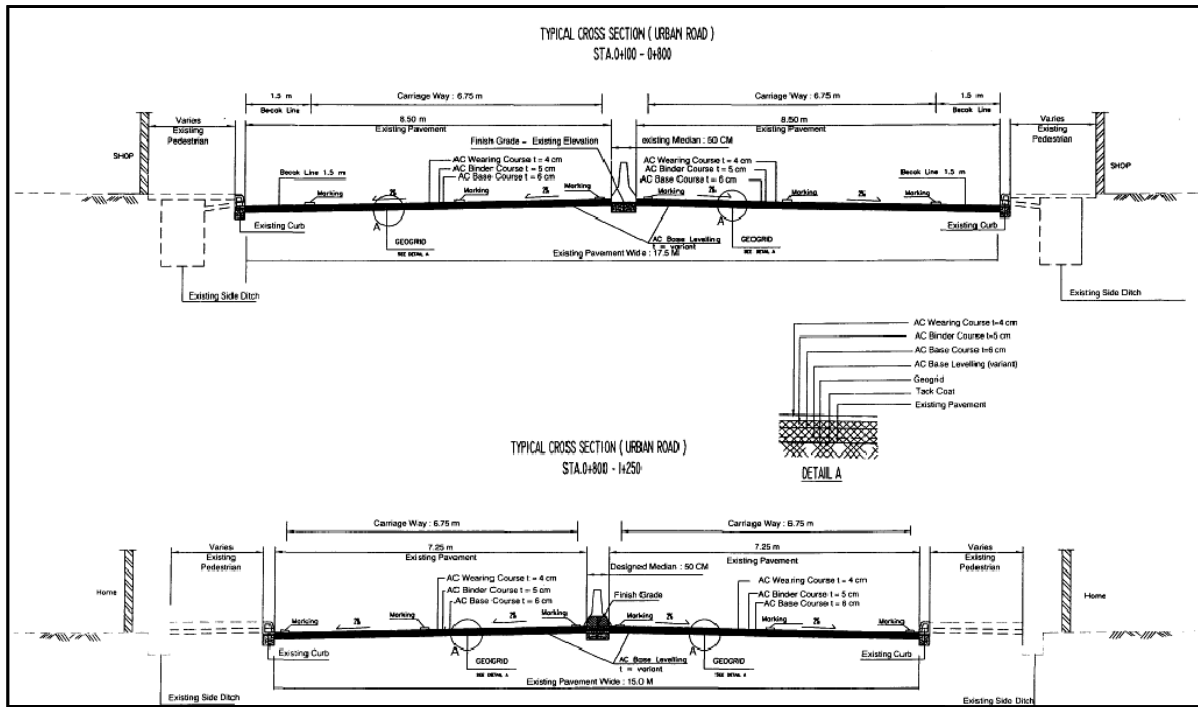
1.3. Objectives of the Audit

The objectives of the Road Safety Audit are to conduct among others the systematic review/checking of the safety aspects of the completed road plans (as constructed), traffic schemes, recommend the modifications of the plans when safety aspects warrants such changes, and the safety aspects during road construction.

1.4. Project Location Karang Ampel – Cirebon

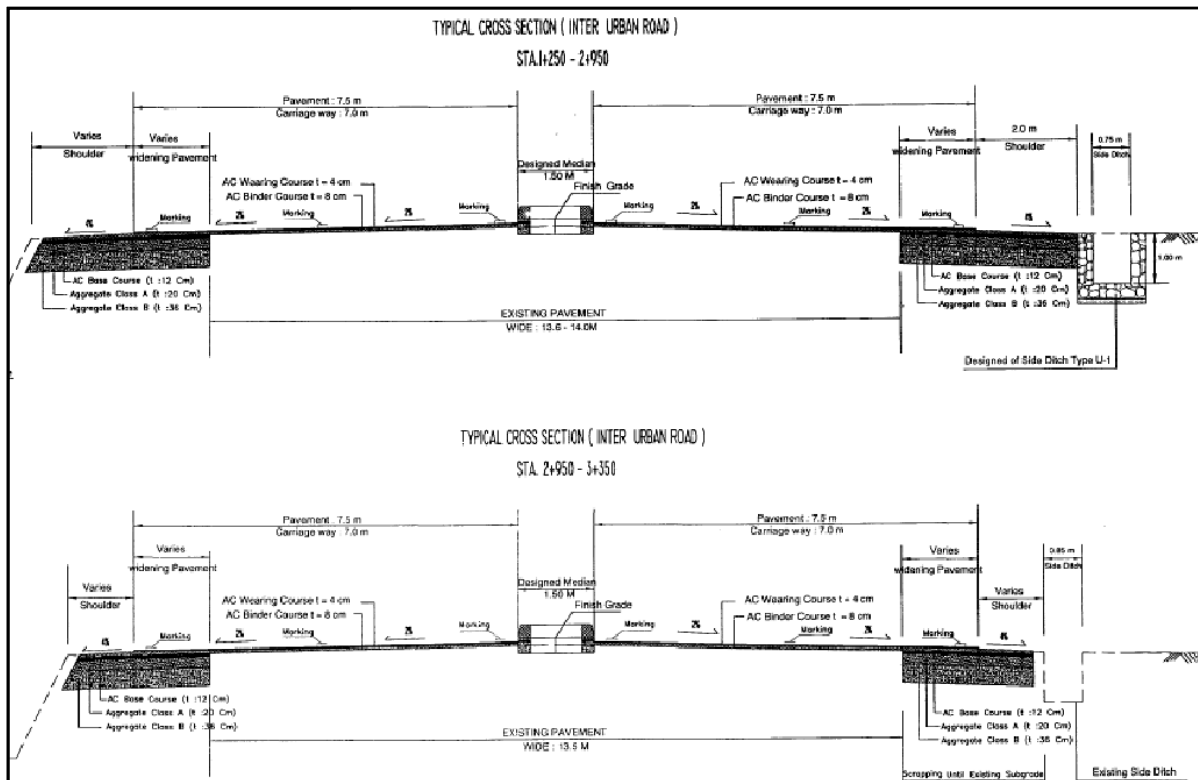


The Project Runs North from the Port of Cirebon for 25.81 Km to Town of Karang Ampel



1.5. Project Information

The length of the Road is 25.81 km. Typical Cross section on Detailed Drawing



Karang Ampel - Cirebon Road is situated in the province of West Java. The road is located along the The road passes mostly residential, commercial, institutional, and rice paddy fields from the starting point up to the end. The road traverses in almost flat terrain.

1.6. Plans and Documents

The plans used in this audit were the contract drawings. The drawings were checked and approved by concerned Bina Marga authorities.

1.7. Traffic Volume

There are no information previous studies available to the audit team. A traffic study of the Karang ampel Cirebon Road normally needed as one of the basis for the level of improvement and justify its construction was not available at the time of the audit.

The existing road section has a high volume of traffic and about one third is considered as vulnerable road users; motorcycles and non-motorized vehicles.

The high volume of traffic along the area reinforces the need to provide a safe road.

1.8. Members of the Audit Team

The road safety audit team is all members of the Core Team Consultant of SRIP and composed of the following:

Mike Goodge	- Senior Road Safety Audit Engineer
Bayani J. Lusica	- Senior Highway Engineer
Agus Herudianto	- Road Safety Audit Engineer

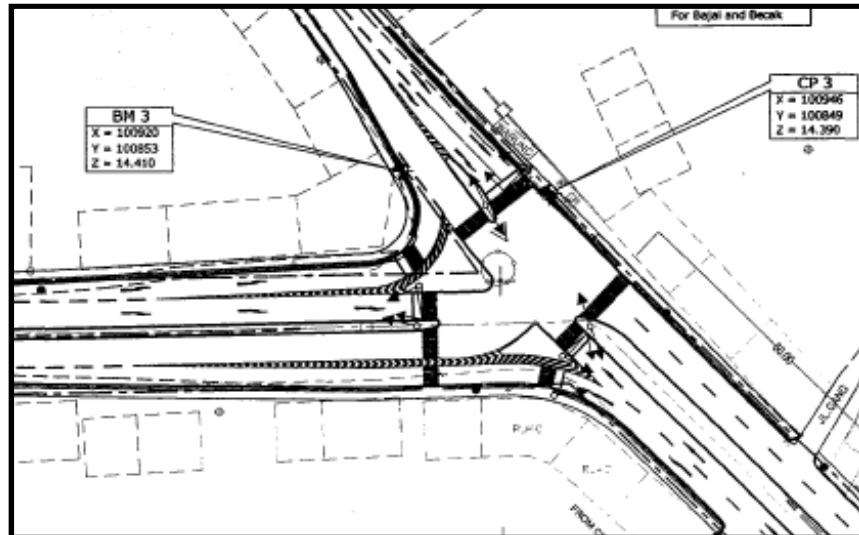
1.9. Date of Site Visit Audit

The site visit was conducted in 26 May 2010, 5 intersections were particularly studied. Many pictures were taken at the 5 junctions and attached in this report.

2. Problems and Recommendations

2.1 Junctions

Intersection KRCR 01 Sta.0+000



Phase A	Phase B	Phase C
G = 17 seconds G + I = 23 seconds (G + I)/C = 38.3 %	G = 15 seconds G + I = 21 seconds (G + I)/C = 35.0 %	G = 10 seconds G + I = 126 seconds (G + I)/C = 28.7 %



**Busy Market
Section of
Project near
northern end in
Karang Ampel**

The proposed design included new signal equipment, islands, footways, pedestrian barriers, but this was not implemented. The junction is still very unsafe for pedestrians and much of the signal equipment is not working or damaged, see photos below:



The Traffic Signal Junction Has Not been Improved as Described in Drawings



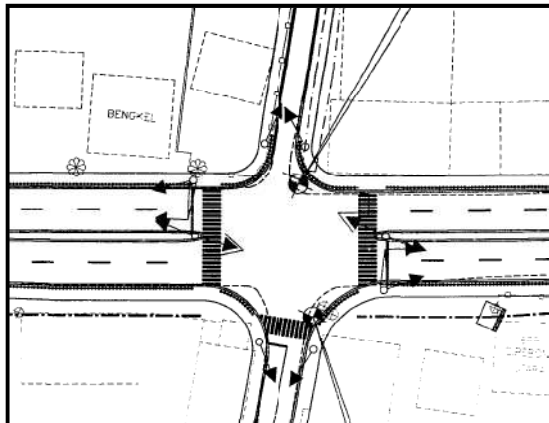
Shoulders & Pedestrian Paths are Used for Parking by Becak & Public Transport



Junction is Un-Safe for Pedestrians & All Road Users



Poor Condition of Traffic Signals (Damaged and Broken) and Pedestrian Crossing Blocked by the Poles



Phase A		Phase B	
G = 96 seconds G + I = 102 seconds (G + I)/C = 81.6 %		G = 17 seconds G + I = 23 seconds (G + I)/C = 18.4 %	

Proposed Signal Design at Junction at Sta 27+000

Junction at Sta 27+000 Still Un signalized



High Standard Traffic Signals on Semarang Barwen, with LEDs & Far Side Signal

Recommendations

- Add rumble bars to all approaches
- Ensure all broken signal equipment repaired promptly
- Upgrade main signal head on each approach to large high visibility specification

2.2 Road Signs

Problems

Signs are missing or incomplete. Others are positioned in the wrong place and inappropriate signs are recommended for installation.

Road signs are not at proper location, should be 100 up to 50 meter from pedestrian crossing, See below



No advance warning at U Turn, Pedestrian crossing and put the pedestrian in danger



Recommendations

- All traffic sign should be reviewed and detailed shop drawing produced to show all signs need to be installed and their exact location on large scale plans.
- Avoid placing traffic sign on narrow median, blocking footpaths, hiding signals or hidden by trees

2.3 U Turn / Gaps at Median

Problems

There are many gaps in median are likely to result in serious accident patterns. The U turns do not have a taper and all have narrow median.

And all gaps in median lack highly visible advance warning signing and there are no speed reduction measure. As shown below;



Recommendations

- Improve signing at all U turns
- Add rumble bars in advance of all gaps
- Paint curbs with high quality reflective paint at all gaps

2.4 Speed Limits

Problems

The design speed for the road is 60 Km/H, but

- there is a great lack of speed limit signs throughout the project. See few isolated signs below.
- Incorrect speed limit approaching School



Recommendations

- Review the whole length of the project and use an appropriate speed limits at commercial areas etc.
- Ensure reduce speed limit are installed on school zone.

2.5 Guard Rails

Problems

There are many lengths of guard rail installed, but they do not all follow standard drawings and they are poorly connected to bridges. There is also lack of maintenance for damaged rails, see photos examples below:





Broken Guardrail and No Maintenance



No Bridge Protection, and Hazardous to Road Users



Broken Guard Rail by Local People for Their Access Road

Recommendations

- Review all guard rail installations & maintenance procedures
- Repair all damaged rails as a matter of urgency
- There should be no exposed end of guard rails
- There should be a strong connection between flexible guard rail and a rigid bridge parapet, see high standard example below:



2.6 School Zones

Problems

No school zones have been installed - unlike all other projects - although there are several locations where hundreds of pupils have to cross the dual carriageway, see photos below.

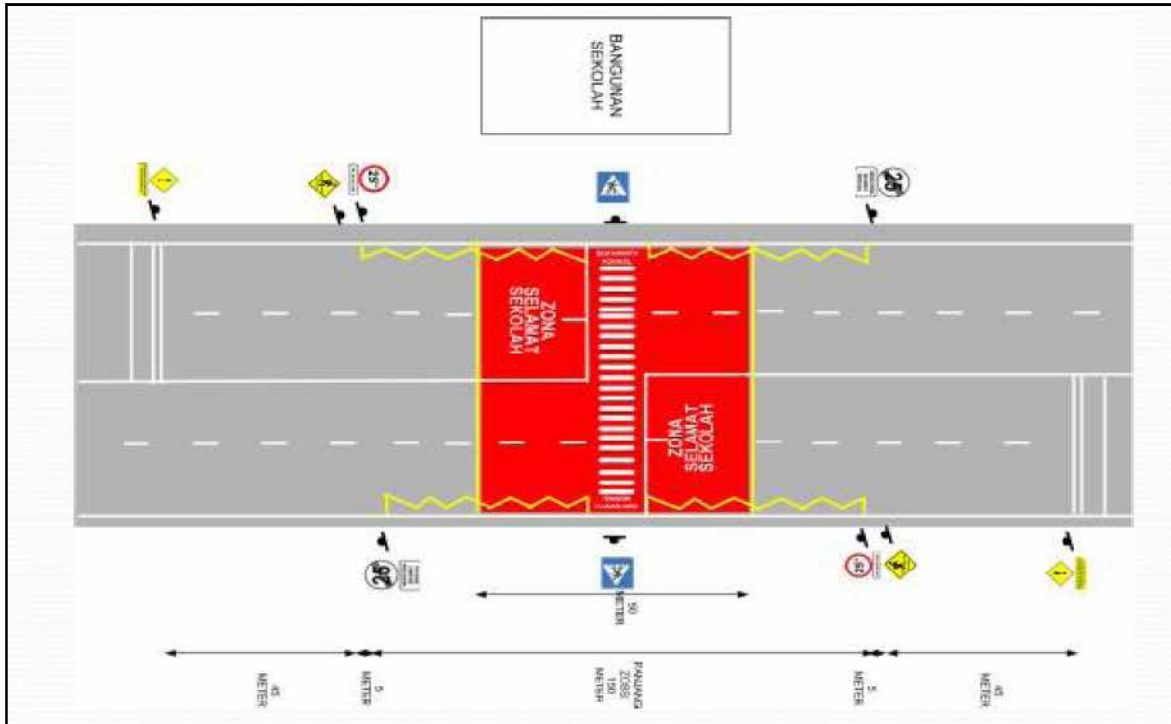




Recommendation

- Urgent consideration needs to be given to adding standard school zone markings, speed limits rumble bars etc. at all schools, see standard details below:





2.7 Pedestrian Facilities

Problems

There are many safety hazards for pedestrians on the project with blocked or damaged footways, and there are no traffic calming measures at the crossings.





Recommendations

- **Review all footways and pedestrian crossings on the road project**
- **Clear blockages on pedestrian footpaths**
- **Review maintenance of footways and repair all defects**
- **Add traffic calming such as rumble strips, speed limits or flashers at crossings**

2.8 Bus Stops & Parking Areas

Problems

Most of Activities on, or near, the Kerbside such as car parking, local accesses, commercial activities etc. can have adverse affects on the freedom of movement to pedestrians and motorised road users alike and can jeopardize their safety.

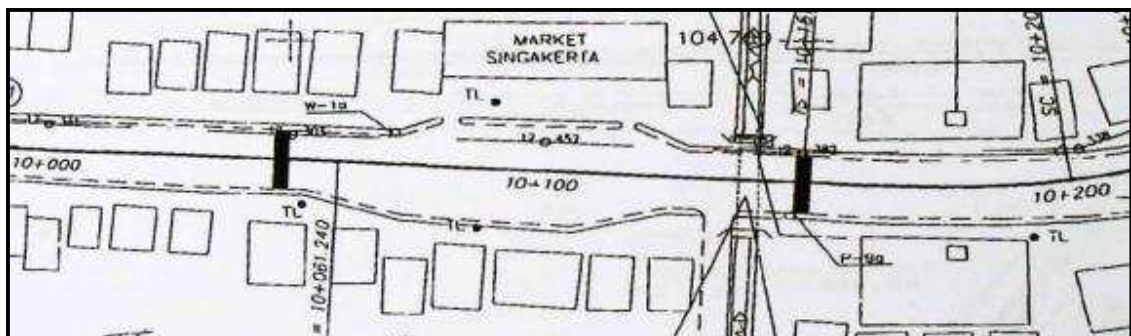
Many Vehicles are parked at the shoulder on the project, causing sudden braking or nose-to-tail shunts and also blocking visibility for any road user;

Similar problems are caused by buses picking up or dropping their passengers

Little or no effort has been made to design parking or waiting areas or bus stops. In consequence the road is blocked congested and dangerous at busy locations.



The only one set of bus bays were installed at the market Sta.10+100, see plan & photo below





Recommendations

- **Review need for bus stops, parking and loading areas and design and install appropriate facilities**

2.9 Road Lighting

Adequate street lighting can help reduce night-time accidents and is an established accident prevention measure in urban areas in industrialized countries. It is particularly important where there are high proportions of pedestrians, cyclists or other poorly lit road users including animals.

Problem

Street lights had been installed but were not working and no new lightning at intersections.



Recommendations

- **Ensure all street lighting is working correctly and repair and maintenance procedures adequate**
- **Review need to increase lighting at all junctions**

Appendix A. References

1. Pedoman Audit Keselamatan Jalan (PD T-17-2005-B), PU Prasarana Transportasi (**Road Safety Guidelines (PDT -17 – 2005 – B). Public Works, Transportation**)
2. Pedoman Teknis Perekayasaan Tempat Pemberhentian kendaraan Penumpang Umum, Dirjen Perhubungan darat No. 271/HK.105/DRJD/96 (**Technical guidance for Public Bus Stops, Directorate General land & transportation No. 271/HK.105/DRJD/96**)
3. Pedoman Audit Keselamatan di jalan raya (Austroads Standard) edisi ke 2, 2002 (**Road safety Audit Guidelines (Austroads Standards) Second edition 2002**)
4. Pedoman Teknis Penanaman Pohon Pada Sistem Jaringan jalan 2010 (**Technical Guidelines for Planting trees at Road Network System 2010**)
5. Pedoman teknis Fasilitas Pejalan Kaki di Perkotaan SK.43/AJ 007/DRJD/1997 Direktorat Jenderal Perhubungan Darat) (**Technical Guidelines for Pedestrian facilities at Cities region, SK.43/AJ 007/DRJD/1997, Directorate General land & transportation**)
6. Mewujudkan Jalan Berkeselamatan di Indonesia, Australia – Indonesia bekerjasama dalam teknis keselamatan di Jalan. Direktorat Jenderal Bina Marga, INDIE 2010 (**Making Indonesia's Roads Safer, Australia- Indonesia Partnership in Road Safety Engineering, Directorate General of Bina Marga, INDI 2010**)
See extracts on construction zone safety below.
7. Petunjuk Praktis , Keselamatan Jalan Pada Zona Kerja di Jalan, mendukung Proyek EINRIP, Direktorat Jenderal Bina Marga (**Practical Guidelines, Road Safety of Construction Zone**) to Support "EINRIP Projects", Directorate General of Bina Marga