Guidelines For Road Safety Audit

Making roads safer
for everyone starts with
YOU !

DIRECTORATE OF URBAN LAND TRANSPORT

Directorate of Urban Land Transport (DULT) was set up by the Government of Karnataka in 2007 under the Urban Development Department with the objective to coordinate planning and implementation of Urban Transport projects and programs. The Directorate is the nodal agency responsible for overseeing all the urban land transport initiatives in Urban/ Local Planning Areas of Karnataka and administers the State Urban Transport Fund (SUTF). The goal of the Directorate is to comprehensively plan and aid in implementing sustainable transport systems that focus on mobility of people.

Since its inception, the Directorate has undertaken many initiatives including service level benchmarking in Bangalore; preparation of policies on parking; preparation of comprehensive mobility plans for cities in Karnataka; development of plans for NMT infrastructure implementations, etc. The Directorate is also spearheading the implementation of Bus rapid Transit system between the twin cities of Hubli and Dharwad.

PREFACE

The increasing number of road fatalities is a matter of concern. The Global Status Report 2013 published by the World Health Organization has revealed that 1.24 million people have died in road accidents each year across the world. India accounts for around 1% of the world's vehicle population. It also accounts for 30% of the world road fatalities, making it one of the most vulnerable nations for road accidents in the world. The state of Karnataka has lost more than 7,000 people in road accidents in the year 2013, which is a matter of concern for the State.

In a developing country like India, the loss of an earning member of the family due to a road accident has a significant impact on the quality of life. Severe disabilities resulting from road accidents also have a very negative impact on the welfare of the family of the affected person and may even push the families into poverty.

In this context, it is important to focus on road safety as the number of vehicles on Indian roads is exponentially increasing. Road safety is the responsibility of all - road users; administrators; engineers who are responsible for designing and managing road infrastructure; etc.

The Directorate of Urban Land Transport (DULT) recognized the need for a toolkit that could be used to assess the safety conditions of our roads. This toolkit has been prepared to enable road safety audits during various stages – from the design to the routine maintenance stage. This toolkit is meant for decision makers, engineers, technicians and others involved in road design, operations and maintenance or oversight.

The Directorate of Urban Land Transport is delighted to share this toolkit the stakeholders involved in improving road safety. DULT is open to suggestions comments, to further refine the toolkit.

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1 Introduction and Background

1.1 Road safety condition in India

The Global Status Report 2013, published by the World Health Organization (WHO), reveals that 1.24 million people were killed worldwide each year in road accidents. India accounts for 0.39 million road fatalities per annum (in year 2012), which is about 30% of the world's total road fatalities.

The data released by the Ministry of Road Transport and Highways has highlighted road accidents to be one of the biggest causes of un-natural deaths occurring in India. Table 1-1 shows the year wise road accidents in India from 2001 to 2012.

Table 1-1: Year - wise road accident statistics in India

Year	Number of Accidents		Number of persons		Number of persons killed per 100 accidents
	Total	**Fatal**	**Killed**	**Injured**	
2001	4,05,637	71,219 (17.6%)	82,261	405,216	19.9
2002	4,07,497	73,650 (18.1%)	84,674	408,711	20.8
2003	4,06,726	73,589 (18.1%)	85,998	435,122	21.1
2004	4,29,910	79,357 (18.5%)	92,618	464,521	21.5
2005	4,39,255	83,491 (19.0%)	94,968	465,282	21.6
2006	4,60,920	93,917 (20.4%)	105,749	496,481	22.9
2007	4,79,216	1,01,161 (21.1%)	114,444	513,340	23.9
2008	4,84,704	1,06,591 (22.0%)	119,860	523,193	24.7
2009	4,86,384	1,10,993 (22.8%)	125,660	515,458	25.8
2010	4,99,628	1,19,558 (23.9%)	134,513	527,512	26.9
2011	4,97,686	1,21,618 (24.4%)	142,485	511,394	28.6
2012	4,90,383	1,23,093 (25.1%)	138,258	509,667	28.2

Source: Road Accident in India 2012 Report published by Ministry of Road Transport and Highways

Figure 1-1 shows that 17% of people killed are pedestrians and cyclists while 26% of people are two-wheeler riders.

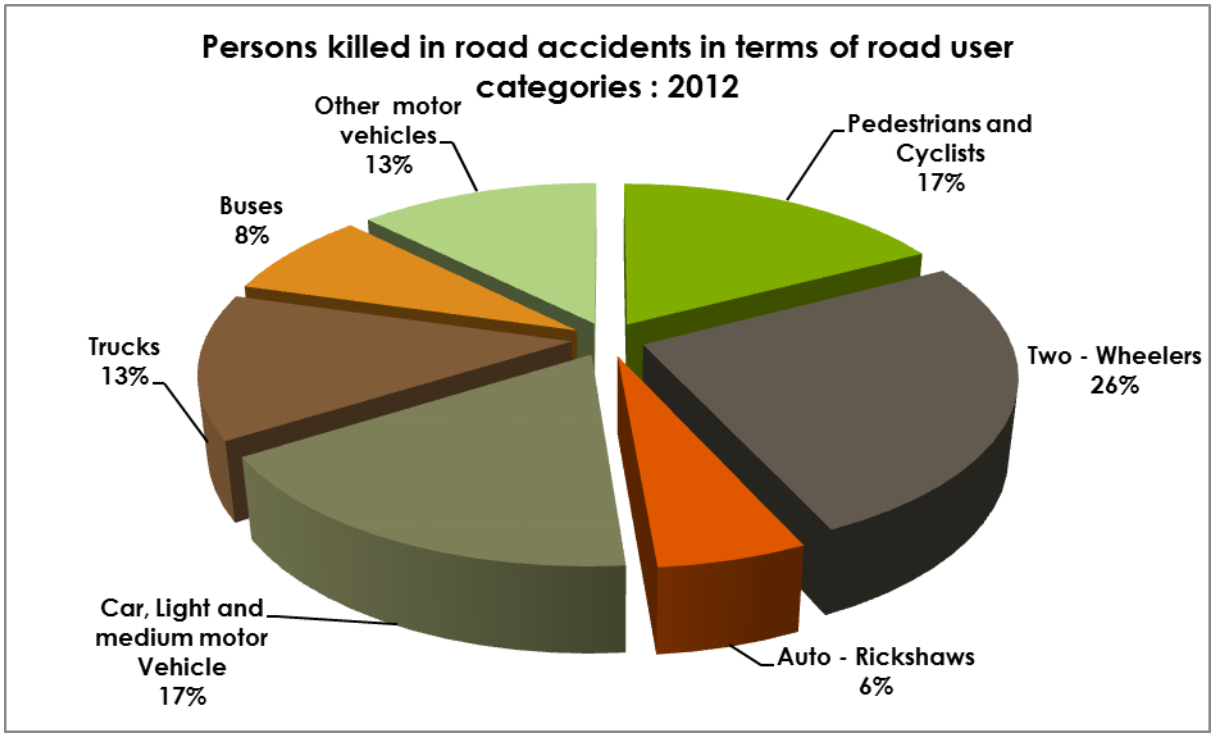


Figure 1-1: Persons Killed - By road user categories
Source: Road Accident in India 2012 report, Ministry of Road Transport and Highways

Figure 1-2 shows the number of people killed per 100 accidents in various states in India for the year 2012. It reveals that Nagaland experiences the worst situation, where 133.3 persons are killed per100 accidents. Compared to other states Goa has less fatalities, where 6.8 persons are killed per 100 accidents.

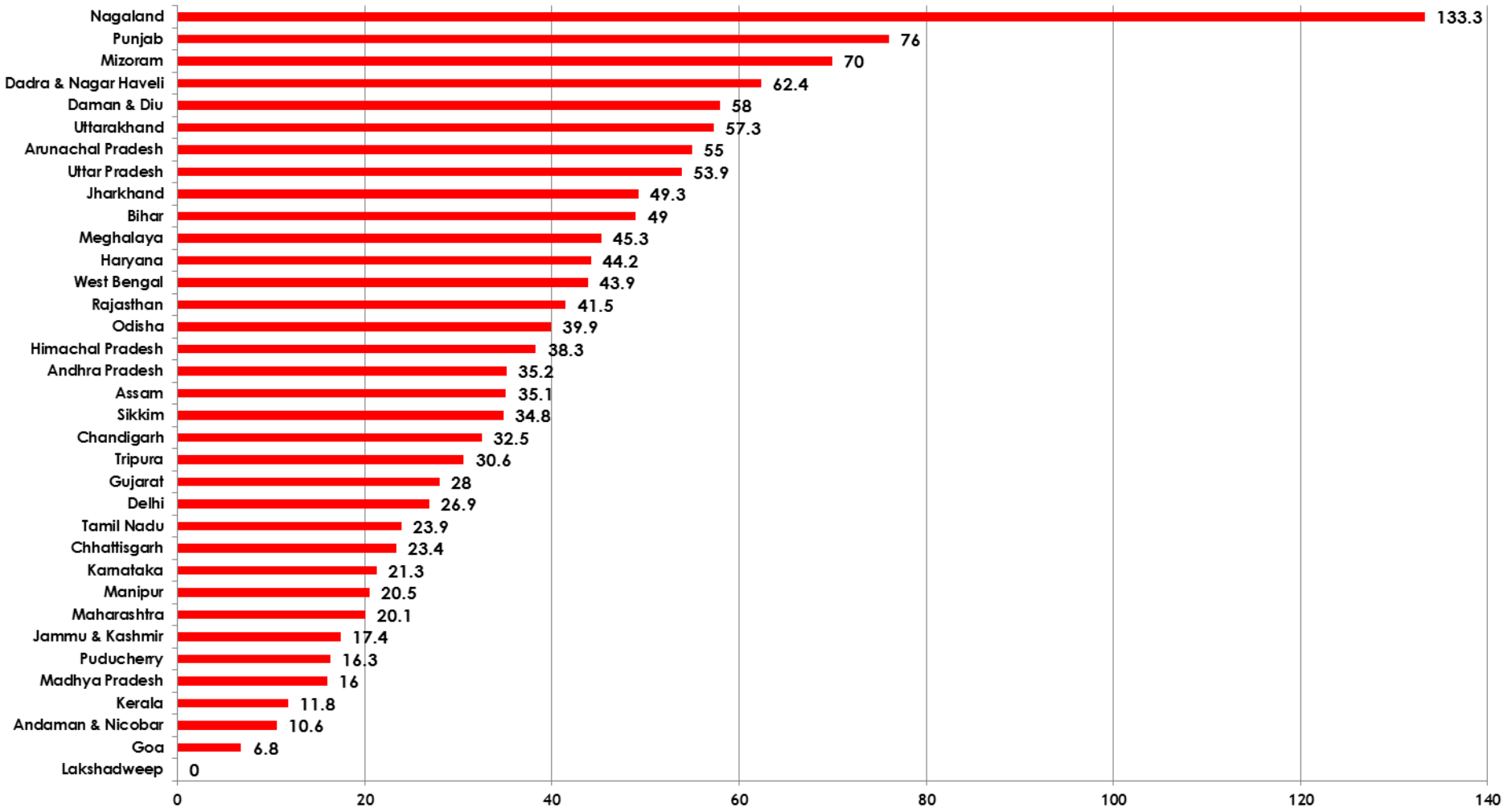


Figure 1-2: No. of persons killed per 100 accidents in the year 2012 (State wise)
Source: Road Accident in India 2012 report, Ministry of Road Transport and Highways

1.2 Road safety condition in Karnataka

Figure 1-3 shows the trend in the number of accidents between the years 2009 to 2013 in the state of Karnataka. The figure indicates a slight decline in overall accidents in the recent years. However, ensuring overall safety of all road users is an uphill task.

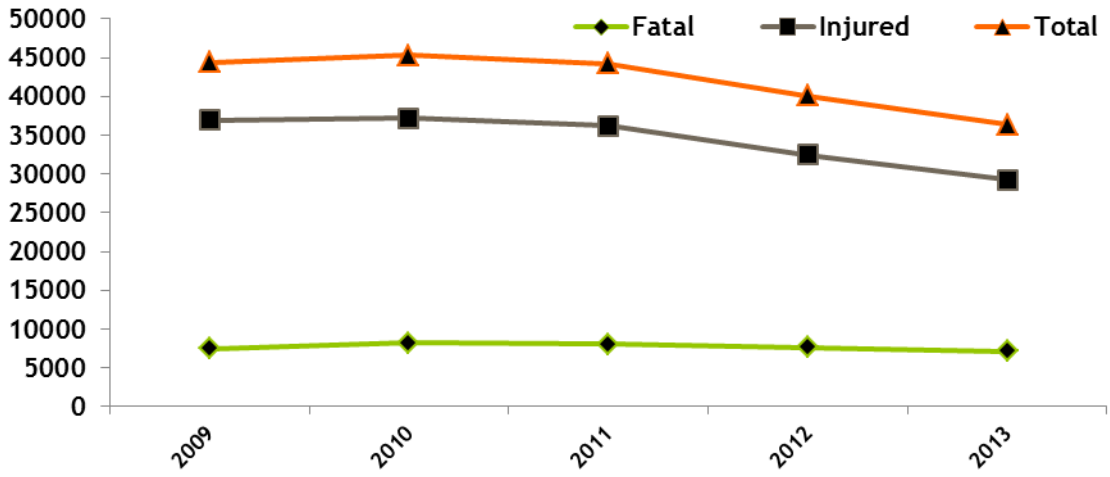


Figure 1-3: Accident statistics of Karnataka State
Source: Annual report and http://rto.kar.nic.in/

Road safety condition in Bangalore

Figure 1-4 shows the trend in road accidents from the year 2002 to 2013 for Bangalore. The figure shows a similar declining trend as that of the state, but the total number of accidents continues to be high (more than 4000). This indicates that there is a need for greater focus to improve safety on roads for all users.
Therefore road safety audits can be a useful tool to prevent road accidents in the city.

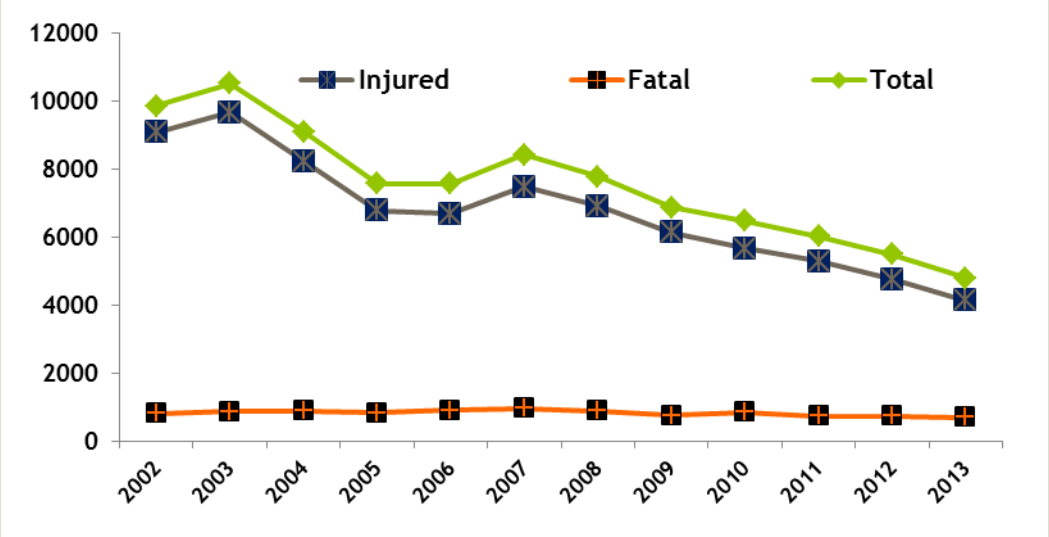


Figure 1-4: Accident statistics of Bangalore City
Source: Bangalore City Traffic Police- http://www.bangaloretrafficpolice.gov.in

2 Road Safety Audit

Road Safety Audit (RSA) is a review of a project to assess and identify the safety concerns of road users. In this RSA process emphasis is laid on improving safety for vulnerable road users such as pedestrians and cyclists. RSA can be carried out in the following cases:

i) To evaluate the safety of an existing road or an infrastructure.

ii) To identify the safety concerns of a proposed infrastructure during the planning, design and implementation stages.

Often, the safety considerations are ignored while planning transport projects, which later prove to have high socio - economic costs. For e.g. - death of an earning member of a household would impact his/her family in many different ways. Injuries may reduce the productivity of an individual, or may result in the loss of livelihood of the family.

Road safety audits are applicable to diverse types of road projects and to all categories of roads in both urban and peri-urban areas. Road safety audits should be conducted on all road projects, such as:

a. Intersection design projects (signalized and non-signalized),
b. Pedestrian and bicycle routes,
c. Local area traffic management schemes in urban areas,
d. Traffic calming measures in neighborhoods,
e. Approaches to bridges, rail over/under bridges,
f. Grade separators and interchanges,
g. Implementation of Mass Rapid Transit System, etc.

The purpose of a road safety audit is to manage safety by identifying and addressing risks associated with road safety deficiencies. Auditing at different stages of a project, starting from the planning stage can lead to the timely elimination of problems and minimize time and costs of retrofitting roads/ transport infrastructure to improve safety at a later stage.

The benefits of conducting a road safety audit are:

a. Identification of potentially unsafe locations along a road,
b. Reducing the severity and likelihood of road accidents
c. Reducing the need for costly remedial work by rationalizing the design,
d. Minimizing the total cost of a project to the community by preventing accidents, disruption and trauma.

3 When to conduct Road Safety Audit?

The RSA process starts with the decision to build a new road, invest in reconstruction, widening or major maintenance of an existing road or simply to evaluate the safety aspects of an existing infrastructure. Road Safety Audits should be performed periodically since the planning stage of a roadway project, so as to ensure the safety aspects for all users are taken care at all the stages. It is recommended that RSA should be conducted in the following critical stages of a project life cycle.

a. Feasibility stage (if any new proposal is made on existing infrastructure)
b. Design stage
c. Construction stage
d. Maintenance stage

In the feasibility stage audit, the existing roadway where the project is proposed will be audited considering the safety aspects of the existing road. The results of any crash investigation, especially any previous road safety inspection reports must be considered in the feasibility stage for brownfield projects (i.e. retrofitting or maintenance of existing infrastructure). Feasibility stage audit need not be carried out for a greenfield project (a project where no transport infrastructure currently exists). The comments and suggestions noted after completion of the feasibility stage audit goes as an input to the design of the proposed transport infrastructure.

Once the detailed design of the proposed infrastructure is completed, the design stage audit needs to be undertaken. The deficiencies identified in the design audit, if any, are to be addressed by making necessary changes in the design of the proposed infrastructure/facility.

The construction stage audit comes into picture when the project is under implementation after the approval of design drawings/ documents and the completion of the procurement process. The objective of this audit is to check whether adequate safety measures are taken during construction.

The final stage of the RSA process is termed as the monitoring stage. Monitoring stage audit needs to be carried out periodically during the service life of a project to ensure that the facility continues to serve road users in a safe manner.

4 Who should Conduct Road Safety Audit?

The RSA process is framed in such a way that auditing shall be done at various stages of a project (Planning, Designing, Execution, and Maintenance etc.), and at each stage the person responsible for a specific stage would also be responsible for conducting the audit.

For e.g. – Following is the list of people, who could be responsible for RSA at various stages of the project.

a. **Project Designer/ Engineer (Planning & Design Stage) -** The person involved in designing or planning of the project will be responsible for conducting the feasibility and design stage audit.
b. **Site Engineer (Construction Stage) -** The person involved in the execution or construction of the project will be responsible for the construction stage audit.
c. **Maintenance Engineer (Maintenance of existing Infrastructure) -** The person involved in the maintenance of the existing infrastructure or in monitoring of a newly executed project will be responsible for the periodic audit.
d. **Administrators (Various Urban Local Bodies) –** Administrators are responsible for ensuring better planning, construction and maintenance of infrastructure that is people-friendly. The checklists are simple enough for them to carry out themselves or to check on the work of their subordinates.

5 Tool to Conduct Road Safety Audit

A catalogue of checklists has been created as a tool to conduct RSA at various stages and is presented in the annexure.

The following checklist should be used at different stages of the audit:

a. Standard Checklist- The standard checklist shall be filled out in the feasibility stage/ monitoring stage/ or maintenance stage. An audit using the standard check list shall be carried out for any maintenance or retrofitting of the existing infrastructure. Standard checklist also needs to be filled out soon after implementation of the project and periodically thereafter.

   On all roads, a safety audit using standard checklist should be carried out every year and preferably after every monsoon season.

b. Design Checklist- The design checklist shall be filled after completion of the proposed design, with a pre-requisite that a standard checklist has already been filled, in case of brownfield project.

c. Construction Checklist- The construction checklist needs to be filled out during the construction phase of the project.

   Multiple construction stage audits need to be carried out on construction projects that last longer than 3 months. It is recommended that the construction stage audits be carried out once every three months on longer duration projects.

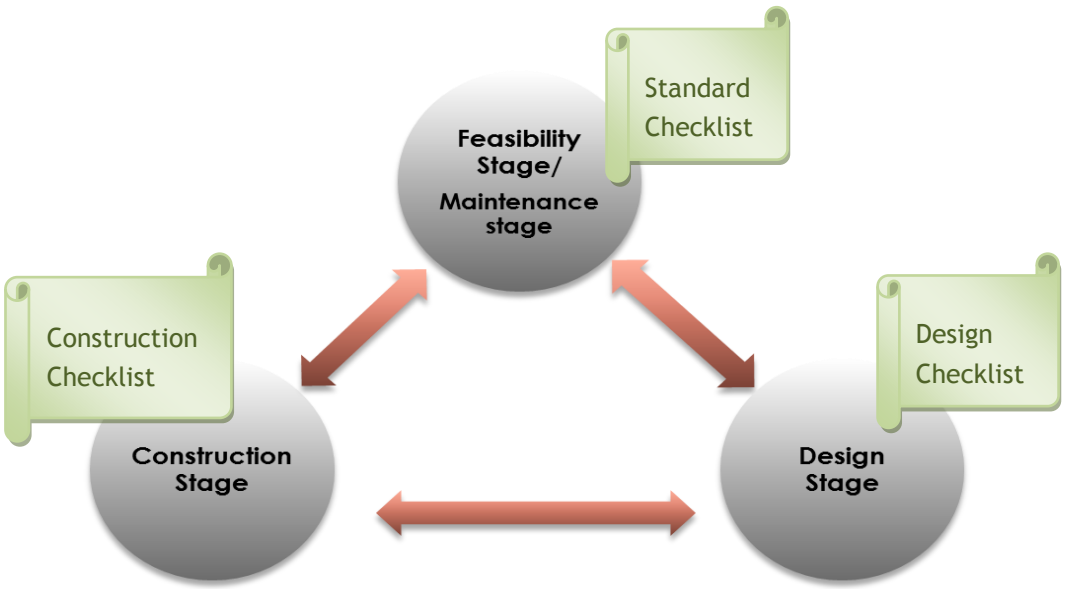
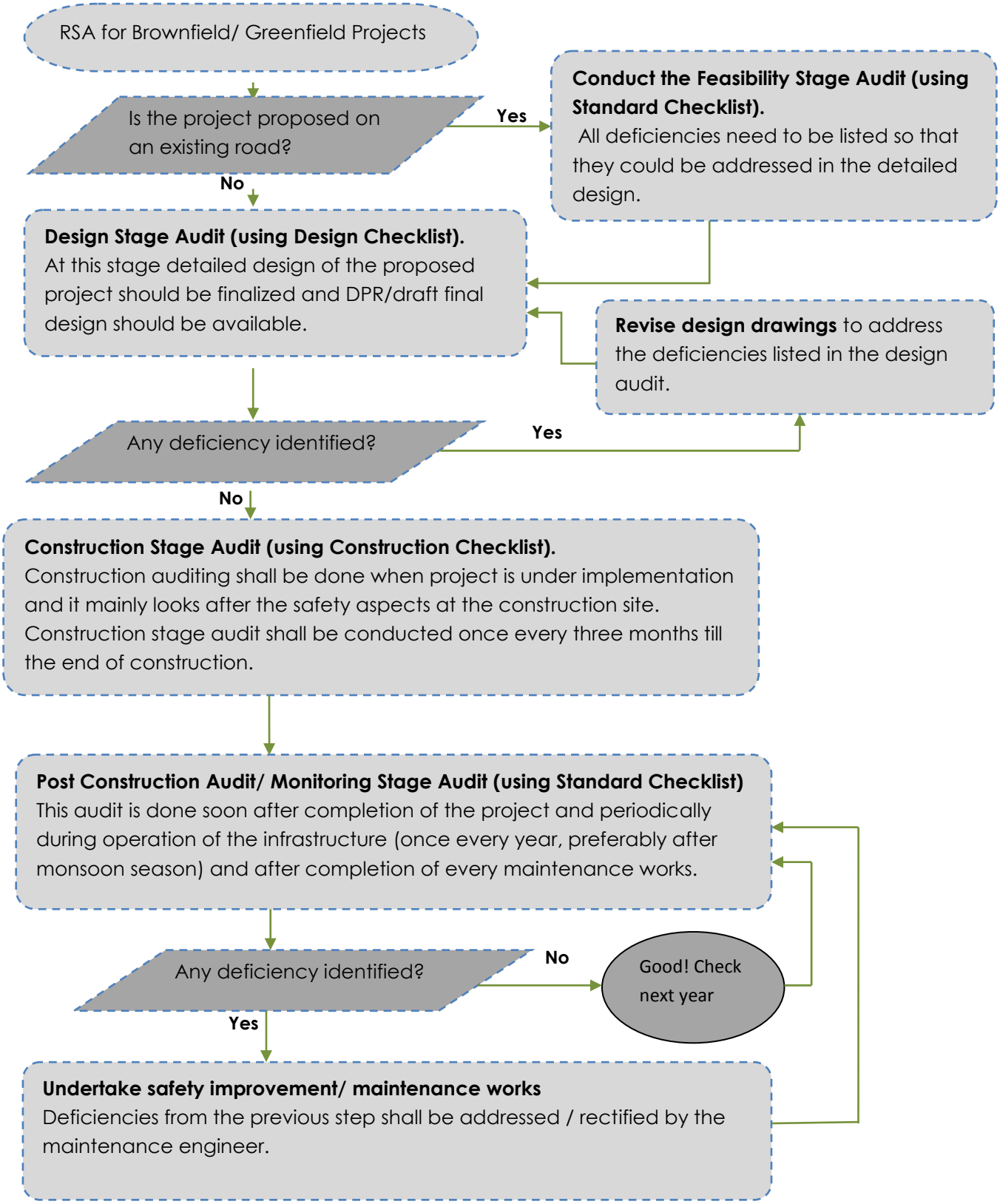


Figure 5-1 Checklists to be used at different stages of RSA

5.1 Process to conduct RSA

The following flow chart depicts the process for carrying out RSA.



RSA can also be done on any existing road infrastructure, even if no infrastructure improvement or new infrastructure is being added. In this case, RSA (monitoring stage) shall be conducted using a standard checklist and the process after the monitoring stage shall be followed as represented in the above flow chart.

5.2 Guidelines for carrying out Road Safety Audit

Before carrying out an audit at any stage, the roadway corridor should be divided into sections by doing a reconnaissance of the corridor to be audited.

The corridor should be divided into sections based on the following guidelines:

a. The sections can be divided from intersection to intersection and should preferably be less than 500m with more or less uniform cross section throughout the section.
b. When significant variation in a cross section is found (like lane reduction, footpath width reduced by more than 1m, etc.) then sections of roadway prior to the transition point and after the transition point should be audited as different sections.
c. The breakup of roadway into sections should be clearly indicated on the checklist with sufficient landmarks demarcating beginning and end points of a section.
d. When standard checklists/ design checklists/ construction checklists are filled out for a roadway at different stages of a project, demarcation of the sections need to be the same for easy comparison.
e. Audits at all stages should be done separately by direction of travel on two- way roads, i.e. separate checklist should be filled for each side of the road section. As shown in figure 5.1.
f. For a one- way road, audit for pedestrian, bicycle and parking facilities should be done separately on both sides. Carriageway and public transport facilities could be part of any one checklist.
g. If a particular facility is not allowed on the road section under audit, the corresponding section of the checklist need not be filled and evaluated.

   For example; if on-street parking is not allowed on the road section under audit, no need to evaluate the parking related aspects and the same should not be included in the calculation of overall marks and level of service.

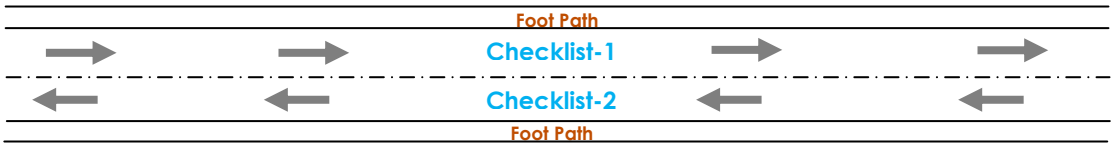


Figure 5-2: Illustration of audit process on a two-way road section

5.3 Instructions for filling out checklist

5.3.1 Standard checklist

- Standard checklist should be used in cases as detailed in section 5.1(a) of the guidelines document.
- Road name, name of the auditor, designation, landmarks, date, section I and II should be filled out before starting the audit.
- A schematic sketch of the section/ roadway to be audited should be drawn in the space provided in the checklist.

Section I and Section II

- In section I and II, general information about the project/ roadway to be audited is sought. If the information sought in section I and II is not available by segment of roadway then representative information for the entire roadway can be entered.
- Accident information for the entire roadway segment can be entered based on information collected from Traffic police station and Police station.
- Congestion level can be assessed based on information/ data collected from traffic volume counts, and by calculating volume[1] to capacity[2] ratio (V/C). Assessment can be done by classifying V/C ratio data as:
    - V/C ratio is greater than 0.9 (High congestion)
    - V/C is between 0.8 to 0.6 (Moderate congestion)
    - V/C ratio less than 0.6 (No congestion).

Section III

- For 8A, 8M, 8R, 8S and 11B, marks should be entered based on the marks obtained in the sub - section;
- Under the remarks /comment section the deficiencies of the particular facilities should be listed out;
- Any other comments regarding the question in the section should be separately listed out under the remarks box;
- Serial number 9, 10 and 11, should be filled only if the facility is present in any form along the project corridor;
- The total marks should be calculated for each facility by adding marks under the yes column.

Section IV

- The total marks against each facility should be added considering the marks under the yes column and should be entered in the 'marks obtained' column;

[1] Volume is the number of vehicles moving in a specified direction on a given lane or roadway that pass a given point or cross section during specified unit of time. It is expressed as vehicle per hour or Passenger Car Unit (PCU) per hour.
[2] Capacity is the ability of a roadway to accommodate traffic volume. It is expressed as vehicle per hour or PCU per hour.

- The level of service categories are shown in the table below:

Table 5-1: Level of Service

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

Section V

- All deficiencies must be consolidated and listed.
- Marks of all the sections of the project corridor by facility type must be entered in the table shown below:

Table 5-2: Score card with LOS- standard checklist

S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved (C)=(a/bx100)	Level of Service
1	Pedestrian Facilities			%	
2	Bicycle Facilities			%	
3	Public Transport Facilities			%	
4	Parking Facilities			%	
5	Road way Facilities			%	
	Total			%	

- All the audit sheets of individual sections should be attached as an annexure.

5.3.2 Design checklist

- Design checklist should be used in cases as detailed in section 5.1(b) of the guidelines document.
- Road name, name of the auditor, designation, landmarks, date, section I and II should be filled out before starting of the audit.
- A schematic sketch of the section/ roadway to be audited should be drawn in the space provided in the checklist.
- For a brownfield project, the standard checklist for the feasibility stage audit is a must.
- Section II should be filled only when the feasibility stage audit has been carried out;
- Deficiencies of all the sections from summary report of the standard checklist should be listed under the remarks box.

- For a greenfield project, section I and II should be left blank and audit shall start from section III onwards.

Section III and IV

- In section III and IV, general information about the project/ roadway to be audited is sought. If the information sought in section III and IV is not available for the segment of roadway then representative information for the entire roadway can be entered.
- Accident information for the entire roadway segment can be entered based on information collected from Traffic police station and Police station;
- Congestion level can be assessed based on information/ data collected from traffic volume counts, and by calculating volume[3] to capacity[4] ratio (V/C). Assessment can be done by classifying V/C ratio data as :
    - V/C ratio is greater than 0.9 (High congestion)
    - V/C is between 0.8 to 0.6 (Moderate congestion)
    - V/C ratio less than 0.6 (No congestion).

Section V

- For 8A, 8O, 8T, 8U and 11B, marks should be entered based on the sub section;
- Under the remarks /comments section the deficiencies of the particular facilities should be listed out;
- Serial number 9, 10 and 11, should be filled only if the facility is present in any form along the project corridor
- The total marks should be calculated for each facility by adding marks under the yes column.

Section VI

- The total marks against each facility should be added considering the marks under the yes column and should be entered in the 'marks obtained' column;
- The level of service are shown in the table below:

Table 5-3: Level of service

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

[3] Volume is the number of vehicles moving in a specified direction on a given lane or roadway that pass a given point or cross section during specified unit of time. It is expressed as vehicle per hour or Passenger Car Unit (PCU) per hour.

[4] Capacity is the ability of a roadway to accommodate traffic volume. It is expressed as vehicle per hour or PCU per hour.

Section VII-

- All deficiencies must be consolidated and listed.
- Marks of all the sections of the project corridor by facility type must be entered in the table shown below:

Table 5-4: Score card with LOS - design checklist

S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved (C)=(a/bx100)	Level of Service
1	Pedestrian Facilities			%	
2	Bicycle Facilities			%	
3	Public Transport Facilities			%	
4	Parking Facilities			%	
5	Road way Facilities			%	
	Total			%	

- Compare section VI with section II to gauge if the level of service is good or bad due to the design elements for each facility;
- All the audit sheets of individual sections should be attached as an annexure.

5.3.3 Construction checklist

- Construction checklist should be used in cases as detailed in section 5.1(c) of the guidelines document.
- Road name, name of the auditor, designation, landmarks, date, section I and II should be filled out before starting the audit.
- A schematic sketch of the section/ roadway to be audited should be drawn in the space provided in the checklist.

Section I and Section II

- In section I and II, general information about the project/ roadway to be audited is sought. If the information sought in section I and II is not available by segment of roadway then representative information for the entire roadway can be entered.

Section III

- The construction stage audit is purely for the work related zone;
- The total marks should be calculated by adding the marks under the yes column and should be entered in the table shown below :

Table 5-5: Score card with LOS- construction checklist

S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved (C)=(a/bx100)	Level of Service
1	WORK ZONE			%	

- All deficiencies must be listed;
- The level of service are shown in the table below:

Table 5-6: Level of service

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

- All the audit sheets of individual sections should be attached as an annexure.

Annexure

Catalogue of Road Safety Audit

A
Standard Checklist

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Road Safety Audit- Standard Checklist							
	S/N						
Sec I	Project Introduction						
	1	Type of Audit					
		Feasibility ☐		Maintenance ☐			
	2	Project title and brief description about the proposed facility					
Sec II	Details on existing Roadway Segment						
	3	Roadway Classification					
		Arterial Road ☐	Sub Arterial Road ☐	Collector Road ☐	Other Road ☐		
	4	Type of vehicles frequently using the facility (other than cars & 2-wheelers)					
		Heavy vehicles ☐	Buses ☐	Cyclist ☐	Pedestrians ☐		
	5	Landuse around the Roadway Segment					
		Commercial ☐	Residential ☐	Mixed ☐	Industrial ☐		
	6	Accident along the Roadway Segment- past 3 years					
		Year:	Year:	Year:			
		Total Accident:	Total Accident :	Total Accident:			
		No. of Fatal Accident:	No. of Fatal Accident:	No. of Fatal Accident:			
	7	Congestion on Roadway Segment- during peak hours (based on available data)					
		High Congestion ☐	Moderate Congestion ☐	No Congestion ☐			

Schematic sketch of the section/ roadway

Date: DD/ MM/ YYYY

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec III	Audit Parameters (Please circle the applicable)			Marking	
	8	**Availability of Pedestrian Facilities**	**Item**	**Yes**	**No**
	A	**Minimum Width of footpath based on Landuse**	**Answer any one of the sub items i, ii and iii based on the landuse adjacent to the corridor**		
	i	Minimum footpath width in residential landuse	1.8 m	10	0
	ii	Footpath width in commercial landuse	4.0 m	10	0
	iii	Footpath width in mixed landuse	2.5 m	10	0
	B	Kerb height of footpath	100 - 150 mm	10	0
	C	Zebra markings at pedestrian crossings	At least 3 m wide	10	0
	D	Minimum vertical clearance for pedestrian	2.4 m	10	0
	E	Minimum walking distance for pedestrian crossing	Less than 250 m	10	0
	F	Accessibility	Easily accessible to all (Blind person, Physically handicap, Wheel chairs)	10	0
	G	Audible Pedestrian signals	At all major intersection/ in the areas of heavy pedestrian traffic	10	0
	H	Pedestrian signal timing	Sufficient time to safely cross the road	10	0
	I	Footpath of the project corridor	Free from obstructions (parking, drainage, trees, utilities, etc.)	10	0
	J	Footpath of the project corridor	Connected with footpaths of intersecting streets at same level	10	0
	K	Footpath surface	Even/ anti skid / rough/ matt finish	10	0
	L	Ramps at locations where	Footpath intersect with the pedestrian crossings / driveways, etc	10	0
	M	**Guard Rail - (Total 10 marks)**	**If guardrail is not provide, please mark "No" for all sub sections**		
	i	Guard rails - Minimum height	1.2m	2.5	0
	ii	Guard rails - Set back distance	At least 150mm from edge	2.5	0
	iii	Guard rail opening for pedestrian crossing at mid block	Aligned with the raised table- top	2.5	0
	iv	Guard rail opening for pedestrian crossing at junction	Aligned with Zebra crossing	2.5	0
	N	Pedestrian Amenities	Benches, shaded resting places	10	0
	O	Placing of sign posts/ signal posts	Not obstructing pedestrian movement	10	0
	P	Road signs and route information board for pedestrian	Clearly visible	10	0
	Q	Lighting	Well illuminated	10	0
	R	**Pedestrian Crossing at Midblock crossings/ Unsignalized intersection crossings - Raise Table Top**	**If raise table top is not provide, please mark "No" for all sub sections**		
	i	Maximum Height	Height matched with footpath	2	0
	ii	Minimum Width	2.5 m	2	0
	iii	Ramps	Smooth gradient on both the sides	2	0
	iv	Table- top surface	Smooth, evenly surfaced with anti skid / rough/ matt finished	2	0
	v	Cat Eye on both sides of the Raised table top	Available	2	0

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec III	Audit Parameters (Please circle the applicable)			Marking	
	S	**Pedestrian Crossing at Midblock crossings/ Un signalized intersection crossings - FOB/ Subway**	**If FOB/Subway is not provide, please mark "No" for all sub sections**		
	SA	**Nature of pedestrian crossing- Foot Over Bridge (FOB)- (Total 10 marks) (mark only if applicable)**	**Staircase + Elevator**	**Yes**	**No**
	i	Minimum width- for pedestrian	2.5-3.0 m	2.5	0
	ii	Minimum width of staircase	2.5 m	2.5	0
	iii	Minimum size of elevator	1.4 x 1.4 m (1400 X 1400 mm)	2.5	0
	iv	Lighting	Well illuminated	2.5	0
	SB	**Nature of pedestrian crossing- Subway- (Total 10 marks) (mark only if applicable)**		**Yes**	**No**
	i	Minimum width	2.5 m	2	0
	ii	Minimum vertical clearance	2.5 m	2	0
	iii	Ventilation	Well Ventilated	2	0
	iv	Marking & Signs	Clearly marked direction signs	2	0
	v	Lighting	Well illuminated	2	0
			Total		
	Remarks/ Comment				
	9	**Availability of Bicycle Facilities (If No Bicycle facilities present, Skip this Section)**	**Item**	**Yes**	**No**
	A	Bicycle lanes	Segregated by physical barrier	10	0
	B	Minimum width of bicycle lane	2.0 m, uniformly along the corridor	10	0
	C	Minimum vertical clearance for bicyclist	2.25 m, uniformly along the corridor	10	0
	D	Bicycle lanes	Free from obstructions (parking, drainage, trees, utilities, etc.)	10	0
	E	Drainage facility	Proper outlet at regular intervals	10	0
	F	Markings & Signs	Clearly marked (symbol) along with direction signs	10	0
	G	Lighting	Well illuminated	10	0
			Total		
	Remarks/ Comment				
	10	**Availability of Public Transport Facilities (If No PT facilities present, Skip this Section)**	**Item**	**Yes**	**No**
	A	Bus Stop locations	At least 50 m after an intersections & easily accessible to commuters	10	0
	B	Proper bus stop sign board	At least 50 m before the approach	10	0
	C	Bus bays	50 m after an intersection	10	0
	D	Bus bays - Length of recess for single bus stop	15 m	10	0

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec III	Audit Parameters (Please circle the applicable)			Marking	
	E	Level boarding	Level matching with the footboard of buses	10	0
	F	Accessibility to bus stop	Easily accessible to all (Blind person, physically handicap, Wheel chairs)	10	0
	G	Presence of basic Infrastructure in bus shelter	Seating arrangement, Guard rail etc.	10	0
	H	Guard rails - Minimum height	1.2 m	10	0
	I	Guard rails - Set back distance	At least 150 mm from edge	10	0
	J	Pedestrian crossings	Within 100 m from a bus stop	10	0
	K	Clear walking space around bus shelter	For pedestrian (not commuters) to walk	10	0
	L	Designated space for Route information map at each bus shelter	Available	10	0
	M	Lighting fixture	Available and working	10	0
			Total		
	Remarks/ Comment				
	11	**Availability of Parking Facilities**	**Item**	**Yes**	**No**
	A	Type of Parking	Parallel Parking/ Angle Parking	10	0
	B	**Minimum Width of parking**	**Answer any one of the sub items i, ii, iii and iv based on the parking angle**		
	i	Minimum Width of Parallel Parking (mark only if applicable)	2.5 m	10	0
	ii	Minimum Width of Angular Parking 30 Degree (mark only if applicable)	4.9 m	10	0
	iii	Minimum Width of Angular Parking 45 Degree (mark only if applicable)	5.6 m	10	0
	iv	Minimum Width of Angular Parking 60 Degree (mark only if applicable)	6.0 m	10	0
	C	Parking information signboards (indicating parking or no- parking)	Clearly marked & visible signboards	10	0
	D	Designated bicycle parking space	At least 10% of total parking space & properly demarcated	10	0
	E	Parking surface	Smooth, even & free of pot holes, rutting , undulation etc.	10	0
	F	Intermediate Public Transport (IPT-Auto) parking space	Clearly marked space for IPT	10	0
			Total		
	Remarks/ Comment				
	12	**Roadway Design**	**Item**	**Yes**	**No**
	A	Lane width (Assuming lane marking are provided)	3.5 m per lane, as per IRC	10	0
	B	Two way road carriageway	Divided with median or with lane marking	10	0
	C	Minimum height- median	100- 150 mm	10	0
	D	Stop lines & Yield Lines	Not less than 2 m and not more than 3 m from the edge of the junction	10	0
	E	Lane & road markings	As per standards	10	0

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec III	Audit Parameters (Please circle the applicable)			Marking	
	F	Pedestrian crossings at junction	Shortest at all approaches	10	0
	G	Pedestrian crossings at midblock	Median opening	10	0
	H	Roadway segment/ surface	Free of potholes/rutting/undulations	10	0
	I	Posted design speed	In accordance with roadway type	10	0
	J	Mandatory signs, warning signs & informatory signs	As per standards	10	0
	K	Sufficient clear sight to motorists at intersections approaching the intersection	To avoid any conflict with pedestrians and cross-street traffic	10	0
	L	Lighting	Well illuminated	10	0
			Total		
	Remarks/ Comment				

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec IV	S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved ©= (a/bx100)	Level of Service (d)
	1	Pedestrian Facilities	**190**			
	2	Bicycle Facilities	**70**			
	3	Public Transport Facilities	**130**			
	4	Parking Facilities	**60**			
	5	Road way Facilities	**120**			
		Total	**570**	**0**		

Sec V	S/N	Deficiencies that needs to be addressed in the Design Stage:
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

Date: DD/ MM/ YYYY

B
Design Checklist

Road Name: Land marks/ Section ID
Name of the Auditor: From:
Designation: To:

Road Safety Audit- Design Checklist						
Sec I	**S/N**	**General**	**Item**			
	i	Standard checklist completed for this project?	If yes, then input the marks obtained and LOS (from standard checklist) in Sec II and proceed to design stage If no, then first fill out the standard checklist assessing the existing facility.			
Sec II	**S/N**	**Component**	**Total Marks (a)**	**Marks Obtained (b)**	**% Achieved ©= (a/bx100)**	**Level of Service (d)**
	1	Pedestrian Facilities	**190**			
	2	Bicycle Facilities	**70**			
	3	Public Transport Facilities	**130**			
	4	Parking Facilities	**60**			
	5	Road way Facilities	**120**			
		Total	**570**	**0**		
	ii	Before Initiating the design	Recommendation made in standard checklist audit reviewed & Considered as appropriate			
	Deficiencies that needs to be addressed from Standard Checklist					

Schematic sketch of the section/ roadway

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

	S/N	Parameters			
Sec III	**Project Introduction**				
	1	**Project title and brief description about the proposed facility**			
	2	**Define whether the proposed facility on**			
		Existing Infrastructure ☐	New Infrastructure ☐		
Sec IV	**Details on existing Roadway Segment**				
	3	**Roadway Classification**			
		Arterial Road ☐	Sub Arterial Road ☐	Collector Road ☐	Other Road ☐
	4	**Type of vehicles frequently using the facility (other than cars & 2-wheelers)**			
		Heavy vehicles ☐	Buses ☐	Cyclist ☐	Pedestrians ☐
	5	**Landuse around the Roadway Segment**			
		Commercial ☐	Residential ☐	Mixed ☐	Industrial ☐
	6	**Accident along the Roadway Segment- past 3 years**			
		Year: Total Accident: No. of Fatal Accident:	Year: Total Accident : No. of Fatal Accident:	Year: Total Accident: No. of Fatal Accident:	
	7	**Congestion on Roadway Segment- during peak hours (based on available data)**			
		High Congestion ☐	Moderate Congestion ☐	No Congestion ☐	

Road Name: Land marks/ Section ID
Name of the Auditor: From:
Designation: To:

Sec V	Audit Parameters (Please circle the applicable)			Marking	
	8	**Availability of Pedestrian Facilities**	**Item**	**Yes**	**No**
	A	**Minimum Width of footpath based on Landuse**	**Answer any one of the sub items i, ii and iii based on the landuse adjacent to the corridor**		
	i	Footpath width in residential landuse	1.8 m- Provided	10	0
	ii	Footpath width in commercial landuse	4.0 m- Provided	10	0
	iii	Footpath width in mixed landuse	2.5 m- Provided	10	0
	B	Kerb height of footpath	100 - 150 mm- Provided	10	0
	C	Zebra markings at pedestrian crossings	At least 3 m wide- Provided	10	0
	D	Minimum vertical clearance for pedestrian	2.4 m- Provided	10	0
	E	Minimum walking distance for pedestrian crossing	less than 250 m- Provided	10	0
	F	Accessibility	Easily accessible to all (Blind person, Physically handicap, Wheel chairs)- Provided	10	0
	G	Audible pedestrian signals	For Arterial and Sub- Arterial road- Provided	10	0
	H	Pedestrian signal timing	Sufficient time to safely cross the road- Calculated & Provided	10	0
	I	Footpath of the project corridor	Free from obstructions (parking, drainage, trees, utilities, etc.)	10	0
	J	Footpath of the project corridor	Connected with footpaths of intersecting streets at same level	10	0
	K	Footpath surface- even with anti skid / rough/ matt finished	Provided	10	0
	L	Profile difference on the adjacent side of the footpath/ pedestrian crossing/ driveways	Ramp- Provided	10	0
	M	Ramp gradient	Not more than 1:12 (8.3%)- Provided	10	0
	N	Smooth curve at corner of the footpath	Radius 12 m- Provided	10	0
	O	**Guard Rail - (Total 10 marks)**	**If guardrail is not provide, please mark "No" for all sub sections**		
	i	Guard rails - Minimum height	1.2m- Provided	2.5	0
	ii	Guard rails - Set back distance	At least 150mm from edge	2.5	0
	iii	Guard rail opening for pedestrian crossing at mid block	Aligned with the raised table- top	2.5	0
	iv	Guard rail opening for pedestrian crossing at junction	Aligned with Zebra crossing	2.5	0
	P	Pedestrians Amenities- Benches, shaded resting places	Provided	10	0
	Q	Placing of sign posts/ signal posts	Not objecting pedestrian movement	10	0
	R	Road signs and route information board for pedestrian	Provided at visible distance of at least 50 m a head	10	0
	S	Lighting fixture, height, spacing etc.- designed as per IRC	Provided	10	0

Road Name: Land marks/ Section ID
Name of the Auditor: From:
Designation: To:

Sec V	Audit Parameters (Please circle the applicable)			Marking	
	T	**Pedestrian Crossing at Midblock crossings/ Un signalized intersection crossings - Raised Table Top (Total 10 marks)**	**If raise table top is not provide, please mark "No" for all sub sections**		
	i	Maximum Height	Height matched with footpath or between 100 - 150 mm- Provided	2	0
	ii	Minimum Width	2.5 m- Provided	2	0
	iii	Ramps Gradient	Slope of 1:8- Provided	2	0
	iv	Table- top surface	Evenly with anti skid / rough/ matt finished- Provided	2	0
	v	Cat Eye on both sides of the Raised table top	Provided	2	0
	U	**Pedestrian Crossing at Midblock crossings/ Un signalized intersection crossings - FOB/ Subway**	**If FOB/Subway is not provide, please mark "No" for all sub sections**		
	UA	**Nature of pedestrian crossing- Foot Over Bridge (FOB) (Total 10 marks) (mark only if applicable)**	**Staircase + Elevator**	**Yes**	**No**
	i	Minimum width- for pedestrian	2.5-3.0 m- Provided	2	0
	ii	Minimum width- for pedestrian & cyclists	3.5 m- Provided	2	0
	iii	Minimum width of staircase	2.5 m- Provided	2	0
	iv	Minimum size of elevator	1.4 x 1.4 m (1400 X 1400 mm)- Provided	2	0
	v	Lighting fixture, spacing etc.	Provided	2	0
	UB	**Nature of pedestrian crossing- Subway (Total 10 marks) (mark only if applicable)**		**Yes**	**No**
	i	Minimum width	2.5 m- Provided	2	0
	ii	Minimum vertical clearance	2.5 m- Provided	2	0
	iii	Good Ventilation	Provided	2	0
	iv	Marking & Signs	Clearly marked direction signs- Provided	2	0
	v	Lighting fixture, spacing etc.	Provided	2	0
			Total		
	Remarks/ Comment				
	9	**Availability of Bicycle Facilities (If No Bicycle facilities present, Skip this Section)**	**Item**	**Yes**	**No**
	A	Bicycle lanes	Segregated- Provided	10	0
	B	Minimum Width	2.0 m, uniformly along the corridor for two way- Provided	10	0
	C	Minimum vertical clearance for bicyclist	2.25 m, uniformly along the corridor- Provided	10	0
	D	Bicycle lanes	Free from obstructions (parking, drainage, trees, utilities, etc.)	10	0

Road Name: Land marks/ Section ID
Name of the Auditor: From:
Designation: To:

Sec V	Audit Parameters (Please circle the applicable)			Marking	
	E	Drainage facility	Provided	10	0
	F	Markings & Signs	Clearly marked (symbol) along with direction signs- Provided	10	0
	G	Lighting fixture, spacing etc.	Provided	10	0
			Total		
	Remarks/ Comment				
	10	**Availability of Public Transport Facilities**	**Item**	**Yes**	**No**
	A	Bus Shelter locations	At least 50 m away from intersections- Provided	10	0
	B	Proper bus stop sign board	At least 50 m after the approach- provided	10	0
	C	Bus bays	50 m away from intersection- Provided	10	0
	D	Bus bays - Length of recess for single bus stop	15 m- Provided	10	0
	E	Level boarding	Level matching with the footboard of buses	10	0
	F	Accessibility of bus shelter	Easily accessible to all (Blind person, Physically handicap, Wheel chairs)- Provided	10	0
	G	Basic Infrastructure in bus shelter	Seating arrangement, Guard rail etc.- Provided	10	0
	H	Guard rails - Minimum height	1.2 m- Provided	10	0
	I	Guard rails - Set back distance	At least 150 mm from edge- Provided	10	0
	J	Pedestrian crossings	Within 100 m from a bus stop- Provided	10	0
	K	Clear walking space around bus shelter	For pedestrian (not commuters) to walk	10	0
	L	Designated space for Route information map at each bus shelter	Provided	10	0
	M	Lighting fixture, spacing etc.	Provided	10	0
			Total		
	Remarks/ Comment				
	11	**Availability of Parking Facilities (based on Parking Policy)**	**Item**	**Yes**	**No**
	A	Type of Parking	Parallel Parking/ Angle Parking- Provided	10	0
	B	**Minimum Width of parking**	**Answer any one of the sub items i, ii, iii and iv based on the parking angle**		
	i	Minimum Width of Parallel Parking (mark only if applicable)	2.5 m- Provided	10	0

Road Name: Land marks/ Section ID
Name of the Auditor: From:
Designation: To:

Sec V	Audit Parameters (Please circle the applicable)			Marking	
	ii	Minimum Width of Angular Parking 30 Degree (mark only if applicable)	4.9 m- Provided	10	0
	iii	Minimum Width of Angular Parking 45 Degree (mark only if applicable)	5.6 m- Provided	10	0
	iv	Minimum Width of Angular Parking 60 Degree (mark only if applicable)	6.0 m- Provided	10	0
	C	Parking information Signboards (indicating parking or no- parking)	Clearly marked & visible signboards- Provided	10	0
	D	Designated bicycle parking space	At least 10% of total Parking Space- Provided	10	0
	E	Parking surface	Smooth, evenly & free of pot holes, any rutting , any undulation etc.- considered	10	0
	F	Intermediate Public Transport (IPT-Auto) parking space	Clearly marked space for IPT- Provided	10	0
			Total		
	Remarks/ Comment				
	12	**Roadway Design**	**Item**	**Yes**	**No**
	A	Lane width	3.5 m per lane	10	0
	B	Carriageway	Divided with median or undivided with lane marking- Provided	10	0
	C	Minimum width- Median (applicable only for 4 or more than 4 lanes)	Minimum width 1.2m (in case of pedestrian Refuge Island) Minimum width 1.5m (in case of pedestrian Refuge Island along with tree line)	10	0
	D	Minimum height- Median	100- 150 mm- Provided	10	0
	E	Stop lines & Yield Lines	not less than 2 m and not more than 3 m from edge of the junction- Provided	10	0
	F	Lane & Road markings	As per standards- Provided	10	0
	G	Pedestrian crossings at Junction	Shortest at all approaches- Provided	10	0
	H	Pedestrian crossings at midblock	Median opening- Provided	10	0
	I	Roadway segment/ surface	Free of potholes/rutting/undulations- Provided	10	0
	J	Posted design Speed	In accordance with roadway type- Provided	10	0
	K	Mandatory signs, warning signs & informatory signs	Provided	10	0
	L	Sufficient clear sight to motorists at intersections approaching the intersection	To avoid any conflict with pedestrians and cross-street traffic- Provided	10	0
	M	Lighting fixture, height, spacing etc.- designed as per IRC	Provided	10	0
			Total		
	Remarks/ Comment				

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec VI	S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved ©= (a/bx100)	Level of Service (d)
	1	Pedestrian Facilities	**210**			
	2	Bicycle Facilities	**70**			
	3	Public Transport Facilities	**130**			
	4	Parking Facilities	**60**			
	5	Road way Facilities	**130**			
		Total	**600**	**0**		

Sec VII	S/N	Deficiencies that needs to be addressed:
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

C
Construction Checklist

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Road Safety Audit- Construction Checklist		
	S/N	**Parameters**
Sec I	**Project Introduction**	
	1	**Project title and brief description about the proposed facility**
Sec II	**Details on existing Roadway Segment**	
	2	**Landuse around the Roadway Segment**
		Commercial ☐ Residential ☐ Mixed ☐ Industrial ☐

Schematic sketch of the section/ roadway

Date: DD/ MM/ YYYY

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec III	Audit Parameters (Please circle the applicable)			Marking	
	3	**Work Zone Related**	**Item**	**Yes**	**No**
	A	NOC from all the concerned department-	Taken before starting of the construction activities	10	0
	B	Marking & Signboards regarding the approaching construction zone	Provided well in advance	10	0
	C	Marking and signboards of the construction activities (work under progress, Men at work)	Placed well in advance for public information	10	0
	D	Satisfactory lane width provided	For traffic passing through the work zone	10	0
	E	Precautions such as safety net, soft cushioning at corners etc.	For safety of construction workers, passerby, motorist & pedestrian	10	0
	F	Lighting (night)	For clear visibility for construction workers, motorist & pedestrians	10	0
	G	Availability of flagmen at appropriate locations	For necessary attention to road side safety	10	0
	H	Traffic Management Plan- temporary diversion for the construction site	From Engineer & concerned department for smooth traffic movement	10	0
	I	Traffic Calming (speed reducing) measures	Provided for safety of the motorist & pedestrian, etc.	10	0
	J	Proper & safe dumping of construction debris	Taken care of	10	0
	K	Construction materials	Not spilling over the road	10	0
	L	Emergency vehicles at the site	Provided in case of any accident(s)	10	0
	M	Proper safety gear & protective clothing (hard hat, reflecting jackets, gloves etc.)	Supplied to all construction workers	10	0
	N	Easily accessible first aid box	Provided at most accessible location and at safe distance	10	0
	O	Easily accessible fire extinguisher at the site	Provided at most accessible location and at safe distance	10	0
	P	Noise reduction measures	Implemented where necessary	10	0
			Total	**160**	

Remarks/ Comments

Date: DD/ MM/ YYYY

Road Name:
Name of the Auditor:
Designation:

Land marks/ Section ID
From:
To:

Sec IV	S/N	Component	Total Marks (a)	Marks Obtained (b)	% Achieved ©= (a/bx100)	Level of Service (d)
	1	Work Zone	**160**			
		Total	**160**			

Level of Service	Range
LOS A	More than 80%
LOS B	Between 80% - 70%
LOS C	Between 70% - 60%
LOS D	Between 60% - 50%
LOS E	Between 50% - 40%
LOS F	Less than 40%

Traffic Signs

Mandatory Signs

Cautionary Signs

CAUTIONARY SIGNS - Signs in the Triangle is for cautions.

Barrier ahead | 200 meters | 50-100 meters | 200 meters | 50-100 meters

Information Signs

INFORMATION SIGNS – Signs in the Blue rectangle informs.

First aid post

Public telephone

Petrol pump

Hospital

Resting place

Eating place

Refreshment place

No through road

No through side road

No through road

No through side road

INFORMATION SIGNS - Signs in the Blue rectangle informs.

Park this Side

Parking both sides

Parking lot Scooters and motorcycle

Parking lot Cycles

Parking lot Taxis

Parking lot Auto rickshaws

DIRECTORATE OF URBAN LAND TRANSPORT

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