Guidelines on Road Safety Audit Management

JABATAN KERJA RAYA
MALAYSIA

FOREWORD

Guidelines for the Safety Audit of Roads and Road Project in Malaysia the first issue was in 1997 and the second issue in 2002 was the guideline for road safety auditors to carry out road safety audit work.

There is a development of technical and legal requirements from external technical agencies from time to time, so JKR Malaysia through this branch takes the initiative to implement the update of the document so that the document is more comprehensive in meeting the needs of agencies closely related or interested in road safety.

The purpose of this guideline is to establish uniformity and consistency in the Road Safety Audit (RSA) management as applied to the road and highway facilities in Malaysia. This guideline on Road Safety Audit (RSA) Management that replaces the existing Nota Teknik Jalan (NTJ) 25/07, is to establish new guidelines to address the shortcomings contained in the existing RSA Guidelines.

The preparation of this guideline was carried out through many discussions and deliberations by the committee members and also a working committee workshop held specially for this purpose. Feedbacks and comments received were carefully considered and incorporated into this guideline wherever necessary or appropriate.

This guideline will be reviewed and updated from time to time to cater for and incorporate the latest requirements in the RSA procedure, as and when necessary, and also to changes in the road and highway design which affects the RSA process, if any. Any comments and feedback regarding this guideline should be forwarded to The Unit Standard, Bahagian Pembangunan Inovasi dan Standard, Pakar Kejuruteraan Jalan dan Jambatan, Cawangan Jalan JKR Malaysia.

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GUIDELINES ON ROAD SAFETY AUDIT (RSA) MANAGEMENT

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SECTION A

INTRODUCTION

1.0 INTRODUCTION

Road Safety Audit is a pro-active and preventive approach adopted by road authorities to enhance road safety for their road networks. Road Safety Audit (RSA) forms an integral part of the Safe System Approach adopted by many developed countries.

In Malaysia, the Guidelines for the Safety Audit of Roads and Road Project in Malaysia published by the Public Works Department (Malaysia) provides detailed technical guide on conducting various stages of the road safety audit.

This document intends to streamline and standardise the practices currently adopted by the different road authorities in commissioning, conducting and completing the Road Safety audits.

The main objective is to set out a clear guideline for road authorities and road safety auditors to ensure uniformity of practices especially in the area of warrants adopted and also in closure of the various audit reports.

This Guidelines on Road Safety Audit (RSA) Management that replaces the existing Nota Teknik Jalan (NTJ) 25/07, is to establish new guidelines to address the shortcomings contained in the existing RSA Guidelines. The main areas that cover in this guideline are the management of road safety audit for road projects and roadside developments.

1.1 Definitions

1.1.1 Road Safety Audit

In general, road safety audit may be defined as the formal examination of planning, design and construction of road projects, including the characteristics and operation of existing roads, by independent and qualified examiners. The task is to identify any potentially unsafe features or operational arrangements that may adversely affect the safety of all road users.

1.1.2 Road Safety Auditor

The examiner or better known as the road safety auditor is a practicing professional who is accredited to undertake road safety audits. He/she shall has the experiences and capabilities in road design, traffic engineering, traffic/transport management, road construction techniques, road safety engineering, road user behaviours or other closely related road safety discipline.

In order to be accredited, the road safety auditor must fulfill the required qualification, requirements and register with the Jawatankuasa Akreditasi Juruaudit Keselamatan Jalan, JKR Malaysia.

1.1.3 Road Authorities

This is the Authority which has jurisdiction over the road networks under its care as gazetted. **TABLE 1.1** provides definitions of the roles and responsibilities of various parties that are referred to in this document.

1.2 Brief Description of Road Safety Audit

For background information relating to what, when, why, who, and how on the implementation of road safety audits, refer to the Guidelines for the Safety Audit of Roads and Road Project in Malaysia published by the Public Works Department (Malaysia).

1.3 Stages of Road Safety Audit

For the purpose of road safety auditing, projects fall under three distinct categories. A project may be in the pre-construction phase, in the construction phase or in the post-construction phase of its life cycle.

These phases can be further divided into the key life cycle stages of a project: feasibility and planning stage, preliminary design, detailed design, construction, pre-opening, finalisation and existing road.

Road safety audits are typically conducted at these key life cycle stages. The stages of road safety audits therefore reflect these key stages. **TABLE 1.2** provides a description of each stage of Road Safety Audit.

TABLE 1.1: Roles and Responsibilities in Road Safety Audit Process

NAME	ROLES AND RESPONSIBILITIES
Project Sponsor	The project director or Head of Project Team (employed or contracted by the Road Authorities / Highway Concessionaire company / Turnkey Contractor / Developer / Local Council) responsible for delivering or overseeing the road infrastructure related works.
Lead Auditor	An accredited road safety auditor with qualifications, experience and skills required to lead and manage every phases of the Road Safety Audit process as well as participating in the entire undertaking of the road safety audit.
Audit Team Member	A road safety auditor and/or engineer with qualifications, experience and skills required to participate in the entire undertaking of the road safety audit.
Designer	The party responsible to prepare the engineering design engaged by the Project Sponsor.
Project Stakeholder	A person with an interest in the road infrastructure related works. May be a planner, designer, construction manager, asset manager or operations manager.
Approving Authority	The road authority who is accountable for delivering or overseeing the road infrastructure related works and also in managing and concluding the various stages of the Road Safety Audit carried out.
Resident Engineer	The representative tasked with the supervision of the construction works.
Contractor	The construction company appointed by the project sponsor to undertake the construction works.

TABLE 1.2: Description of Each Stage of the Road Safety Audit

PROJECT PHASE	STAGE OF ROAD SAFETY AUDIT	DESCRIPTION & THE RSA STAGE
Pre-construction	Feasibility & Planning Stage (Stage 1)	The Stage 1 Audit will be carried out during the feasibility and planning phase, where a number of alternative proposals are being considered for the project. Audit is to be made of each alternative, the results of which (to the extent relevant) should be included in the evaluation process.
	Preliminary Design (Stage 2)	The Stage 2 Audit will be carried out at the end of the preliminary design phase where the Preliminary Design (Functional Layout) has been prepared and land acquisition requirements are being determined.
	Detailed Design (Stage 3)	This Audit must be done at an appropriate stage towards the end (but not at the end) of the detailed design, or as soon as it is possible to determine the safety implications of the design and when changes can be made at the most opportune time to avoid costly redesign. This may necessitate separate audit checks as various elements of the project reach the desired stage of design. A compliance audit report shall be prepared after the designer submitted their compliance report. The audit work at this stage includes auditing the suitability and workability of the proposed traffic management that will be carried out during the construction.

TABLE 1.2: Description of Each Stage of the Road Safety Audit (Cont'd)

PROJECT PHASE	STAGE OF ROAD SAFETY AUDIT	DESCRIPTION & THE RSA STAGE
Construction	Verification Audit (Stage 4 Part 1)	This Audit is to ensure that the decision of the Approving Authority with regard to Stage 3 Audit are 'carried through' or 'verified' in the construction drawings issued to the Contractor for construction. An Audit of the Traffic Management Plan (TMP) prepared by the Contractor shall also be carried out before construction works commence to ensure safety of the existing traffic affected by the construction are taken care of.
	Construction (Stage 4 Part 2)	This stage of Audit shall be carried out when the construction works progress is about 50%. It shall include the on-site Traffic Control Plan (TCP) implemented by the Contractor based on the approved TMP. Any changes on the TCP shall be documented and approved.
	Pre-opening (Stage 4 Part 3)	This Audit is carried out prior to its opening to traffic. Conducted immediately after the completion of the construction of the entire project works where it is intended to be opened to traffic. Both day and night audit will be required. Auditing the TCPs and on-site Work Zones during construction phase shall also be carried out at the intervals specified under Table 2A or 2B as directed by the Approving Authority.

TABLE 1.2: Description of Each Stage of the Road Safety Audit (Cont'd)

PROJECT PHASE	STAGE OF ROAD SAFETY AUDIT	DESCRIPTION & THE RSA STAGE
Construction	Additional Audit on Traffic Management at Work Zone (TMWZ)	Auditing the TCPs and on-site Work Zones during construction phase shall also be carried out at the intervals specified under Table 2A or 2B as directed by the Approving Authority.
Post-construction	Operational (Stage 5)	Conducted within 3 to 6 months after the completion of the construction of road infrastructure works. It is typically conducted once traffic patterns have normalises or immediately prior to the change-over of ownership or responsibility in regard to the assets or network operations following the completion of the project. Also known as the post-opening or operational stage. This is usually carried out within the Defects Liability Period (DLP). This stage of audit shall be carried out as specified under **TABLE 2A** and **TABLE 2B**.
	Existing Road* (Stage 5)	Conducted on an existing road, path or road network where no recent construction works were undertaken. * This type of road safety audit is a component of Road Safety Assessment and Inspection. This will not be covered in this guideline.

1.4 Road Safety Audit Process

A road safety audit is only one component of the overall road safety audit process. The RSA process consisted of a variety of tasks which at together would deliver the highest road safety benefits back into the community.

The phases of the road safety audit process are:

i. Commissioning of road safety audit. This is undertaken by the project sponsor.
ii. Conducting road safety audit. This is undertaken by the road safety audit team.
iii. Completing corrective actions to address road safety deficiencies arising from the road safety audit. This is undertaken by the project sponsor.

SECTION B

ROAD PROJECTS

2.0 WARRANTS FOR ROAD SAFETY AUDIT (RSA)

2.1 General

The main objective of RSA is to add value in terms of enhanced safety to the road project with the road users as the main beneficiary. This will complement the Government's objective to reduce accident fatalities and accident rates in the roads network which contributes to significant economic loss to the country.

2.2 Warrants for RSA on Road Projects

RSA started in Malaysia in 1997. Many States and Local Authorities are imposing RSA to enhance safety to their new road designs, upgrading of existing roads and also in the granting of access connections for abutting developments. Therefore, more consistent and uniform practices need to be formulated to ensure its effective implementation.

However, it should be noted that not all projects will require RSA or the full scope of RSA. This will depend on the category of the road and the standard of the design adopted.

2.3 Category of Roads

Roads can be classified according to the geometric standards that they are designed to. Usually it ranges from JKR R1 to R6 for rural road environments and JKR U1 to U6 for urban road environments.

Road projects can either be a construction of new roads or an upgrading of existing roads. They can also be access connections to roadside development projects. The requirement for RSA will therefore differ slightly depending on the status of each road project or the type of access connection required.

TABLE 2A and **2B** show the recommended warrants for RSA for road projects under different conditions or categories. However, the warrants related to access connections for roadside developments will be given in another section of this guideline.

TABLE 2A: Warrant of RSA for Upgrading of Existing Road

Geometric Standard	Stages of RSA							Frequency of Audit on Traffic Management at Work Zone (TMWZ)
	Stage-1	Stage-2	Stage-3	Stage-4			Stage-5	
				Part 1	Part 2	Part 3		
U1/R1	✗	✗	✓	✗	✗	✗	✗	✗
U2/R2	✗	✓	✓	✓	✗	✓	✗	✓ Every 6 months
U3 to U6 / R3 to R6	✓	✓	✓	✓	✓	✓	✓	✓ Every 3 months

Notes:

1. **Notwithstanding the above, whenever there is road safety concern the road authorities can still impose to any/all RSA stage, even if the road upgrading does not fall under any of the above geometry standard.**
2. **In general, RSA is only required where the project involves changes in road layout or/and road alignment. Maintenance works such as resurfacing, minor roadside repairs, grass cutting etc. do not require RSA.**
3. **RSA Stage 5 shall be carried out within 3 to 6 months after the completion of works.**

TABLE 2B: Warrant of RSA for New Road Construction

Geometric Standard	Stages of RSA							Frequency of Audit on Traffic Management at Work Zone (TMWZ)
	Stage-1	Stage-2	Stage-3	Stage-4			Stage-5	
				Part 1	Part 2	Part 3		
U1/R1	✗	✗	✓	✗	✗	✗	✗	✗
U2/R2	✓	✓	✓	✓	✗	✓	✗	✓ Every 6 months
U3 to U6 / R3 to R6	✓	✓	✓	✓	✓	✓	✓	✓ Every 3 months

Notes:

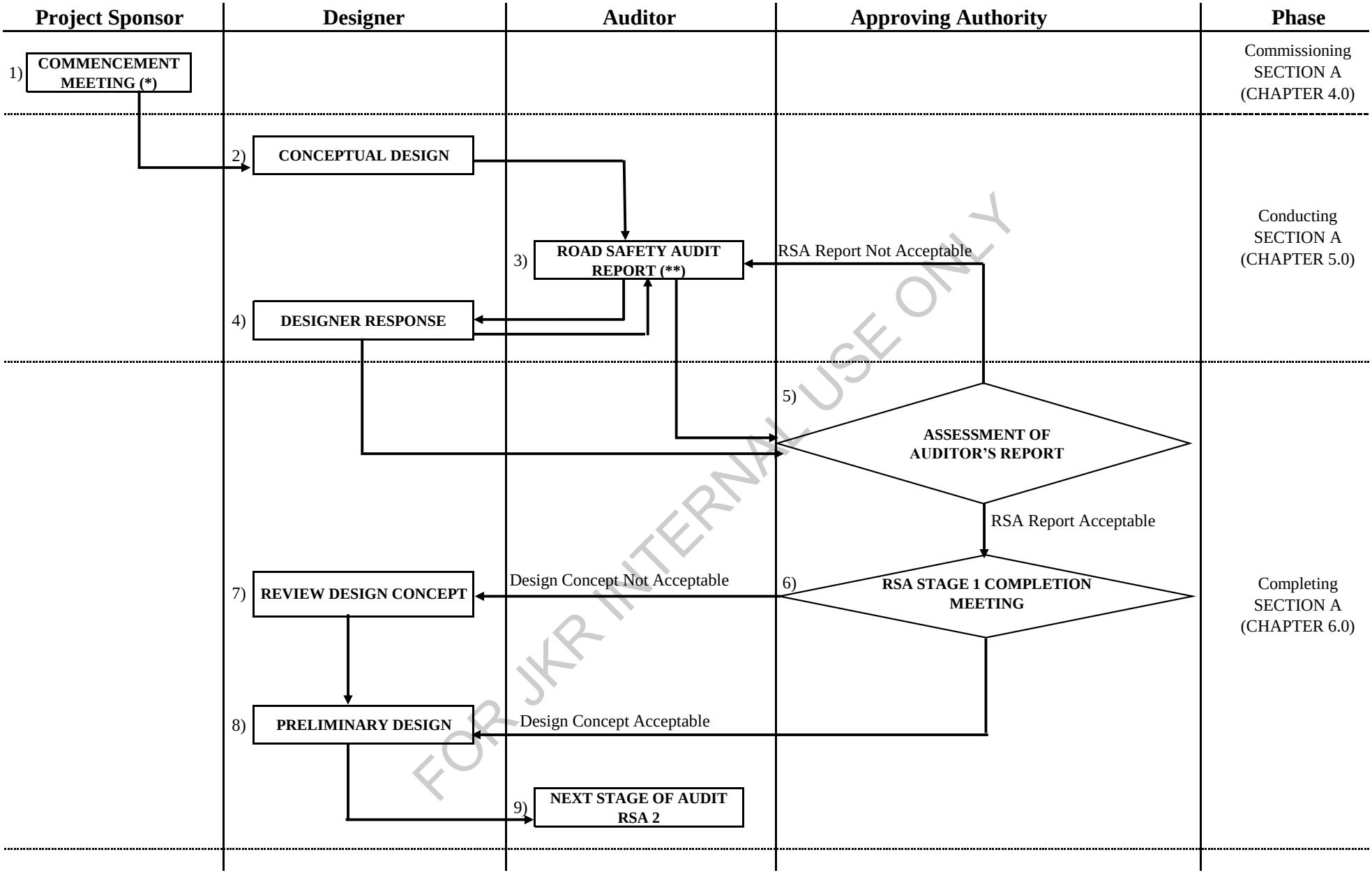
1. **Notwithstanding the above, whenever there is road safety concern the road authorities can still impose to any/all RSA stage, even if the new road construction does not fall under any of the above geometry standard.**
2. **In general, RSA is only required where the project involves changes in road layout or/and road alignment. Maintenance works such as resurfacing, minor roadside repairs, grass cutting etc. do not require RSA.**
3. **RSA Stage 5 shall be carried out within 6 to 9 months after the completion of works.**

3.0 FLOW CHART OF RSA FOR ROAD PROJECTS

3.1 Flow Chart of Different Stages of RSA

The following flow charts will give a better understanding of the processes involved in each stage of the road safety audit. Each chart also shows the relationship between the project's sponsor, designer, road safety auditor and the approving authority.

RSA Stage-1 Process



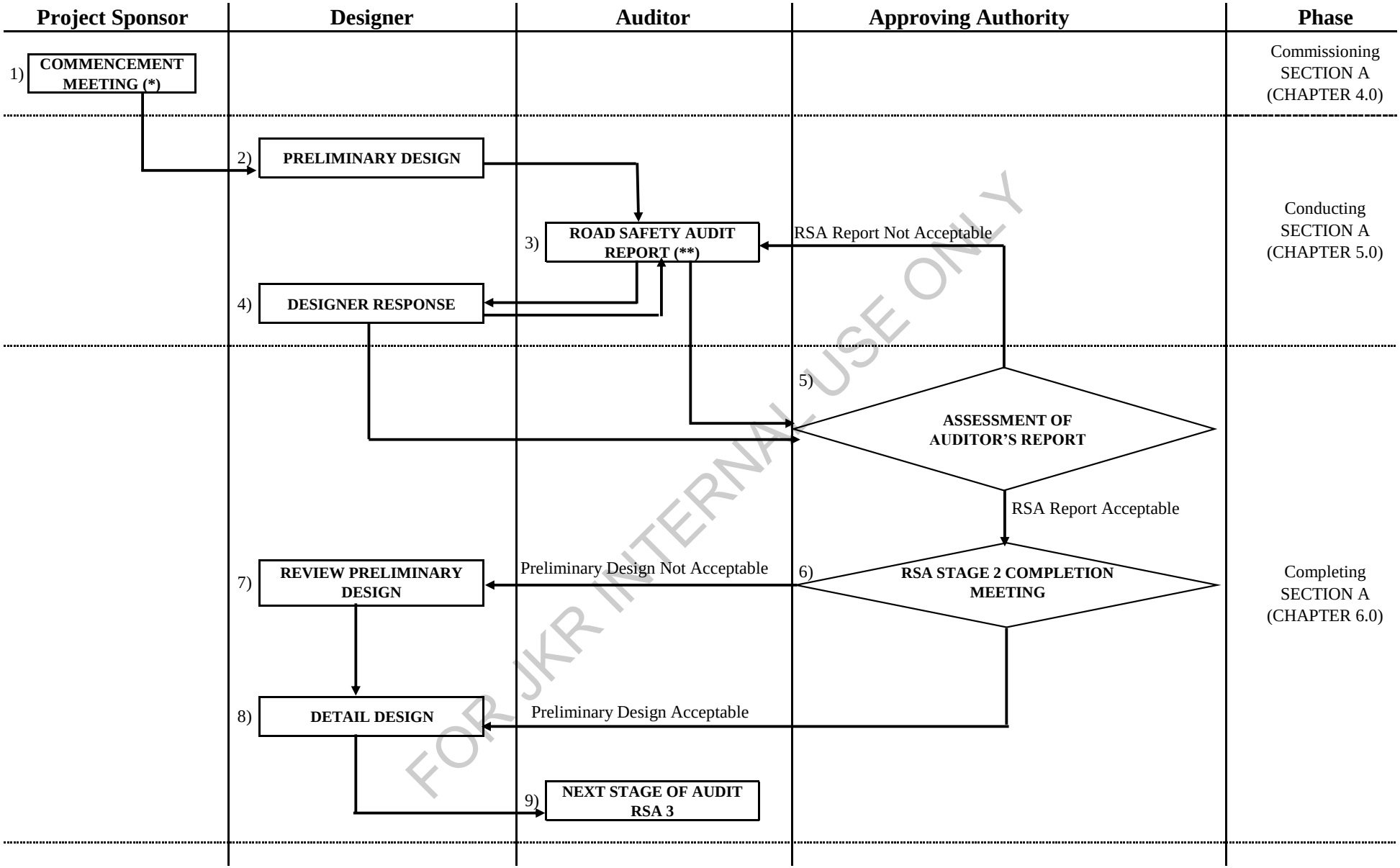
Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.

ii) (**) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iii) Recommended on the designer response to be included in the RSA presentation for the completion meeting.

RSA Stage-2 Process



Notes:

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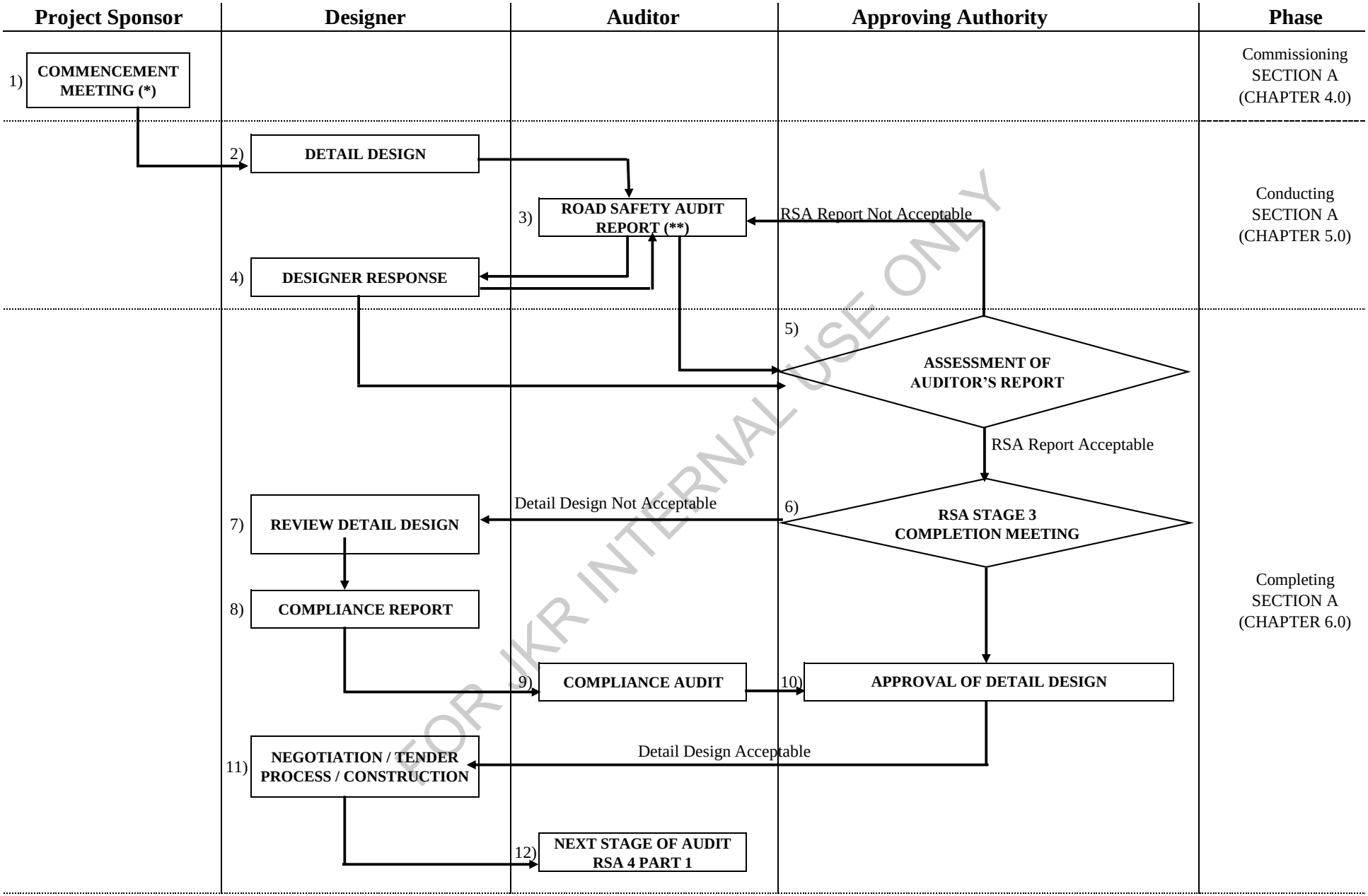
iii) Recommended on the designer response to be included in the RSA presentation for the completion meeting.

RSA Stage-3 Process



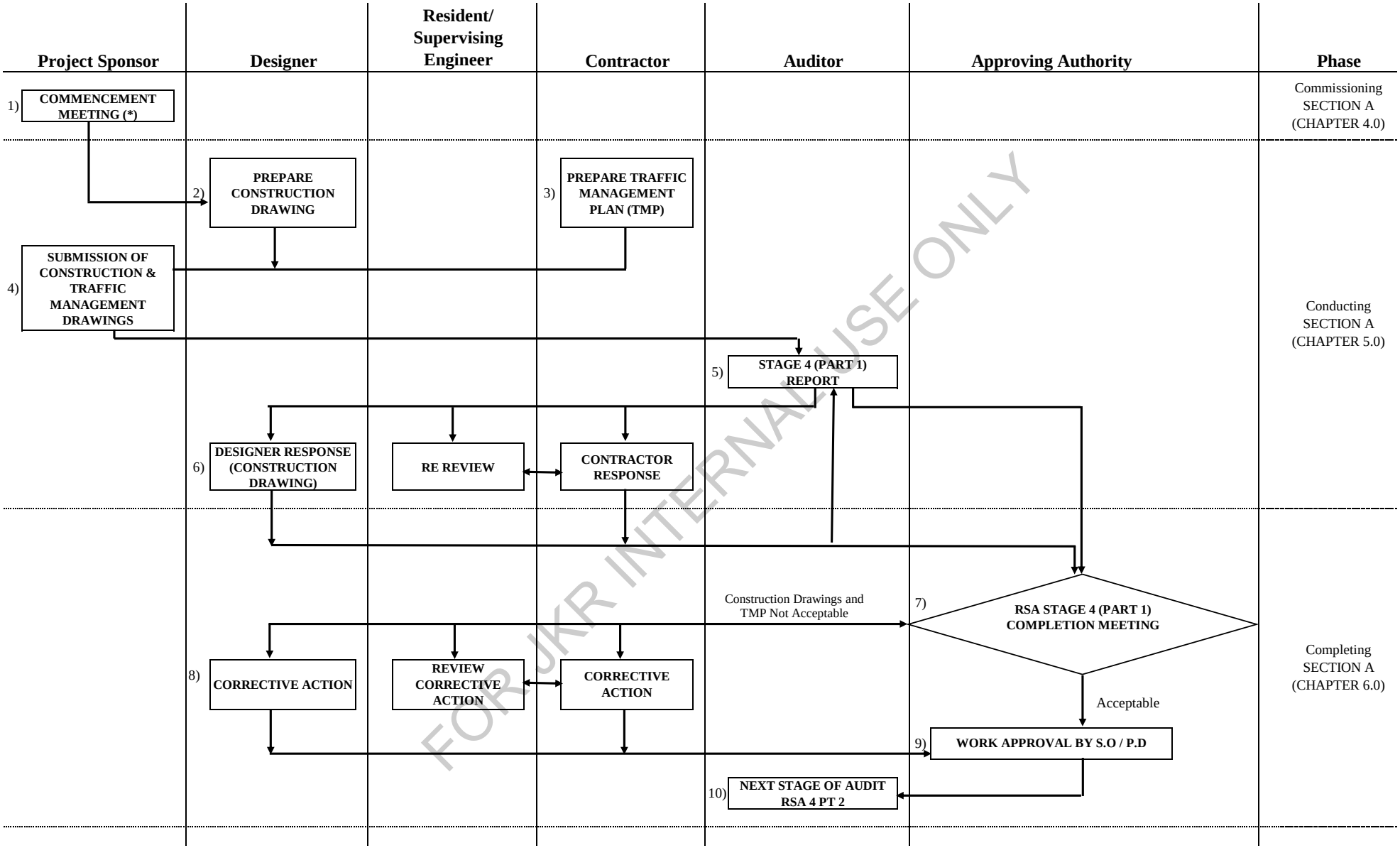
Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.

ii) (**) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the design consultant to fully appreciate the thinking behind the proposed design.

iii) Recommended on the designer response to be included in the RSA presentation for the completion meeting.

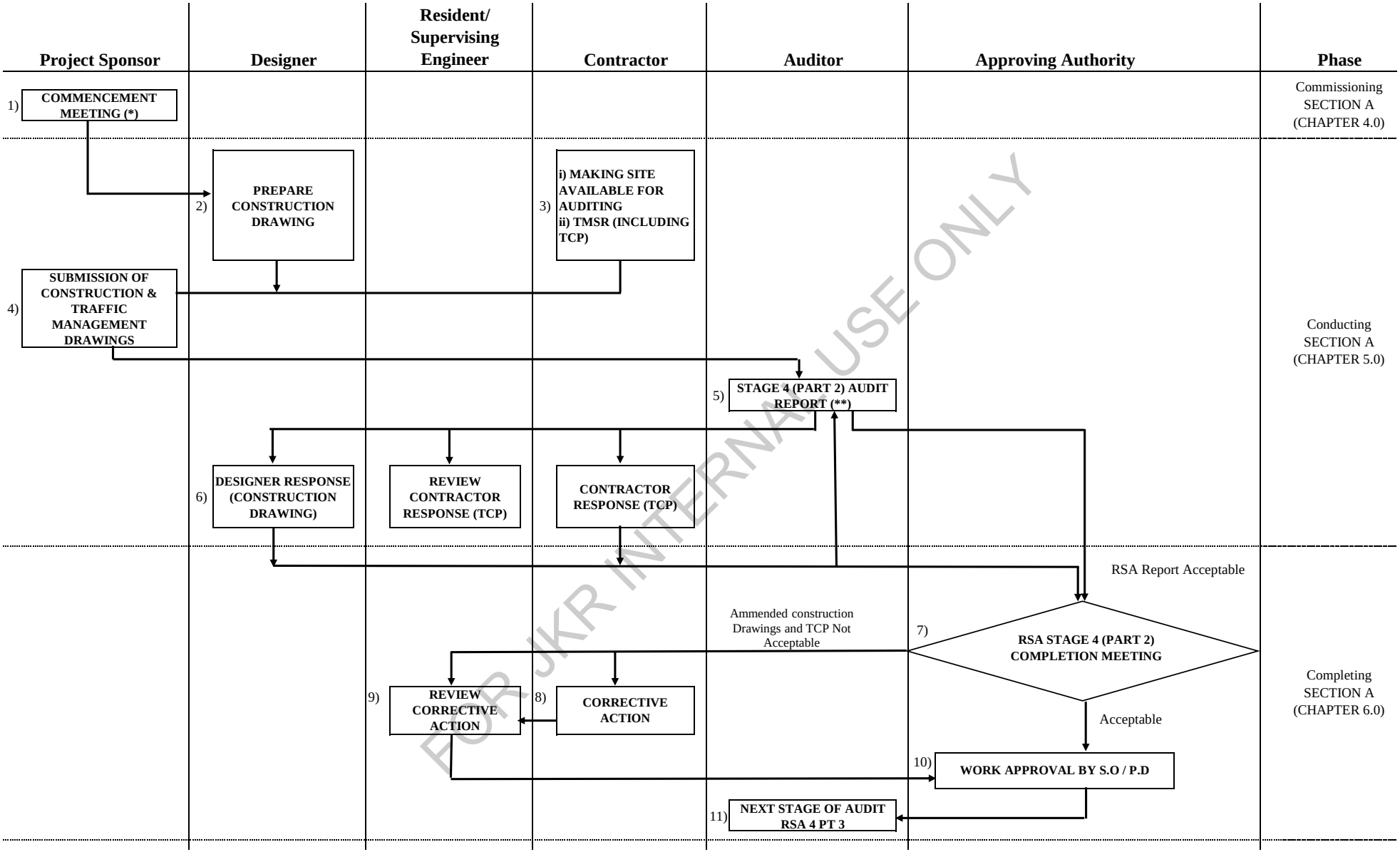
RSA Stage-4 (Part 1) Process



Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.
ii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design, method of construction and site traffic management/ control plan.
iii) Recommended on the designer/contractor response to be combined in RSA presentation for the completion meeting.
iv) If any major change of the design occurs during construction, a supplementary RSA Stage 3 shall be carried out on the proposed change.

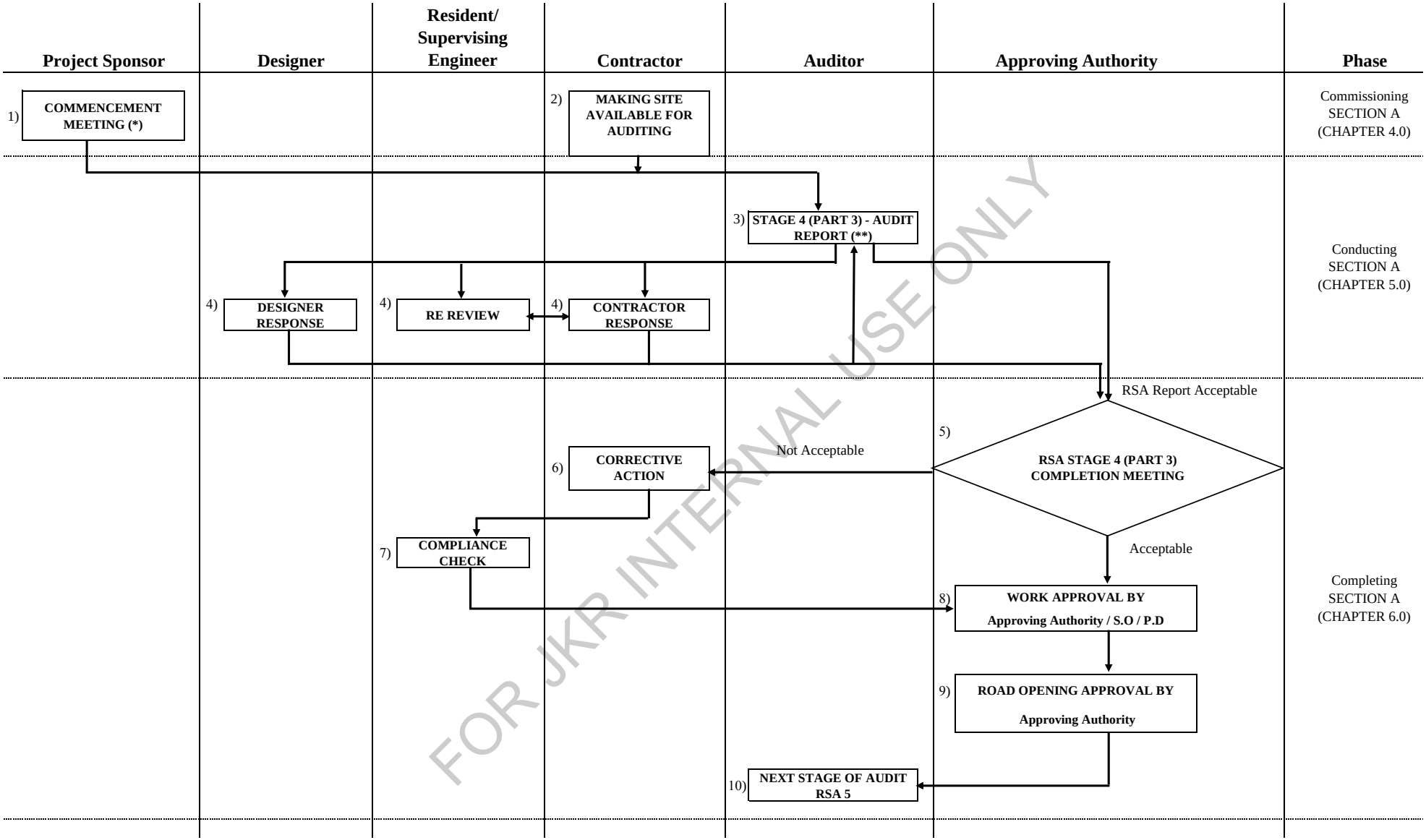
RSA Stage-4 (Part 2) Process



Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.
ii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design, method of construction and site traffic management/ control plan.
iii) Recommended on the designer response to be combined in RSA presentation for the completion meeting.
iv) If any major change of the design occurs during construction, a supplementary RSA Stage 3 shall be carried out on the proposed change.

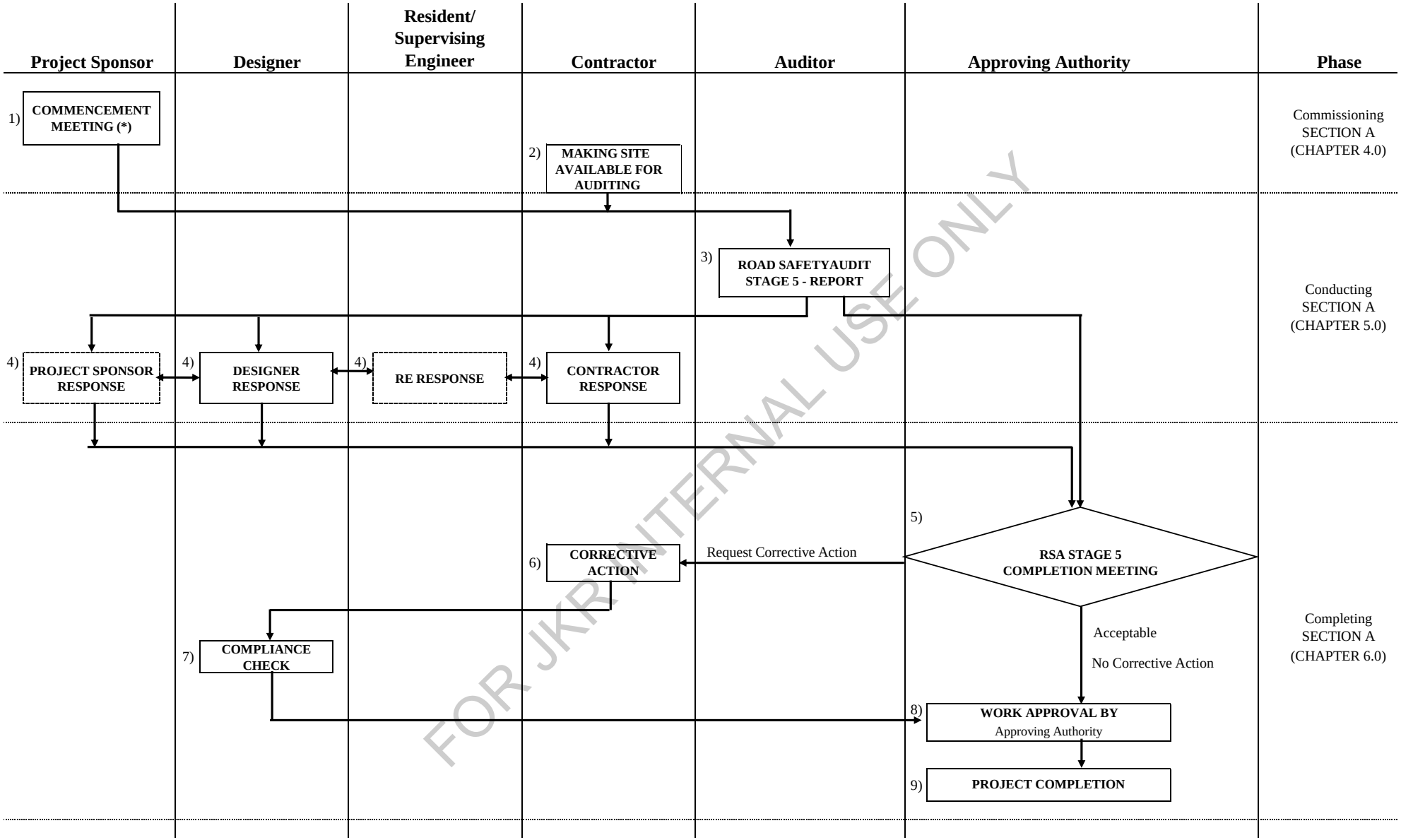
RSA Stage-4 (Part 3) Process



Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.
ii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design, method of construction and site traffic management/ control plan.
iii) Recommended on the contractor response to be combined in RSA presentation for the completion meeting.
iv) If any major change of the design occurs during construction, a supplementary RSA Stage 3 shall be carried out on the proposed change.

RSA Stage-5 Process



Notes:

i) (*) Commencement Meeting shall be conducted at the start of audit.
ii) (**) Before the auditor finalises his audit report for submission to the Approving Authority, it is always necessary that a discussion to be conducted with the project sponsor and the designer consultant to review and fully appreciate the thinking behind the proposed design, proposed amendment/mitigation if required.
iii) If RE is not available during RSA Stage 5, the designer shall be responsible to respond on the RSA Stage 5 comments and compliance check.
iv) Recommended that the contractor's responses to be included in the RSA presentation for the completion meeting.

4.0 COMMISSIONING ROAD SAFETY AUDIT

4.1 Overview

The objective of the commission phase is to establish the requirements, limitations and expectations for conducting a road safety audit. It also provides an opportunity to establish clear and concise communication and understanding between all parties.

The following key steps determine a successful outcome when commissioning a road safety audit:

a) Selecting a road safety audit team.

b) Gathering background information about the project and delivering it to the audit team.

c) Holding a commencement meeting.

TABLE 4.1: Roles and Responsibilities

Roles	Responsibilities
Project Sponsor	i. Produce a road safety audit brief which provides a clear statement of the scope of the audit and the expectations of the audit team. ii. Select and engage the road safety audit team. iii. Gather background information. iv. Hold the commencement meeting.
Lead Auditor	i. Represent the road safety audit team.

TABLE 4.1 shows the roles and responsibilities of the parties involved during the commissioning a road safety audit.

4.2 Selecting Road Safety Auditor

The objective of selecting the road safety auditor is to select a person or team which are independent, qualified and experienced in road safety issues and can successfully conduct the road safety audit and deliver the necessary outcomes.

The road safety auditor or audit team must consist of qualified and experienced professionals with the required knowledge, skills, experience and attitudes to deliver a successful road safety audit outcome. They must also be independent of the project being audited. The auditor or audit team members must be independent of project planner, designers, traffic consultant and construction companies involved in the project and have no business or other company association with them.

An audit can be carried out individually or in a team. The audit team, if any, must consist of a lead auditor and at least an assistant auditor. The lead auditor must be accredited by JKR or must have the specified criteria at the time the road safety audit is conducted.

4.2.1 Qualification of Road Safety Auditor

A qualified Road Safety Auditor shall be an engineer who has a good understanding of the driver/vehicle/road environment interaction and have experiences in road design, road safety analysis and countermeasures. He shall also be an accredited Road Safety Auditor and registered with JKR Malaysia.

4.3 Gathering and Delivering Background Information

The objective of gathering and delivering background information is to provide all the relevant project information, and made available to the road safety audit team in order to produce a successful road safety audit report.

The type of information provided to the road safety audit team may varies depending upon the project and the phase/stage of the project to be audited.

Background information is supplied to the road safety audit team to enhance their understanding of the project background and constraints. The information may include details of any restrictions and compromises that were part of the design process to enable them to identify measures that were taken.

TABLE 4.2: Role and Responsibility during Commencement of RSA

Role	Responsibility
Project Sponsor	i. Gather all relevant information / material and ensure it is available. ii. Decide what information is appropriate to be provided to the road safety audit team. iii. Deliver the relevant information to the lead auditor.

4.3.1 Steps for Gathering Relevant Information

4.3.1.1. Collect all the relevant information / material.

4.3.1.2. Determine what information is appropriate to provide and the format in which to provide it.

a) The latest full set of design plans, the design report and information on the project background must be provided for all pre-construction phase road safety audits.

b) It is highly desirable to provide traffic data.

c) It is desirable to provide any previous road safety audit reports of earlier stages.

d) Details of all corrective actions which still need to be taken / completed from previous road safety audits must be provided.

e) Provide the information in the appropriate format for dissemination to the road safety audit team.

4.3.1.3 Deliver the information to the lead auditor.

This may be done at the commencement meeting.

4.4 Holding the commencement meeting

The objective of holding the commencement meeting is to set the context for the road safety audit by bringing together the project sponsor, the road safety audit team representatives and all relevant stakeholders. The meeting shall discuss the scope of the road safety audit, the project constraints, the required information/material and to clarify any ambiguity thereof.

The commencement meeting is an important part of the road safety audit process. It is held before the audit team begins assessments/inspections and is attended by the project sponsor and members of the road safety audit team, or at least the lead auditor.

The meeting enables the project sponsor to hand over relevant information for the road safety audit to the lead auditor. It also provides an opportunity for the project sponsor to explain the purpose of the road safety audit and for the auditors to get clarification on any issues highlighted.

TABLE 4.3: Roles and Responsibilities for the Commencement meeting

Roles	Responsibilities
Project Sponsor	i. Determine which of the relevant stakeholders are required to attend the meeting. ii. Convene and hold the meeting with all the applicable stakeholders. iii. Record the meeting outcomes.
Lead Auditor	i. Attend the commencement meeting ii. Seek clarification about the project and audit scope.
Project Stakeholders (Optional)	Explain the details of the project to the audit team representatives to ensure that they understand the project purposes and scope, deviations from standards, constraints, compromises and previous road safety audits.

4.4.1 Steps for Holding the Commencement Meeting

4.4.1.1 Decide which of the relevant stakeholders are required at the commencement meeting and what information to be provided.

At a minimum, the meeting must be attended by the project sponsor and the lead auditor as the audit team representative.

4.4.1.2 Convene the commencement meeting.

The commencement meeting must be held with all the applicable stakeholders.

4.4.1.3 Hold the commencement meeting.

a) Provide adequate information to enable the road safety audit team to understand the project and conduct the road safety audit successfully.

b) The checklists to be used for the road safety audit must be in accordance to the latest JKR Guidelines.

c) Communicate matters of importance to the audit team.

d) Confirm the agreed schedule for the completion of the road safety audit and the expected for the outputs of the audit including the audit scope.

e) Confirm the arrangements for the completion meeting, such as how and when it is to be conducted.

f) Set up lines of communication with the lead auditor and relevant stakeholders.

g) The meeting outcomes must be recorded and must be kept in the official file for the project.

5.0 CONDUCTING ROAD SAFETY AUDIT

5.1 Overview

The conducting phase is the main activity of road safety audit. It is a process to identify road safety deficiencies and areas of risk that could lead to road crashes and documenting these findings into a formal report for the project sponsor and for the submission to the relevant authority.

TABLE 5.1: Roles And Responsibilities

Roles	Responsibilities
Lead Auditor	i. Lead/manage the overall road safety audit. ii. Undertake road safety audit. iii. Produce and deliver the final road safety audit report to the project sponsor.
Audit team member (where appropriate)	i. Undertake the road safety audit. ii. Assist in preparing the road safety audit report.
Designer, Supervision Team, Contractor	i. Provide project information to the auditor. ii. Prepare response to comments and recommendations by the auditor.

5.2 Undertaking Road Safety Audit

Undertaking the road safety audit is the main task of the road safety audit process. A road safety audit involves different activities depending upon the phase of the project being audited. The responsibility of each role in undertaking the road safety audit can be referred in **TABLE 5.1.**

The table below specifies the key activities for a road safety audit of each phase of a project.

TABLE 5.2: Stages and Key Activities

Road Safety Audit Stages	Key Activities
Planning Stage (Stage 1)	i. Conduct a site visit. ii. Audit the project from the conceptual design. iii. Review traffic impact assessment (if any). iv. Record all road safety deficiencies.
Preliminary Design (Stage 2)	i. Audit the project from the preliminary design plan. ii. Record all road safety deficiencies.
Detailed Design (Stage 3)	i. Audit the project from the detailed design plan. ii. Record all road safety deficiencies.
Construction (Stage 4 Part1)	i. Verify the construction drawings against the detailed design drawings that has been audited in Stage 3. ii. Audit the Traffic Management Plan (TMP) that will be implemented on site. iii. Record all road safety deficiencies.
Construction (Stage 4 Part 2)	i. Audit the project from the construction drawings. ii. Inspecting the project site during day and night. iii. Record all road safety deficiencies.
Pre-Opening (Stage 4 Part 3)	i. Audit the project from the construction drawings. ii. Inspecting the project site both during day and night. iii. Record all road safety deficiencies.
Additional Audit On TMWZ	i. To carry out every three (3) or six (6) months or as directed by Superintending Officer (SO). ii. Inspecting the project site during day and night. iii. Record all road safety deficiencies.
Finalisation (Operational) (Stage 5) Existing Road (Stage 5)	i. Audit the project by inspecting the project site both during day and night. ii. Record all road safety deficiencies.

5.2.1 Steps for Planning Stage (Stage 1)

a) To receive the conceptual design drawings and other relevant information prepared by the designer.

b) Visit and view the site after reviewing the information/material is highly recomended for all audit team members to familiarise with the surroundings. It is advisable to take photographs/images to capture details of the current site.

c) Assess the project from the design plans with other material and prepare the Road Safety Audit Stage 1 preliminary comments. All audit team members must participate in the entire assessment.

d) The key items that need to be audited for Road Safety Audit Stage 1 are as listed in **TABLE 5.3.**

e) To prepare the Road Safety Audit Stage 1 report to be submitted to the designer, the project sponsor and/or project approving authority.

f) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer, to review and fully appreciate the thinking behind the proposed design.

g) Designer to prepare response note to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.3: List of Items to Be Audited In Stage 1

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion
2.0	Traffic Planning Strategy and Road Network	2.1 Traffic Planning Strategy 2.2 Functional Classification of Road and Hierarchy 2.3 Route Standard 2.4 Lane and Carriageway Requirement/Traffic Analysis
3.0	Road Network Effect	3.1 Location, Spacing and Type of Intersections/ Interchanges 3.2 Terminal Problem 3.3 Access Control Strategy
4.0	Geometric Standard	4.1 Design Criteria 4.2 Cross Section Element 4.3 Route Continuity & Consistency
5.0	Provisions for Users with Special Need	5.1 Pedestrian 5.2 Motorcyclists 5.3 Bicyclists
6.0	Environment Considerations	-
7.0	Other Public Facilities	-
8.0	Consideration of Alternatives	-

5.2.2 Steps for Preliminary Design Stage (Stage 2)

a) To receive the preliminary design drawings and other relevant information prepared by the designer.

b) Visit and view the site after reviewing the information/material is highly recomended for all audit team members to familiarise with the surroundings. It is advisible to take photographs/images to capture details of the current site.

c) Assess the project from the design plans with other material and prepare the Road Safety Audit Stage 2 preliminary comments. All audit team members must participate in the entire assessment.

d) The key items that need to be audited for Road Safety Audit Stage 2 are as listed in **TABLE 5.4.**

e) To prepare the Road Safety Audit Stage 2 report to be submitted to the designer, the project sponsor and approving authority.

f) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer, to review and fully appreciate the thinking behind the proposed design.

g) Designer to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.4: List of Items to Be Audited In Stage 2

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	Design Criteria	
3.0	Cross Section Element and Reservation Width	3.1 Cross Section 3.2 Reservation Width 3.3 Terminal Problem 3.4 Roadside Safety
4.0	Geometric Design	4.1 Horizontal Alignment 4.2 Vertical Alignment 4.3 Combination of Horizontal and Vertical Alignment
5.0	Interchanges and Intersections	5.1 General Layout 5.2 Geometric Design 5.3 Cross Section 5.4 Sight Distance 5.5 Lane Configuration 5.6 Traffic Signal Phasing
6.0	Private or Local Access	-
7.0	Provision for Road Users with Special Need	-
8.0	Other Public Facilities	-
9.0	Environment and Climatic Consideration	-

5.2.3 Steps for Detailed Design Stage (Stage 3)

a) To receive the detailed design drawings and other relevant information prepared by the designer.

b) Visit and view the site after reviewing the information/material is highly recomended for all audit team members to familiarise with the surroundings. It is advisible to take photographs/images to capture details of the current site.

c) Assess the project from the design plans with other material and prepare the Road Safety Audit Stage 3 preliminary comments. All audit team members must participate in the entire assessment.

d) The key items that need to be audited for Road Safety Audit Stage 3 are as listed in **TABLE 5.5.**

e) To prepare the Road Safety Audit Stage 3 report to be submitted to the designer, the project sponsor and/or project approving authority.

f) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer, to review and fully appreciate the thinking behind the proposed design.

g) Designer to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.5: List of Items to Be Audited In Stage 3

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	General Items of The Project	2.1 Design Criteria 2.2 Reservation Width and Other Design Constraint 2.3 Access Control 2.4 Environment and Climatic Consideration
3.0	Geometric Design	3.1 Horizontal Alignment 3.2 Vertical Alignment 3.3 Combination of Horizontal and Vertical Alignment 3.4 Cross Section Elements
4.0	Intersections and Interchanges	4.1 General Layout 4.2 Geometric Design 4.3 Cross Section Elements 4.4 Visibility and Sight Distance 4.4.1 Approach Sight Distance (ASD) 4.4.2 Stopping Sight Distance (SSD) 4.4.3 Entering or Crossing Sight Distance (ESD) 4.4.4 Safe Intersection Sight Distance (SISD) 4.4.5 Sight Distance to Queued Vehicles 4.4.6 Sight Distance to Exit Nose and 'Gore' Area at Interchanges 4.5 Exit and Entry Layout, Auxiliary Lanes and Lane Continuity 4.6 Island Size and Shape 4.7 Kerb Type
5.0	Traffic Signal Installation	5.1 Signal Phasing 5.2 Signal Head
6.0	Traffic Signing and Road Marking	6.1 Traffic Signs 6.2 Road Marking and Delineation 6.3 Directional or Information Signs
7.0	Road Lighting	7.1 The extent of road lighting 7.2 Standard of lighting 7.3 Lighting transition 7.4 Hazards caused by lighting poles 7.5 Sight line obstructions

TABLE 5.5: List of Items to Be Audited In Stage 3 (Cont'd)

No.	Topic	Sub-Topic
8.0	Roadside Safety Provision and Hazards	8.1 Provision for a 'Clear Zone' 8.2 Guardrail Provision and Standard Details 8.3 Barrier Provision and Standard Details 8.4 Crash Cushion Provision and Standard Details 8.5 Bridge Parapet 8.6 Other Roadside Hazards
9.0	Provision for Vulnerable Road Users	9.1 Pedestrian 9.2 Bicyclist 9.3 Motorcyclist
10.0	Other Public Facilities	-
11.0	Traffic Management At Work Zone (TMWZ)	11.1 Overall Traffic Management at Work Zone (TMWZ) 11.2 Traffic Control Plan (TCP) 11.2.1 Advance Warning Area 11.2.2 Transition Area 11.2.3 Buffer Space 11.2.4 Work Area 11.2.5 Termination Area 11.3 Cross Section 11.4 Function of Devices 11.4.1 Temporary Signs 11.4.2 Channelizing Devices 11.4.3 Temporary Marking 11.4.4 Temporary Lighting Devices 11.4.5 Flagman 11.5 Construction Machinery Access

5.2.4 Steps for Construction Stage (Stage 4 Part 1)

a) To receive the construction drawings and other relevant information prepared by the designer.

b) To receive the traffic management plan (TMP) prepared by the contractor.

c) Visit and view the site after reviewing the information/material is highly recommended for all audit team members to familiarise with the surroundings. It is advisable to take photographs/images to capture details of the current site.

d) Assess the project from the design plans with other material and prepare the Road Safety Audit Stage 4 (Part 1) preliminary comments against the approved detailed design drawings and traffic management plan. All audit team members must participate in the entire assessment.

e) The key items that need to be audited for Road Safety Audit Stage 4 (Part 1) are as listed in **TABLE 5.6.**

f) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer/contractor, to review and fully appreciate the thinking behind the proposed design, method of construction and traffic management plan.

g) To prepare the Road Safety Audit Stage 4 (Part 1) report and to be submitted to the designer/contractor, the project sponsor and/or project approving authority.

h) Designer/contractor to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.6: List of Items to Be Audited In Stage 4 (Part 1)

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	Verification Audit	2.1 General Items Of The Project 2.1.1 Earlier Stage Audit 2.1.2 Design Criteria 2.1.3 Reservation Width and Other Design Constraint 2.1.4 Access Control 2.1.5 Environment and Climatic Consideration 2.2 Geometric Design 2.2.1 Horizontal Alignment 2.2.2 Vertical Alignment 2.2.3 Combination of Horizontal and Vertical Alignment 2.2.4 Cross Section Elements 2.3 Intersections And Interchanges 2.3.1 General Layout 2.3.2 Geometric Design 2.3.3 Cross Section Elements 2.3.4 Visibility and Sight Distance 2.3.4.1 Approach Sight Distance (ASD) 2.3.4.2 Stopping Sight Distance (SSD) 2.3.4.3 Entering or Crossing Sight Distance (ESD) 2.3.4.4 Safe Intersection Sight Distance (SISD) 2.3.4.5 Sight Distance to Queued Vehicles 2.3.4.6 Sight Distance to Exit Nose and 'Gore' Area at Interchanges 2.3.5 Exit and Entry Layout, Auxiliary Lanes and Lane Continuity 2.3.6 Island Size and Shape 2.3.7 Kerb Type 2.4 Traffic Signal Installation 2.4.1 Signal Phasing and Time 2.4.2 Signal Head 2.4.3 Road Marking and Delineation 2.4.4 Directional or Information Signs

TABLE 5.6: List of Items to Be Audited In Stage 4 (Part 1) (Cont'd)

No.	Topic	Sub-Topic
2.0	Verification Audit	2.5 Road Lighting 2.6 Roadside Safety Provision And Hazards 2.6.1 Provision for a 'Clear Zone' 2.6.2 Guardrail Provision and Standard Details 2.6.3 Barrier Provision and Standard Details 2.6.4 Crash Cushion Provision and Standard Details 2.6.5 Other Roadside Hazards 2.7 Provision For Vulnerable Road Users 2.7.1 Pedestrian 2.7.2 Bicyclist 2.7.3 Motorcyclist 2.8 Other Public Facilities
3.0	Traffic Management Plan (TMP)	3.1 Overall Traffic Management Plan (TMP) 3.2 Traffic Control Plan 3.2.1 Advance Warning Area 3.2.2 Transition Area 3.2.3 Buffer Space 3.2.4 Work Area 3.2.5 Termination Area 3.3 Cross Section 3.4 Function of Devices 3.4.1 Temporary Signs 3.4.2 Channelizing Devices 3.4.3 Temporary Marking 3.4.4 Temporary Lighting Devices 3.4.5 Flagman 3.5 Construction Machinery Access

5.2.5 Steps for Construction Stage (Stage 4 Part 2)

a) To receive the construction drawings and other relevant information prepared by the designer.

b) To receive the traffic control plan (TCP) prepared by the contractor.

c) Visit and view the site during day and night is highly recomended for all audit team member to familiarise with the surroundings. It is advisible to take photographs/images to capture details of the current site.

d) Assess the project from the design plans with other material and prepare the Road Safety Audit Stage 4 (Part 2) preliminary comments against completed works and traffic control plan (TCP) implemented on site. All audit team members must participate in the entire assessment.

e) The key items that need to be audited for Road Safety Audit Stage 4 (Part 2) are as listed in **TABLE 5.7.**

f) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer/contractor, to review and fully appreciate the thinking behind the implementation of traffic management plan.

g) To prepare the Road Safety Audit Stage 4 (Part 2) report to be submitted to the designer/contractor, the project sponsor and/or project approving authority.

h) Designer/contractor to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.7: List of Items to Be Audited In Stage 4 (Part 2)

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	General Grading, Alignment and Cross Section	
3.0	Roadway Layout Features	
4.0	Traffic Management At Work Zone (TMWZ)	4.1 Overall Traffic Management At Work Zone (TMWZ) 4.2 Traffic Control Plan (TCP) 4.2.1 Advance Warning Area 4.2.2 Transition Area 4.2.3 Buffer Space 4.2.4 Work Area 4.2.5 Termination Area 4.3 Cross Section 4.4 Function of Devices 4.4.1 Temporary Signs 4.4.2 Channelising Devices 4.4.3 Temporary Markings 4.4.4 Temporary Lighting Devices 4.4.5 Flagman 4.5 Construction Machineries Access

5.2.6 Steps for Pre-Opening (Stage 4 Part 3)

a) Visit and view the site during day and night is necessary for all audit team members to familiarise with the surroundings. It is recomended to use photographs/images to capture details of the current site.

b) Assess the project from the completed work on site and prepare the Road Safety Audit Stage 4 (Part 3) preliminary comments against completed works. All audit team members must participate in the entire assessment.

c) The key items that need to be audited for Road Safety Audit Stage 4 (Part 3) are as listed in **TABLE 5.8.**

d) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential to have a discussion with the project sponsor and the designer/contractor on amendment/mitigation if required.

e) To prepare the Road Safety Audit Stage 4 (Part 3) report to be submitted to the designer/contractor, the project sponsor and/or project approving authority.

f) Designer/contractor to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.8: List of Items to Be Audited In Stage 4 (Part 3)

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	Geometric And Cross Section	2.1 Horizontal and Vertical Alignment 2.2 Cross Section
3.0	Terminal Treatment	
4.0	Intersections/ Interchanges	4.1 Layout 4.2 Auxiliary Lanes 4.3 Island Size and Shape 4.4 Kerb Types 4.5 Visibility and Sight Distance
5.0	Traffic Signal	
6.0	Traffic Signing And Road Marking	6.1 Traffic Signs 6.2 Road Marking and Delineation 6.3 Directional and Information Signs
7.0	Road Lighting	
8.0	Roadside Safety Provision And Hazards	8.1 Guardrail 8.2 Barrier 8.3 Crash Cushion 8.4 Other Hazards
9.0	Provision For Vulnerable Road Users	9.1 Pedestrian 9.2 Bicyclist 9.3 Motorcyclist
10.0	Other Public Facilities	

5.2.7 Steps for Post-Construction (Stage 5)

a) Visit and view the site during day and night is highly recomended for all audit team members to familiarise with the surroundings. It is desirable to take photographs/images to capture details of the current site.

b) Assess the project from the completed work during the operational stage and prepare the Road Safety Audit Stage 5 preliminary comments. All audit team members must participate in the entire assessment.

c) The key items that need to be audited for Road Safety Audit Stage 5 are as listed in **TABLE 5.9.**

d) Before the auditor finalises the report for submission to the Approving Authority, it is always very essential that a review discussion be conducted with the project sponsor and the design consultant/contractor on amendment/mitigation if required.

e) To prepare the Road Safety Audit Stage 5 report to be submitted to the project sponsor and project authority.

f) Designer/contractor to prepare response notes to the auditor findings as per paragraph 5.5 and submit to the project sponsor and auditor before completion meeting.

TABLE 5.9: List of Items to Be Audited In Stage 5

No.	Topic	Sub-Topic
1.0	Introduction	1.1 Objectives 1.2 Scope of Audit 1.3 Information Made Available to the Auditor 1.4 Site Visit and Discussion 1.5 Previous Audit
2.0	Geometric and Cross Section	2.1 Horizontal and Vertical Alignment 2.2 Cross Section
3.0	Terminal Treatment	
4.0	Intersections/ Interchanges	4.1 Layout 4.2 Auxiliary Lanes 4.3 Island Size and Shape 4.4 Kerb Types 4.5 Visibility and Sight Distance
5.0	Traffic Signal	
6.0	Traffic Signing and Road Marking	6.1 Traffic Signs 6.2 Road Marking and Delineation 6.3 Directional and Information Signs
7.0	Road Lighting	
8.0	Roadside Safety Provision and Hazards	8.1 Guardrail 8.2 Barrier 8.3 Crash Cushion 8.4 Other Hazards
9.0	Provision for Vulnerable Road Users	9.1 Pedestrian 9.2 Bicyclist 9.3 Motorcyclist
10.0	Other Public Facilities	

5.3 Preparing Road Safety Audit Report

The objective of preparing the road safety audit report is to produce a written report documenting all the road safety deficiencies identified during the road safety audit. It must be produced in the specified format and it must be specific, clear and comprehensive. The format shall be referred to **CHAPTER 12.**

A written road safety audit report is required for each road safety audit conducted. The report is a concise document which clearly identifies and describes all the road safety deficiencies identified during the road safety audit.

The lead auditor is responsible for producing the road safety audit report. The road safety audit team prepares the audit report and all team members shall sign the report to verify that they concur with the contents.

The report may contain suggested actions or recommendations. These are the responsibilities of the project sponsor.

The content and format for this preparation of the road safety audit report are given in **CHAPTER 12.**

5.4 Finalising Road Safety Audit Report

The objective of finalising the road safety audit report is to produce and deliver the final written report which clearly and comprehensively documents all the road safety deficiencies identified during the road safety audit. The report is produced in the specified format, signed and dated by all members of the road safety audit team.

The road safety audit report is the formal product of the road safety audit. It is the document on which decisions about corrective actions will be based.

To ensure the completeness of the road safety report, the designer/contractor shall provide adequate information as requested by auditor. Without adequate information, the approving authority shall have the right to review the acceptance of the report.

5.5 Response to Audit Comments by Designer/Contractor

Upon completion and submission of road safety audit report to the project sponsor, designer, project stakeholder, approving authority and other respective parties, the designer is to respond to the findings highlighted in the road safety audit report by filling up the summary of audit.

Before the Completion Meeting is called by the Approving Authority, the designer/contractor shall submit the response to the Approving Authority and the auditor.

A Response Report will be prepared by designer before any completion meeting at any stage of audit. This report is based on the Summary of Audit by the Road Safety Auditor. A Response Report is a document that allows the designer to respond the Road Safety Auditor's comments or recommendations.

The response must be in an approved format that includes words such as 'complied', 'to comply', 'partially comply', or 'cannot comply'. The reasons and mitigations shall be stated for the 'partially comply' and 'cannot comply' response. The response report must be a well thought response prepared and signed off by the Project Director in charge of design or construction.

6.0 COMPLETING ROAD SAFETY AUDIT

6.1 Overview

The objective for the completion of the Road Safety Audit is to manage the implementation of mitigation actions to enhance the level of road safety and comprehensively record the completed action for every deficiency identified in the final road safety audit report.

The completing phase is critical to the road safety process as it ensures that the project delivers the best possible road safety outcomes. It also ensures transparency and accountability in relation to the decision making process and actions taken.

The key steps that determine a successful outcome after the mitigation of all the road safety issues involved:-

i. Attending the Completion Meeting (Chaired by Approving Authority).
ii. Producing a corrective action program.
iii. Implementing corrective actions.
iv. Closing the corrective action program.

6.2 Attending Completion Meeting

6.2.1 Roles and Purposes

The objective for attending the completion meeting is to present to the approving authorities the road safety audit findings, finalise the proposed corrective actions and expected outcomes with Approving Authority. This meeting must be carried within two (2) weeks upon issuance of the Road Safety Audit Report.

TABLE 6.1: The attendees and their responsibilities

Roles	Responsibilities
Approving Authority	i. Assessment of RSA Report. ii. Initiate the completion meeting. iii. Record and confirm the outcomes/ actions of the meeting.

TABLE 6.1: The attendees and their responsibilities (Cont'd)

Roles	Responsibilities
Project Sponsor/ Owner	Attend and present the project in the completion meeting
Lead Auditor	Present the road safety audit findings and outcomes
Designer	Provide and present design as requested by the Project Sponsor
Project Stakeholders (Optional)	Attend the completion meeting as directed by the Project Sponsor

The completion meeting is an important part of the road safety audit process. It is held after the audit team has finished the assessments/inspections and produced a final report of their findings. The meeting is held by the Approving Authority and is attended by the members of the road safety audit team, the Project Sponsor, the Designer, or the Project Stakeholders as listed in **TABLE 6.1**.

6.2.2 Completion Meeting Objective

The objective is for the Road Safety Auditor to present his findings. It will be discussed, elaborated and actions agreed upon to be formally documented.

The proposed corrective actions must be feasible and in the best interests of the road users. In order to potentially reduce the incidence and/or severity of crashes, they must be designed in accordance with the best accepted national/international standards and specifications

All decisions of the meeting must be recorded and formally documented.

6.2.3 Completion Meeting Action

The objective of the Completion Meeting is to ensure that the recommendation of the completion meeting meets the expectations and requirements specified in the project needs.

TABLE 6.2: Role and Responsibility

Role	Responsibility
Approving Authority	i. Record and confirm the outcomes/ actions of the meeting. ii. Convey the acceptance of the road safety audit report during the completion meeting.

The followings are action required to be discussed and reviewed during the Completion Meeting:-

i. Present the deficiencies identified during the road safety audit.
ii. To discuss corrective action options for key findings.
iii. The proposed corrective actions to address the deficiencies which may be for short, medium or long term solution.
iv. The corrective actions developed must be feasible and in the best interest of the road users. In order to potentially reduce the incidence and/or severity of crashes, they must be designed in accordance with the best accepted national/international standards and specifications.
v. Include all proposed corrective action options and the reasons for selecting the preferred option, including details of their safety benefits.
vi. To confirm meeting on the actions and outcomes. The record of the meeting outcomes and decisions must be minuted for official use as specified in **TABLE 6.2.**

6.3 Implementing Corrective Actions

The objective is to completely implement the corrective actions and clearly and concisely record the details of each completed corrective action which was implemented to address the deficiencies identified in the road safety audit report.

6.3.1 During Design Stage

TABLE 6.3: Roles and Responsibilities

Roles	Responsibilities
Project Sponsor	Initiate or delegate the implementation of corrective actions.
Designer	i. Refer identified deficiencies to other external agencies (if relevant). ii. Reviewing the design to implement corrective action. iii. Verify that the completed corrective actions have been satisfactorily implemented in the design for next stage of audit for Stage 1 and 2. iv. Verify that the completed corrective actions have been satisfactorily implemented in the design for compliance audit for Stage 3. v. A compliance report will then be prepared by the designer based on the Summary of Audit from the Stage 3 Road Safety Audit Report. The Compliance Report is a document indicating designer's declaration that matters agreed upon in the Road Safety Audit Stage 3 completion meeting has been incorporated in the revised detailed design engineering drawings.
Road Safety Auditor	Prepare compliance audit for Stage 3 only. Compliance Audit needs to be carried out by the Road Safety Auditor after receiving the Compliance Report from the designer. This audit produces the Compliance Audit Report which confirms all matters agreed upon in the Road Safety Audit Stage 3 completion meeting has been incorporated by the designer in their detailed design engineering drawings.

The implementation of corrective actions to address some or all of the identified deficiencies can be delegated, but it remains the responsibility of the Project Sponsor until all have been satisfactorily addressed. **TABLE 6.3** shows the responsibilities of various parties in implementing the correcting actions during the design stage.

The followings are some important steps in the preparation for the implementation of corrective actions:-

i. If a deficiency relates to the matters that are the responsibility of a third party, forward the details to the relevant authority for action. Record the acceptance of the referral received from the third party.
ii. Document all completed corrective actions. It is important that details of the work that has been completed are documented as it may become a legal issue in the future.
iii. For each deficiency, a corrective action (response) must be identified and it must be documented.
iv. Corrective actions must be clearly and comprehensively described in details.
v. If no further action is proposed, a comprehensive explanation must be provided.

6.3.2 During Construction Stage

TABLE 6.4: Roles and Responsibilities

Roles	Responsibilities
Project Sponsor	Initiate or delegate the implementation of corrective actions.
Designer / Supervising Engineer / Contractor	i. Refer identified deficiencies to other internal branches or external agencies. ii. Verify that the completed corrective actions have been satisfactorily implemented. iii. Implement corrective action, as directed by the Project Sponsor for Stage 4 and Stage 5.

The implementation of corrective actions to address some or all of the identified deficiencies can be delegated, but it remains the responsibility of the Project Sponsor until all have been satisfactorily addressed. **TABLE 6.4** shows the responsibilities of various parties in implementing the correcting action during the construction stage.

The followings are some important steps in the preparation for the implementation of corrective actions:-

i. If a deficiency relates to the matters that are the responsibility of a third party, forward the details to the relevant authority for action. Record the acceptance of the referral received from the third party.
ii. Document all completed corrective actions. It is important that details of the work that has been completed are documented as it may become a legal issue in the future.
iii. For each deficiency, a corrective action (response) must be identified and it must be documented.
iv. Include all proposed corrective action options and the reasons for selecting the preferred option, including details of the safety benefit.
v. Corrective actions must be clearly and comprehensively described in details.
vi. If no further action is proposed, a comprehensive explanation must be provided.

SECTION C

ROADSIDE DEVELOPMENT (RSD)

7.0 WARRANTS FOR RSA

7.1. RSA for Roadside Development (RSD)

7.1.1 Generally, Road Safety Audit shall be considered in the following situation:

i) Projects are located within the high road safety risk areas identified by road authority;

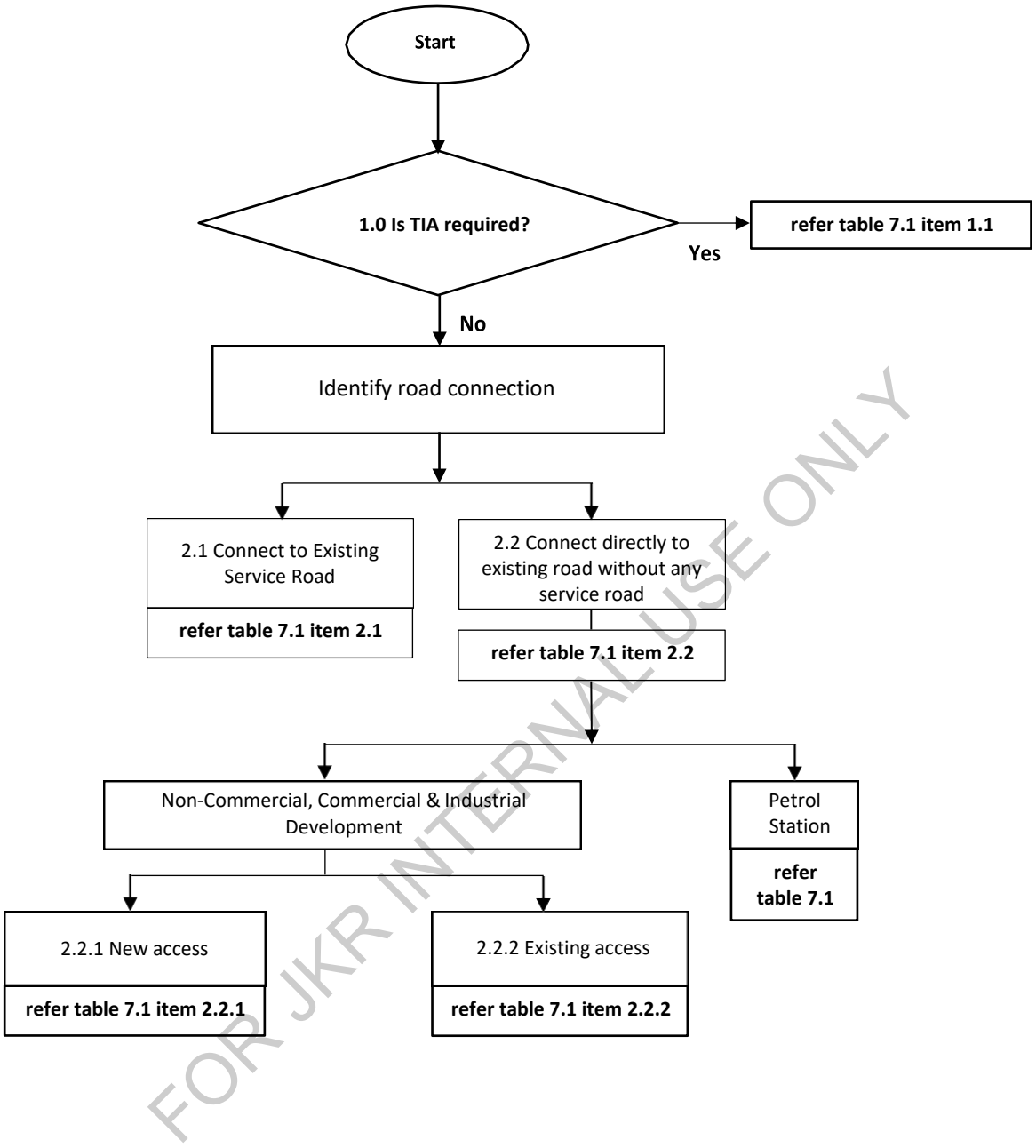
ii) Developments that is likely to generate high traffic movements and/or conflict points;

iii) Developments of public amenities such as school, army camp, hospital, etc.; and

iv) Developments that may involve a permanent change to the public road network.

7.1.2 Road safety audits shall be conducted on the access of Roadside Developments (RSD) intersecting roads that meet any of the criteria as per **FIGURE 7.1.**

Figure 7.1: Flowchart in Determining Stages of RSA for RSD



Note:

1. Notwithstanding above, whenever it is road safety concern the Road Authorities can still impose to any/all RSA stage, even if they do not fall into any of the above requirement criteria.
2. Road safety audit is not required for access to development directly joining to existing main line roads with R2/U2 standard and below.
3. **FIGURE 7.1** to be read together with **TABLE 7.1**.

TABLE 7.1: Selection of Road Safety Audit Stages for Roadside Development (RSD)

		Road Safety Audit Stages						
		Stage 1	**Stage 2**	**Stage 3**	**Stage 4 Part 1**	**Stage 4 Part 2**	**Stage 4 Part 3**	**Stage 5**
1.0	When Traffic Impact Assessment (TIA) Report is **REQUIRED:**							
1.1	With TIA report	√	√	√	√	**X**	√	√
2.0	When Traffic Impact Assessment Report (TIA) is **NOT REQUIRED:**							
2.1	Connect to Existing Service Road							
		X	**X**	√	√	**X**	√	√
2.2	Connect directly to existing road without any service road							
Non-Commercial, Commercial & Industrial								
2.2.1	New Access	**X**	√	√	√	**X**	√	√
2.2.2	Existing Access	**X**	**X**	√	√	**X**	√	√
Petrol Station		**X**	√	√	√	**X**	√	√

NOTE:

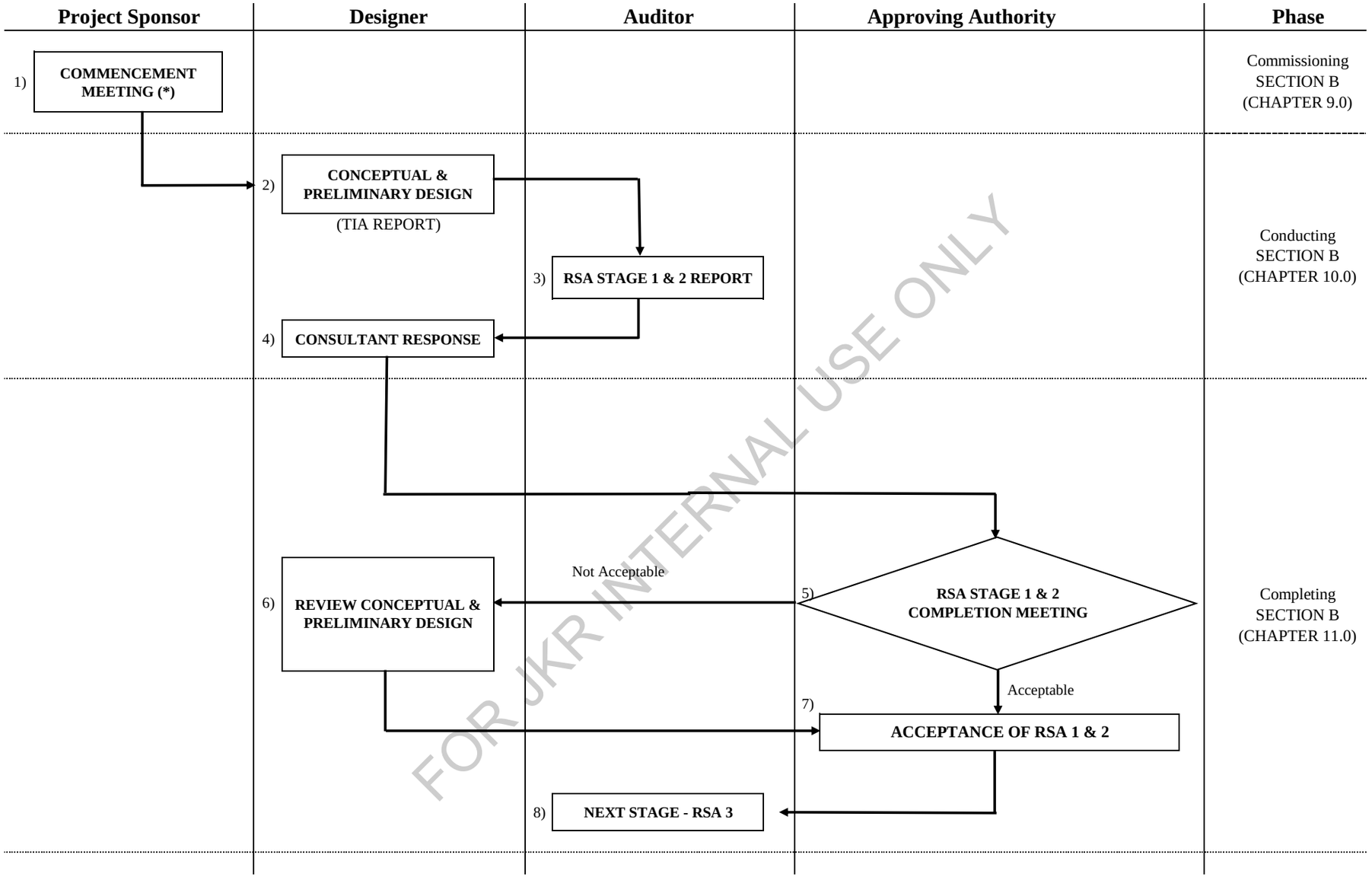
1. Road safety audit is **not required** for accesses of development directly joining to existing main line roads with **R2/U2** standard and below.
2. **RSA 4 Part 2** and Additional audit on **Traffic Management At Work Zone (TMWZ)** is required for:
   a) Development involving an interchange / intersection or upgrading of the mainline road of minimum **1km** length and/or;
   b) Construction period of the above more than **12** months.
3. RSA Stage 5 to be carried out within **3 to 6 months** after completion of works.

8.0 FLOW CHART OF RSA FOR ROADSIDE DEVELOPMENT (RSD)

8.1 Flow Chart of Different Stages of RSA for Roadside Developments (RSD)

The following flow charts will give a better understanding on the processes involved in each stage of Road Safety Audit. It shows the relationship between the project sponsor, designer, road safety auditor and the approving authority.

RSA Stage 1 & 2 Process for KM Approval



Notes:

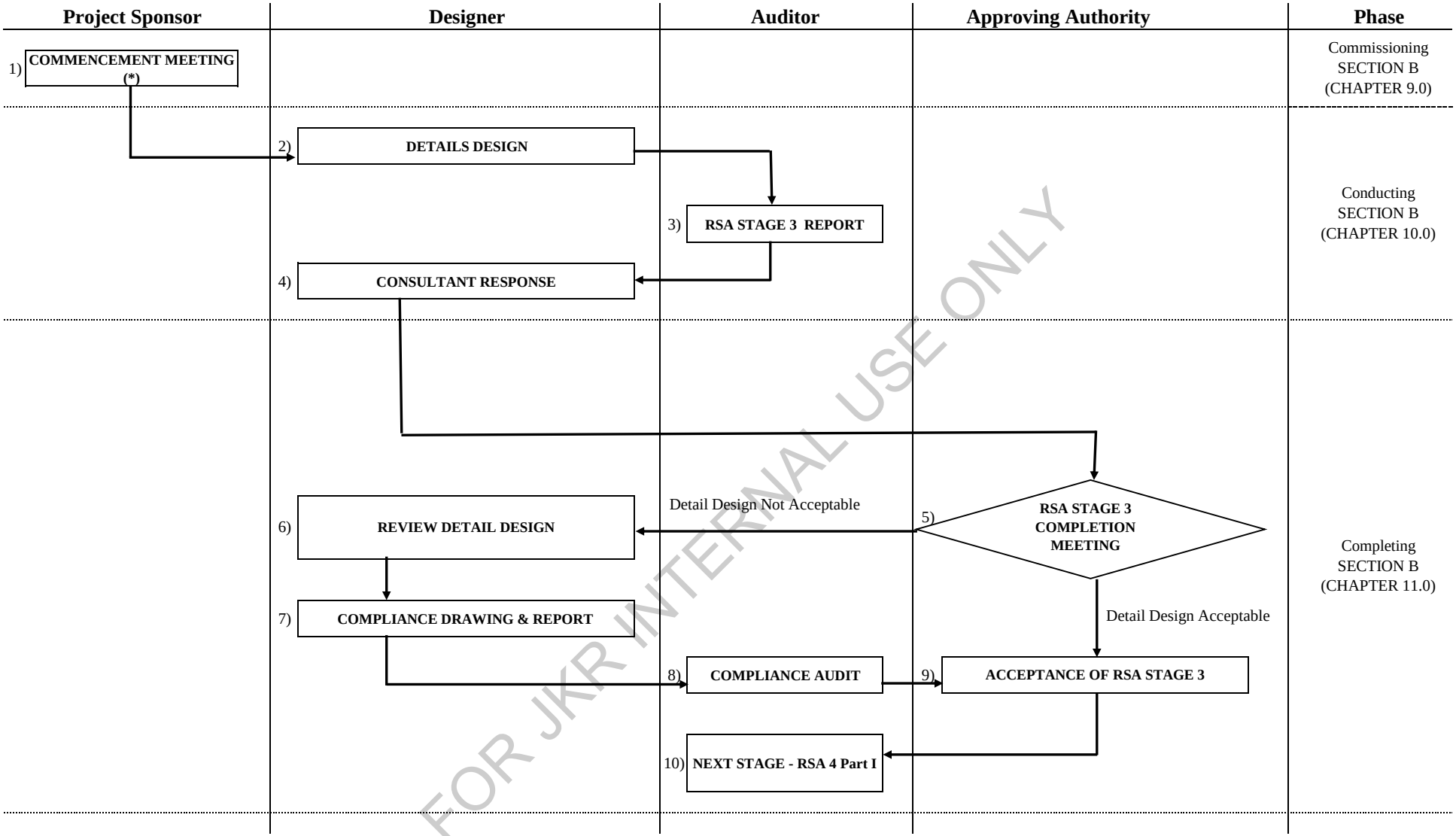
i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iv) The TIA consultant and the RSA auditor must not from the same company

RSA Stage-3 Process



Notes:

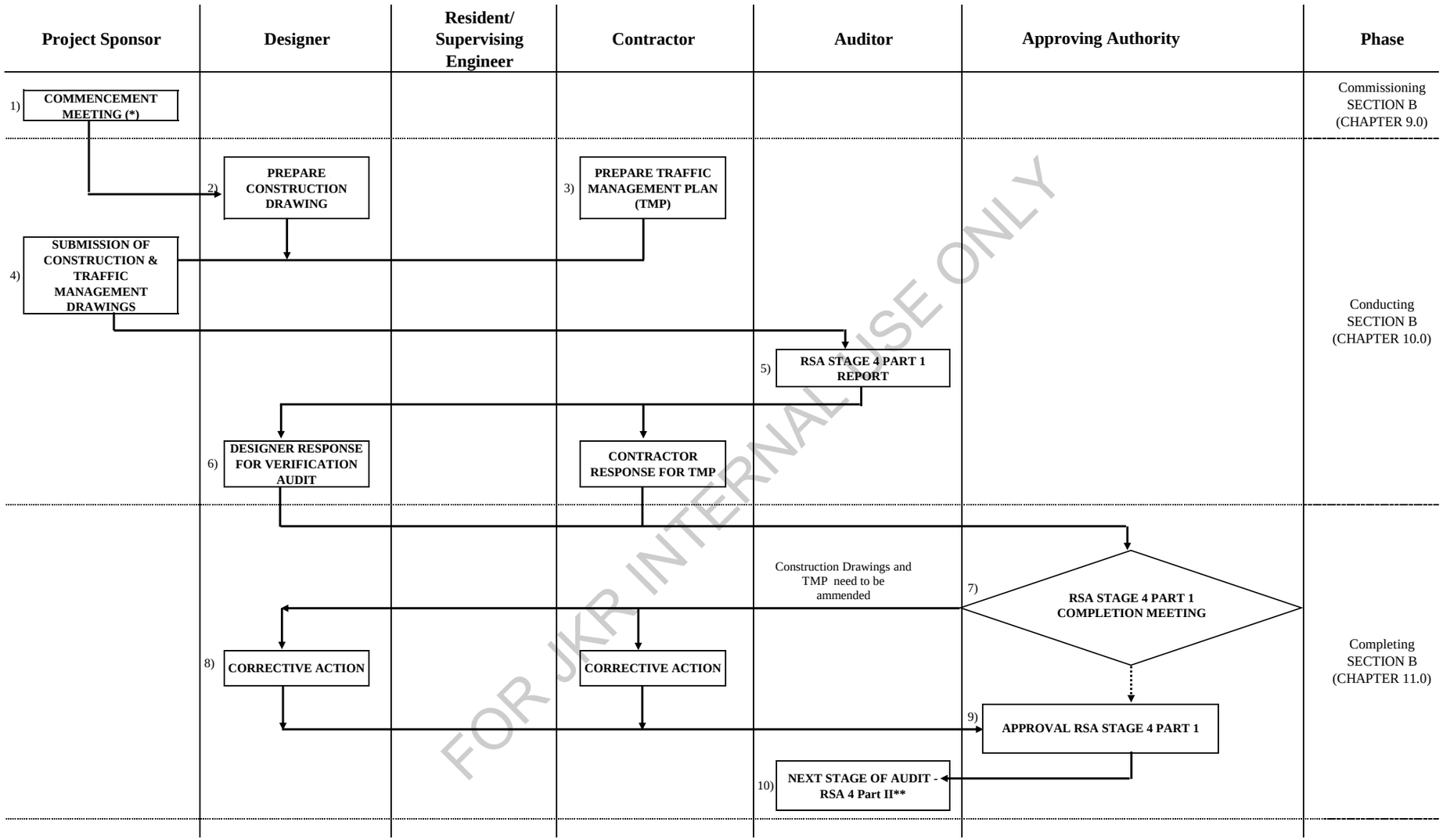
i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iv) RSA 4 Part I comprises Verification Audit and Traffic Management Plan

RSA Stage-4 (Part 1) Process



Notes:

i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

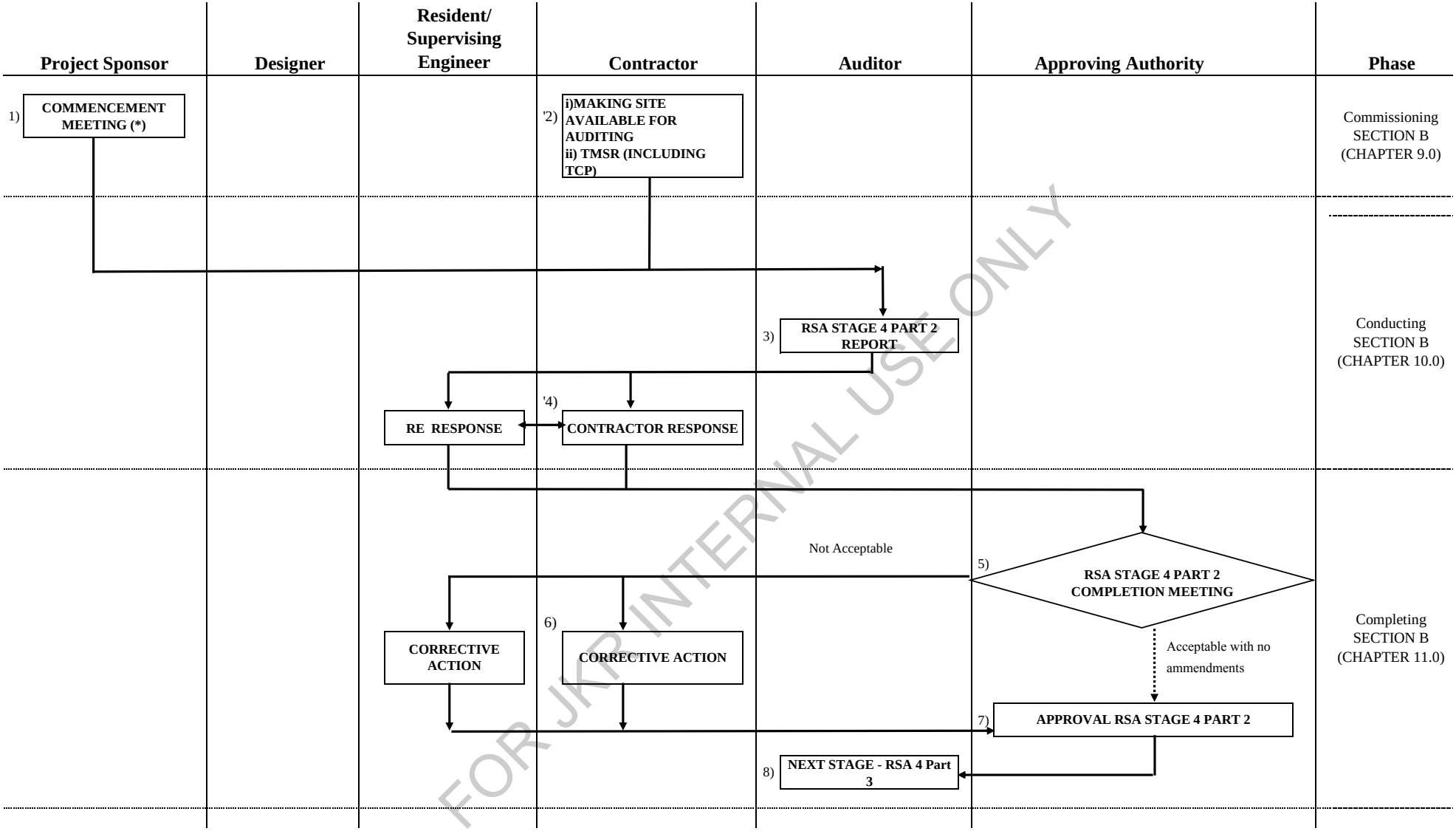
iv) S.O - Superintending Officer

v) P.D - Project Director

vi) RE - Resident Engineer

vii)(**)The next stage of audit ie. Stage 4 Part 2 or Stage 4 Part 3 shall be decided by the Approval Authority based on the complexity or duration of the project

RSA Stage 4 Part 2 Process



Notes:

i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

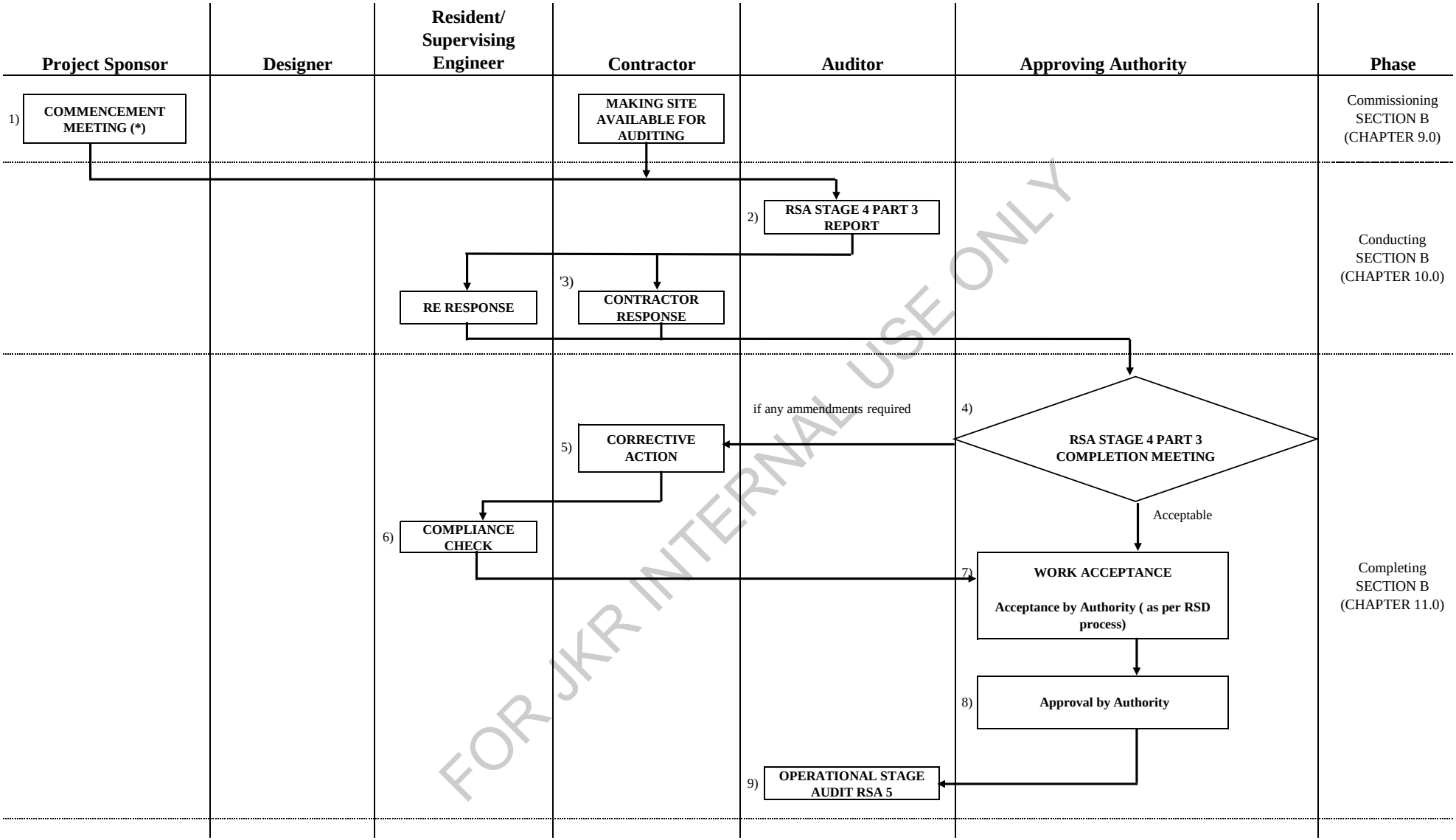
iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iv) S.O - Superintending Officer

v) P.D - Project Director

vi) RE - Resident Engineer

RSA Stage 4 Part 3 Process



Notes:

i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

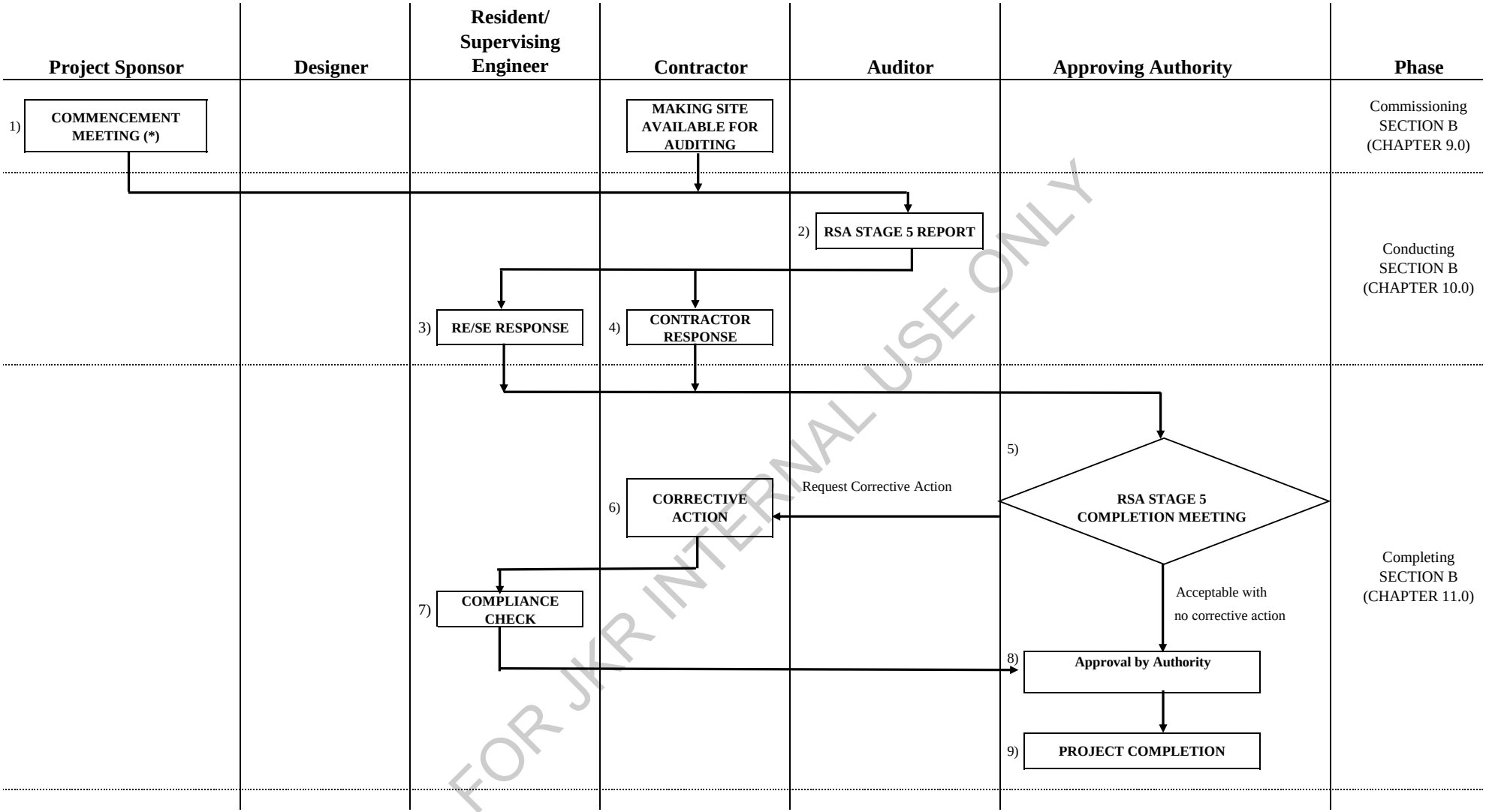
iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iv) S.O - Superintending Officer

v) P.D - Project Director

vi) RE - Resident Engineer

RSA Stage 5 Process



Notes:

i) Project Sponsor - Road Authority / Highway Concessionaire / Turnkey Contractor/ Local Council / Developer

ii) (*) Commencement Meeting shall be conducted at the start of audit.

iii) Before the auditor finalises his audit report for submission to the Approving Authority, it is always very essential that a discussion to be conducted with the project sponsor and the design consultant to review and fully appreciate the thinking behind the proposed design.

iv) S.O - Superintending Officer

v) P.D - Project Director

vi) RE - Resident Engineer

9.0 COMMISSIONING ROAD SAFETY AUDIT

9.1 Overview

The Objective of this section is to establish the requirements, limitations and expectations for the conduct of a road safety audit.

i. The commissioning phase is important to the road safety audit process. It is concerned with achieving the right combination of road safety auditors or team who are most suited to understand the characteristics, needs and outcomes of the project to be audited.

ii. The commissioning phase also provides an opportunity to establish clear and concise communications and understanding between all parties.

The type of information provided to the road safety auditor varies depending upon the project and the phase/ stage of the project to be audited. Background information is supplied to the road safety auditor to enhance their understanding of the project background and its constraints. The information may include details of any restrictions and compromises that were part of the design process to enable them to identify measures to be taken.

9.1.1 Steps (Data Collection)

The process of the Data Collection shall comprise of the following:

1. Collect all the relevant information/material.
2. Information to be provided is the appropriate format:
    a. The latest full set of design plans, the design report and information on the project background must be provided for all pre-construction phase road safety audits.
    b. Traffic data or TIA Report (if available).
    c. Any previous road safety audit reports of earlier stages (if available).
    d. Details of all corrective actions which still need to be implemented base on the previous road safety audits.

The summary of information that needs to be provided is as shown in **TABLE 9.1.**

3. Submit the information to the lead auditor or team. This may be done at the commencement meeting.

TABLE 9.1: Summary of the Relevant Information/Documents for each RSA Stage

RSA STAGE	INFORMATION/DOCUMENTS REQUIRED
Stage 1 & 2	i. Traffic Impact Assessment (TIA) Report. ii. Project Brief / Design Criteria. iii. Full details of preliminary Engineering Design Drawings inclusive: a. Junction/Access Layout Plan showing dimensions for Acceleration & Deceleration Lane Lengths. b. for Access Road and Mainline. c. Typical Cross-Section of the access road and mainline (both sides of the junction).
Stage 3	Full details of Detailed Engineering Design Drawings inclusive: i. Horizontal and Vertical Profile for the propose access road and the affected mainline. ii. Typical Cross-Sections including cross-sections at 25m intervals of the access road and mainline (both sides of the junction). iii. Road Furniture including Road Markings, Signages and Barriers. iv. Intersection (Junction) or Interchange details Scale of 1: 500 in accordance with the latest revision of ATJ 3/2011. v. Access Layout Plan showing dimensions for Acceleration & Deceleration Lane. vi. Road Lighting Layout and design information. vii. Traffic signal layout and design information. viii. Landscaping plan and tree planting details. ix. Grading and Drainage plan.
Stage 4 Part 1	i. Construction drawings. ii. Traffic Management Plan (TMP) including Overall Traffic Control Plan (TCP).

TABLE 9.1: Summary of the Relevant Information/Documents for each RSA Stage (cont'd)

RSA STAGE	INFORMATION/DOCUMENTS REQUIRED
Stage 4 Part 2	i. Construction drawings. ii. Making site available for auditing. iii. TMSR including Traffic Control Plan (TCP).
Stage 4 Part 3	i. Construction drawings. ii. Making site available for auditing.
Stage 5	i. As-built Drawings. ii. Decision of RSA Stage 4 Part 3.

9.2 Holding the Commencement Meeting

The commencement meeting is an important part of the road safety audit process. It is to bring together the project sponsor/owner, the road safety auditor representatives and all relevant stakeholders to discuss the scope of the road safety audit, the project constraints, the supplied and required information/material and clarify the understanding of expectations.

TABLE 9.2: Roles and Responsibilities

Roles	Responsibilities
Project sponsor/owner	i. Issue out Letter of Appointment to Road Safety Auditor; ii. Provide project information; iii. Hold the commencement meeting together with Designers.
Lead auditor	i. Attend the commencement meeting. ii. Seek clarification about the project.
Project Stakeholders (Optional)	i. Attend the commencement meeting as directed by the project sponsor/owner. ii. Explain the details of the project to the audit team representatives to ensure that they understand the project purpose and scope, deviations from standards, constraints, compromises and previous road safety audits.

It is held before the audit team begins assessments/inspections and is attended by the project sponsor and members of the road safety audit team, or at least the lead auditor.

The meeting enables the project sponsor to deliver relevant information for the road safety audit to the lead auditor or team. It also provides an opportunity for the auditors to clarify any issues.

9.2.1 Commencement Meeting Process

The process of the commencement meeting shall comprise of the following actions:

i. Provide adequate information to enable the road safety audit leader / team to understand the project and successfully conduct the road safety audit.
ii. Communicate matters of importance to the audit team.
iii. Confirm the agreed schedule for the completion of the road safety audit and the expected outputs of the audit.
iv. Confirm the arrangements for the completion meeting, such as how and when it is to be conducted.
v. Set up lines of communication with the lead auditor and relevant stakeholders.
vi. The meeting outcomes must be recorded / minuted.
vii. Confirm the outcomes of the meeting with the lead auditor.
viii. The record of the meeting outcomes must be filed in the official file for the project.

10.0 CONDUCTING ROAD SAFETY AUDIT

The purpose of this chapter/section is meant for the designer and the auditor's team in conducting the road safety audit.

10.1 Overview

To carry out road safety audit for the proposed roadside development and to produce road safety audit report for the purpose of submission and approval of the approving authority.
The key steps that determine the successful outcome of a road safety audit involves:

i. Gathering information.
ii. Undertaking the road safety audit.
iii. Preparing the road safety audit report.
iv. Holding a completion meeting.
v. Finalising the road safety audit report.

10.2 Gathering Information

The type of information provided to the road safety audit team may varies depending upon the project and the phase / stage of the project to be audited.

Background information is supplied to the road safety audit team members to enhance their understanding of the project background and constraints. The information may include details of any restrictions and compromises that were part of the design process to enable them to identify measures that were taken. The information to be provided is summarised as per **TABLE 9.1.**

10.3 Undertaking the Road Safety Audit

The RSA is to conduct a formal examination of the proposed or existing roads / access for the roadside development from the perspective of the road users, with the intention of identifying road safety deficiencies and areas of high risk that could lead to road crashes. Undertaking the road safety audit is the core of the road safety audit process.

The task involves different activities depending upon the phase of the project being audited. The **TABLE 10.3** below specifies the minimum activities of the road safety audit during each phase of a project.

TABLE 10.1: Minimum Activities of the Road Safety Audit for Each Phase of a RSD Project

Project Phase	Type of Road Safety Audit	Minimum Activities
Pre-construction	Concept Design: RSA Stage 1 Preliminary Design: RSA Stage 2 Detailed Design: RSA Stage 3	i. View the site. ii. Assess the project from the design plans. iii. Record all road safety deficiencies.
Construction	Traffic Management Plan (TMP) : RSA Stage 4 Part 1	i. Assess the project from the construction plans. ii. Assess TMP iii. Record all road safety deficiencies.
	Implementation of TMP : RSA Stage 4 Part 2 (if any)	i. Assess the project from the construction plans. ii. Assess Traffic Control Plan. iii. Record all road safety deficiencies.
	As built drawing : RSA Stage 4 Part 3	i. Assess the project by inspecting the site, both during day and night conditions. ii. Record all road safety deficiencies.
Post-construction	Operational/Existing Road : RSA Stage 5	i. Assess the road and road related areas by inspecting the site, both during day and night conditions. ii. Record all road safety deficiencies.

10.3.1 Pre-Construction Road Safety Audits Activities

1. Review all the information/material.

a) Gathering all information/material necessary for the road safety audit.

b) The latest design plans must be reviewed.

c) Follow up any missing information/material and clarify any uncertainties with the project sponsor.

d) Record any information/material required that is not available but is needed/desirable to achieve for.

2. View the site.

a) It is highly recommended to physically visit the site.

b) All audit team members must view the current site along all approaches, from the perspective of all the relevant different road users.

c) It is advisable to use photographs/images to capture details of the current site.

3. Assess the project from the design plans with other related information.

a) All audit team members must participate in the entire assessment.

b) The assessment must be conducted from the perspective of all the relevant road users.

c) The project must be assessed for potential road safety risks, that is, the assessment must go beyond assessing the conformance to standards.

4. Record all road safety deficiencies that are identified.

Refer to checklist in the Guidelines for the Safety Audit of Roads and Road Project in Malaysia.

10.3.2 Construction Phase Road Safety Audits Activities

1. Review all the information/material.

a) Gather any additional information/material necessary for the road safety audit.

b) The latest design plans must be reviewed.

c) Follow up any missing information/material with the project sponsor.

d) Record any information/material required that is not available but is needed/desirable to achieve for.

2. Assess the project from the construction plans and by inspecting the site.

a) All audit team members must participate in the entire assessment.

b) The assessment must be conducted along all approaches from the perspective of all the relevant different road users.

c) The project must be assessed for potential road safety risks, that is, the assessment must go beyond assessing the conformance to standards.

d) It is highly desirable to perform inspections before the project is opened to traffic.

e) The site must be inspected during daylight conditions.

f) The site must be inspected during night lighting conditions.

g) It is desirable to observe the site during peak and off-peak operating conditions.

h) It is desirable to conduct inspections under adverse weather conditions such as fog, rain, etc, if the opportunity arises.

3. Record all road safety deficiencies that are identified.

a) Refer to checklist in the Guidelines for the Safety Audit of Roads and Road Project in Malaysia.

b) It is advisable to use photos/images to support the descriptions of deficiencies.

10.3.3 Post-Construction Phase Road Safety Audits Activities

1. Review all the information/material.

a) Gather any additional information/material necessary for the road safety audit.

b) Follow up any missing information/material with the project sponsor.

c) Record any information/material required that is not available but is needed/desirable to achieve for.

2. Assess the road and road related areas by inspecting the site.

a) All audit team members must participate in the entire assessment.

b) The assessment must be conducted along all approaches from the perspective of all the relevant different road users.

c) The road and road related areas must be assessed for potential road safety risks, that is, the assessment must go beyond assessing the conformance to the standards.

d) The site must be inspected during daylight conditions.

e) The site must be inspected during night lighting conditions.

f) It is highly desirable to observe the site during peak and off-peak operating conditions.

g) It is desirable to conduct inspections under adverse weather conditions such as fog, rain, etc, if the opportunity arises.

3. Record all road safety deficiencies that are identified.

a) Refer to checklist in the Guidelines for the Safety Audit of Roads and Road Project in Malaysia.

b) It is recommended to use photos/images to support descriptions of deficiencies.

10.4 Preparing Road Safety Audit Report

A written road safety audit report is required for each road safety audit conducted. The report is a concise document which clearly identifies and describes all the road safety deficiencies identified during the road safety audit. It must be produced in the specified format and it must be specific, clear and comprehensive.

The lead auditor is responsible for producing the road safety audit report. The road safety audit team prepares the audit report and all team members must sign the report to verify that they concur with its contents.

The report must also contain suggested actions or recommendations. These are the responsibilities of the auditor.

10.4.1 Steps

1. Draft The Road Safety Audit Report.

a) The report must be in writing and should be specific, clear and comprehensive.

b) The report must be uniquely identified by a road safety audit report number.

c) It should include the following sections:

i. Purpose.
ii. Background.
iii. Scope of the audit.
iv. Assessment methodology and details.
v. Information and material supplied, used and referenced.
vi. Consultant response and pre-decision of meeting between Project sponsor, Lead Auditor and Designer.
vii. Deficiency details (findings), suggested actions or recommendations.
viii. Brief conclusion
ix. Formal Audit statement.

d) The Report must include details of:

i. The dates of the commencement and assessments were conducted and the dates and times of site inspections.

ii. The scope of the road safety audit assessments, including lists of all plans reviewed and the area covered by the audit.

e) For each identified road safety deficiency or group of deficiencies, the report must:

i. Include a comprehensive description of the location.

ii. Include an explanation of the potential road safety impact (i.e. in relation to crash types).

iii. Contain any suggested actions or recommendations.

2. The Road Safety Audit Team Review The Draft Report.

a) The RSA report must be reviewed by all the audit team members.

b) Must be signed and dated by lead auditor

3. Finalise Road Safety Audit Report.

a) Must be finished in the approved format and printed in the required number of copies

b) The Road Safety Audit Report is ready for submission to Approving Authority.

11.0 COMPLETING ROAD SAFETY AUDIT

11.1 Overview

The completion phase is critical to the road safety audit process. It is designed to ensure that the project delivers the best possible road safety outcomes. It also ensures transparency and accountability in relation to decision making and actions.

The key steps that determine a successful outcome for the completion of a road safety audit involves:

a) Attending the completion meeting.
b) Accepting the road safety audit report.
c) Reviewing the report.
d) Producing a corrective action.
e) Implementing corrective actions.

11.2 Attending Completion Meeting

The purpose of attending the completion meeting is to discuss the road safety audit findings, outcomes and finalizes the contract agreement.

TABLE 11.1: Roles and Responsibilities

Roles	Responsibilities
Approving Authority	i. Initiate the completion meeting. ii. Record and confirm the outcomes/ actions of the meeting.
Lead Auditor	Present the road safety audit findings and outcomes
Project sponsor	i. Attend the completion meeting. ii. Determine which project meeting the stakeholders need to attend the completion meeting and advise them.
Project stakeholders (Optional)	Attend the completion meeting as directed by the project sponsor.

The completion meeting is an important part of the road safety audit process. It is held after the audit team has finished the assessments/inspections and produced a draft report of their findings. It is attended by the members of the road safety audit team, or at least the lead auditor, the project stakeholders and the project sponsor.

The meeting enables the lead auditor to present the draft report and discuss the audit findings and other relevant information with the project sponsor. It also provides an opportunity for the project sponsor to confirm the expectations of the road safety audit report. The draft report enables the lead auditor, the project sponsor and project stakeholders to work together to ensure that the road safety audit outcomes can be achieved.

11.2.1 Steps for Completion Meeting

The steps of Completion Meeting are as follows:-

1. **Identify the relevant stakeholders that must attend the completion meeting and invite them.**

   It is highly desirable to invite the project stakeholders.

2. **Attend the completion meeting.**

   a) Provide feedback on the layout, format and level of detail of the road safety audit report.

   b) Discuss the deficiencies identified during the road safety audit.

   c) Confirm that each identified deficiency is a road safety deficiency.

   d) Must not compromise the safety of the road users by requesting that all deficiencies be amended or removed.

   e) It is highly recommended to discuss on the options for the corrective action on the key findings.

3. **Confirm meeting actions/outcomes.**

   Confirm the arrangements of decision of meeting for finalising the report.

11.3 Implementing Corrective Actions

To completely implement all corrective actions and clearly and concisely record the details of each completed corrective action implemented to address the deficiencies identified in the final road safety audit report.

TABLE 11.2: Roles and Responsibilities

Roles	Responsibilities
Project sponsor	i. Refer the agreed list safety deficiencies to other internal branches or to the relevant agencies. ii. Initiate or delegate the implementation of corrective actions.
Approving Authority	Approve the corrective action program and any variations necessary
Contractor	i. Under take the implementation of corrective actions, as directed by the project sponsor. ii. Verify that the corrective actions have been completed and satisfactorily implemented
Resident Engineer	Review the corrective actions implemented by Contractor.

The implementation of corrective actions is to address some or all of the agreed deficiencies can be delegated, but it remains the responsibility of the project sponsor until all have been satisfactorily addressed.

All completed corrective actions need to be documented. It is important to ensure that details of the work that has been completed are documented as this may become legal issue in the future.

SECTION D

CONTENTS OF ROAD SAFETY AUDIT REPORT

12.0 CONTENTS OF ROAD SAFETY AUDIT REPORT

12.1 Format of the Report Cover

The format of the report cover can be referred to Appendix 1.

12.2 Table of Contents for the Audit Report

The table of content of the audit report can be referred to Appendix 2.

12.3 Summary of Audit Findings & Recommendation

The purpose of the Summary of Audit is to highlight the findings and recommendations by the audit team. It needs to be brief and easily understood. In the event where there are differences in the Summary of Audit and the Report, the content of the Report will prevail. Hence, the Report shall be read entirely.

The Summary of the Audit Findings and Recommendation is to be included in the Report and the standard formats for the Summary of Audit for various stages of audit are given as follows:-

i. The Standard Format for the Summary Of Audit (RSA Stage 1, 2 & 3) is as shown in Appendix 3(i).
ii. The Standard Format for the Summary Of Audit (Compliance Audit) is as shown in Appendix 3(ii).
iii. The Standard Format for the Summary Of Audit (RSA Stage 4 Part 1) is as shown in Appendix 3(iii).
iv. The Standard Format for the Summary Of Audit (RSA Stage 4 Part 2 & 3) is as shown in Appendix 3(iv).
v. The Standard Format for the Summary Of Audit (RSA Stage 5) is as shown in Appendix 3(v).

12.4 General Layout of Main Report

The arrangement of header, footer, page number & headings for the main report is as shown in Appendix 4(i) while the arrangement of tables & figures in the main report is as shown in Appendix 4(ii)

12.5 Introduction of Project

The introduction of the project need to include the followings:-

i. Location of project.
ii. Project/Road name, limit of work, length of road & other project general characteristics.
iii. Project owner.
iv. Commencement of project.
v. Date of Appointment of Auditor & stages to be carried out.
vi. Details of standard used in the design.
vii. Scope & objective of the audit.

12.6 Information Made Available to Auditor

The information to be made available to the Auditor comprises of the followings but not limited to:-

i. Development plans.
ii. Traffic reports.
iii. Drawings.
iv. Audit reports & decision of previous audits.
v. Site Visit.
vi. Date of meeting or discussion with the client.

12.7 List of Relevant References Technical Guidelines

The Audit Report shall include a list of all relevant references on the latest technical guideline published by the Malaysian Road Authority.

12.8 Details in the Road Safety Audit Report

12.8.1 Identification of Safety Deficiencies

i. Ensure all major items (as in checklist of 'Guidelines for the Safety Audit of Roads and Road Project in Malaysia') **are reported irrespective of whether they are acceptable or non-acceptable to the Auditor.**
ii. The order of reporting must be logical and helpful for the report's recipients for them to consider the implementation of the proposed corrective action.
iii. Photos of safety deficiencies identified for stage 4 & 5.
iv. General implication of safety deficiencies with regard to safety need be stated for major findings/deficiencies.

12.8.2 Recommendation / Corrective Treatments

i. Not an essential requirement but Auditor may include this after each finding/deficiency.

ii. An audit recommendation should indicate the direction in which a solution should be sought, rather than specifying the solution. The Auditor may not always know all of the project constraints and possibilities.

12.9 Conclusion

The Conclusion of the Main Report shall include:-

i. Indicate adequacy of drawings & information provided at the time of audit.

ii. Indicate only the general safety deficiencies and not the specific deficiencies.

iii. Specify the needs of any immediate amendments/corrective actions (e.g. before the next stage of audit, before construction etc.)

12.10 Details of the Lead Auditor & Team Members

i. Name of the Lead Auditor & team members, include signatures & dates.

ii. Professional Engineer Stamp (with Registration number) – only for lead Auditor.

iii. Auditor's accreditation certificate number – only for lead Auditor.

12.11 Appendices

The Appendices should include the following topic in their order of priority irrespective whether it is not applicable or not provided.

Appendix:

Appendix A: A copy of the Auditor's accreditation certificate

Appendix B: Location plan of the project

Appendix C: Strip map of the project

Appendix D: Photos of existing site

Appendix E: Decisions of the previous audit, e.g.

- Summary of Audit of previous audit reports with decisions of meeting include minutes of meeting
- Relevant correspondences

Appendix F: List of drawings used for the audit

Appendix G and onwards.

Safety Deficiencies & Recommendations:

i. If there are similar type of deficiencies (repetitive in same/different locations), attaching an example in the form of drawings/sketches will suffice with the locations specified in the main report

ii. If there are different type of deficiencies, attaching all relevant drawings / sketches are required

iii. The deficiencies need to be highlighted by clouding and indicating what are the deficiencies in the drawings

iv. Should try to use minimum number of drawings for the appendices without losing clarity and content. i.e. use shared drawings that contain many/different deficiencies (where possible)

LIST OF APPENDICES

APPENDIX 1

EXAMPLE OF REPORT COVER

Font : Times New Roman:
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KERAJAAN MALAYSIA

JABATAN KERJA RAYA MALAYSIA

Font : Times New Roman:
Saiz : 24 (Bold)

PROJECT NAME

Font : Times New Roman
Saiz : 18 (Bold)

ROAD SAFETY AUDIT REPORT
(Stage of Road Safety Audit)
Date of Submission

Font : Times New Roman
Saiz : 16 (Bold)

Saiz : Height : 0.7" , Width: 1"

Project Sponsor
JABATAN KERJA RAYA
Cawangan Jalan,
Ibu Pejabat JKR Malaysia,
Jalan Sultan Salahuddin,
50582 Kuala Lumpur

Design Consultant
Syarikat Perunding XXX
No 12, Jalan Liku
32100 Shah Alam , Selangor

Contractor
Bina Siap Sdn. Bhd.
No 176, Fasa II
Bandar Baru Puncak Alam
23100 Kuala Selangor
Selangor

Font : Times New Roman
Saiz : 11

Prepared By

Ir Ismail b. Ahmad

Acreditiation No:JKR/CJ/UKJ/028/07 2005

Jitu Consultancy
No 100, Jalan Jitu 4
Damansara Utama
Selangor

Tel No: 03-41078650
Fax No: 034106785 4
Email :

SYARIKAT ABC COMMERCE SDN BHD

Font : Times New Roman
Saiz : 26 (Bold)

ROADSIDE DEVELOPMENT PROJECT NAME

Font : Times New Roman
Saiz : 10 min. (Bold)

ROAD SAFETY AUDIT REPORT
(Stage of Road Safety Audit)
Date of Submission

Font : Times New Roman
Saiz : 16 (Bold)

Owner
Syarikat ABC Sdn Bhd
Lot ***, Batu 7
Jalan Meru
42100 Klang
Selangor D.E

Engineering Consultant
Perunding XYZ Sdn Bhd
****
****
******** Petaling Jaya
Selangor D.E.

Font : Times New Roman
Saiz : 16 (Bold)

Prepared By
Ir. Ahmad M.bin Shah
Accreditation No:
JKR/XXX/XXX/000/00 2020

XX Consultancy
X, Jalan ABCD
47600 Subang Jaya
Selangor D.E.

Tel No: 03-xxxxxxxx
Fax No: 03-xxxxxxx
E-mail:

APPENDIX 2

EXAMPLE TABLE OF CONTENTS

"EXAMPLE TABLE OF CONTENTS"

MENAIKTARAF SIMPANG DUNGUN FT0127, TERENGGANU

Road Safety Audit (Stage 1)
(Planning & Feasibility)

Font : Times New Roman
Saiz : 11 (Bold)

TABLE OF CONTENTS **PAGE NO.**

List of Appendices

i. Standard Text

Font : New Times Roman
Saiz : 12
Paragraph :1.5 lines spacing

ii. Standard Margin

Top : 1. 5"
Bottom : 1"
Left / Right : 1. 25"

APPENDIX 3

STANDARD FORMAT SUMMARY OF AUDIT

First Page Only

MENAIKTARAF SIMPANG DUNGUN FT0127, DUNGUN, TERENGGANU

Road Safety Audit (Stage 1)
(Planning & Feasibility)

Summary Of Audit

Font : Times New Roman
Saiz : 11 (Bold)

No	Item	Auditor's Comment & Recommendation	Designer's Response	Decision Of Meeting
		Text For Table Font : New Times Roman Saiz 11/12		

First Page Only

MENAIKTARAF SIMPANG DUNGUN FT0127, DUNGUN, TERENGGANU

Compliance Audit

Font : Times New Roman
Saiz : 11 (Bold)

No	Item	Auditor's Comment & Recommendation in Stage 3	Decision of stage 3 RSA Meeting	Designer's Compliance	Auditor's Compliance Audit
			Text For Table Font : New Times Roman Saiz 11/12		

First Page Only

MENAIKTARAF SIMPANG DUNGUN FT0127, DUNGUN, TERENGGANU

Road Safety Audit (Stage 4 Part 1)
(Construction)

Verification Audit

Font : Times New Roman
Saiz : 11 (Bold)

No	Item	Decision of RSA Stage 3 Meeting	Designer's Compliance	Auditor's Verification Audit
		Text For Table Font : New Times Roman Saiz 11/12		

First Page Only

MENAIKTARAF SIMPANG DUNGUN FT0127, DUNGUN, TERENGGANU

Road Safety Audit (Stage 4 Part 2)
(Construction)

Summary Of Audit

Font : Times New Roman
Saiz : 11 (Bold)

No	Item	Auditor's Comments & Recommendation	Contractor's Response	Decision of Meeting
		Text For Table Font : New Times Roman Saiz 11/12		

First Page Only

MENAIKTARAF SIMPANG DUNGUN FT0127, DUNGUN, TERENGGANU

Road Safety Audit (Stage 5)
(Operational Stage)

Summary Of Audit

Font : Times New Roman
Saiz : 11 (Bold)

No	Item	Auditor's Comments & Recommendation	Contractor's Response	Decision of Meeting
		Text For Table Font : New Times Roman Saiz 11/12		

APPENDIX 4

EXAMPLE OF REPORT LAYOUT

i. Standard Numbering and Heading Format

1 MAJOR HEADING *(Capital + Bold)*

1.1 Minor Heading *(Bold)*

1.1.2 Subsequent Heading *(Bold)*

2 MAJOR HEADING *(Capital + Bold)*

2.1 Minor Heading *(Bold)*

2.1.2 Subsequent Heading *(Bold)*

ii. Standard Text

Font New Times Roman

Saiz 12

Sentence spacing : 1.5

Paragraph : 3.0

iii. Standard Margin

Top : 1. 5"

Bottom : 1"

Left / Right : 1. 25"

Arrangement of Tables & Figures

Figure 1: Location of Project.

Table1: Inadequate Vertical Gradient

Chainage		Gradient
Start	**End**	
0.00	217.866	0.1%
585.152	628.190	0.0 % (Bridge)
962.419	1090.282	0.4 %
1090.282	1482.387	0.1%
2245.727	2512.392	0.1%

Road Branch, Public Works Department, Headquarters
Jalan Sultan Salahuddin, 50582, Kuala Lumpur