Research on Effect of Outdoor Advertising on Road Safety and Safety Engineering Manual for Outdoor Advertising

Outdoor Advertising Report with Draft Engineering Manual

Road Traffic Management Corporation

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2020-02-27

Road Traffic Management Corporation

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Bringing ideas to life

Document control record

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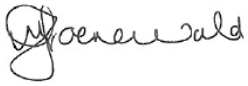
Author signature		Approver signature	
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Glossary of Terms

DoT	Department of Transport
NRTETC	National Road Traffic Engineering Committee
RTMC	Road Traffic Management Corporation
SAMOAC	South African Manual for Outdoor Advertising Control
SANRAL	South African Roads Agency Limited
SARTSM	South African Road Traffic Signs Manual

1 Introduction

1.1 Project background

Currently the South African Manual for Outdoor Advertising Control (SAMOAC) 2010 forms the backbone of outdoor advertising control in South Africa. It serves as a national guideline document to controlling authorities on national, provincial and local level and guides the outdoor advertising industry. However, the document does not adequately deal with road safety issues.

The Road Traffic Management Corporation (RTMC) through the National Road Traffic Engineering Committee (NRTETC) and its subcommittees and working groups identified the need for research on the effect of outdoor advertising on road safety. In addition, it was proposed that the SAMOAC or other needs to be amended to refer to a national document dealing with road safety matters as far as outdoor advertising is concerned.

Even though outdoor advertising in South Africa is guided by the SAMOAC 2010 as well as by SANRAL policy and municipal by-laws, income generation offerings from outdoor advertising have contributed to the guidelines and policies being ignored by many road authorities, with outdoor advertising now posing a severe safety risk in various areas.

The RTMC aims to, informed by a newly compiled road safety engineering manual on outdoor advertising, provide for well-regulated outdoor advertising according to prescribed minimum standards.

1.2 Project objectives and scope

The purpose of this project is to undertake a review of available local and international literature to facilitate a wider understanding of outdoor advertising and the impact outdoor advertising content and formats have on the environment adjacent to the road network and subsequently on road traffic operations and safety. This review and the subsequent recommendations will form the basis for the development of an engineering manual that will assist road authorities to make informed decisions regarding the management, application, and implementation of outdoor advertising practices on the South African road network.

The terms of reference for this assignment (attached in Annexure A) requested the following deliverables in the execution of the project, based on sound traffic engineering and road safety principles:

1. The successful Bidder must attend to the following deliverables in the execution of the project, based on sound traffic engineering and road safety principles:
    a. A literature review of local and international research regarding the impact of outdoor advertising on road safety.
    b. The formulation of recommendations for further research if available research results are inconclusive or inadequate.
    c. A literature review of local and international research regarding the implications of inattentive / distracted driving.
    d. A literature review of existing legislation governing outdoor advertising control for all (including Metro's) road authorities, including references and control mechanisms in the South African Road Traffic Signs Manual (Volumes 2 and 3) and the Southern African Development Community Road Traffic Signs Manual (Volume 1 and 4).
    e. Identifying what aspects of outdoor advertising has the potential to impact on road safety.
    f. Distinguishing between the implications of advertising along private roads vs advertising along public roads.
    g. Considering the necessity of outdoor advertising within public road reserves.
    h. Quantifying the (negative) implications of outdoor advertising structures on subterranean engineering services, electrical services and communication services within road reserves.

i. Quantifying the impact of outdoor advertising on the conspicuousness of formal road traffic signs.

j. Identifying liability issues related to risks linked to non-essential structures within road reserves.

k. Determining whether income generation should be a consideration when considering outdoor advertising applications (Considering potential income generation vs potential crash costs, based on industry records and available crash information.)

l. Review and formulation of recommendations regarding outdoor advertising classes that can be considered within public road reserves.

m. Review and formulation of recommendations regarding outdoor advertising classes that can be considered on road reserve boundaries.

n. Review and formulation of recommendations regarding outdoor advertising classes that can be allowed outside public road reserves, but still aimed at and visible to passing motorists.

o. Formulation of recommendations regarding mobile advertisements within public road reserves.

p. Formulation of recommendations regarding electronic billboards and other new advertising media aimed at the travelling public.

q. Formulation of recommendations regarding required changes to the SAMOAC in order to account for road safety considerations, as well as references to the new road safety manual on outdoor advertising.

2. The appointed Bidder, in collaboration with an adequately qualified and experienced legal practitioner/team must attend to the following tasks:

    a. Clarification of the legal framework governing outdoor advertising.

    b. Formulation of recommendations regarding the best way to ensure that compliance with certain outdoor advertising principles/requirements is a legal requirement.

    c. Formulation of recommendations regarding the best options to amend existing guidelines/standards/legislation to ensure:

        i. A uniform approach among road authorities in dealing with outdoor advertising

        ii. A reduction in the road safety risks associated with outdoor advertising.

        iii. That road authorities are capacitated to effectively manage outdoor advertising within road reserves.

        iv. That road authorities are capacitated to effectively manage outdoor advertising located outside road reserves, but still aimed at passing traffic.

        v. That road authorities are capacitated to effectively deal with the erection and display of illegal advertisements and advertising structures.

    d. The formulation of recommendations regarding avenues to use to minimise or eliminate the negative impact of historic legal precedents that limits the ability of road authorities to deal effectively with illegal and unsafe advertisements.

3. In addition, given the recommendations formulated by the person/team above and the requirements included in the new road safety manual on outdoor advertising, procedures be proposed to deal with:

    a. The updating of road authority by-laws in order to account for changes in SAMOAC and legislation and to be in line with national standards prescribed in the new road safety manual on outdoor advertising.

    b. Applications involving more than one road authority, in so far as jurisdiction and responsible road authority is concerned

    c. The determination of the desirability of, and road safety implications of proposed advertisements (compilation of a Traffic Safety Assessment Manual), possibly considering procedures already used by some South African road authorities.

    d. Legally sound procedure for the removal of illegal and/or unsafe advertisements.

4. Recommendations regarding desired staffing requirements at road authorities should be formulated to ensure that outdoor advertising applications are dealt with effectively and professionally. (Also, the correct placement of an outdoor advertising section within the structure of a planning/road authority.)

1.3 Purpose of the report

This document presents the Outdoor Advertising Report with Draft Engineering Manual, which includes the following two key deliverables:

- Literature Review Report;
- Draft Engineering Manual.

The main report provides a brief background on the study, the methodology that was followed, and recommendations on the way forward.

The Literature Review Report provides a summary of findings from the literature review and incorporates views from a road and traffic management perspective and provides an overview of road and traffic engineering principles that are accepted as best practice to manage the road and traffic environment, globally. This report provides an overview of the outdoor or more specifically, out-of-home advertising industry, recognising the industry contribution to the economy but taking cognisance of the fact that the industry is inherently designed to disrupt traffic and road operations through attracting road users (drivers and non-motorised transport users) attention.

The Draft (Road Safety and Safety) Engineering Manual (inclusive of traffic safety assessment procedures) was developed in the style of the South African Road Traffic Signs Manual (SARTSM), as Chapter 22, and deemed as a best practise guide for traffic and road safety engineers. The Engineering Manual is relevant to outdoor advertising control and makes various recommendations and proposals including overall discussion on traffic engineering and road safety principles underlying how outdoor advertising affect the safety of the road transport system. This is followed by a traffic safety assessment procedure and best practise for positioning and spacing of outdoor advertising and lastly outdoor advertising classes and categorisation.

1.4 Structure of this report

This report presents the **Outdoor Advertising Report with Draft Engineering Manual**.

The report is structured as follows:

- Chapter 1 (this chapter) presents an introduction to the study, including the purpose of the project;
- Chapter 2 discusses the project approach and project management;
- Chapter 3 gives an overview of the findings of the Literature review, Draft Engineering Manual and way forward and future research suggestions;
- Chapter 4 contains the conclusions;
- Annexure A: Terms of Reference for this study;
- Annexure B: Outdoor Advertising Literature review;
- Annexure C: Draft Road Safety and Safety Engineering Manual for Outdoor Advertising.
- Annexure D: Removal of Illegally Erected Advertisements Visible from a Road.

2 Project approach and management

2.1 Project methodology

The project consisted of four phases namely:

- **Phase 1: Inception**. This entailed mobilisation of the project team and an Inception Meeting with the Project Management Committee consisting of the RTMC and representatives from national, provincial and local government.
- **Phase 2: Literature Review and Research on Outdoor Advertising**. The literature review focused on local and international research regarding the impact of outdoor advertising on road safety, as well as existing legislation and regulations governing outdoor advertising. Research covered a variety of aspects such as the transport and road management environment (for considerations of the appropriate placement of an outdoor advertising section within the structure of a planning/road authority), the current management of outdoor advertising, the impact of outdoor advertising on driver performance, the impact on the visibility of road traffic signs, considerations about outdoor advertising within public road reserves, the legislative framework and considerations to ensure compliance with regulations and standards.
- **Phase 3: Development of Outdoor Advertising Report with Draft Manual**. The report and draft road safety engineering manual (inclusive of traffic safety assessment procedures) relevant to outdoor advertising aimed at giving context on relevant traffic engineering and road safety principles underlying how outdoor advertising affect the safety of the road transport system, and drawing up traffic safety assessment procedures and identifying best practises for positioning and spacing of outdoor advertising and lastly outdoor advertising classes and categorisation.
- **Phase 4: Review and feedback**. The study team presented the findings of the literature review, and the Draft Engineering Manual to the Project Management Team, who will further distribute to the National Road Traffic Engineering Committee (NRTETC) and its subcommittees.

2.2 Project deliverables

In accordance with the Scope of Works, the key deliverables of this project were:

a) Project Plan;

b) Literature Review Report;

c) Draft Road Safety Engineering Manual for Outdoor Advertising.

The deliverables and dates of submission are summarised in the table below.

Table 1: Project deliverables

Item / Deliverable	Date / Time Frame
Project inception meeting and signing of contract	17 October 2019
Project Report related to envisaged project activities and scheduling of (monthly) project meetings Submitted to RTMC	30 September 2019
Literature Review and Research on outdoor advertising - Draft Report	30 November 2019
Road Safety Engineering Manual for Outdoor Advertising - Draft Report	31 January 2020
Approved by RTMC Board and Published	31 March 2020

2.3 Project management

The project was overseen by a Project Management Team (Steering Committee) that consisted of the following:

- Project Manager: Mr D. Roux (RTMC);
- Ms L Johnson (Department of Transport);
- Ms W Snyman (Eastern Cape Department of Transport);
- Mr G Elliot (City of Cape Town);
- Mr A Rautenbach (Mangaung Metropolitan Municipality);
- Ms H Jenkins (SANRAL).

Four progress meetings were held between Aurecon and the Project Management Team, over the duration of the project, as summarised in Table 2 below.

Table 2: Project progress meetings

No	Meeting	Date
1	Inception meeting	18 October 2019
2	Progress meeting 1	18 November 2019
3	Progress meeting 2	10 December 2019
4	Progress meeting 3	13 January 2020

3 Findings

3.1 Literature Review

The literature review is attached in Annexure B of this report.

3.2 Draft Road Safety and Safety Engineering Manual for Outdoor Advertising

The Draft Road Safety and Safety Engineering Manual for Outdoor Advertising is attached as Annexure C of this report.

The Manual is recommended to form part of SARTSM and to become Chapter 22: Outdoor Advertising of this document.

3.3 Recommendations on the removal of illegally erected advertisements visible from a road

The recommendations on the removal of illegally erected advertisements visible from a road is attached as Annexure D of this report.

3.4 Recommendations on further research requirements

Following the literature review and the drafting of an Engineering Manual, the following aspects are highlighted as areas where additional research can be done to further refine the outputs of this study.

- There is a need for local South African research into the effect that outdoor advertising displays have on local driver behaviour in local conditions (the high-risk areas; in between hawkers on the road etc.);
- There is a need to understand and engage the local outdoor advertising industry, especially if they have to adopt and conform their practices to the Engineering Manual. A better understanding of the industry will assist authorities/government to better plan for future constructive engagements;
- Quantification of the problem, i.e. how big is the problem and where are these problems located?
- Refining advertising display restriction areas for the South African context;
- Conducting research on the application of the manual, with a before and after study. Before would be the status quo of a route or corridor. After would constitute the conditions after application of the assessment method in the Engineering Manual.

3.5 Way forward

The Draft Road Safety and Safety Engineering Manual needs to be submitted to a process of stakeholder consultation, and refinement.

The RTMC will, as a next phase, distribute the Literature Review and the Draft Engineering Manual for comment to a wider group of stakeholders outside of the Project Management Committee.

Finally, the documents will be presented to the RTMC board.

4 Conclusion

Aurecon South Africa Ltd has been appointed by the Road Traffic Management Corporation (RTMC) in providing Research on the Effect of Outdoor Advertising on Road Safety and the Drafting of a Safety Engineering Manual for Outdoor Advertising.

During this assignment local and international research and Outdoor Advertising industry and best practices were studied. The Project Management Committee provided valuable input and guidance during the course of the study. A Literature Review Report was compiled documenting the findings of the desktop review. A Road Safety and Safety Engineering Manual for Outdoor Advertising were developed from the principles contained in the literature review. It was recommended to make the Engineering Manual implementable in the industry through adding it to the SARTSM as Chapter 22, thus becoming the best practise for the engineering industry.

Being the first document of this nature, some areas for future research have been proposed.

Legislation development, particularly municipal by-laws, is another step for the industry to take, adhering to the principles discussed in the Literature review and the Engineering Manual.

Annexure A

TERMS OF REFERENCE - EFFECT OF OUTDOOR ADVERTISING ON ROAD SAFETY AND SAFETY ENGINEERING MANUAL FOR OUTDOOR ADVERTISING

A. PURPOSE

The Road Traffic Management Corporation (RTMC) herewith provides for, through this Terms of Reference, the invitation from competent service providers to assist the RTMC in undertaking of Research on the Effect of Outdoor Advertising on Road Safety and Safety Engineering Manual for Outdoor Advertising.

The appointment for this project will be until project completion end March 2020.

B. OBJECTIVE

The National Road Safety Strategy 2016-2030 set specific interventions to be concluded towards reducing road related fatalities with 50% by 2030, underpinned by the United Nations Decade of Action (UNDA) to which South Africa is a signatory.

These interventions include various road safety related research and inter alia the Effect of Outdoor Advertising on Road Safety and Safety Engineering Manual for Outdoor Advertising to guide road safety practitioners towards safer roads in South Africa.

C. INTRODUCTION

Currently the South African Manual for Outdoor Advertising Control (SAMOAC) 2010 forms the backbone of outdoor advertising control in South Africa. It serves as a national guideline document to controlling authorities on national, provincial and local level and guides the outdoor advertising industry. However, the document does not adequately deal with road safety issues.

The RTMC through the National Road Traffic Engineering Committee (NRTETC) and its subcommittees and working groups identified the need for research on the effect of Outdoor Advertising on road safety. In addition, it was resolved that The SAMOAC needs to be amended to refer to a national document dealing with road safety matters as far as outdoor advertising is concerned.

Even though outdoor advertising in South Africa is guided by the SAMOAC 2010 as well as by SANRAL policy and municipal by-laws, income generation from outdoor advertising have contributed to the guidelines and policies being ignored by many road authorities, with outdoor advertising now posing a severe safety risk in various areas.

Outdoor advertising is aimed at distraction by design, which contribution to crashes and injuries and it is difficult to impossible to measure the impact due to the fact that drivers of a vehicles that were distracted by such advertising and involved in crashes, would hesitate to indicate as such, as it could have negative effects on insurance claims.

The RTMC aims to, informed by the outcome of the research and an updated SAMOAC document, with a newly compiled road safety manual on outdoor advertising, provide for well-regulated outdoor advertising according to prescribed minimum standards, minimising risk for road trauma on South African Roads.

The Project will be managed for the RTMC by a project management team consisting of:

- Project Manager: Mr D. Roux (RTMC)
- Mr A Rautenbach (Mangaung Metro)
- Ms H Jenkins (SANRAL)
- Mr G Elliot (City of Cape Town)
- Ms L Maakal (WC Province)

D. SCOPE OF WORK

1. The successful Bidder must attend to the following deliverables in the execution of the project, based on sound traffic engineering and road safety principles:

a) A literature review of local and international research regarding the impact of outdoor advertising on road safety.

b) The formulation of recommendations for further research if available research results are inconclusive or inadequate.

c) A literature review of local and international research regarding the implications of inattentive / distracted driving.

d) A literature review of existing legislation governing outdoor advertising control for all (including Metro's) road authorities, including references and control mechanisms in the South African Road Traffic Signs Manual (Volumes 2 and 3) and the Southern African Development Community Road Traffic Signs Manual (Volume 1 and 4).

e) Identifying what aspects of outdoor advertising has the potential to impact on road safety.

f) Distinguishing between the implications of advertising along private roads vs advertising along public roads.

g) Considering the necessity of outdoor advertising within public road reserves.

h) Quantifying the (negative) implications of outdoor advertising structures on subterranean engineering services, electrical services and communication services within road reserves.

i) Quantifying the impact of outdoor advertising on the conspicuousness of formal road traffic signs.

j) Identifying liability issues related to risks linked to non-essential structures within road reserves.

k) Determining whether income generation should be a consideration when considering outdoor advertising applications (Considering potential income generation vs potential crash costs, based on industry records and available crash information.)

l) Review and formulation of recommendations regarding outdoor advertising classes that can be considered within public road reserves.

m) Review and formulation of recommendations regarding outdoor advertising classes that can be considered on road reserve boundaries.

n) Review and formulation of recommendations regarding outdoor advertising classes that can be allowed outside public road reserves, but still aimed at and visible to passing motorists.

o) Formulation of recommendations regarding mobile advertisements within public road reserves.

p) Formulation of recommendations regarding electronic billboards and other new advertising media aimed at the travelling public.

q) Formulation of recommendations regarding required changes to the SAMOAC in order to account for road safety considerations, as well as references to the new road safety manual on outdoor advertising.

2. The appointed Bidder, in collaboration with an adequately qualified and experienced legal practitioner/team must attend to the following tasks:

a) Clarification of the legal framework governing outdoor advertising.

b) Formulation of recommendations regarding the best way to ensure that compliance with certain outdoor advertising principles/requirements is a legal requirement.

c) Formulation of recommendations regarding the best options to amend existing guidelines/standards/legislation to ensure:

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   iii) That road authorities are capacitated to effectively manage outdoor advertising within road reserves.

iv) That road authorities are capacitated to effectively manage outdoor advertising located outside road reserves, but still aimed at passing traffic.

v) That road authorities are capacitated to effectively deal with the erection and display of illegal advertisements and advertising structures.

d) The formulation of recommendations regarding avenues to use to minimise or eliminate the negative impact of historic legal precedents that limits the ability of road authorities to deal effectively with illegal and unsafe advertisements.

3. In addition, given the recommendations formulated by the person/team above and the requirements included in the new road safety manual on outdoor advertising, procedures be proposed to deal with:

a) The updating of road authority by-laws in order to account for changes in SAMOAC and legislation and to be in line with national standards prescribed in the new road safety manual on outdoor advertising.

b) Applications involving more than one road authority, in so far as jurisdiction and responsible road authority is concerned

c) The determination of the desirability of, and road safety implications of proposed advertisements (compilation of a Traffic Safety Assessment Manual), possibly considering procedures already used by some South African road authorities.

d) Legally sound procedure for the removal of illegal and/or unsafe advertisements.

4. Recommendations regarding desired staffing requirements at road authorities should be formulated to ensure that outdoor advertising applications are dealt with effectively and professionally. (Also, the correct placement of an outdoor advertising section within the structure of a planning/road authority.)

Annexure B

LITERATURE REVIEW REPORT

Research on Effect of Outdoor Advertising on Road Safety and Safety Engineering Manual for Outdoor Advertising

Literature Review and Research on Outdoor Advertising

Road Traffic Management Corporation

Revision: 2

2020-01-31

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Bringing ideas to life

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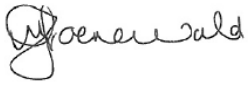
Author signature		Approver signature	
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Figures

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ACRONYMS

ACASA	Association for Communication and Advertising in South Africa
ARRDA	Advertising on Roads and Ribbon Development Act 21 of 1940
CoCT	City of Cape Town
CROW	Knowledge and information about infrastructural challenges, technology platform for transport, infrastructure and public space in the Netherlands
DPADs	Digital and Projected Advertising Displays
EA	Emergency Assistance
EBB	Electronic Billboards
ERSO	European Road Safety Observatory
ETSC	European Transport Safety Council
FHWA	Federal Highway Administration
HBA	Highway Beatification Act (1965 USA)
LSM	Living Standard Measure
MGD	Maximum Glance Duration
MOTSAM	Manual of Traffic Signs and Markings (New Zealand)
NCHRP	National Cooperative Highway Research Programme
NEMA	National Environmental Management Act
NH	Not hospitalised (injured but)
NLTA	National Land Transport Act
NZTA	New Zealand Transport Authority
OAB	Outdoor Advertising By-law
OAC	Outdoor Advertising Control
ODA	Outdoor Advertising
ODV	Original Digital Video
OOH	Out-of-Home
OHMSA	Out of Home Media South Africa
PIN	Performance Index (Annual Road Safety Performance Index)
RFID	Radio Frequency Identification Device (RFID)
RLA	Road Level Advertisements
RTMC	Road Traffic Management Corporation
RTSMS	Road Traffic Safety Management System
SADC-RTSM	Southern African Development Community Road Traffic Sign Manual
SAMOAC	South African Manual for Outdoor Advertising Control
SANRAL	South African Roads Agency Limited
SARTSM	South African Road Traffic Sign Manual
SCM	Swiss Cheese Model

SER	Self-Explaining Road
SLA	Street level advertisements
SEEV	Salience, Effort, Expectancy, Value Framework
SPI	Safety Performance Indicator
SPLUMA	Spatial Planning and Land Use Management Act
SWOV	Stichting for Wetenschappelijk Onderzoek Verkeersveiliheid
TAC	Transport Authority Canada
TCI	Transport Capability Inference
TCD	Traffic Control Device
TEOR	Time-Eyes-Off-Road
TRB	Transport Research Board
TSM	Transportation System Management
UNDoA	United Nations Decade of Action (for Road Safety)
USP	Unique Selling Point
UTG	Urban Transport Guideline
VMS	Variable Message Sign
ZAR	South African Rand

GLOSSARY OF TERMS

Attention	The cognitive process of selectively concentrating on one aspect of the environment such as the task of driving while ignoring other things (Engstrom, 2011) Orientation to sensory events; detection of objects or event for cognitive processing, and the maintenance of a vigilant state (Adverts, 2018)
Attentiveness	The trait of being observant and paying attention to a certain task, e.g. the task of driving (Gozar et al., 2008)
Advertisement	Means any representation by a word, or abbreviation thereof, letter, logo, symbol, sign, figure, painting, and drawing or other pictorial representation, or light, displayed in or in view of any public place, provincial or national road within the jurisdiction of a city for the purpose of drawing the attention of the public to or promoting any product, service, business or commercial enterprise, trade, person, election or candidature in an election, voter registration, entertainment, function, meeting or other event, aspects relating to security and news headlines (City of Johannesburg, 2009)
Advertising sign	Object that is freestanding or attached to any wall or structure, in a fixed position intended to be used or used for the purpose of displaying any advertisement and any object, structure or device which is in itself an advertisement, in or in view of a public place, provincial or national road and includes an advertising hoarding and billboard and in so far as any provision of these by-laws relating to an advertising sign is practically capable of being applied to an advertisement. This includes an advertisement other than an advertisement displayed on an advertising sign and a poster (Local Government Municipal Act, 32 of 2000)
Advertising	Means the act or process of displaying an advertisement and 'advertise' has a corresponding meaning (City of Johannesburg, 2009)
Billboard	A large outdoor advertising structure, typically found in high traffic areas such as alongside busy roads; presents large advertisements to passing pedestrians and drivers (City of Johannesburg, 2009)
Delta V	Delta V is a function of travelling speed and mass of vehicle. The orientation of the colliding vehicles is also an important determinant of injury (Shelby, 2011)
Digital billboard	Billboards that uses LED and similar techniques allowing static advertisements to rotate in succession (Gozar et al., 2008)
Digital and Projected Advertising Displays	Any type of stationary advertising display that is located outside of a building, visible from the road, and capable of displaying dynamic content or automatically changing content (Rempel et al., 2013).
Distraction	A diversion of attention away from activities critical for safe driving toward a competing activity (Lee et al., 2013)
Driver behaviour	The way a driver behaves while driving
Dwell time (Dwindling time)	Total amount of time the driver fixates at an object (e.g. a billboard) when the driver passes this object (Rempel., 2013)
Fixation	Period the visual gaze is on a single location
LED-screen	Surface composed out of Light Emitting Diodes (LED)

	These screens emit light and, on these screens, advertisements can be displayed (Adverts, 2018)
Luminance	Intensity of a surface in a given direction per unit of projected area
Processing	The change of information in any manner detectable by the driver (Alexander, 1986)
Roadside advertising	All kinds of visible expressions road users can see that promote a product, event or activity (Adverts, 2018).
Static digital billboard	Light emitting screen or a light emitting screen composed of various screens that displays a static image This static advertisement is digitally replaced by another static advertisement after it has been displayed for a given time (Adverts, 2018)
SPI	Safety Performance Indicator Data-based parameter used for monitoring and assessing safety performance (Adverts, 2018)
Traditional static billboard	Billboard that displays one advertisement continuously. An old advertisement must be removed, and new advertisement put up manually. Traditional static billboards can be illuminated (Adverts, 2018)
Video billboard	A light emitting screen or a light emitting screen composed out of various screens that displays videos or moving animations (Adverts, 2018)
Visual capability	The acuteness or clearness of vision, especially from vision, which is dependent on the sharpness of the retinal focus within the eye and the sensitivity of the interpretative faculty of the brain (Science Daily, 2020)
Visual clutter	Disturbance of visual attention that is required for the driving task (e.g. looking at road signs) due the visual attraction of billboards (Adverts, 2018)
Visual demand	Measured using vision occlusion to quantify driver workload (Van Der Horst, 2004)
Visual task	An assigned piece of work using the sense of sight often to be finished within a certain time (Van Der Horst, 2004)
Ziegarnik Effect	Refers to the psychological difficulty of abandoning a task which has not been completed (Rempel et al., 2013)

1 Introduction

1.1 Background

Outdoor advertising in South Africa is guided by the South African Manual for Outdoor Advertising Control (SAMOAC) 2010, the South African National Roads Agency (SOC) Limited (SANRAL) policy, as well as municipal policies and by-laws. However, the income generation offerings from outdoor advertising have contributed to the guidelines and policies being ignored by many road authorities, with outdoor advertising now posing a severe road safety risk in various respects.

Over many decades', road and environmental authorities have struggled with the issue of outdoor advertising targeted at road traffic. Since the early days of the Advertising on Roads and Ribbon Development Act, Act No. 21 of 1940 (hailed as one of the most far-sighted proclamations at the time), there have been various efforts to institute or improve control over advertising displays along roads. Much effort has gone into the development of legislation and guidelines as to what would be acceptable advertising on roads and in human settlements.

The SAMOAC 2010 forms the backbone of outdoor advertising control in South Africa. It serves as a national guideline document to the road authorities on national, provincial, and local level responsible for managing and controlling outdoor advertising practices, as well as a guide for the outdoor advertising industry. SAMOAC, however, addresses neither road safety nor the complications that result from outdoor advertising in road reserves.

1.2 Motivation for the project

The Road Traffic Management Corporation (RTMC), through the National Road Traffic Engineering Committee (NRTETC) and its subcommittees and working groups, identified the need for research on the effect of outdoor advertising on road safety. In addition, it was resolved that the SAMOAC 2010 needs to be amended to refer to a national technical document that directs road safety matters as far as outdoor advertising is concerned.

This RTMC project thus aims to address the shortcomings with respect to road safety engineering and management, in addition to considering amendments to address some of the most cumbersome inconsistencies in the SAMOAC. Informed by the outcome of the research, the RTMC aims to prepare a road safety engineering manual with respect to outdoor advertising, which provides for appropriately regulated outdoor advertising according to prescribed minimum standards.

1.3 Overview of the literature review (this report)

1.3.1 Purpose of the literature review

This report provides an overview of the outdoor advertising industry and of South African practices and guidelines for managing outdoor advertising in South African road reserves, stakeholders in the outdoor advertising process; it incorporates views from road, traffic and environmental management perspectives. It also offers an overview of road and traffic engineering principles that are accepted as global best practice to manage the road and traffic environment. In addition, the review gives an overview of local and international legal considerations and regulatory frameworks, and a review of the impact outdoor advertising has on road safety, as well as a review of existing technical guidelines, strategies and policies applicable to managing outdoor advertising in the context of the road and traffic environment.

1.3.2 Methodology for conducting the literature review

Outdoor advertising consists of a range of media and mechanisms that have static as well as moving components. Not all outdoor advertising media is aimed at road users. This review only considers outdoor advertising media that is found on the road, in the road reserve, or adjacent to the road (e.g. building wraps or billboards in private property).

The literature review considers scientific evidence, published in accredited and peer reviewed local and international conferences and journals, as well as grey literature. The industry review included a review of popular media, and use was made of interview data from South African national and local road authorities to understand the outdoor advertising problem within the local context.

The first draft of the literature review was distributed to the project management steering committee in November 2019 and presented to the project steering committee on the 10 December 2010.

The project steering committee provided inputs and comments which were incorporated into the second draft of the literature review. This second draft of the literature review consolidates the inputs and aims to provide an objective, comprehensive and integrated review of the topics, themes and inputs received.

1.3.3 Structure of this report

The literature review consists of four sections. Each section deals with a specific theme, and each theme provides a review of available local and international literature applicable to transport management, road safety, outdoor advertisement practices and context within the South African milieu.

Part one of the literature review provides an overview of principles, guidelines, strategies and practices used globally for the management of the transport system and subsequently road safety as a key transport system performance indicator. This part of the literature review provides the road safety context against which the impact of outdoor advertising practices in road reserves can be measured.

- Chapter 2: Transport system management and road safety management principles

Part two of the literature review provides a general overview of global and local literature:

- Chapter 3: The outdoor advertising industry and advertising practices
- Chapter 4: The impact of outdoor advertising practices on road safety
- Chapter 5: International policies and best practices about outdoor advertising management
- These chapters provide a review of available literature (scientific as well as grey) that relates to the outdoor advertising industry in general, including the contribution to economies, creation of employment and so forth. Part two also highlights the fact that outdoor advertising practices exist because they have inherently been designed to be a distraction in road traffic. Distraction while driving is a significant contributor to road traffic accidents (resulting in deaths, injuries and damage) and attention globally is paid to investigating and proposing mitigating measures to prevent distracted driving.

Part three reviews South African legislation, policies and technical or strategic documents:

- Chapter 6: Outdoor advertising in the South African road and traffic environment
- Chapter 7: Legal and regulatory frameworks applicable to outdoor advertising
- Chapter 8: Existing strategies and technical specifications applicable to management outdoor advertising in South Africa.

Part four considers the findings from the literature review and make preliminary recommendations for the development of an engineering manual for outdoor advertisement control in South Africa.

[bullet point] Chapter 9: Summary of findings and way forward.

2 Transportation system management

2.1 Introduction

Transport system management is an overarching management regime that focuses on transportation as a service, within a socio-political context. Transport system management recognises that the elements of the system (transport infrastructure; transport modes; land use; and human factors) need to be managed in a holistic manner that facilitates safe and effective transport.

Chapter 2 provides background information about transport system management and highlights best practices for managing the transport system. Chapter 2 establishes the foundation upon which outdoor advertising management practices need to be evaluated and contextualised within the road transport system. It provides a framework for managing outdoor advertising from a transport management and road safety perspective. Emphasis is placed on the impact outdoor advertising has on the planning of the road, adjacent communities and landscapes; negative environmental impacts on quality of life (visual pollution, conservation) as well as the impact that outdoor advertising, inherently designed to be a distraction, has on motorised traffic operations and road safety.

2.2 Context of the transport management system

Outdoor advertising practices form part of the road and have an impact on the road environment. It is therefore important that outdoor advertising practices are considered from the perspective of the broader transport, road and road environment management regime and especially from the viewpoint of 'transportation system management' as postulated in the 'Guidelines for the Transportation System Management Process (Committee of Urban Transport Authorities or UTG 9 1991). It defines Transportation System Management (TSM) as follows:

"'Transportation System Management is the process of co-ordinating the individual elements of the system through investment, regulatory, monitoring, pricing, operating, and servicing policies to achieve maximum efficiency and productivity for the system. Monitoring is an essential part of the process (UTG 9, 1991, pp.5)"

The UTG 9 (1991) characterises the transportation system into four main elements: transportation infrastructure; transportation modes; land use; and human factors. As TSM suggests, it is a management process with the typical management functions of, planning, organising, directing or leading, co-ordinating and controlling or monitoring (as may well be relatable to the institutional management functions defined in the Road Traffic Safety Management System (RTSMS) as per ISO 39001 and the Safe System approach (referred to later in this report). TSM recognises transportation in an area as a unitary system where the four elements function interactively, needing to be organised and managed in an integrated manner (UTG 9, 1991).

The primary objective with a process like TSM is to achieve optimal use of existing transportation facilities. It includes organising the various modes (non-motorised transport, bus, taxi, car, and rail) through the careful evaluation and selection of the most efficient, investment, regulatory, monitoring, pricing, operating, and servicing policies (UTG 9, 1991). The National Land Transport Act (No. 5 of 2009) (NLTA) empowers the Minister of Transport to assign functions to the most appropriate sphere of government, subject to Sections 99 and 156(4) of the Constitution, and Sections 9 and 10 of the Municipal Systems Act (No. 32 of 2000) (MSA). As such road authorities at all spheres of government, as mandated by the Constitution have the sole responsibility for the management of the road transport system to deliver the mandated services at agreed service levels by applying appropriate systematic procedures that will ensure coordination of all respective activities, projects and programmes to achieve performance targets (Dawood and Mokonyama, 2014). As with all management processes, measurement of the critical system indicators before, during and after implementation is crucial for achieving desired transport and traffic operation results. Importantly, TSM also consider political agendas and work with investment preferences as well as pricing for transport and traffic services.

Whilst the TSM process of UTG 9 is aimed at achieving transport development outcomes over the short term, it is implemented and integrated with long range land and road network development planning. Key to this is the management and control of the immediate and long-term impacts on the environment. Similarly, road safety is a primary performance indicator of the effectiveness of land and road network development planning concomitant with the achievement of operational efficiency (UTG, 1991).

Poor regulatory measures or poorly implemented regulatory, monitoring, operating, and servicing policies, will have devastating impacts on the environment and road safety (Organisation for Economic Co-operation and Development, 2010). With examples of systems that fail (such as South Africa's road fatality rate of 14 000 fatalities per year), it is important to consider that any effective remedial measures implemented now, will only realise results much later. In road safety management, strategies and associated action plans are typically developed for periods of 10 years or longer. Thus, poor execution of functions and implementation of actions in present time will make it exponentially more difficult to devise and implement turn-around strategies further in the future (Bills and Breen, 2010).

Roads can have a negative effect on the environment (Tsunokawa Hoban, 1997). Therefore, road engineers pay particular attention to the road environment with the objective to not only minimising the negative impacts, but also to enhance the human habitat and the natural environment as far as possible – this approach is reinforced by the environmental assessment processes. Road engineers are also aware of the role the road environment plays in the behaviour of road users. Road design is guided by the fundamentals of road user performance, specifically driver performance and is aimed at continuously improving design for road safety, road safety engineering and management practices (Eluru et al., 2018; Oviedo-Trespalacios et al., 2019).

Road environment management deals with the interface of road traffic and the environment which refers to the road reserve and what is visible from the roadway (Tsunokawa and Hoban, 1997). Traffic management is about the discipline of traffic engineering that is also the main functionary in the road safety management efforts (Underwood, 1990).

The subsections below provide some perspective on where and/or how the control of the environment of road reserves and of the environment adjacent to it, and the mandates for TSM, road environment management, traffic management and road safety management manifests or can manifest within the existing legislative, policy, planning and operations frameworks.

2.2.1 Road environment management

The management of outdoor advertising displays that targets road traffic is resorts under three areas where control should be or is being exercised (SAMOAC Chapter 6, 2011):

- From the land development perspective where land is built up in accordance with land use plans. Established structures or buildings on land also become the carrier of advertising displays visible by traffic on adjacent roads. Structures with the sole purpose of displaying advertisements and specifically targeting road traffic have become part of the landscape.
- Protecting the environment is another perspective for controlling outdoor advertising display and one of the compelling reasons for exercising such control.
- Road network development is a third perspective for controlling how it impacts the environment with the added dimension of limiting the exposure of the travelling public to danger and harm.

A. Land development

Section 156(1)(a) and (b) of the Constitution, 1996 (Act 108 of 1996) confers on municipalities the executive authority and the right to administer the local government matters listed in Part B of Schedule 4 and Part B of Schedule 5 to the Constitution and any other matter assigned to municipalities by National or Provincial legislation. Part B of Schedule 4 to the Constitution lists 'municipal planning' as a local government matter and Section 156(2) of the Constitution empowers municipalities to make and administer by-laws for the effective administration of the matters which it has the right to administer. Furthermore, Parliament has enacted the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) (SPLUMA), which amongst others, sets out development principles which apply to all organs of state responsible for the implementation of legislation regulating the use and development of land. With these as the legislative framework, municipalities have the responsibility to manage land development and to conduct proper planning. Municipalities may execute their functions in compliance with legislation through a municipal by-law that would typically contain provisions and principles to guide and inform all land development applications such as that the authorisation for an application must:

- Give effect to the development principles as set out in the SPLUMA.
- Be guided and informed by the integrated development plan and municipal spatial development framework as adopted and approved in terms of the SPLUMA and the municipal spatial development framework.

- Address need, reasonableness, desirability, and public interest.
- Have as its main purpose the coordinated and harmonious development of the area to which the application relates in such a way as will most effectively tend to promote the health, safety, good order, amenity, convenience and general welfare of such specific area as well as efficiency and economy in the process of such development.

B. Protection of the environment

The environment is a functional area of concurrent national and provincial legislative and executive competence, and all spheres of government and all organs of state must cooperate with, consult, and support one another (National Environmental Management Bill, 1998). Protecting the environment is founded on the Constitutional principle that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and measures such as the:

- Prevention of pollution and ecological degradation;
- Promotion of conservation; and
- Securing of ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The National Environmental Management Act No. 107 of 1998 (NEMA) essentially provides for co-operative environmental governance under established principles for decision-making on matters affecting the environment, institutions that promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state, and for certain aspects of the administration and enforcement of other environmental management laws, etc.

C. Road network planning design and operation

Route determination

Route determination is the planning process to determine the route of a future road or railway line or amend an already planned or existing route (Tsolakis et al., 2009).Before determining or amending a route, an environmental assessment and report in respect thereof must be done if required by the National Environmental Management Act No. 107 of 1998 (NEMA) or, if NEMA does not require such an assessment, an environmental assessment and report to the level required by the respective executive authority (e.g. the provincial MEC). Municipalities in whose areas the route will be situated, must be requested to submit written comments on the preliminary route report and environmental report with specific reference to the effect which the proposed route may have on any spatial framework or other strategic municipal development planning of the municipality concerned or the municipality's integrated transport plan contemplated in section 36 of the National Land Transport Act, Act 5 of 2009 (NLTA). Similarly, it must be ensured that the route determination is aligned as far as possible with any spatial framework or other strategic provincial development planning formulated in terms of development planning legislation of the Province or the Province's Provincial Land Transport Framework contemplated in section 35 of the NLTA.

Preliminary design

After publication of the route, established through route determination, the preliminary design of the future road or railway line can be initiated in the areas that are typically defined as falling within a specified distance measured from either side of the centre line of the route (e.g. 200 m or as otherwise published);

The executive powers must in the preliminary design process have due regard to the existing and future road and rail planning in the national, provincial or municipal sphere, and among others, to the interests and functions of municipalities and service providers inasmuch as these may be directly or indirectly affected by the preliminary design and the environment. Further environmental investigation and written report in respect thereof can be required in terms of NEMA or, if NEMA does not require such an investigation, an environmental investigation and report to the level required by the respective executive powers (Municipal Systems Act, 2000)

The finalisation of the preliminary design culminates into the detail design when a road project is readied for implementation (Tsolakis et al., 2009). Noticeable are the main themes to carefully consider the environment and ensure safety. The broadly defined 'road environment' becomes a very important aspect of how roads (new, upgraded

or amended) are planned, designed and operated to deliver on function with the least degrading environmental impact and optimal safety of operation on a long-term sustainable manner.

Considerations for the development of a road network

Apart from the NEMA requirements, the planning and design of a new, upgraded, realigned, or amended road, are processes with specific considerations that relate to wide-ranging effects beyond that of providing traffic services to users. For this the road is considered as an element of the total environment that refers to the totality of man's surroundings: social, physical, natural, and man-made (Abott et al., 1995). It includes human, plant, and animal communities and the forces that act on all three. It is the overarching philosophy of road planners and designers that a road can and should be located and designed to complement its environment and serve as a catalyst to environmental improvement (Tsolakis et al., 2009).

The area surrounding a proposed road is an interrelated system of natural, synthetic, and sociological variables. Changes in one variable within this system cannot be made without some effect on other variables. Some of these consequences may be negligible, but others may have strong and lasting impact on the environment, including the sustenance and quality of human life. Because road location and design decisions influence adjacent area developments, it is important that environmental variables be given full consideration.

2.2.2 Traffic management

Traffic management is defined as the “organisation, arrangement, guidance, and control of both stationary and moving traffic, including pedestrians, cyclists and all types of vehicles” (Austroads, 2019). In addition, Underwood (1990) add that traffic management aim to provide not only the safe, orderly and efficient movement of persons and goods, but to also, protect and where possible, enhance the quality of the local environment on and adjacent to traffic facilities (Austroads, 2019: pp. 6)

The discipline of traffic management links traffic control practices, within a defined policy framework, over a length of road or an area, to achieve specified objectives which may be set by national, provincial, or local governments in terms of sole or concurrent functions (Austroads, 2006). Traffic management, in arrangement with the relevant planning, design, construction, and operational practices, is a valuable tool with which safety in the road and road environment can be addressed (Austroads, 2009).

Traffic management is the function of the road authorities responsible for managing the orderly and efficient movement of persons and goods on roads. These practitioners have a responsibility to ensure that the road environment is designed in a consisted manner to guide road user behaviour. Use is made of guiding documents including:

- legislation standards (formal technical specifications based on agreed baseline practice);
- guidelines (technical guidance for practitioners based on consolidated experience and acknowledged best practice) as well as;

Agreed upon codes of practice, supported by manuals with policy and procedures for implementing programs in accordance with standards, guidelines, and best practice (Austroads, 2009).

A. Traffic management objectives

Traffic management aim to facilitate safe traffic operations within and adjacent to the road. Traffic management is the tool with which road authorities manage traffic operations, ensuring safety and efficiency, considering the needs of a range of road users (Austroads, 2009). The aim of traffic management is to provide the most desirable levels of safety, accessibility, service, and environmental quality in the area under study (Austroads, 2009).

Each road environment or area has its own set of issues and objectives (Austroads, 2009). These traffic management objectives include the following (Austroads, 2009):

- improving traffic flow conditions and reducing congestion, (most sought on arterial roads, where traffic flow efficiency objectives claim higher priority);
- ensure that safety of a route or area is enhanced (arising from accident analysis or from direct community concerns);
- improved safety, mobility and accessibility for vulnerable road users such as children, pedestrians, and cyclists;

- improved amenity of residential areas;
- improved access to commercial, retail, and recreational activities;
- improved road freight productivity and safety (important in the achievement of economic objectives in the overall transport task);
- improved operating conditions for road-based public transport (reflecting priority for efficient movement of people rather than on movement of vehicles *per se*);
- Improved information for road users such a real time traveller information;
- Improvement of parking problems.

Traffic management approaches take cognisance of the fact that the objectives of any traffic management scheme are mainly influenced by the traffic volume, composition, and speed of the traffic either throughout the road network or in one or more parts of the network (Austroads, 2009). In addition, road safety engineering, as an element of traffic management make use of specific principles and guidelines (geometric) to improve the safety of the road environment and reduce the total cost of road accidents to the community in a cost-effective manner (World Bank, 2019).

Within the Safe System approach (which South Africa adopted in 2011 and discussed in Section 2.3.1) engineering principles are applied to manage the severity of the traffic system outcomes, namely death, and serious injuries. This is done by proactively working towards a road environment that is consistent in terms of appearance and control features (predictable and self-explaining) and assists road users in their decision-making and behavioural responses. Self-explaining roads advocates' geometric consistency, and the principle of predictability and recognisability is important to achieve safe road user behaviour (Butler, 2014). Road designs therefore need to be in line with these expectations (Sucha, 2015).

B. Traffic management principles

C. Functional classification of the road

Technical Recommendations for Highways 26 (TRH26) guide national, provincial, and municipal spheres of government on the functional classification of roads and the methodology according to which such classification must be undertaken. It also serves as a guide on how a road must be managed to function effectively in accordance with its classification. TRH26 establishes a uniform and integrated classification system for the country, to underpin and inform the planning, development, and management of roads.

TRH26 asserts that the primary objective of a road network is to serve the need to travel for all modes of transport. From a road function viewpoint there are two essential needs which must be met:

- The traffic movement, or mobility, function – providing how people and goods can move from one place to another.
- The access function – providing access to properties and land uses adjacent to the road.

TRH 26 make provision for six classes of road in South Africa Figure 2-1 and Table 2.1).

Roads are classified (Figure 2-1) according to a hierarchy that takes into consideration different transport and other functions together with the needs of abutting land use, communities in support of effectively managing road networks (Committee of Transport Officials, 2012).

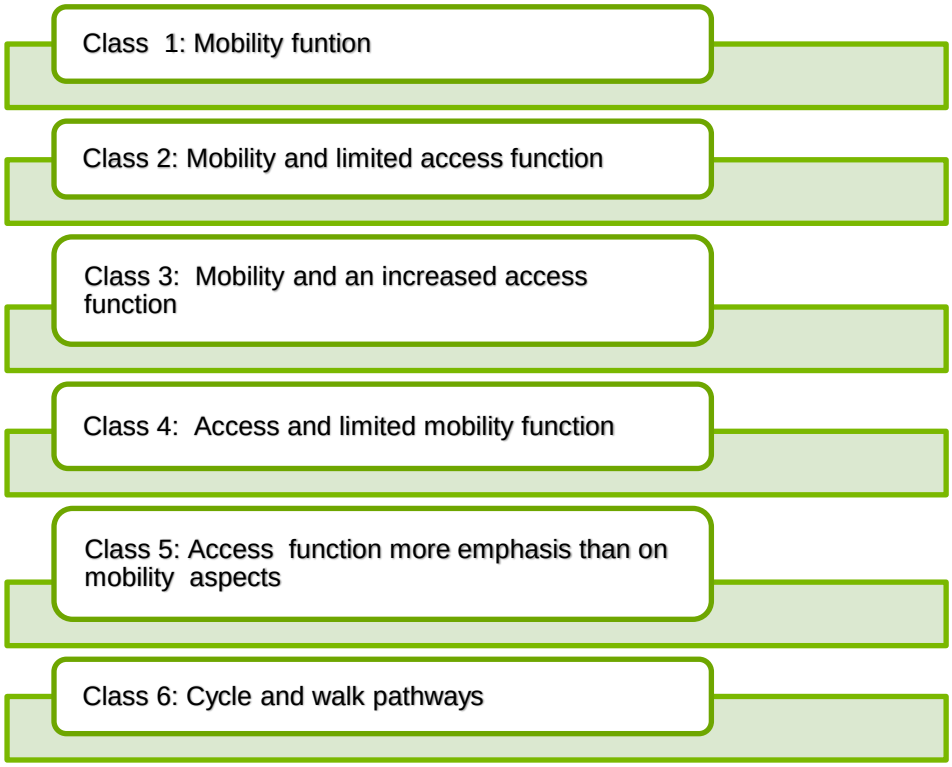


Figure 2-1: Functional classification of roads (TRH 26)

Table 2.1: Functional classification of roads (Committee of Transport Officials, 2012)

Number	Function	Description
Class 1	Mobility	Principal arterial
Class 2		Major arterial
Class 3		Minor arterial
Class 4	Access/activity	Collector street
Class 5		Local street
Class 6		Walkway/cycle ways

Road authorities need to make decisions in terms of where traffic is desired, as well as introduce measures that will facilitate the distribution and flow of traffic (TRH 26 Committee of Land Transport Officials, 2012). As such traffic volumes, adjacent land use and so forth are considered in the planning of road networks

There are three types of road networks: primary; secondary; and tertiary road network.

- **Primary road network** consists of the main arterials of the South Africa road network that interconnect cities and promote mobility rather than accessibility.
- **Secondary road networks** provide *the link between the principal avenues of communication across the country, i.e. primary roads, and the tertiary road system.* In general, these roads are classified as roads whose main function is to form an avenue of communication between important centres and key towns and the primary road system. Main avenues of communication between important centres with significant economic, social, agriculture development and agri-business, tourist, or recreational roles, for example promotion of tourism and resource development
- **The tertiary road network** resorts under the administration of the local municipality, or metropolitan level of government. Such roads vary between multi-lane freeways in densely developed urban areas to rudimentary gravel roads in sparsely populated rural municipal areas.

2.2.3 Basic elements of traffic management

Observed traffic flow arises from the characteristics of transport demand, road user behaviour, vehicle performance, and road and weather conditions (Aronsen, 2006). Traffic management requires an awareness of these basic elements, as well as an understanding of the characteristics of traffic flow, ability to measure and analyse traffic conditions. In addition, there is a need for traffic management expertise in identifying and implementing appropriate techniques to influence and control traffic flows to meet objectives (Austroads, 2019)

A. Traffic theory and analysis

A traffic stream consists of the variables; volume, speed, and density. The relationships between these variables can be described mathematically and graphically (Hall, 1992). The different combinations of the variable values give rise to different traffic conditions. An additional requirement for traffic management is the continuous monitoring and analyses of traffic conditions. Traffic conditions are constantly evaluated to assess and enhance road capacity in order to develop effective operational initiatives (Austroads 2019).

B. Traffic control devices

The movement of people and goods involve a degree of conflict between traffic management objectives (safe and efficient movement of people and goods) and traffic conditions may exceed desired characteristics of traffic operation. Were traffic conditions exceed the desired traffic operation, such situations necessitate the implementation of constraints on the movements of road users in order to achieve behaviour or operation which is in accord with a general policy or strategy on traffic management (Austroads, 2019).

C. Legislation, standards, and guidelines

Primary requirements for road user behaviour are set down in various Acts, regulations, and rules that specify mandatory requirements which are enforceable under law with detailed specifications set down in formal standards agreed by government and industry (Han and Luk, 2015). The guidance for practical implementation of facilities to support and give effect to traffic law is given in guideline documents issued by jurisdictional governments.

Ensuring consistency, in similar situations, across jurisdictions is a fundamental requirement of effective and safe traffic management is that (World Bank, 2019). Consistency adopted as a principle by the various jurisdictions, may produce supplementary guidelines and manuals to accommodate specific legislative or physical situations, followed by local government bodies (Austroads, 2019).

D. Application

The basic elements of traffic management practice (theory, data, analysis, control devices, regulations, and standards) are applicable to the wide range of circumstances encountered in practice (World Bank, 2019). The best practice principles and tools are according the Austroads (2019) designed to meet set objectives, on defined routes or in defined areas. In addition, there is a need to understand the wider road network and the elements that influence road traffic operations on the network. This includes a broader understanding of freight or public transport operations and issues, major land use developments, local residential areas to commercial and civic precincts, and major transport nodes such as ports and inter-modal transfer centres.

E. Road environment safety

Traffic management have a direct impact on the physical road environment in which road users operate and therefore directly influences road user behaviour (World Bank, 2019). The Safe System principles and approach to be discussed below provide for the strategic application of traffic management practices to achieve safer operation within the road and traffic environment (Austroads, 2019).

2.3 Road safety management

The United States of America (USA) has a clear understanding that the design and maintenance of a safe road and traffic system, is the responsibility of government and its agencies (road authorities). These institutions, mandated, through law, are responsible to ensure that the road and traffic system is safe. As such the American Association of State Highway and Transportation Officials (AASHTO, 2018) highlight the mandate as published by the USA House Committee on Public Works (1973) states:

“Whose responsibility is it to see that maximum safety is incorporated into our motor vehicle transportation system? On this, the sub-committee is adamant. It is the responsibility of government and specifically those agencies that, by Law have been given that mandate. This responsibility begins with the Congress and flows through the Department of Transportation, its Federal Highway Administration, the state Highway Departments and safety agencies, and the street and highway units of counties, townships, cities, and towns. There is no retreating from this mandate, either in letter or in spirit (House Committee on Public Works, 1973, pp.93)"

Managing road safety is complex and the complexity lies in the fact that an accident seldom results from a single cause. There are usually several influences affecting the situation at any given time (Shah et al., 2018). These influences, as is customary, are separated into three groups: the human elements; the vehicle elements; and the road elements; and it is the intricacies and mechanisms with which these elements interact, that make the search for road accident causes so complex (Alexander and Lunefield, 1986).

2.3.1 The Safe System Approach

The Safe Systems approach is premised on a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles, and road users (Figure 2-2).

This inclusive approach caters for all groups using the road system, including drivers, motorcyclists, passengers, pedestrians, cyclists, and commercial and heavy vehicle drivers. The Safe System approach recognises that people will always make mistakes – these mistakes could result in accidents —but the system should be forgiving, and those accidents should not result in death or significant injury.

The origin of Safe System thinking can be traced back to developments in Sweden which achieved a historical milestone when the country’s parliament adopted ‘Vision Zero’ providing a mandate for the government to pursue road safety in a new way. A Safe System is usually considered in terms of key interacting ‘pillars’ (Larsson, 2010):

- Safe roads and roadsides;
- Safe speeds;
- Safe vehicles;
- Safe road users.

Figure 2-2: Safe System approach – a holistic view of the road transport system

This approach is centred on a moral and ethical argument postulated by Tingvall and Haworth (1999) that mobility has historically been regarded as a function of the road transport system for which safety is regarded as a trade-off. Vision Zero resets this thinking as mobility being a function of safety and that no more mobility should be generated than that which is inherently safe for the system (Tingvall and Haworth 1999).

Over the past almost a decade since the commencement of the United Nations Decade of Action for Road Safety (UNDoA) which endeavours to reduce the number of fatalities by half of what it was in 2010/11, road safety programmes and actions, globally, were planned in an arrangement of 'pillars' as a pragmatic approach to pursue an ambitious reduction in fatality target. The guiding principles underlying the UNDoA are those included in the 'Safe System' approach. The Safe System approach aims to develop a road transport system that is better able to:

- take account of human limitations;
- allowing for the fact that humans are prone to err;
- When such erring occurs, taking into consideration the vulnerability of the human body.

The Safe System approach starts from the acceptance of the likelihood of human error and thus the realisation that traffic accidents cannot be completely avoided (Austroads, 2019). The goal of a Safe System is to prevent accidents from happening through proactive actions and when accidents do occur, to ensure that they do not result in serious human injury. In many of the countries with of the lowest road accident and road fatality rate, the Safe System principles have been acknowledged in road safety strategies and action plans.

The Safe System approach demands an integrated approach to manage the safety of the road system, with the aim of no person being killed or seriously injured on the road network. All elements of the road system are inclusive of a safety focus, i.e., safe roads, safe vehicles, safe road use and safe speeds and are incorporated in the approach with all stakeholders assuming their respective responsibilities, including the, governments, road authorities/agencies and road users (Butler, 2014).

Safe System-based measures aimed at improving the safety of the road environment can be 'primary' with the focus on reducing the severity of accidents while with 'supporting' techniques, the focus is on reducing the number of accidents. Whilst road authorities traditionally used to be challenged with the trade-off between mobility objectives and road safety, the strict application of Safe System principles is about establishing the concept of safe mobility which is defined as 'mobility maximised within the limits of safe operation' (Austroads 2017). The implication is that the priority of the road authority will be to establish safe operation. Thereafter mobility can be maximised within the boundaries that do not compromise safe operation – the other way around to the traditional approach to first satisfy mobility (or other utility) requirements and then consider the level of safety that can be achieved. A consequence of this approach is that when the desired level of mobility cannot be realised after safety is appropriately addressed, the context and function of the road will need to be re-evaluated.

Central to the Safe System approach is the recognition that road users are fallible and will make mistakes, even if alert and intending to comply with the road rules. As a result, vehicles and road infrastructure need to be designed to discourage errors and protect against the consequences (damage and injury) when errors do occur.

A. International success with the Safe System approach

The 'Towards Zero approach implemented in European countries has driven down road traffic fatalities remarkably – in some countries down from already low levels. Figure 2-3 shows the average decrease of road traffic fatalities of the 32 countries monitored from the European Transport Safety Council (ETSC) 13th Annual Road Safety Performance Index (PIN) Report. Notable is the dramatic initial decrease of fatalities over the first three years of the UNDoA and the flattening out since. It means that it becomes increasingly challenging to drive down road traffic fatality rates when countries get into the low rates. It becomes a matter of making sure that every effort should go into saving that one more fatality. The second graph from the ETSC report (see Figure 2-3) indicate that 18 out of the 32 countries monitored achieved 20 % or better (Norway achieved 49 % reduction of fatalities from 2010 to 2018 (Figure 2-4).

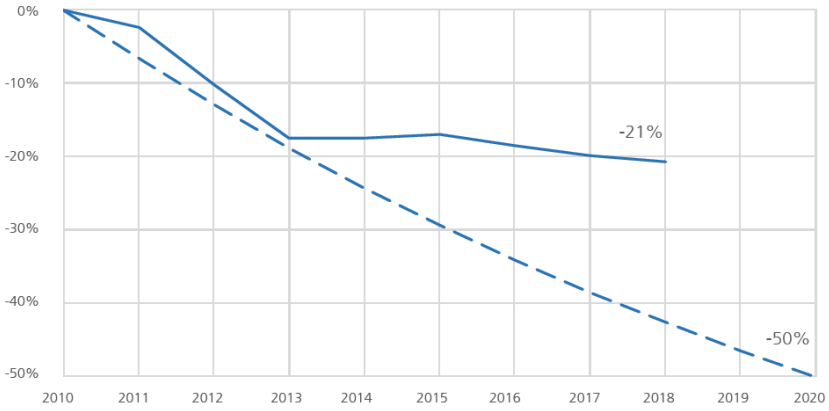


Figure 2-3: Reduction in the number of European road deaths since 2010 (blue line) plotted against the EU target for 2020 (blue dotted line)

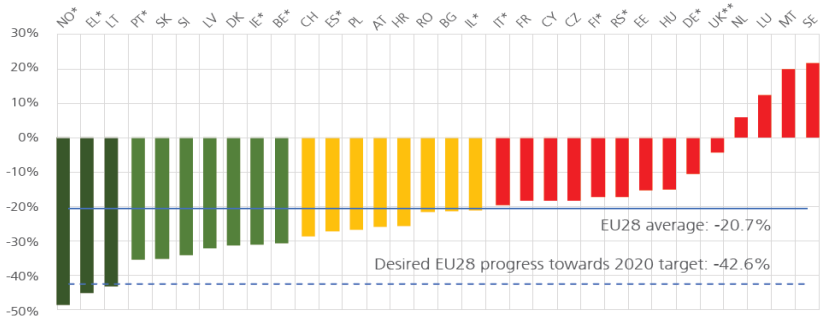


Figure 2-4: Relative change in road deaths per European country between 2010 and 2018

**National provisional estimates used for 2018, as final figures for 2018 are not yet available at the time of going to print. **UK data for 2018 are the provisional total for Great Britain for the year ending June 2018 combined with the total for Northern Ireland for the calendar year 2018*

B. Safe System principles underpinning the South African National Road Safety Strategy (SANRSS) 2030

South Africa has adopted the Safe System approach as the overarching strategy to drive down road casualties. The South African National Road Safety Strategy 2016–2030 has the Safe System as the foundation of its interventions and programmes. The South African Road Safety Strategy refers to the various elements of the road or the traffic system which is the road user, the vehicle and the road environment and the various collections of actions/strategies under the five pillars of the UNDoA are interventions that are designed to impact the three elements to better the safety performance of the system (Figure 2-5).

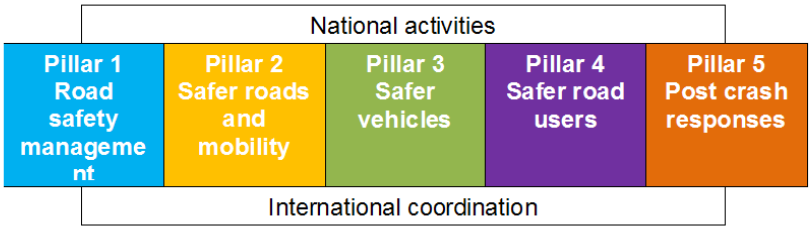


Figure 2-5: UNDoA – pillar approach in support of the Safe System

Under Pillar 4: Safer Road Users it is the objective to develop comprehensive programs to improve road user behaviour. One of the key matters in the South African context (as a current dilemma) is driver education and training with respect to the risks associated with driving distracted and/or inattentively (Venter et al., 2016; Venter and Sinclair, 2019). This is a matter that has become significantly elevated since the onset of the UNDoA a decade ago as a prevalent issue that is undoubtedly contributing to escalated road safety risks.

No matter how well trained or skilled road users are, it must be acknowledged that errors are inevitable when using the road system. It is unrealistic to expect road users to be operating at peak performance all the time and many of us can relate to being tired, distracted, emotional, stressed, inexperienced or unwell when using the road system.

The UNDoA pillars are inter-related and problems in one area may be compensated for with solutions in other areas. A true Safe System approach would involve the optimisation in planning, design, and operation across all pillars however in practice this can be difficult. Vehicle design is an offshore activity within the private sector whereas planning, road design and operation is the domain of government. Despite this, there are opportunities to ensure that there is cooperation between the two. For example, intersection geometry could be established that maximised the occupant protection offered by current vehicle design. Road user performance can also contribute via training, enforcement, and education. However, no matter how well this is done, errors will continue to occur.

C. Road Traffic Safety Management Framework for implementation of the Safe System approach

International Standard Organisation ISO 39001 provide a framework according to which road safety can be managed. The Road Traffic Safety Management System (RTSMS) provide a practical approached to managing road safety. Elements of the framework include (Bliss and Breen, 2012):

Institutional management functions: The seven identified institutional management functions (figure 2-6) are the foundation on which road safety management systems are built. The institutional management functions are essential to produce interventions which, in turn, achieve road safety results and for this reason they must receive the highest priority in road safety planning and policy initiatives. The institutional management functions relate to all government, civil society and business entities that produce interventions and results.

Interventions: Comprise system-wide strategies and programmes of interventions that aim to address road safety targets (Figure 2-6). Interventions cover the planning, design and operation of the road network, the entry and exit of vehicles, and users into the road network, and the recovery and rehabilitation of accident victims. At an intervention level, the aim is to manage exposure to the risk of accidents, prevent accidents, and reduce accident injury severity and the consequences of accident injury. They comprise safety designs, standards, and rules and well as a combination of activity to secure compliance with these such as information, publicity, enforcement, and incentive

Results: Road safety results are expressed in the form of long-term goals and interim quantitative targets. Targets specify the desired safety performance endorsed by governments at all levels, stakeholders, and the community.

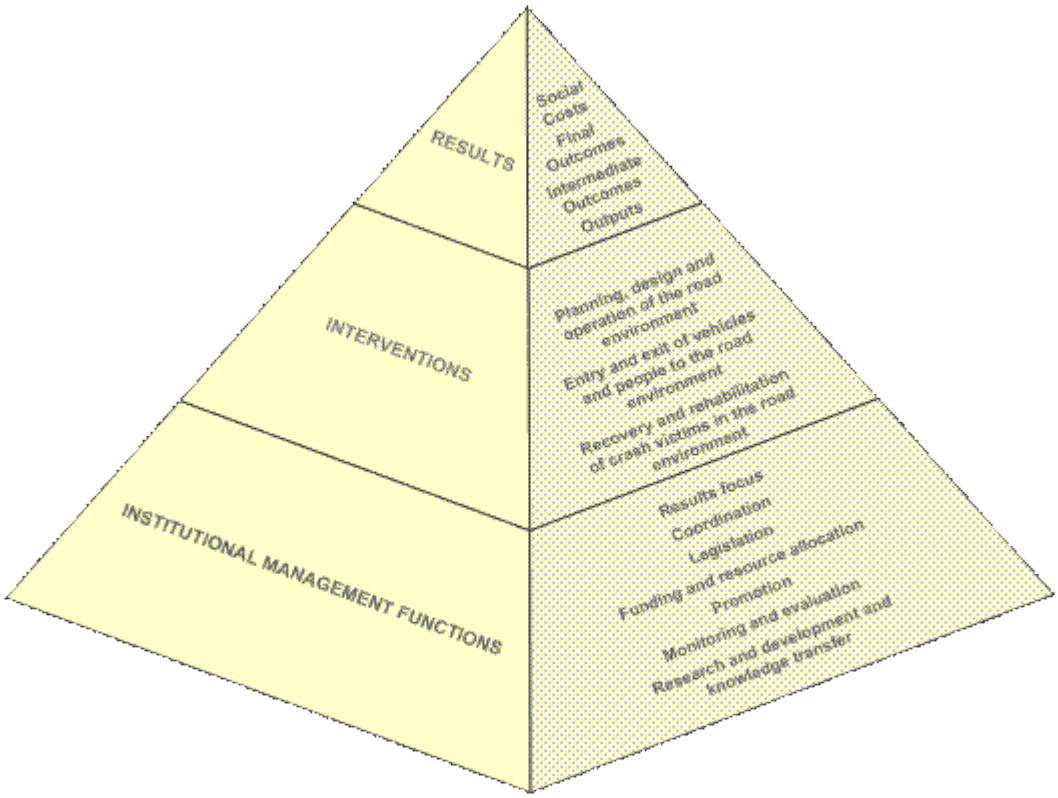


Figure 2-6: Road Traffic Safety Management System Framework (Bliss and Breen 2009)

Road safety is a shared responsibility between the road-users, designers, and operators of the system (Larsson et al., 2010). Although the Safe System advocates that no person should die or be seriously injured in road traffic accidents, human behaviour do contribute to the occurrence of accidents. There is thus a need to understand the correlates of safe driving behaviour, to help drivers to function optimally and safely (Wickens et al., 2008). It is necessary to understand human characteristics and behaviour within the road traffic system to design and cater for the Safe System (Wickens et al., 2008).

2.3.2 Minimising harm with forgiving roadsides in the Safe System approach

A. Harm minimisation on rural roads

The aim of roadside safety management in Safe System context is to provide a forgiving area on both sides of the carriageway that will minimise the likelihood and severity of run-off-road crashes (Jurewicz and Troutbeck, 2012). Within the Safe System a forgiving roadside, would include the provision of safety barriers to deflect a wayward vehicle or to disperse its kinetic energy to a safe level. As such, unprotected roadside objects would be selected or engineered to be frangible in a case of a vehicle collision. Clear zones are deemed important as it could play a supporting role in providing a traversable recovery zone (Jurewicz and Troutbeck, 2012).

Most rural roads will not benefit from infrastructure investment that is typically applied to higher volume highways and arterials. The situation is even more pronounced when considering low volume roads in rural areas. Infrastructure treatments are likely to play a minor role when compared to the contribution of vehicle safety

The safety factors on rural roads to consider are (Woolley et al., 2018):

- Severe injury accidents on rural roads continue to be dominated by single vehicle lane departures and head-on collisions;
- Most benefit from clear zones is obtained within the first few metres of width and for vehicles that have ‘drift off’ low angle departures, this is thought to represent in the order of 80 % of departures;
- No matter how wide a clear zone or central median, the risk of incursion cannot be eliminated;

- A desired clear zone width (up to 12 metres) will never be achieved on many parts of the road network;
- A high level of safety performance appears to be possible from the use of continuous lengths of accident barrier both in the centre of the road and on roadsides.

The safety on rural roads can be improved by (Woolley et al., 2019):

- The clear zone approach has contributed to safer roads in the past and will continue to do so, especially on lower order roads. However, if harm minimisation is to be achieved, we need to rethink the way in which we use the combination of clear zones and barriers on the rural road network;
- Clear zones should be regarded as holding the potential to be a hazard in the same way that barriers considered dangerous;
- Clear zones should include the concept of 'run-out' areas where attention is focused on ensuring safe vehicle departures, from the roadway, free of non-survivable impacts and rollover;
- Wide centrelines are showing promise, yet they cannot deliver Safe System outcomes in isolation and should be regarded as (step towards) supporting treatment; they do have a potential benefit in that a barrier system might be retrofitted to achieve a primary Safe System treatment in future.

B. Harm Minimisation at Intersections

Intersection collisions are one of the major sources of injury on the road network. This is also true for South Africa and the City of Cape Town (CoCT, 2001) indicated that accidents occur much more frequently at intersections than on sections of road between intersections. Accidents at signalised intersections, in turn, occur much more frequently than at unsignalized intersections. The need to protect road users from an overload of information at signalised intersections is, therefore, higher than anywhere else on the road (City of Cape Town, 2001).

Internationally, more harm is associated with unprotected right turns and red light running. Intersection planning, design and operation relies on drivers and riders recognising that an intersection is present and making the right decisions in all circumstances – this is unrealistic (Woolley et al., 2018). There are a multitude of circumstances and reasons why driver and rider errors may occur – a harm minimisation approach is the most practical way to compensate for this. Design tends to favour intersecting approach legs at 90 degrees; this also ensures that vehicles collide in their most vulnerable configurations: side impacts and offset frontal impacts. In addition, there are strong relationships associating change in velocity in an impact between vehicles (Delta V) with injury severity; Delta V (mean acceleration and deceleration) is a function of travelling speed and mass of vehicle. Delta-V (Δv) is a measure of the severity of a traffic collision, defined as the change in velocity between pre-collision and post-collision trajectories of a vehicle (Shelby, 2011). The orientation of the colliding vehicles is also an important determinant of injury.

Well-designed roundabouts achieve elevated levels of safety performance as they manage approach speeds, do not have 90-degree impact angles and simplify decision making (Federal Highway Administration, 2006). Primary collisions between vehicles are sometimes followed by secondary collisions with roadside objects – there is no consideration of secondary collisions in intersection design.

In general, accident locations in urban areas are dominated by exposure (i.e. those with the highest traffic volumes) and are most associated with a signalised intersection or the junction between a local road and an arterial road. Many of the safety issues are associated with unprotected right turns and red light running (SANRAL, 2003).

Although traffic signals may have lower accident rates, there is an irony associated with the large numbers of accidents occurring at signalised intersections (Retting et al., 2003). Traffic signals are considered locations are where the most control is exercised on road users. Road users are instructed when to stop, when to go and what manoeuvres can be performed. While they may have low accident rates on an exposure basis, they have a high injury risk when collisions occur (Ogden et al., 1994). Many metropolitan intersections have been amongst the worst performing locations in the road network for decades. Road authorities have had limited success in addressing the core safety problems associated with unprotected turns and red light running.

The approach to intersection design and operation is predicated as road users first realise that an intersection is present and then make the right decisions when using the facility. There are a myriad of reasons and circumstances as to why road users make errors that lead to collisions at intersections. As discussed in the above section, intersection collisions need to be considered from a system failure perspective rather than as road user performance failure.

Table 2-2 and Table 2-3 highlight some of the differences in features that exist between conventional and Safe System intersections.

Table 2.2: Signalised Intersections comparing conventional and Safe System features (Woolley et al., 2018)

Type	Conventional	Safe System
Signal control	Ranges from unprotected to protected turns often governed by efficiency objectives	Default position is provision of protected turns
Speed management	Rely on compliance with general speed limit; occasional use of safety cameras	Design features that guarantee survivable impact speeds
Redundancy	Primary, secondary, and sometimes tertiary signal locations; mast arms, advanced warning signs	Geometric design features that influence drivers who might otherwise inadvertently travel through a red light
Points of conflict	Maximise throughput by increasing the number of lanes – this creates more points of conflict	Limit points of conflict
Expectations of road users	Road users make the right decisions in all circumstances; the decision-making environment tends to be complex	Road users will make errors; the decision-making environment is simplified
Collision orientations	90-degree vehicle to vehicle impacts; right turn against offset frontal collisions	Collisions at acute angles
Dynamic visual obstruction	Rarely considered	Considered in design process
Inattentional blindness (looked but did not see)	Rarely considered	Compensated for with design that limits accident severity
Secondary impacts	Rarely considered	Considered in design process
Accident severity	Rarely considered	Considered in design process
Pedestrians	Usually pedestrian/vehicle conflict can exist in a phase; occasional use of all pedestrian crossing phases	30 km/h speeds where pedestrian/vehicle conflict exists in a phase: segregation or all pedestrian phases for higher speeds
Cyclists	Usually cyclist/vehicle conflict can exist in a phase; occasional use of exclusive cyclist phases	Design features that support the vision of cyclists from vehicles and ensure slow vehicle speeds; segregation where speeds are high

Table 2.3: Unsignalised intersections comparing conventional and Safe System features (Woolley et al., 2018)

Type	Conventional	Safe System
Control philosophy	One road has priority for which travelling speeds remain constant	All approaches may have an expectation to stop or that speed may need to be reduced (e.g. roundabout)
Traffic control	Ranges from no control to Stop and Give Way	A control must be present unless speeds managed well
Speed management	Rely on compliance with general speed limit	Design features that guarantee survivable impact speeds
Redundancy	Advanced warning signs, median islands, transverse rumble strips, pavement marking	Geometric design features that influence drivers who might otherwise inadvertently travel through the intersection when required to give way; if one fails another will compensate

2.3.3 Accidents and road unsafety

A. Understanding accidents as low probability incidents

A traffic accident is defined as a collision with a motor vehicle on a public road (Hakkert, 2002). Probability is the likelihood of an accident with a given hazard. The likelihood of having an accident is dependent on how much exposure a road user has to a hazard or risk. In this instance the exposure is related to the number of kilometres travelled, exposure to unsafe environments and exposure to unsafe actions (Hakkert, 2002). Exposure to risk varies by mode of transport, road user type and demographics as well as the frequency with which exposure to risk take place. In comparison to the amount of time road users spent on the road, compared to the probability that one would be in an accident, the risk is considered low.

B. Road safety and unsafety

Participating in traffic, is by nature unsafe, and many traffic situations are dangerous. But by participating in traffic, people accept a certain level of danger (Hakkert and Braimaster, 2002). Nevertheless, the risk of death or physical injury in traffic is according to Safe System principles, socially unacceptable (Butler, 2014).

Lack of road safety is defined as (CROW, 2009):

- the presence of danger or risk in traffic;
- An unacceptable degree of risk in traffic.

The presence of danger

Danger is a critical combination of circumstances that occurs and/or may occur in traffic and that may result in an accident (Crow, 2009). The concept of ‘risk’ is defining a measurable level of road safety that is dependent on numerical accident exposure value (Łukasik and Szymanek, 2012). Objective and subjective estimates of the risk of different elements inherent in road traffic seem to overlap with a road's physical characteristics (Olvensen, 1978).

All collisions are accompanied by a transfer of energy onto structures. In road traffic, if those structures are not sufficiently protected the system becomes vulnerable (Constant and Legarde, 2010; United Nations, 2010).

An accident involves damage

‘Damage’ in traffic may refer to fatalities, injuries, psycho-traumatic effects, material damage and damage to the road environment (Peden et al., 2004). Lack of road safety is:

- the total of potential and existing critical combinations of circumstances in the process of traffic and transport;
- unplanned events or an unplanned series of events that involve the transfer of energy onto vulnerable structures that are not protected against it;
- the possibility of damage to or loss of people or materials as a result of traffic (death, injury, permanent disability, psychological trauma, material damage and damage to the road environment).

Accidents take place due to the accumulation of a multitude of factors (Reason et al., 2006). These factors are the holes in the cheese. When the holes in the cheese slices align, accidents take place. The cheese slices are the barriers that prevent the accidents from occurring (Figure 2.7).

The Swiss Cheese Model (SCM) presents a straightforward way of viewing road transport system failures (Salmon et al., 2013). Each of the categories that constitute the road traffic system (infrastructure, users, vehicles, and environment) can potentially affect its safety. The failures impact perception, planning and decision-making, and physical behaviour such as the execution of vehicle control tasks (Salmon et al., 2012).

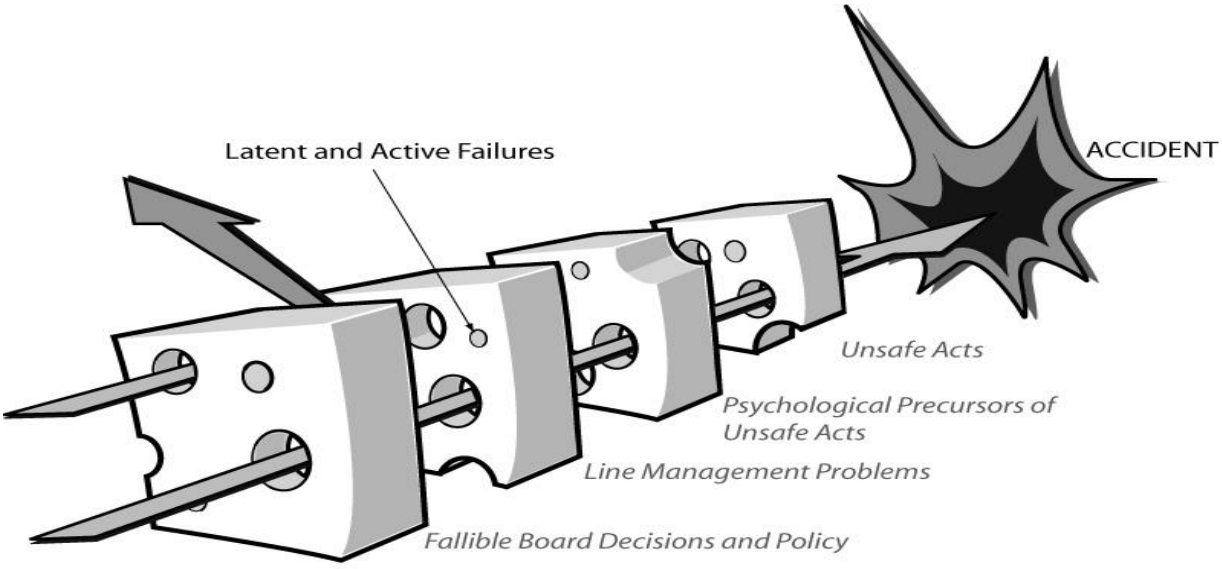


Figure 2-7: Swiss cheese model (Reason et al., 2006)

An incorrect reaction will lead to a succession – a chain – of ever more critical (combinations of) circumstances. If that chain is not broken, an accident is inevitable. The series of critical combinations of circumstances may even continue as the accident takes place and the damage occurs (Reason et al., 2006).

The consequences of a traffic accident

A lack of road safety is manifested in the different forms of damage that are caused by traffic accidents (Shah et al., 2018). The definitions of the consequences are categorised in accordance with accident registration:

- Death: death occurring within thirty days of an accident (Adeloye et al., 2010);
- Hospital: hospitalisation for at least one night, but no death occurring within thirty days;
- Emergency assistance: transported to hospital by ambulance, but not hospitalised;
- Not hospitalised: injured, but not transported to hospital;
- Material damage only: no personal injuries (Organisation for Economic and Cooperation Development, 2019)

In addition, the following groups are distinguished:

- Serious injuries: fatalities and hospitalised injuries combined.
- Slight injuries: emergency assistance (EA) and not hospitalised (NH) together.

Internationally the recording of injuries does not currently do not distinguish between EA and NH. In South Africa for example only fatal crashes1 are recorded (Labuschagne et al., 2016). This is a limitation as the burden of traffic crashes to social and economic well-being of the country is not considered in terms of consequences such as: disability, psychological trauma, permanent sorrow due to the loss of loved ones and its effects due to traffic accidents are not recorded.

An unacceptable degree of risk

Risk can be defined as follows:

Risk is the chance of an unwanted or harmful consequence of participating in an activity or of exposure to a dangerous situation. The chance of risk is the probability of an unwanted event occurring with all the related harmful effects (Wang et al., 2004).

In other words: Risk = chance x consequence

[1] Internationally, the term crash/collision is used rather than accident to emphasise that crashes can be prevented. The South African NRTA 93 of 1996 still uses the term ‘accident’.

Traffic risk is the chance of getting involved in a traffic accident resulting in death, injury and/or damage. The severity of the interaction is dependent on the amount of risk and the level of exposure to the risk (Hakkert and Braimaster, 2002). Therefore: Safety (severity) = risk x exposure.

Traffic risk is the chance of getting involved in a traffic accident resulting in death, injury and/or damage. The severity of the interaction is dependent on the amount of risk and the level of exposure to the risk (Hakkert and Braimaster, 2002). Therefore: Safety (severity) = risk x exposure.

The significance, and benefits of participating in a certain activity must be weighed against the sacrifices that may have to be made and the harm caused by the damage that may result (Beauchamp, 2019). The more benefits a traffic activity has, the higher the acceptance of risk (Porter, 2011). For example, a driver who starts out too late for an important meeting will accept more risks than one who has left on time for a leisure destination. In the first instance, the chance of arriving too late outweighs the increased chance of an accident.

Peer group norms play a role in that consideration as well. Young drivers take more risks because their peers find daring and 'testing limits' important and, moreover, because they underestimate the risk (Peden, 2008). Whether a traffic risk is acceptable is a social and political issue. The perception of risk is influenced by a variety of factors and these factors also influence the way road users accept risk in traffic (table 2-4).

Table 2.4: Perception of risk (Peden, 2008)

Perception of risk	Description
The voluntary nature of participating in traffic and taking risks	Risks taken voluntarily on an individual basis are also given much less weight than danger faced involuntarily.
The catastrophic or chronic nature of the risk	The severity, scope and concentration of an accident is more important than its frequency (e.g. a plane crash is considered more catastrophic than a car crash).
The degree to which people think they can control the risk themselves	Much less risk is accepted for plane, train, tram, and bus passengers than for motorists or cyclists. Public transport passengers depend on a driver without being able to influence his behaviour, while motorists and cyclists take part in traffic themselves, often contribute to the risk by their behaviour, and control the risk themselves.
The degree of protection	The risk for unprotected pedestrians is socially less acceptable than the risk for a motorist in his steel cage. The degree of familiarity with the risk. Risks that cannot be perceived or assessed by traffic participants are given more weight than risks that can.
The avoid-ability of risks	In situations in which the risk could have been avoided – for example by means of a solution implemented by the road authority – the risk is considered less acceptable than in other situations.

C. Mechanical and kinetic energy contribution to accidents

The category assigned to a road determines its functional and technical requirements and, consequently, to an important degree its design (Committee of Land Transport Officials, 2012). The classification of a road (discussed in section 2.2.2) determines most of the prerequisites for use of such a road, as well as which users share a road and the conditions in which they meet.

The choice for separating or mixing traffic is related to the homogeneity principle of Sustainable Safety: equality of speed, direction, and mass at moderate and high speeds (Wegman and Van Aarts, 2006). Homogeneity of mass, speed, and direction are the fourth principle, and refers to the physical vulnerability of humans, which results in injury. The foundation of this principle is rooted in the notion that the more homogeneous (similar) the traffic is, the lower the risk of (severe) injury. Where road users/vehicles with large mass differences use the same traffic space, the speeds should be sufficiently low that, in the event of a traffic accident, the most vulnerable road users and modes should be able to walk away without any severe injuries.

Different classes of roads need to be designed in such a manner that the differences in classes are significant enough for the driver to adapt behaviour accordingly (Enzfelder, 2013). The Sustainable Safety vision (Netherlands) has five guiding principles (Table 2-5) that aim to facilitate the recognition and behavioural adaptation (Wegman en Aarts, 2006).

Table 2.5: Guiding principles of sustainable traffic safety (Wegman et al., 2006)

	Principle	Description
1	Functionality of roads	Ensure the mono-functional properties of through roads, distributor roads, or access roads. Ensure a hierarchically structured road network.
2	Homogeneity of traffic load Homogeneity of speed Homogeneity of direction	Ensure equality in speed, direction, and mass at medium and high speeds.
3	Forgiving roadside	Limit injuries through a forgiving road environment and anticipation of road user behaviour.
4	Predictability of road course and road user behaviour by a recognisable road design	Road environment and road user behaviour that support road user expectations through consistency and continuity in road design.
5	State of awareness by the road user	Ability to assess task capability adequately and safely manage the driving task.

These principles translate into specific measures aimed at designing road environments and infrastructure that adapt to the limitations of the road user (Schemers et al., 2010).

Energy transfer during an accident

The mechanical properties of the traffic system are a key principle for road safety concepts. Mechanical properties are subject to the laws of physics, where energy transfer during a collision is defined on the basis of the law of conservation of momentum. Momentum comprises three components:

- speed;
- mass;
- direction.

It is assumed that the two objects that collide are not deformable and therefore do not absorb collision energy. An important way to reduce fatal or serious injury crash outcomes is through better management of crash energy, so that no individual road user is exposed to crash forces that are likely to result in death or serious injury (World Road Association, 2015).

D. Differences in speed

Even slight changes in speed affect road safety (Silvano, 2013). Speed is important for several reasons. It determines the available response time and, therefore, the accident risk, but it also determines the speed of collision and, consequently, the seriousness of the accident (World Health Organisation, 2008).

Speed determines reaction distance and speed of collision

When a road user must react to avoid a collision, the car's speed determines the amount of time available to respond. Reaction time refers to the amount of time a driver takes to see both a hazard and the time it takes the brain to realise the danger and process a reaction to a hazard. Braking distance refers to the distance that a vehicle travels while slowing to a complete stop, this in turn is dependent on the speed at which the vehicle travelled (Roads and Traffic Authority of New South Wales, 2011). Speed increases both the reaction distance, and the distance that is required to safely come to a stop (Roads and Traffic Authority of New South Wales, 2011). A driver travelling at faster speeds will

have covered more ground in between spotting and reacting to a hazard than a driver travelling at a slower speed, so the speeding driver is more likely to crash.

Consequently, driving at high speeds requires greater anticipation than driving at low speeds.

An example (CROW, 2009): assume a stopping distance of 15 metres. This equals a situation in which a child runs onto the street three parked cars down. Under favourable conditions (a braking deceleration of 8 m/s^2 and a 1 second reaction time, this gives the following picture:

- drivers driving at a speed of 30 km/h can stop in time and avoid a collision;
- drivers driving at a speed of 40 km/h collide at a speed of 25 km/h (compared to a 2-metre free fall);
- drivers driving at a speed of 50 km/h collide at a speed of 45 km/h (Compared to an almost 10-metre free fall);
- Drivers driving at a speed of 60 km/h have not reacted at the time of the collision (compared to a 14metre free fall).

Under less favourable conditions (such as a slippery road), the differences in stopping distance increase even further. This sharp increase in stopping distance was the reason for introducing 30 km/h zones.

It is assumed that 30 km/h is a safe speed. However, the risk of a fatal collision with a car going 30 km/h is still five times higher than a car that is driving at walking pace (15 km/h) in a home zone (see table 2-6).

By driving at walking pace (15 km/h) instead of 30 km/h, the chance of a collision also decreases. Table 2-7 shows the reaction path, the brake path, and the stopping distance as functions of speed. Reaction path is the distance covered during the reaction time, while the brake path is the distance covered while braking. The sum of these two distances is the stopping distance.

Table 2.6: Relationship between collision speed and risk of death

Collision speed (km/h)	15	30	50
Chance (%)	1% to 2 %	5 % -10 %	50 %

Table 2-7 illustrate distance travelled under braking, reacting, and stopping distance at various speeds.

Table 2.7: Reaction path, brake path and stopping distance as a function of speed

Speed km/h (m)	15	30	50
Reaction path (m)	4	8	14
Brake path (m) (Breaking deceleration at 8m/s^2 and a reaction time of 1second	2	8	22
Stopping distance	6	16	36

Driving at 30 km/h certainly decreases the risk compared to the original speed of 50 km/h but driving at walking pace increases safety more. In addition, it improves a road's residential function and usability in terms of social activities for young and old. In other words: 30 km/h is safe, but 15 km/h is safer.

Speed determines the severity of the accident

There is also much to be said about the relationship between speed, the chance of an accident and the severity of that accident (SWOV, 2007).

Theoretically, a change in average traffic speed and the consequences in terms of accident risk are related as follows (SWOV, 2007):

- the effect on the number of accidents is quadratic;
- the number of severe accidents is proportional to the power of three;
- the number of fatal accidents is proportional to the power of four.

This calculated connection does not include any other important aspects, such as road categories.

Speed and risk

The differences in the relationship between speed and risk reverberate in the distinctive design requirements for the different road types. These requirements are geared to the amount of information road users can effectively process. A motorway is less complex than the underlying road network. Because of this lower level of complexity, risks increase more slowly with increasing speeds on a motorway (SWOV, 2007).

To be able to predict the effects of a change in speed on road safety, it is important to at least consider the specific conditions. Moreover, a change in speed limit may also bring about an increase in speed differences.

The relationship between speed differences and risks manifests itself in two ways:

- Roads with a broad range of speeds are less safe;
- Vehicles that drive faster than average run a higher risk.

Vehicles that drive slower sometimes appear to run a higher risk, sometimes no change in risk is found (SWOV, 2007).

A. Differences in mass

The difference in mass determines what portion of collision energy is absorbed by the collision partners. Mass differences between for example a heavy vehicle and a passenger vehicle may be a factor 10; mass differences between passenger vehicles may be up to a factor 3, while mass differences between vehicles and vulnerable road users vary between factor 10 and 700 (SWOV, 2007). In the event of significant differences in mass, an accident may have profound consequences even at exceptionally low speeds.

A separation in time (e.g. traffic lights) or space (e.g. cycle tracks) is a way of eliminating collisions, thus making mass differences irrelevant. However, a separation in time or space is not always possible (World Health Organisation, 2008). Where separation is impossible, both weaker and stronger road users must be given a fair chance of behaving in a safe manner. They should know that there are other road users, should be able to see each other and judge each other's (potential) behaviour, and, finally, they must be willing to take responsibility for their own behaviour. This is not as self-evident as it appears. It is usually not possible to see whether a lorry is heavily loaded or not, but this makes all the difference in terms of braking behaviour for the cars behind it. And predicting drivers' attitude is something that is completely unclear (World Health Organisation, 2008).

B. Resilience

The vulnerability of road users (and their vehicles) is often related to the difference in mass: lightweight road users are usually less protected than heavier road users (Wittink, 2001). Road users, such as pedestrians, cyclists, moped and motorcycle drivers do not have a protective cage, seat belts and airbags that can absorb the collision energy for them, these groups are vulnerable (Petak, 2019). This is even more the case with elderly people, who are physically weaker and more vulnerable to begin with (SWOV, 2012).

The resilience of car passengers has increased considerably. Cars often achieve the maximum score possible in accident tests, while a safety cage, crumple zones and one or more airbags have become standard features. The safety of children also receives considerable attention (DEKRA, 2019).

The reverse is true for the safety of pedestrians and cyclists in the case of a collision with a car. A collision-friendly car front has been the subject of study for a few decades now, but this aspect does not feature much in accident tests, where the focus is more on collisions with other vehicles and concrete surfaces. It took a long time before a car achieved the maximum score for collision-friendliness with vulnerable road users in the EuroNCAP test (European Commission 2018).

C. Differences in direction

Based on the differences in direction of the different road users, various groups of conflicts exist (Federal Highway Administration, 1989; Ulak et al., 2019):

- passing conflicts in the same driving direction, such as rear-end collisions;
- conflicts in almost the same driving direction, such as when changing lanes;

- crossing conflicts, with driving directions at right angles, such as with right-of-way mistakes;
- unilateral conflicts with a stationary object, such as an obstacle by the side of the road;
- Frontal conflicts with opposite driving directions, such as frontal accidents.

The severity of a conflict depends in part on the fact that the modes of transport and, therefore, the vehicles, have a different level of resilience in different directions. The front of a car is more resilient than the side or the back.

2.4 Summary of findings

Transport System Management is the process whereby individual transport elements (infrastructure, modes, land use, and human factors) are overseen to achieve maximum efficiency and productivity for the system. TSM recognises transportation as a unitary system where all four elements function interactively and need to be organised and managed in an integrated way.

Road environment management deals with the interface between road traffic and the environment (the road reserve and what is visible from the roadway). Road environment management involves managing land development, the protection of the environment, and road network design and planning. All three aspects are relevant to outdoor advertising practices, and as such outdoor advertising needs to be managed and controlled within the road environment.

Traffic management entails the planning of the road, environment, and road network. This planning is done according to the function of the road (allowing for the flow of traffic or managing the access along the road). The road is classified according to a hierarchy that consists six types of roads, ranging from high speed, and high mobility roads to roads with an access function, typically found in suburban low speed environments. Class 6 makes provision for non-motorised transport users i.e. walking and cycles paths. The road network (primary, secondary, or tertiary) are ordered according to the functional classification of roads.

To manage traffic, road authorities make use of road and related data (traffic volume, traffic flow etc.) to understand the characteristics of the road. Planning for a stretch of road or a network are done according to the function and characteristics of the road. The purpose of traffic management is to achieve short-term transport development outcomes (e.g. managing outdoor advertising within the reserve) with the aim to implement and integrate medium to long-term plans that address the land use, development and planning on a network level. To manage the road and road environment, use is made of legislation, best practices and guidelines that prescribe the way road users are expected to behave in a particular road environment. These tools are also employed to create and manage road environments that are uniform and recognisable ensuring that the transport system (and elements) behave and perform the same in any jurisdictions. This uniformity is achieved through the implementation of the legislation, control devices and so forth to create road environments that are predictable, and that conform to road users' expectations creating self-explaining roads that guide safe road users' behaviour.

Road safety management revolves around the strategies and approaches that is implemented in support of a Safe System. This include approaches to minimise harm from the environment and vehicles as well as human factors. Road safety is a performance indicator of the transport system. Countries that have made considerable progress to reduce the number of fatalities on the roads do so by implementing Safe System principles. By adopting the Safe System principles, road authorities and planners acknowledge that people make mistakes. As such, road, and traffic environments need to be designed in such a way that making a mistake will not result in serious injury or death.

South Africa has adopted the Safe System approach as the basis for the South African National Road Safety Strategy (SANRSS). As a signatory to the UNDoA which endeavours to reduce the number of fatalities by half of what it was in 2010/11, South Africa need to implement road safety programmes to pursue an ambitious reduction in fatality target. The five pillars (safer road users, vehicles, infrastructure as well better post-crash care along with the institutional management functions) of the UNDoA guide the implementation of interventions and the Road Traffic Safety Management System is a practical approach to determining where investments in road safety should be made to achieve the objective of reducing the fatal road accident rate. The Safe System principles advocates that any interventions in support of improving road safety need to:

- take account of human limitations;
- allowing for the fact that humans are prone to err; and
- When such erring occurs, taking into consideration the vulnerability of the human body.

However, accidents do happen, and this is seen as failures of the road and transport system. Accidents are the result of several factors (behaviour, speed choice, deficiencies in road design etc.) that interact and align to cause a collision. The outcome or severity of the accident is also depended on a number of factors including the speed at which the vehicle/person was travelling, the direction in which the road users were travelling and the mass of the vehicles which all determine the impact with which the person or vehicle collided with the structure. To prevent system failures, the Sustainable Safety approach (Netherlands) advocates that by separating traffic streams, managing speed and conflicts it is possible to significantly reduce the severity of accidents and associated injuries. The choice for separating or mixing traffic is related to the principles of equality of speed, direction, and mass at moderate and high speeds. Homogeneity of mass, speed, and direction relates to the physical vulnerability of humans and the foundation of this principle is rooted in the notion that the more homogeneous (similar) the traffic is, the lower the risk of (severe) injury. Where road users/vehicles with large mass differences use the same traffic space, the speeds should be low enough that, in the event of a traffic accident, the most vulnerable road users and modes should not be severely injured.

Although the Safe System principles aim to address the severity of the outcomes by designing roads, infrastructure and supporting services in such a way that it minimises harm, human factors are still considered the leading contributory factor to accidents world-wide. This is also true for South Africa, where human behaviour (road user) remains the leading contributory factor for fatal road traffic accidents. Human error in/on the transport network is a result of human limitations including physical, perceptual, and cognitive shortcomings. Within the Safe System, the road and vehicle environment are designed in such a manner, that it is able absorb these errors and mistakes to prevent death and serious injuries. In addition, the Safe System advocates that road users in turn need to be educated and aware (road safety education, attitude etc.) of how they need to behave to participate safely in traffic.

Road designs that take cognisance of human factor guidelines and include an understanding of how road users (drivers) process information from the road, understand the role that the road and road environment play in guiding behaviour and how the road environment influence perception of risk and subsequently the level of situational awareness which is critical for safe driving. Human factor guidelines consider issues such as the role road geometry plays in behaviour, consider field of view, and how information received from the road environment. All these road elements that serve as information sources to the driver have the potential to influence reaction time, stopping distance and driving behaviour (such safe passing, lane keeping, the distance needed to come to a safe stop and so forth).

Road planners and engineers need to consider any additions to what is officially allowed in the road and road reserve in the context of how these additions will influence the importance of official road signs and markings as well as the manner in which these additions influence driver expectations in terms of the function and characteristics of the road and network. By implementing Safe System principles, road authorities that are responsible for managing safety acknowledges that humans are frail and therefore design and manage the road environment in such a manner that mistakes, made by road users do not end in death or serious injuries. According to the Safe System approach, this proactive approach includes managing high-risk locations (such as intersections), introducing clear zones and managing speed, all which influence managing the severity of accidents, making the roadside more forgiving.

3 Outdoor advertising industry: trends and methods

3.1 Introduction

Chapter 3 provides an overview of the outdoor advertising industry and advertising practices. Outdoor advertising has been around for as long as humans have been mobile although the type and way outdoor advertisements are done have changed significantly over the years. This chapter highlights the development and trends pertaining to outdoor advertising internationally, in Africa as well as in South Africa. The type of outdoor advertising displays available are listed and mention is made of the mediums and content used for outdoor advertising displays. The chapter highlights the role of the industry in the economy, the benefits of outdoor advertising to agencies and advertisers and describe the motivation for outdoor advertising practices as it relates to the traffic environment. The chapter concludes with an overview of critique raised against outdoor advertising practices and motivations as to why outdoor advertising needs to be regulated.

3.2 Outdoor advertising history, development, and industry trends

3.2.1 Definition of outdoor advertising

Outdoor advertising is defined as the act of transferring information visually or audibly at a public outdoor space (Kruger, 2015). Davidson (2001) defines outdoor advertising as a "rented medium for displaying and transferring commercial information in a visible manner on structures and signs erected out of doors. It is a legitimate land-use form of advertising which is an integral part of the western economic system with direct and indirect benefits for the community as a whole".

Outdoor advertising [2] traditionally referred to billboards, however, this definition has been expanded to include all name, destination or route signage (except for formal road signage), announcements or promotions (whether cultural, ideological or commercial) that are visible in public spaces with the aim of delivering a message or communication regarding a brand, company, product, service, ideology or corporate identity (Crow, 2017).

3.2.2 International outdoor advertising development and trends

Outdoor advertising beginnings can be traced back to ancient Egypt or the 1790s, when lithography (a method of printing using oil and water) was invented, making the creation of posters possible (The Operators, 2015). Egyptian 'posters' became popular in early Egypt and was used in locations with high pedestrian volumes. Initially, billboards (as we know them now), were called 'hoardings' and the first record of a hoarding being rented goes back to 1867. The demand for hoardings gave birth to a new industry, and by 1870 there were 300 signwriting companies in the United States of America (USA).

In 1889, 24 billboards or hoardings were placed at the Paris Exposition. With the shift in focus to motoring in the 1920s, Ford Motor Company was one of the first companies to advertise affordable motoring alongside roadsides, which subsequently became a popular location for displaying adverts. In the 1900s, the USA started to standardise billboard sizes and by 1915 the National Outdoor Advertising Bureau was listed on the New York Stock Exchange. Following suit, French outdoor advertising company, JCDecaux (still one of the biggest advertising companies, also in South Africa) in 1962 started to advertise in European bus shelters.

During the 1970s in the United Kingdom, British Posters Limited represented the interests of media owner members. The organisation was shut down 1982 following a Monopolies and Mergers Commission report however, its closure led to a former employee setting up as specialist buyers – a role that still exists today. Buyers were responsible for checking campaigns that had been posted. This role still exists today as these companies or individuals are used to plan campaigns with media owners (The Operators, 2015).

By the early 21st century OOH advertising became increasingly attractive to advertisers, with the decline of the print media and the advent of the digital and online arena. This growth in OOH is significant, accounting for 66 % of advertising

[2] Also referred to as out-of-home (OOH) advertising.

expenditure in the US in 2007, with increases in OOH advertising in Asia and Europe (Du Plooy, 2012). In 2017 US companies Apple, Google, Amazon, and Netflix were deemed part of the top clients as well as consumers of OOH as the OOH advertising industry was the only traditional channel expected to grow (Benatar, 2019).

3.2.3 Sub-Saharan Africa outdoor advertising development and trends

Studies indicate that OOH is 382 % more effective than television, 200 % more effective than print, and 63% more effective than radio in driving consumers online (Benatar, 2019). Due to the rate of return or return on investment (ROI) that persistently influence media schedules, the industry has developed methods to accurately calculate the reach and frequency for OOH advertising. Despite the lack of certainty related to the ROI, media buyers recognise that fast-growing populations in African cities, no longer drive during traditional commute times. Untraditional commute times equate to more time on unpredictable roads (unlike the predictability of the developed world's public transport commute), which means that due to the unfamiliarity, commuters are more aware of their surroundings which results in increased consumption of roadside media (Benatar, 2019). In addition, new, mostly online media options available to brands for advertisements, have increased the value of OOH advertising which is seen as a less costly method to target certain income groups in geo-located specific areas which means that OOH will grow its share of media spend in Africa (Benatar, 2019).

The growth of outdoor advertising in Africa in markets such as those in Kenya and Nigeria have increased with more than 200 % from 2008 to 2012 (Price Waterhouse Coopers, 2013; Roux, 2017). Growth in Sub-Saharan Africa (SSA) is being driven by rapid rates of urbanisation, car ownership rates, high penetration and visibility, improved literateness among the population, and investments by large international and local media companies (Roux, 2017).

However, OOH in Africa faces challenges such as the lack of effective confirmation of audience sizes, traffic count data and available inventory as well as increasingly strict (also deemed inconsistent) regulation and legislation across states. In addition, there are indications of practices where hawkers/sellers in rural areas demand fees to allow the changing of advertisements or structures (Price Waterhouse Coopers, 2013; Roux, 2017).

African consumers have significantly longer commute times, because of a variety of reasons that include for example traffic congestion and long distances travelled. South Africans spend much more time commuting than commuters in developed countries. Research indicated that in comparison to developed countries such as United Kingdom (45 minutes), Germany (44 minutes), and the Netherlands (43 minutes), In Africa, on average, people spent longer than 60 minutes commuting (Price Waterhouse Coopers, 2016). The increased time presents an opportunity for advertisers the reach this mobile audience. For these reasons, Roux's work (2017) suggests that the potential for OOH advertising remains significantly untapped.

3.2.4 South African outdoor advertising development and trends

This growth, evident in the US, Europe, Asia and the rest of SSA took some time to become evident in South Africa, where in 2012 the share of OOH adverting was still less than more other traditional media types with television advertising accounting for the largest share of advertisement expenditure followed by print advertisement. While television advertising has continued to show some gains, by 2019 no traditional form of media had grown as significantly as OOH (Benatar, 2019). This growth is attributed to the OOH advertising industry "showing itself to be internet proof over the last 10 years by being a part of, and being needed, by the online world".

The entire advertising market in South Africa in 2019 is estimated to be worth 30.4 billion ZAR (2.05 billion U.S. dollars), and television and video advertising spending is projected to account for the largest share of that amount (21 %). The internet is reported to be the second largest medium in the country. However, looking at 2018-2023 compound growth rates, televisions' 1.8 % Compound Annual Growth Rate (CAGR) in the period will be exceeded by internet's 12.4 % CAGR. This implies that by the end of 2023 internet advertising will for the first time have a larger advertising share than television. Television is still the predominant advertising medium in South Africa, accounting for 56.3 % of total advertising spend of R 38.13 billion between July 2016 and June 2017, the traditional platforms for advertising are being affected by a shift in the increasing usage of digital devices and the Internet.

Statistics from the Interactive Advertising Bureau (IAB) report show that internet advertisement spending increased from R 1.3 billion in 2013 to R 3.95 billion in 2016, benefitting international companies Google and Facebook. Original digital video (ODV) advertising spend is also increasing. However, South African advertisers are reported to plan to increase their digital and mobile video spending in the next year. Investment in ODV programming has climbed steadily since 2016 and is expected to grow 68 % by the end of 2018. (Who Owns Whom, 2018).

According to PWC (Myburgh, 2018) the South African OOH advertising market was valued at R 4.4 billion in 2017 increasing 1.1 % from the previous year. This slow growth is attributed to a declining physical OOH market, as well as challenging political and social economic outlooks. Projections are that where in 2017, 70 % of revenue were collected for static OOH advertising compared to 30% digital OHH advertising, this will improve to a nearly 60/40 split by 2022, with estimations indicating that digital advertisement revenue will increase to 43 % of the total revenue for OOH compared to 57% for static advertisements by 2022 (Myburgh, 2018).

Figure 3-1 illustrates the growth in expenditure by advertisement medium in South Africa over a three-year period.

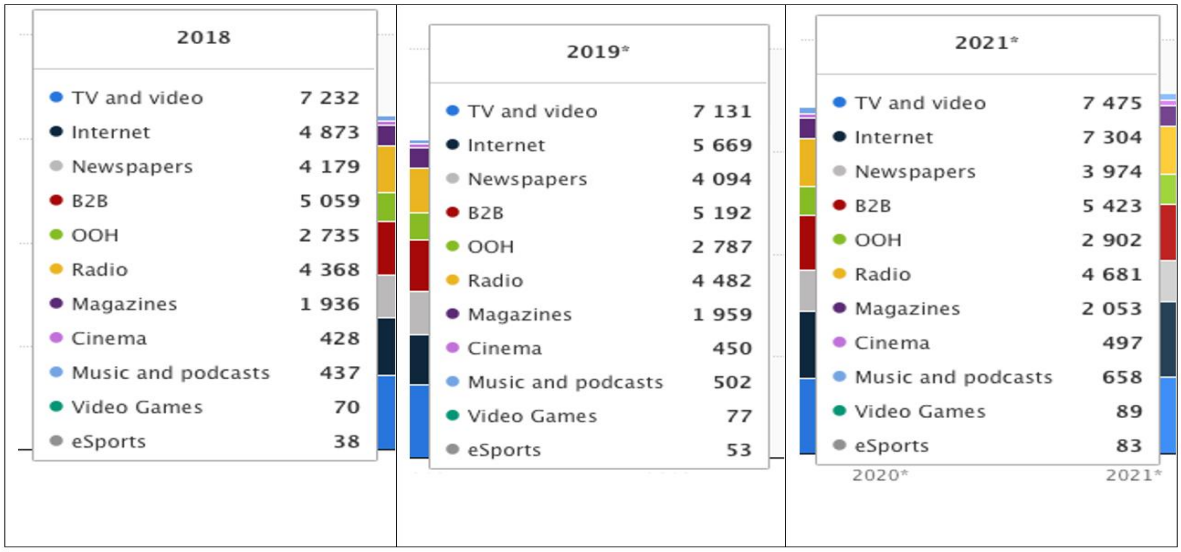


Figure 3-1: Advertising expenditure by medium, South Africa (Guttman, 2019)

South African estimations are that out-of-home advertising reaches 85 % of the adult population, exceeded only by radio and television, which reach about 90 % of the population. By contrast, magazines and newspapers only reach 50 % of the adult population (Liebenberg, 2012).

Based on the 2018 OOH auditor's latest report of the outdoor landscape, outdoor advertising sites in the country were totalled at 12 900 billboards across all nine provinces. This equates to a 1.5 % increase in inventory versus August 2017, and this growth has happened mostly in Gauteng (which accounts for 50 % of all billboards in South Africa) and KwaZulu-Natal (Mokgale, 2018). The tables in Annexure B provide an overview of the extent to which OOH advertising is used to reach consumers in South Africa (Mokono, 2019).

3.3 Outdoor advertisement types, formats, and strategies

3.3.1 Background

Outdoor advertising falls under 'support media', working in conjunction with more traditional mediums to reinforce existing brands or brand messages rather than to create awareness for latest brands (Du Plooy, 2011). Advertising on freeways and major arterials result in extremely high frequency albeit brief viewing (Roux, undated) and are used to maintain 'top of mind' brand awareness. The high-impact, larger than life format is seen as one of the strengths of the traditional billboard medium (Roux, undated).

Large format advertising is not legal in within all road reserves. Road reserves are areas of maximum control where high impact advertisements are be prohibited. Only road authorities succumbing to the revenue generation incentive at the expense of proper management allow high impact advertisements within road reserves (Rautenbach, no date)

More recently, the OOH advertising definition has expanded to incorporate DOOH (Digital Out-of-Home) advertising, which uses networked digital signage displays with messages that are targeted at viewers in an environment. The message delivery is supported by dynamic and rich digital technology with real-time capabilities, targeting mobile consumers (The Interactive Advertising Bureau, 2016).

The difference between traditional OOH advertising media and DOOH media are that traditional OOH advertisements are placed next to major roads to obtain broad consumer awareness, this results in media wastage when the message is ignored by individuals not part of the target market. DOOH on the other hand, provide advertisers with an opportunity to customise content according to the demographics of people viewing the display at different times and locations, so that the messages are targeted and appeal to a certain group (Roux et al., 2017).

3.3.2 Types of outdoor advertising media

Outdoor advertising media can be categorised into the following categories:

- Outdoor advertising media (both freestanding and on constructions and buildings);
- Transit-related (both moving and static);
- Street-and-retail furniture (including street furniture and shopping trolleys, etc); and
- Alternative advertising (including digital and mobile screens in sports clubs, public ablutions etc.

The South African outdoor advertising market consists of advertisers that advertise on out-of-home (OOH) media and the Advertising Regulatory Board (ARB) segments the OOH advertisement industry according to eight classifications.

Table 3-1 provide an overview of the types of OOH advertising according to the ARB classification matrix.

Table 3.1: OOH advertising according to ARB classification matrix

A: Billboards	**B: Digital OOH**	**C: Street furniture**
▪ Roadside billboards (36m2 and larger) ▪ Roadside billboards (smaller than 36m2) ▪ Painted walls ▪ Building wraps ▪ Digital ▪ Inflatables ▪ Aqua aids	▪ Specified under media categories	▪ *Directional signs ▪ *Street pole ads ▪ *Suburban signs ▪ Tenant towers ▪ Litter bins ▪ Bus shelters ▪ Car wash branding ▪ Street furniture
D: Activations	**E: Transit Media**	**F: Retail/Store Media**
▪ Shopping mall promotions ▪ In-store promotions / sampling ▪ Commuter promotions ▪ Sports stadiums ▪ Leaflet promotions ▪ Knock 'n Drop	▪ Buses ▪ Taxis ▪ Trains ▪ Trailers ▪ Trucks ▪ Cars ▪ Digital ▪ Sky banners	▪ In store ▪ Shelf posters ▪ Trolleys ▪ Washrooms ▪ Mall advertising ▪ Wallscapes ▪ Store facades ▪ Digital
G: Stadium Media	**H: Static Transit Media**	

▪ Electronic perimeter ads ▪ Static perimeter ads ▪ Revolving perimeter ads ▪ Billboards – external ▪ Billboards – internal* ▪ Digital ▪ Banners ▪ Flags	▪ Airport outdoor digital ▪ Airport indoor ▪ Railway stations ▪ Taxi ranks ▪ Bus terminals ▪ Gautrain stations ▪ Digital
* No longer permitted	

A. Traditional outdoor advertising media and strategies

The Commonwealth of Australia (2011) highlights that because outdoor advertising media cannot be turned off or put down (unlike printed media or television/radio adverts), consumers are not able to fast-forward through an outdoor ad as it moves through their environment or when entering the viewing range of strategically placed displays such as billboards. Outdoor spaces are therefore the last place where consumers do not have control over the advertisement space. This gives advertisers unprecedented control over how and where an advertisement is seen. Outdoor advertising agencies are giving advertisers control over advertising space through its unprecedented offering of different media options. Increasingly though, control over advertising message exposure is shifting from the medium and the advertiser to the consumer.

The intrusive nature of OOH, however, means advertisers can break through this barrier to advertising consent. Tactically positioned to maximise the impact of thematic and decision-interval relevance, OOH not only attracts the attention of consumers, but actively engages with them (Muller, 2013).

Static (non-digital OOH) advertising displays

OOH static advertising is one of the oldest advertising formats (such as billboards, banners, transit displays) and remains as one of the most essential advertising segments. The growing adoption of light-emitting diode (LED) mobile billboards is one of the top outdoor advertising trends. The reason for the traction is because LED mobile billboards are moveable and can be moved to physical locations to optimise the number of viewers. LED mobile billboards can reach many audiences through the LED display as campaigns and can be used to target specific geography by covering various places such as sports events, schools, and conventions (TechNavio Blog, 2019).

Digital OOH advertising displays

Roux and Van der Walt (2014:16) state that:

"Digital OOH advertising media allow for the real-time adaptation of advertisements, supported or automated by information systems. Contemporary digital OOH advertising will only be successful if placed in environments which allow enough dwelling time for the necessary interaction"

Digital display advertising was launched in the 1990s and has rapidly expanded ever since. In the past, a manual operator changed billboard features manually however with digital displays the features switch displays within seconds. In 2003, the digital outdoor market accounted for 2 % of market share; however, by 2010 these digital advertisements have grown to 10 % of the market share (Consadine, 2019). In addition, unless the view of the passer-by is hampered or blocked, OOH advertising offers a brand safe environment, with unparalleled view-ability

Mixed advertising strategies

Indications are that in the next two to three years, 70 % of global media planners indicated that DOOH advertising will form part of campaign plans. Digital advertising creates opportunities for printed media although indications earlier were that traditional media advertising might start to fall by the wayside with advent of new and innovative technologies that provide new opportunities for marketing channels. Webster (2019) indicates that recent technologies provide new

opportunities for physical printed media as a component of wider multi-channel campaigns. Digital strategies are paired with traditional print media and printed media is used to supplements the digital advertising campaigns.

Mobile advertising

Targeting OOH in the right location is crucial for advertisers to reach the intended target audience. OOH making use of mobile advertising are considered a better campaign generating more online activity. Mobile advertising refers to the advertisements that is placed on advertising space on the side of logistic vehicles and a recent trend is that the advertisement does not necessarily reflect the cargo that is carried within the vehicle (Webster, 2019). Truck advertising is also seen as a cost-effective marketing tool and indications in the USA are that in busy areas, advertisements can be seen by up to 3 000 people. Compared to billboards, truck advertising is considered more effective as billboards are only observed by potential customers for brief periods of time. This practice is now being extended to include advertising on vehicles that form part of fleets such as minibus-taxis and other types of public transport.

B. Future trends applicable to outdoor advertising in the road environment

Benefits of digital outdoor digital media include the value that the addition of technology to displays can have on reaching wider audiences (Muller, 2013). As such with Radio Frequency Identification (RFID) wireless technology it is possible to identify and deliver personalised content to individuals, including drivers, carrying an equipped device/card within 100 metres. Sociable Media is dynamic and is a result of the convergence of OOH media, mobile, online social media and real-world social media that is used to interact with consumers. Streaming OOH incorporates images, video, or data into digital screen content on a real time basis again effectively reaching target audiences. In addition, mobile phone applications are developed for recognising objects via the camera of the phone to connect consumers with related web links.

Digitisation, interactivity, and OOH advertising

The significant penetration of smartphones and mobile network services, along with the amount of time spent on smartphone applications has encouraged advertisers to focus on in-application advertisements of their products and services. Social media has changed the way in which people interact with their immediate environment (TechNavio Blog, 2019). Consadine, (2019) states that: “This creates an opportunity for OOH media to attract not only attention and eyeballs, but active engagement – like posting and sharing photos of street pole ads, billboards, posters, and wall murals (The Media Online, 2019).

In-application advertising and social media work well together and accordingly advertisers are focusing on advertising spaces that are responsive and flexible towards target audiences (TechNavio Blog, 2019; Moving Walls, 2019). According to recent Facebook data (TechNavio Blog, 2019) most social media application users, use the platforms’ story function to interact and the research showed that approximately 81 % of Snapchat users post stories compared to 61 % for Instagram users. Advertisers are taking note of social media preferences and use and are using the video advertising format for sponsored content stories. Video advertising is deemed more engaging than standard text and is an effective medium to deliver information to mobile users. It also allows real-time interaction and feedback that helps vendors to reach a larger customer base (TechNavio Blog, 2019).

Interactive billboards present the target audience with the opportunity to experience something personnel such as an engaging campaign tailor-made for the consumer and based on the consumer habits (Moving Walls, 2019). These campaigns are designed to provoke a positive interaction with the consumer. According to Moving Walls (2019), therefore dynamic and digital screens are transitioning to address audience segments. Future features include digital billboards offering the ability to integrate with additional interactive features like augmented reality screens, facial recognition, and gamification.

Smarter and faster digital OOH advertising

Programmatic advertising is the use of automated technology for media buying, as opposed to traditional (often manual) methods of digital advertising. Major digital media players accept programmatic buying as the standard form of advertising, according to TechNavio (2019). Programmatic advertising is the automated process of buying and selling online advertising space and is a new advertising format that quickly gained momentum over the recent decade.

Programmatic advertising in OOH has been held back by inefficiencies like lack of planning data and manual proposal generation. However, although programmatic buying is developing within the OOH advertising space, stakeholders are yet to agree on data standards for the buying process to become faster and more transparent. For DOOH to be considered alongside other digital platforms, the OOH advertising space needs to be immediately accessible and transparent (TechNavio Blog, 2019).

Geo-fencing OOH advertisements

Geo-fencing involves targeting consumers based on location-based data, which means that those who leave the area in proximity of the advertisement would be able to view the advert on their mobile phones too. Geo-fencing as a practice is becoming the norm with outdoor advertising providers now offering an additional mobile geo-fencing layer to make their outdoor advertising packages more attractive (TechNavio Blog, 2019).

Specialist digital signage networks for OOH advertising

Specialist networks operate to target ads in specific parts of a city or town to maximise impact making use of location-based data (TechNavio Blog, 2019). TechNavio provides the following example: If there are several financial institutions around an area, networks air advertisement space that is for example promoting a banking service. This can be used for any product or service prevalent in a location or an area. Digital billboards can form part of the network of sites used to reach the same type of consumers at several places in their daily lives.

Instagrammable and scrolling billboards

Younger consumers are shying away from traditional media and marketing channels. Young consumers do most of their activities online and although they are not interested in traditional marketing materials such as web advertisements, they share content (Williams and Page, 2010; Inman, 2018).

‘Instagrammable’ refers to a form of OOH advertisements that are engaging, creative, visually pleasing and have the potential of being shared and streamed. Technavio (2019) stipulate that Instagrammable OOH media gives advertisers the opportunity to interact with consumers by giving consumers the opportunity to share the content of the billboard on social media platforms. The advertisers therefore employ the consumer to do the work for them.

C. Industries adopting digital marketing and OOH advertising

Industries adopting outdoor advertising as a preferred media include:

Real estate advertising: Real estate advertisers are increasingly using digital technology and personal content to create more effective advertising campaigns (TechNavio Blog, 2019). A major digital advertising trend in the real estate industry is virtual home tours that include 360-degree video showing of entire properties. In addition, the real estate industry is using social media and location-based and programmatic advertising for buying and selling of properties.

Retail advertising: Retailers are adopting ‘omni channel’ advertising strategies shifting advertising budgets between mobile advertising, paid social media, and online influencer endorsements. Retailers link their social media posts to online or e-commerce pages where the products can be purchased directly by social media visitors. Retailers are adopting automation software to send deals to the customers through several of digital advertisings (TechNavio Blog, 2019)

Pharmaceutical advertisements: Television and printed media have traditionally been the advertisement strategy used buy medical and pharmaceutical companies. This sector has strict privacy and regulatory guidelines that companies must abide by. However, in recent years, programmatic advertising to find targeted audiences are increasingly being used (TechNavio Blog, 2019).

Recruitment advertising: The recruitment industry is increasingly using automation software to search and find relevant matching curriculum vitae for recruiters to attract the right candidates (TechNavio Blog, 2019). These strategies are included in outdoor advertising practices and aim to reach a larger segment of the target audience.

3.4 Motivation for outdoor advertising

Roux (2017) quotes the outdoor media advertising association of America that says, “Outdoor is not medium; it is an extra-large,” which according to Roux, signifies the fact that advertisement next to roads can literally become ‘larger than life’.

Roux further reiterates that the impact of these large advertising boards is designed to influence the visual cortex of the human brain, responsible for processing visual information (Roux 2017). Roux states that:

> *“Mediums such as super-size advertising boards and large screens in movie theatres offer audiences a unique exposure to monumental images, whose psychological impact is directly proportional to their greater-than-life dimensions. It is the size of these images that connect outdoor advertising in a kind of kindred communicational potency“ (Roux, 2017:1).*

OOH media refers to advertising aimed at reaching people when they are outside of their homes (Roux, van der Waldt & Ehlers, 2013). Roadside advertisements have a significant reach (85 % of the adult population) especially because people spent so much time out of home. Due to changing patterns in urbanisation and centralisation of economic activities, consumers worldwide are more mobile than ever before. The Operators (2015) state that “advertising offers provides a powerful mix of formats for reaching people — especially hard to reach segments — throughout their day, as well as amplifying and activating the messaging from other platforms”.

Outdoor advertisements include all advertising aimed at reaching a mobile audience such as advertising on roadside billboards, inside and outside of busses and taxis, road furniture such as for example public transport stops, pedestrian routes, public restrooms, waiting rooms, schools, events, branded children’s playgrounds and public transport ranks and so forth (Muller, no date; Roux, no date).

Outdoor advertising media can reach most people – something not possible with traditional media, such as television, radio, magazines, or newspapers, reaching commuters that spend significantly more time commuting between home and work, due to traffic congestion and distance. According to Kerr (2015), data from the 2003 National Travel Survey shows that South Africans spent an average of 71 minutes per day commuting to work. This was just less than double the average commute time both in the United States in 2002, a country known for its long commuting times, and Hungary, the European Union country with the longest commute times. Ten years later, the 2013 South African National Travel Survey suggested that average commuting times had increased by a further 14 minutes for South Africans (Kerr 2015).

3.4.1 Benefits to advertisers, advertising agencies and property owners: motivation for outdoor advertising

As indicated earlier, advertising agencies have a tremendous benefit financially from outdoor advertisers, making use of outdoor media to advertise their brands. In addition, the benefits of the outdoor advertising industry (to both advertising agencies and brand advertisers) include stimulating the economy, attracting business and trade, and enabling landowners (both public and private) to increase the value of their property through rates, levies, rentals and taxes (Davidson, 2001; Wakil et al., 2016; CROW, 2017) are all cited as additional benefits of outdoor advertising. A 20 % share of advertising income is the typical standard payment to private property owners, or a fixed monthly rental with annual escalation.

The benefits of outdoor advertisements to advertisers (owners of the brand advertised) appears immediately obvious when considering statement such as the ones below:

> *“Advertisers are interested in the mass of citizens who are mobile, either on foot, on public transport, or in their private vehicles. It is not possible for consumers to ‘switch off’ outdoor adverts as they might their televisions or radios, nor to opt out of them altogether, by not buying a magazine or newspaper. As such, the ubiquity and unavoidability of the outdoor adverts makes it a powerful tool for media planners who aim to reach as many viewers as possible for each advertising campaign”*
>
> (Iqani and Baro, 2017).

"[Street pole ads] are like having your own sales team on the ground, permanently, driving people towards your product. The brand can now own the windscreen space of thousands of South African consumers, 24-hours a day, where and when it matters."

(https://www.adreach.co.za).

"The aim of our lease acquisition is to allow you as property owner of billboard / cell mast tower the opportunity to turn your lease into immediate cash in hand….We will evaluate your lease and determine a market value and pay you a lump sum for the rights.

Prime location rights on busy highways can be valued as high as R 400 000 subject to the lease terms and conditions and location.…

Unlock the value of your lease today!"

https://www.outdoormedia-sa.co.za/leasing

Furthermore, there are claims that outdoor advertisements 'develop visual diversity, festivity, local character in the form of permanent landmarks', serving as guiding tools for pedestrians, one of the best ways for fundraising, sharing information and increasing revenue (Wakil et al., 2016). Adding colour to a drab environment, illuminated signs enhancing the symbolic value of a city by becoming landmarks and objects of interest and pride, safety (lighting makes outdoor environments more secure – and even reducing accidents through reducing motorists' boredom – are arguments marshalled in support of this medium (Wakil et al., 2016).

3.4.2 Industry motivation for OOH advertising next to roadsides

The Mixed Media Group (Mixed Media Group, 2018) states that distracted driving is more prevalent today than ever before. Distractions range from mobile phone use, in-vehicle navigation systems and a range of different electronic displays and listening devices. The argument put forward by the outdoor advertising industry is that despite all these internal distractions, such as cell phones, passengers and so forth drivers still notice billboards.

Billboards therefore remain a completive marketing tool because of the amount of time that people spent travelling. The Mixed media Group (2019) state that Americans spend an average of 17,600 minutes in their cars every year, approximately 293 hours annually. In the US the average person drives between 31.5 and 26.2 miles per day, depending on the season. And adults 30-49 log the most miles behind the wheel, at 13,506 per year. What does all this mean? The more time people spend in the car, the more time they look at their surroundings and noticing billboards (Mixed Media Group, 2018).

There are two schools of thought around the use of billboards and distraction. The first revolves around the fact that digital billboards capture the attention with moving or changing images (Mixed Media Group, 2018) while on the other hand the argument is that because drivers are so distracted, static advertisements have a greater impact. Because of the digital overload that people experience daily, real life adverting is becoming more effective. Constantine (2019) states that "when coming across a billboard, street sign or other eye-catching object, people take a moment to look. In a world with an abundance of screens, large, uncluttered, mostly static images still have the power to grab our attention".

The Media Group (2019) cites the findings of a survey conducted among American road users and found that:

- Two-thirds of respondents reported seeing a billboard in the past month;
- 80% of billboard viewers looked at the advertising message some of the time, and half did it all the time;
- 66% of bus and taxi riders said they had seen one in the previous month. This is particularly notable, because it negates the claim that people are just looking at their phones when they are passengers. This answer proves they still look out the windows.

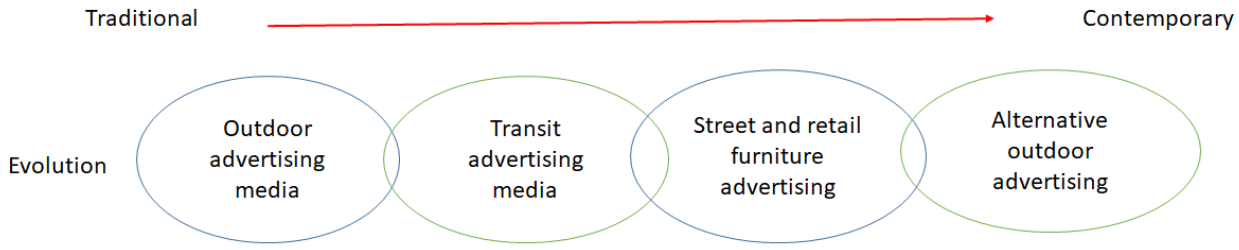
The main reasons why people notice billboards are listed below (Mixed Media Group, 2018):

- Captive audience: Drivers can't avoid them in their sightlines as they drive;
- Relevancy: People are interested in information contained in the billboards;
- Creativity: People love the message or humour depicted on the board;
- Relevancy: Billboards deliver pertinent content.

3.4.3 Target audiences and market reach

Roux and van der Walt (2014) state that outdoor advertisement displays (figure 3-2) are primarily used for vehicular traffic, pedestrians and transit areas. The primary consideration for placement of displays is the audience: "the placed on different formats should be suitable for the environment where the audience is exposed to messages to maximise the effectiveness' (Roux and van der Walt, 2014: 108).

In addition, the authors highlight that the roadside environment where the message is aimed at fast-moving traffic means that there is little dwelling time for observers and as such messages need to be short with a limited number of high-impact visual cues (Figure 3-2).



OOH audiences				
Type of OOH audiences	Vehicular traffic	Commuters	Pedestrians/shoppers	Specific targets
Extent of market coverage	Broad mass coverage			Niche markets
OOH advertising environment				
Type	Roadside	Transit	Retail/leisure	Various locations mostly indoors
Potential dwelling rime	Limited			Low
Ability for interaction	Low			High

Figure 3-2: Types of outdoor advertising media platforms and target audience, locations (adapted from Roux and van der Walt, 2014: 109)

3.5 Critique and arguments in support of regulating outdoor advertising practices

3.5.1 Lack of measurement techniques to verify the impact of outdoor advertising practices

Outdoor advertising agencies are criticised for its lack of verified research pertaining to the reach that the advertisements have, as the few existing techniques used to determine the impact of outdoor advertising, have not been validated (Page et al., 2017; Wilson and Casper, 2016). Studies indicate that it is difficult to measure the impact of outdoor advertising due to the fact that the messages are displayed for short periods of time (in other words the exposure time is short); and the number of exposures high (number of consumers seeing the advertisement), making the responses difficult to measure (Kovacic, 2012).

International academic research focusses predominately on quantifying audience responses to new media such as the internet, mobile advertising and social media (Knoll, 2015) and digital television (Wilding et al. 2018) but lose sight of the fact that other media are attempting to find innovative solutions to cope with and thrive in the contemporary media environment. Bloom (2000) however highlights that despite recent studies into the effect of advertising media on consumers, little is known about how to assess the impact of the format and frequency with which outdoor advertising is delivered and should be assessed. In general, there seems to be a lack of understanding of audience measurement systems used by the outdoor advertising industry to plan and evaluate OOH advertising media (Taylor, 2015).

Similarly, South African empirical research regarding the impact of outdoor advertising is also limited. Available research studies focus on the regulation of outdoor advertising of harmful products (De Bruijin et al., 2014) or the promotion of public health campaigns (Nagel and Louw, 2004). Studies that do focus on measuring the effect of outdoor advertising on consumers include investigations into digital signage (Dennis et al., 2010; Burke 2009) and computational neuroscience software and eye-tracking programmes that measures the processing of outdoor advertising messages (Wilson et al 2015; Wilson & Casper 2016).

3.5.2 Arguments in support of the regulation of outdoor advertising practices

Alternate perspectives that critique outdoor advertising include reference to outdoor advertisements as 'litter on a stick,' 'sky trash', and the 'junk mail of the …highway' (Wakil et al., 2016). These critiques have led to the positioning of arguments for regulation of outdoor advertising – including arguments that relate to crime and vandalism, poor community identity, devaluation of place and commercialisation of places, in addition to encouraging unsustainable consumption patterns, light pollution, direct environmental impact, devaluation of property values, and having a negative impact on tourism resources (Jordaan, 2001).

Cultural alienation and exclusion are further criticisms of large-scale outdoor advertising interventions (Iqani and Baro, 2017). Research in the US, New Zealand, Asia, and lower-income European countries suggest that outdoor advertising specifically targets potentially vulnerable communities, and young people (Avram, 2012; Kovacic, 2012) notes that 'influencing emotions of consumers without their consent should be of deep concern for government and communities. In addition, because consumers have no control over the messages and media that they are exposed to this involuntary exposure thereto can be considered a violation of human rights. Critiques argue that outdoor advertising, and the fact that is inherently designed to distract drivers, is call to immediate action and stricter regulation (Commonwealth of Australia, 2011)

Lastly (and the focus of this review) the fact that outdoor advertisements, are by nature, designed to be distracting, diverting the attention of the motorist away from the driving task. This argument highlights the dire impact on road safety has long been cited as a legitimate basis for regulation (Jordaan, 2001).

3.6 Summary of findings

Outdoor advertising is seen as the last advertising space where consumers do not have control over whether they want to be exposed to the advertisements and messages. This makes outdoor advertising a sought-after medium as the audience is considered captive. Outdoor advertising practices have grown tremendously, with new types of digital and interactive displays competing for advertising space. This is a trend that is seen internationally, in Africa, and although at a slower pace, in South Africa. Outdoor advertising space is popular and advertising agencies and advertisers actively seek these spaces out to display their products, services, and events. In addition, the industry invests heavily in market and consumer research to understand target audiences to know where and how these outdoor advertising displays will have the largest reach, impact on consumers, and highest return on investment.

The motivation for outdoor advertising in and adjacent to the road reserve is simple. People spend more time on the roads, which results on the increased consumption of roadside media. Due to changing patterns in urbanisation and centralisation of economic activities, consumers worldwide are more mobile than ever before. This is a trend that is fast-developing and advertising space near roads have become prime locations.

The aim of outdoor advertising in and adjacent to the road reserve is to attract drivers' attention. In South Africa, advertising on roads are however only permitted in some instances and in some formats, as prescribed by the SAMOAC and SANRAL guidelines. Traditionally, outdoor advertising as applicable to road reserves, was mostly concerned with static billboards. Due to the potential distraction and contribution to traffic crashes, static billboards, in and outside the road reserve, have been the subject of road safety research since the 1950s. However, with the advent of the digital and technology era, the type of outdoor advertising displays utilised in the road environment, have seen significant development and changes. Advancements in technology and changing consumer patterns, have made digital and interactive outdoor advertising practices even more popular with the outdoor advertising industry. Advertising on freeways and major arterials are popular as the advertisements are seen with high frequency, but exposure viewing is brief. This type of high impact, 'larger than life' format is one of the strengths of the traditional billboard medium.

There are indications that the outdoor advertising is being pressured into conforming to stricter regulatory practices. Firstly, there seems to be lack of verified research that indeed suggest that outdoor advertising is effective. Secondly there is a need to better quantify the impact that outdoor advertising has on the environment with arguments that outdoor

advertising is negative and is correlated with crime and vandalism, poor community identity, devaluation of place and commercialisation of places, in addition to encouraging unsustainable consumption patterns, light pollution, direct environmental impact, devaluation of property values, and having a negative impact on tourism resources. There have also been concerns that the fact that people have no control over it, the messages, and media that they are exposed to is a violation of human rights. Lastly critiques argue that outdoor advertising, and the fact that is inherently designed to distract drivers, is call to immediate action and stricter regulation.

4 Impact of outdoor advertising on road safety

4.1 Introduction

Traditionally outdoor advertisements have been known to contribute to unsafe road environments as follows:

- Distraction at unsafe locations;
- Attention overload at locations where complex driver decisions need to be made;
- Degradation of visibility of warning signs, guidance signs and traffic control measures;
- Conflict with guidance sign systems;
- Unwanted sign supports in vehicle recovery zones;
- Interference with communication devices.

Chapter 4 provides an overview of how roadside advertisements contribute to road traffic accidents, unsafe road environments and negative impact on driver performance which include a review of the consequences of driving distracted or inattentive. The chapter concludes with an overview of modern technologies used in the road reserve and the serious road safety implications that the use of new digital technologies has on road safety.

4.2 Ways in which to measure the impact of roadside advertising on road safety

4.2.1 Traditional methodologies

Several research studies with different methodologies have through the years been employed to study the effect that outdoor advertising displays have on driver behaviour and road safety (Vlakveld and Helman, 2019). These include post-hoc collision studies, field investigations, and laboratory tests, all methods used to determine a relationship between outdoor advertising and road safety impacts. Each methodology, however, has its own set of constraints. Rempel et al (2013) state that a limitation, found across methodologies, is the variability that exists between the types of outdoor advertising displays and the contexts in which they are placed. Variations in sign characteristics (e.g., size, luminance), message content (text, images, video), placement (e.g., urban, rural, lateral offset from road, height), and driver demographics according to Rempel et al (2013) create thousands of unique environments in which displays can be studied and each which can lead to measurable differences in distraction regardless of the study method. Table 4-1 below summarises the limitations of the traditional methodologies used to investigate the effect of roadside advertisements on road safety.

Table 4.1: Limitations of methodologies used to investigate the effect of roadside advertisements on road safety (Rempel et al., 2013)

Methodology	Limitations
Post hoc collision studies	▪ Underreported collisions ▪ Driver involved may be unwilling or unable to report distracted driving ▪ Requires data collection over extensive time periods
Field investigations	▪ Artificial nature of implementation ▪ Route contrived for experimental purposes ▪ Participants sometimes drive with experimenter present ▪ Driver may wear a head-mounted eye tracking device
Laboratory experiments	▪ Artificial nature of implementation

Methodology	Limitations
	▪ Requires drivers to adapt to simulator

4.2.2 Studies disputing outdoor advertising's role in accident causation

Earlier reports from the FHWA and Transport Research Board (TRB) concluded that despite years of research there was no definitive conclusions about the impact that digital and other types of outdoor displays have on road safety (Rempel et al., 2013). There were also several studies that disputed the fact that outdoor advertising practices are a contributing factor in the causation of accidents. In addition, studies also highlight that it is difficult to quantify the impact with which outdoor advertising is contributing to distraction, influencing driver behaviour negatively and road traffic accidents (Finnish Road Administration, 2004).

In 2001 for example, the US FHWA investigated the impact of electronic billboards as well as the effects of roadside advertisements generally and the consensus was that the review did not include clear findings pertaining to the effects of roadside advertisements on road safety (European Road Safety Observatory, 2018). Recent studies emphasise the need for more and urgent research on the matter (Roberts 2013; Oviedo-Trespalacios et al., 2019).

Most of these studies are dated and tend to consider distraction because of outdoor advertising in the form of billboards (traditional/electronic) only. Studies focusing on billboards include:

- Smiley et al. (2005), which also reportedly found that when comparing the effects of moving versus non-moving advertising billboards, no significant impact on accidents was found.
- Lee et al. (2003), compared eye movements in relation to the lateral position of vehicles along with driving speeds of test drivers, in the vicinity of several types of roadside advertisements and research reference (test and control) sites. The conclusion was that roadside advertisements did not change driver behaviour. However, differences in glance behaviour near the advertisements and control sites, was reported as part of the results.
- The Finnish Road Administration (2018), which concluded that the effects of billboards and business signs or logos do not seem to differ.

In some instances, the findings from studies debating the contribution of outdoor advertising in accident causation has been disputed. A case in point is the Tantala and Tantala (2005 and 2009) studies which investigated the influence of advertising billboards at the roadside in Ohio. Two studies were completed in 2005 and again in 2009 (Tantala and Tantala, 2009). In both instances, the studies found that the billboards had no statistical or considerable influence on accidents (Tantala et al., 2005; Tantala et al., 2009). These two studies claimed that "electronic billboards are no more likely to cause accidents than conventional billboards" (Tantala et al., 2005; Tantala et al., 2009). Lazarus (2008) state that the findings have since been contradicted in the Watchel 2007 report which critiqued the conclusions and methodology of both studies. More recently to quantify the research related to road safety and outdoor advertising Rempel et al (2013) based on a review of available literature prepared the schematic illustrated in Figure 4-1. The conclusion was that the research is still not well positioned to assist road authorities in especially Canada to make informed decisions regarding the safety implications of roadside advertising applications.

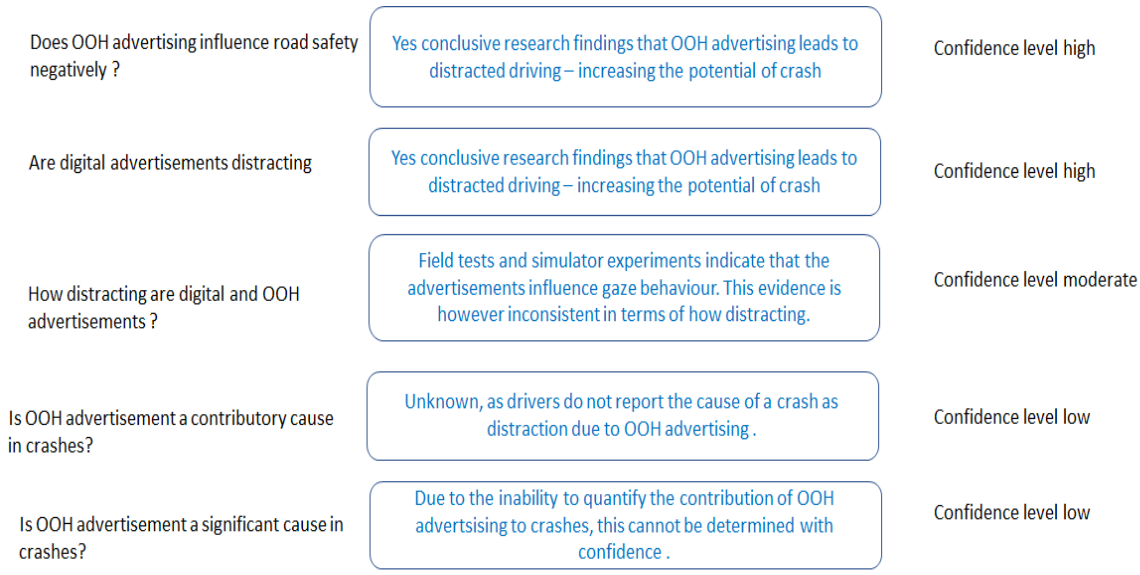


Figure 4-1: Quantifying the impact of road safety research pertaining to outdoor advertising (Rempel et al., 2013)

In addition, the fast pace at which technology is developing also has implication for the use of methodologies and data collection techniques as it seems that modern data collection and analysis tools are better to detect human behaviour such as head movements and eye glances, measured in seconds. These advances in data collection and analyses now make it possible to notice record and report on behaviour which was previously not possible.

4.2.3 Studies confirming the role of outdoor advertising in accident causation

A. Self-reported studies

External distractors, including outdoor advertisements, have been identified as significant self-reported causes of road traffic accidents despite research that has been put forward to question the possibility of a direct link between distraction due to advertisements and accident causation (Crundall, 2006).

The European Road Safety Observatory (2018) state that roadside advertising (such as looking at advertising billboards) increases accident risk by a factor of 17. This conclusion is based on a study by (Backer-Grondahl 2009) in which car drivers who had accident in the past year reported sources of distraction during an accident. Advertising billboards were reported to be part of the accident causes. The numbers of drivers who were reported to be culpable in an accident were compared with numbers of drivers who were reported as not being culpable to calculate the relative risk (ERSO, 2018).

B. Accident records

The Finnish Road Administration (2004) examined 405 Insurance Companies' Road Safety Committee's accident reports on fatal accidents (taking place between 2000 and 2001) to get an understanding of whether roadside advertisements were reported as causes of the accidents. The reports were inspected with the aim of finding evidence of situations where an excess of information directed toward road users could be considered a partial cause of a fatal accident. The reported advertisements were studied not only for excess of information, but also for evidence of contributing to the accidents by obstructing visibility. The findings indicated that six of the accidents were caused by roadside advertisements in or next to the road.

The findings indicated that all six accidents occurred at an intersection. Nine people were killed and 2 were injured in the six accidents. In four cases the effect was obstructed visibility, in one case obstructed visibility and disturbance of the driver's concentration, and in one case only disturbance of the driver's concentration (Table 4-3).

Table 4.2: Effect of advertisements on the occurrence of accidents (Finnish Road Administration 2004)

Effect of advertisements	Accidents
Obstructed visibility	4

Effect of advertisements	Accidents
Disturbed concentration	1
Obstructed visibility and disturbed concentration	1

Roberts (2013) state that in Australia at least 1 % of recorded accidents, are attributed to incidences where roadside advertising is the cause of the distracted driving. Estimations in New Zealand were that in 30-35 % of recorded cases where the cause of the accident was distraction, the source of distraction, was located outside the vehicle (Edquist, 2007).

Edquist et al (2007) further highlights the following studies that support the notion that roadside advertising is a cause of distraction:

- In 2000 Cairney and Gunatillake (2000) compared accident data with advertisement locations and found that areas with a greater density of advertisements correlated with a higher accident rate, especially for changeable (variable) message signs;
- In 2001 Farby et al found that accident rates were higher in areas where electronic billboards have been installed;
- In 2003 Wallace reviewed literature related to billboards and accidents, concluding that the presence of billboards correlated with high accident rates in only some circumstances. Higher accident rates were associated with billboards at intersections and along monotonous stretches of road. Wallace concluded that more research should be done to identify the conditions under which billboards interfere to a dangerous extent with the driving task (Wallace 2003).

C. Simulation studies

In 1976, Johnston and Cole (1976) performed a simulated tracking task in which participants moved a joystick to track arrows that appeared on a screen. Distracting advertisements were occasionally presented just above the arrows (Edquist 2007). The conclusion was that the distractions from advertising billboards did not affect vehicle control negatively, but affected hazard perception, critical for safe driving, because it limited the participants' ability to observe peripherally.

Crundall et al (2006) compared street level advertisements (SLAs) with raised-level advertisements (RLAs) of the same size, that were suspended 3 metres above the ground, on their ability to attract attention under different task conditions. SLAs received the most fixations when participants were solely looking for hazards. SLAs received the least fixations when primed to look for advertisements. Though SLAs had longer fixations than the RLAs, they were more poorly recognised in a memory test. The conclusion from the research was that SLAs attract and hold attention at inappropriate times compared to raised-level advertisements (Crundall 2006).

D. Before and after studies

More recently, Gitelman et al (2019) studied the impact of advertising billboards on a highway in Israel and the effect on accidents. The study considered two phases namely a) removing (or covering) existing billboards and b) the subsequent restoration or when they became visible again (Gitelman et al., 2019). The findings indicated that removing the billboards was associated with a decrease of 30 to 40% in injury accidents. Restoring the billboards was associated with an increase of 40 to 50 % in injury accidents. According to the researchers, the accident changes were consistent across various analyses. The estimated decrease in accident numbers during the removal period was up to 100 damage-only accidents and 50 injury accidents per year, and the estimated increase in accidents after billboard restoration were up to 120 damage-only accidents and 30 injury accidents a year. The study provided empirical evidence that removing billboard advertising from the roadsides of a suburban highway in Israel reduced the accidents significantly. The conclusion was that the high frequency of which conspicuous billboards were placed along the road along with complicated traffic conditions on the road – a heavily travelled route with a high density of interchanges – increased the negative impact of driver distraction due to advertising billboards (Gitelman 2019).

4.2.4 Traffic conflict studies and naturalistic driving

As discussed in Chapter 2, accidents are rare events and the stretches of road a billboard may cause a crash are small and the low frequency with which crashes potentially can take place implies that the impact of billboards on crash rates is difficult to determine (Vlakveld and Helman, 2019). Despite this limitation, it is possible to measure driver behaviour in the vicinity of billboards through for example gaze behaviour.

A traffic 'conflict' refers to a situation in which two or more road users approach each other, in time and space. As such the road users risk colliding if their movements remain unchanged. The necessary evasive action is usually braking but may also be swerving or acceleration, or a combination of those manoeuvres. In other words, traffic conflicts are events that would result in an accident if one of the drivers was not able to make an evasive manoeuvre because both vehicles were on course to occupy the same space simultaneously. Conflicts are therefore far more frequent than accidents, and are observable in real time at a site, allowing safety assessments without the occurrence of accidents (Astarita et al., 2019). While interest in the conflict technique has been considerable, its practical use has been limited because of questions of subjectivity and the costs associated with the human registration process (Vasconcelos et al., 2014).

Naturalistic driving refers to naturalistic observations that as a new research approach are already considered as a leading methodology among applied traffic research methods, applied worldwide (Backer-Grondahl, 2009). Under the naturalistic observation approach, the behaviour of road users is observed unobtrusively in a natural setting for an extended period (Klauer et al., 2011). Making use of instrumented vehicles (cameras and data acquisition systems) driver behaviour is observed within the context of the vehicle as well the environment. The result is rich behavioural data that provide insight not only into crashes but into factors that can potential contribute to crashes. Naturalistic driving studies (NDS) events of interest, such as crashes and near crashes are recorded with these sensors and allow for opportunities to gain insight on crash causes (Wu and Jovanis, 2013).

4.2.5 Surrogate measures for understanding contributory factors to crashes

Because road safety cannot be measured directly use can be made of surrogate measures as an approximation (Rempel et al., 2013). NDS research has shown (100-car study) that there is a relationship between crash risk and gaze behaviour. When drivers look at an external object for an extended period, that the crash risk increases exponentially (Dingus et al., 2016). Gaze behaviour is therefore a safety performance indicator (SPI) with which distraction can be measured (Vlakveld, 2019).

The most common surrogate for measuring road safety is collision frequency (sometimes as a function of traffic volume, i.e., collision rate). Six surrogate measures are proposed to approximate the change in collision frequency due to outdoor displays (Rempel et al., 2013):

- glance frequency;
- maximum glance duration (MGD);
- time-eyes-off-road (TEOR);
- lane position control;
- travel speed and deceleration;
- Driver response time.

Research has shown that there is an established relationship between the increased risk of a collision and the surrogates (glance frequency, MGD and TEOR) but that the effect on collision risk of the latter three surrogates (lane position control, speed and response time) is only defined qualitatively in literature (Rempel et al., 2013; Dingus et al., 2016).

In addition, that objective surrogates measure:

- eye glances as a surrogate for distraction;
- distraction is used as a surrogate for estimating the increased risk of a collision;
- The increased risk of a collision is used as a surrogate measure for road safety.

Rempel et al. summarises indicators to quantify the impact of roadside advertisements on road safety and crash risk (Table 4-4). As can be seen from table 4-3 crash risk increases exponentially, the longer eyes are diverted away from the road.

Table 4.3: Objective surrogate measures for the road safety impact of outdoor advertising displays

Surrogate measure	Threshold	Increase in crash risk
Glance frequency	1–2 glances	Increase risk by 140 %
	More than 2 glances	Increase risk by 230 %
Maximum glance duration	>0.75 s	* not applicable
	>2 s	Increase risk by 200 %
Time-eyes-off-road	2 s out of 6 s task	Increase risk by 160 %
	3 s out of 15 s task	Increase risk by 130 %
0.75s is defined as the reaction time to a braking vehicle directly in front of a driver and therefore the amount of time needed to avoid a rear-end collision.		

4.3 Impact of outdoor advertisements on the road environment

Roadside advertising is a common sight on urban as well as rural roads although it is usually found in high traffic areas including highways, major roads, and intersections. Roadside advertisements and the optimal placement thereof are recognised by the advertising industry as a crucial factor in attracting the attention of passing drivers (Crundall et al., 2006). Outdoor advertising companies maximise the use of outdoor advertisements to attract attention of drivers through witty slogans and distinctive visuals, maximising product exposure to the public (Chou, 2008). Billboards are large, brightly coloured, and placed near the road, making them “conspicuous attention grabbers” (Edquist 2007). The purpose of the advertising is to draw the attention of the maximum number of observers to the displayed product or service. Outdoor advertising also has an influence on visual amenity and the natural and built environment heritage and may represent a source of distraction and therefore collision risk for road users (Chou 2008; Chattington et al., 2009).

Road environments in low- and middle-income countries such as South Africa differ fundamentally from road environments in high income countries (Vermaak, 2000). Characterised by congestion with a variety of drivers and vehicles, animals and non-motorised transport users, competing for road space, even if infrastructure is available, construction of these spaces are poor or inadequate to allow for the volumes of users making use of them (Vermaak, 2000). South African road environments are therefore unique as they cater for a range of road users, behaviours, vehicles and activities along roads and road reserves. Unfortunately, since homogeneity of the traffic streams is not consistently addressed, the road and traffic environment seem unorganised (not carefully planned and regulated). The lack of proper planning and regulation give rise to frequent conflicts as the environment essentially fails to provide guidance to users and fail in facilitating a sense of community and belonging, elements, essential for establishing an environment where users feel compliant to behave according to a set of specific social norms. Unorganised road and traffic environments heighten perceived perceptions of risk; expediting behaviours aimed at self-preservation, leading to a ‘free-for-all,’ lawless, prone to rule violation environment (Wegman, et al., 2013a). Left unmanaged, overtime these complex environments, become the norm and part of the everyday ‘normal’ environment.

Chou (2008) highlights the following factors for consideration when assessing the impact of outdoor advertisements and increases in potential risk of accidents:

- Location: The potential road safety impact on road users varies depending on the location in which an advertisement is placed.
- Surroundings: Billboards placed amid multiple outdoor advertising signs may result in visual clutter. The more visual clutter there is, the more likely drivers are to be distracted and fail to notice important traffic or information signs.
- Design: This may relate to a billboard’s advertising content: length of the message, colours, and size of the font. It is evident that drivers’ fixation duration on the billboard will vary depending on the advertising content/design being displayed.

Considerations for assessing the road safety impact of digital and projected advertising displays in Canada include the regulation of the variables summarised in table 4-5 below.

Table 4.4: Outdoor advertising factors influencing driving tasks (Rempel et al., 2013)

Variable	Description	Impact of variable on road safety
Movement	Presence of motion in the advertisement, including video and special effects within a single display.	▪ Dynamic displays increase glance frequency (between 2 -5 times more glances; glance duration, and the number of long glances (i.e., greater than 0.75 seconds) compared to static signs. ▪ Drivers operating in the vicinity of outdoor advertising displays with dynamic displays tend to have less lateral lane control, brake harder (i.e., exhibited slower reaction time) and decrease vehicle speed. ▪ The negative road safety effects of Outdoor advertising displays with dynamic displays tend to decrease as sight distance to these signs increases.
Message duration	Also referred to as dwell time, message on-time, or exposure time.	▪ As the message duration decreases, glance frequency tends to increase. ▪ Increase glance duration in anticipation of the next message. Many jurisdictions have established fixed message duration limits regardless of travel speed. ▪ Literature recommends developing minimum message duration times which are dependent on travel speed and sight distance. ▪ The objective of variable message duration limits is to ensure that drivers only see one or two messages per digital display.
Transition time	Interval between successive displays or messages; also referred to as message change time.	▪ No research quantifies the relationship between message sequencing and road safety. ▪ The application of human factors principles, such as the Ziegarnik Effect, suggests that message sequencing should be discouraged (difficulty of abandoning a task which has not been completed). ▪ This effect concerns displays such as DPADs that attract drivers' attention for longer periods if there are changing images or messages.
Message sequencing	Use of a sequence of displays and messages as part of a single advertisement. Quantity of information includes message length, quantity of text, or number of informational elements.	▪ Insufficient research to make recommendations on the amount of information to display. ▪ The amount of information should be a function of the distance where the sign becomes legible, posted speed limit, legibility, text height, lateral placement of the sign, and glance duration (1.5 to 2.0 seconds per glance is suggested). ▪ The quantity of information should consider driver characteristics such as vision, reaction time, reading time, and spare capacity available to process the information.
Information presentation	The format of information including font type, text size	▪ Text size should be chosen to encourage drivers to read the sign f 500 m in front of the sign (the lateral offset of the

Variable	Description	Impact of variable on road safety
	and spacing, layout, and arrangement.	sign should be chosen such that the sign is not legible at a distance of 150 m in front of the sign). ▪ This is a function of travel speed, but the range of text height values falls between 0.3 m to 1.0 m (12). ▪ If a DPAD includes navigational information to a business, these instructions should contain as few words as possible (less than or equal to six words) to be read in a single glance. Navigational information should be larger than non-navigational information.
Colour	Use of colour in general or in relation to a specific area of a sign.	▪ Colours and designs like official traffic signs tends to decrease road safety. ▪ Therefore, official traffic sign colours should be discouraged for use on outdoor displays.
Information content	Include content and meaning of the information contained within the message including textual and graphical elements.	▪ Messages with both positive and negative emotional content impact vehicle speed, lane position, and driver response time. ▪ Emotional content can hold the driver's attention longer than neutral content and can adversely affect driver performance for up to 0.8 s after the sign. ▪ Negative content decreases speed 10 and increases lateral lane movement. ▪ Positive content increases travel speed after the sign and reduces driver response time. ▪ Mix advertising content with public service announcements impact drivers' ability to notice that a sign's message has changed from irrelevant information to relevant information, particularly drivers familiar with the route.
Luminance	Photometric brightness is the 'brightness' of the billboard as seen from an angle of view. It is measured in candelas per square metre (cd/m2).	▪ The effect of luminance on road safety is dependent on ambient lighting conditions. ▪ Many jurisdictions require advertisers to automatically adjust sign luminance using ambient light sensors. ▪ Higher sign luminance increases driver distraction and reduces the visibility of official traffic signs. ▪ High luminance levels can cause glare and increase visual adaptation times when drivers observe a sign and then return their attention back to the road (especially at night). ▪ Maximum luminance levels and ranges of acceptable luminance vary significantly between jurisdictions. ▪ Although luminance should be a function of ambient lighting conditions, limiting the maximum luminance of a DPAD to 100 nits.

Recommendations (Table 4-6) pertaining to the impact roadside advertising variables can have on road safety (Rempel et al, 2013; Vlakveld et al., 2016):

Table 4.5: Roadside advertising variables and impact on road safety

Variable	Impact on road safety
Longitudinal placement / sign spacing	a) The number of collisions at a location tends to increase in proportion to the number of billboards (although research does not distinguish between static billboards and DPADs).
Lateral placement	▪ The lateral placement of a sign directly affects its conspicuity. ▪ The angle of eccentricity of a DPAD (i.e. the angle from a driver's line of sight to the sign) has a greater effect on sign conspicuity than the sign's 11 size or reflectivity. ▪ A sign's conspicuity increases as the angle of eccentricity decreases, the sign sight distance increases, and when signs are placed along a horizontal curve. ▪ Increasing sign conspicuity increases glance frequency and total time that a driver's eyes are off the road but does not necessarily increase glance duration. ▪ Digital displays (DPADs) should be placed such that conspicuity is decreased. ▪ Lateral placement of a sign should be measured from the driver's field of view and not as a fixed offset from the edge of the roadway. ▪ Road safety is improved by ensuring that official signs are more conspicuous than DPADs and when DPADs are placed outside of the driver's field of view.
Vertical placement	▪ Displays installed at the eye-level of drivers tend to cause higher glance frequencies and longer glance durations compared to signs that are raised above eye level. ▪ Like the lateral placement of signs, the placing of displays needs to be outside of the field of view.
Sight distance / visibility	▪ Drivers tend to be more distracted by displays that are visible for short amounts of time. ▪ Displays especially digital and projected, which are visible for long amounts of time do not significantly affect glance duration but do increase overall time of eyes off the road. ▪ Consideration should be given about the road safety effects of DPADs which are visible to adjacent roads.

4.4 Effects of outdoor advertising in specific traffic locations

Classifying the road environment visually, in a meaningful way is an important task (Balk et al., 2011). Like South Africa, the FHWA (1989) employs a functional classification system (i.e., interstate, other freeways, principal arterials, minor arterials, major collectors, minor collectors, and local (Federal Highway Administration, 1989). Balk et al. (2011) advocates that although the functional classification is useful there is a need for a perceptually based roadway classification system that can support the placement of signage (or removal of extraneous clutter) in the right-of-way as a means to enhance driver performance (Balk et al., 2011).

Table 4-7 provide recommendations pertaining to the impact roadside advertising variables can have on road safety (Rempel et al, 2013; Vlakveld et al., 2016).

Table 4.6: Roadside advertising variables and impact on road safety

Variable	Impact on road safety
Longitudinal placement / sign spacing	b) The number of collisions at a location tends to increase in proportion to the number of billboards (although research does not distinguish between static billboards and DPADs).
Lateral placement	▪ The lateral placement of a sign directly affects its conspicuity. ▪ The angle of eccentricity of a DPAD (i.e. the angle from a driver's line of sight to the sign) has a greater effect on sign conspicuity than the sign's 11 size or reflectivity. ▪ A sign's conspicuity increases as the angle of eccentricity decreases, the sign sight distance increases, and when signs are placed along a horizontal curve. ▪ Increasing sign conspicuity increases glance frequency and total time that a driver's eyes are off the road but does not necessarily increase glance duration. ▪ Digital displays (DPADs) should be placed such that conspicuity is decreased. ▪ Lateral placement of a sign should be measured from the driver's field of view and not as a fixed offset from the edge of the roadway. ▪ Road safety is improved by ensuring that official signs are more conspicuous than DPADs and when DPADs are placed outside of the driver's field of view.
Vertical placement	▪ Displays installed at the eye-level of drivers tend to cause higher glance frequencies and longer glance durations compared to signs that are raised above eye-level. ▪ Like the lateral placement of signs, the placing of displays needs to be outside of the field of view.
Sight distance / visibility	▪ Drivers tend to be more distracted by displays that are visible for short amounts of time. ▪ Displays especially digital and projected, which are visible for long amounts of time do not significantly affect glance duration but do increase overall time of eyes off the road. ▪ Consideration should be given about the road safety effects of DPADs which are visible to adjacent roads.

4.4.1 Traffic lights and signalised/unsignalised intersections

In 1996 it was found that billboards erected along roadsides influenced the drivers' ability to see (visibility of) traffic lights. A later, study also reported that drivers tend to have a longer eye fixation on advertisement billboards, as compared to traffic control signs such as pedestrian or speed limit signs (Lazarus, 2008). Signalised intersections have shorter headways and more variable traffic speeds compared to mid-block locations, where the risk of road users getting involved in rear-ends accidents due to distraction by outdoor advertisements is expected to be significantly higher (Chou et al., 2008).

4.4.2 Intersections

Higher accident rates were also associated with billboards at intersections, where billboards function as visual clutter and interfere with the driver's ability to perceive important traffic signs; and on long monotonous stretches of road, when drivers may be surprised by the sudden appearance of a billboard or fixate upon it as the brightest object in their

visual field (Edquist et al., 2007). Wallace (2003) concluded that more research should be done to identify the conditions under which billboards interfere to a dangerous extent with the driving task.

Many sources of information are irrelevant to the driving task, which leads to driver distraction. A certain amount of distraction is accepted by roadway agencies as evidenced by the universal permission to advertise along the roadside by jurisdictions; the reason given by Rempel (Rempel et al., 2013) is that drivers tend to have spare mental capacity that allows them to direct their attention, to some extent, to stimuli and activities unrelated to the driving task (e.g., looking at scenery, talking to a passenger, reading a billboard). However, directing attention to objects and activities unrelated to driving can distract the driver, reduce situational awareness, and lead to driver error and/or a crash (Rempel et al., 2013).

4.5 Impact of outdoor advertisement on driver awareness and performance

4.5.1 Target audience demographics and other person factors

"By analysing and monitoring a target audience's movements (walking, driving a private car, using public transport) across different environments advertisers can use a combination of OOH advertising media options to create a well-timed, targeted OOH advertising media campaign." (Roux and Van der Walt, 2014: 111)

Outdoor advertising displays are designed to appeal to specific audiences and demographic as well as income groups. Messages, content etc. are designed to distract specific types of consumers at specific places frequented by these target audiences. Roberts (2013) for example highlight that personality factors dictate how attention to emotional material is controlled. Roberts highlighted research by MacLeod et al whom found that "clinically anxious research subjects" directed attention towards threatening material, at the cost of attention to other material. Non-anxious subjects directed attention away from threatening material. This processing bias appears to occur automatically and outside of awareness (MacLeod & Rutherford 1992).

In addition, negative emotions are associated with content 'blindness'. Participants with lower harm avoidance tendencies were able to more easily able to modify their cognitive processing to reduce the induced blindness when given appropriate instructions than were participants who scored high on harm avoidance. Roberts (2013) state that these findings suggest that billboards with emotional content have a greater capacity to attract and hold the attention of individuals for whom that emotional content is significant, resulting in deterioration of driver performance.

Similarly, a study conducted by Glendelle, et al (2008) found that the major factors that make a billboard distracting include large billboards (28 %), famous artist/sexy image model (28 %), reflection of digital billboards (15 %), newly installed billboards (15 %), placement of billboards (8 %), and information/content (6 %). In addition, drivers are more likely to be affected when seeing new images (changed for promotion purposes) and drivers who are not used to billboards are drawn to the size thereof. Nonetheless, drivers reported that famous models with sex appeal distracted them more than other content.

In South Africa about 5.6 % of the population are older than 65 years. In the United States the number of people older than 65 is estimated to grow to 22 % of the USA population by 2030. In South Africa, the growth is unlikely to be that steep over the next decade, yet the trend is still an indication of upward growth.

Elderly drivers and pedestrians are a significant and rapidly growing segment of the traffic stream, with a variety of age-related sensory-motor impairments. As a group, they have the potential to adversely affect the road network system's safety and efficiency. Visual, cognitive, and mobility impairments are often associated with collisions involving older drivers (Rolison, 2018). Data detailing the extent of these impairments is lacking, which is problematic for the design and development of operational standards for roads. Basic policy decisions are also few. However, there is agreement that elderly road users require mobility, and that they should be accommodated by the road's design and operational characteristics to the greatest extent practicable. For every decade after age 25, drivers need twice the brightness at night to receive visual information. Hence, by age 75, some drivers may need 32 times the brightness they did at age 25.

On the other end of the scale, South Africa has a young driver population, and driver training in many respects is not regarded as on par with countries with similar road networks to which South Africa can be compared (Chokotho et al., 2012). The disparity of driving skill levels and the expected erratic behaviour in situations with elevated risks that result

from the low quality and non-uniformity of driver training is a problem which is intensified with the added issues of illegal licensed and unlicensed drivers (Venter and Sinclair, 2019). Thus, designers and engineers should be aware of the problems and requirements of vulnerable road users such as the elderly on the one side and an inexperienced driver group on the other and consider applying applicable measures to aid their respective performances.

4.5.2 Outdoor advertisements impact roadway characteristics and driver performance

As indicated in chapter 2, road designs need to facilitate driver decision-making and the road need to be designed in a manner that will assist the driver in making the correct choice to travel safely from origin to destination. The road therefore needs to be designed in a manner that is standardised, and this standardisation contributes to the drivers' schematic representation of what to expect and how to behave on the road.

Safe driver behaviour is linked to the road layout and geometry because the road influences driver perception in terms of safe travel. This perception relates to the road characteristics and the level of risk perceived by drivers (Medino and Tarko, 2006). Similarly, the road environment affects speed choice as drivers adapt their speed to what they perceive as safe and appropriate for the road (Edquist et al., 2009).

Chou (2008) states that roadside advertisements influence motorists' driving ability depending on:

- The condition of the road environment (amount of traffic, type of intersection controls, road location i.e. urban or rural, and traffic proportions);
- The location of the billboards (placed on a sharp bend or at an intersection and their location above the street);
- The types of billboards (sizes and colours, advertising contents, placement angles and distances, static or dynamic);
- Driver age, as attention and visual processing speed degrade with age, particularly for drivers of over 55 years old;
- Visual clutter including other signage, sign size and the influence of the billboard if it is located amongst other signs.

Table 4-8 provides an overview of road characteristics that need to be consistent throughout the road environment to support safe driving.

Table 4.7: Roadway characteristic variables that can impact road safety near outdoor advertisement displays (Rempel et al., 2013)

Road characteristic	Description	Impact on road safety
Geometry	Refers to the physical dimensions of a road including vertical and horizontal curvature, cross-sectional features, and longitudinal grade.	▪ Glance frequency and glance duration increases when digital displays are placed along roads with long sight distances, an uninterrupted view to the sign, and along a horizontal curve with a low degree of 12 eccentricity. ▪ Increasing glance frequency and duration has been shown to increase the risk of a collision (Table 4-3).
Complexity	Refers to the complexity of the roadway in terms of the driving demand placed on the driver.	▪ Distracting effects contribute to driver demand loads and can significantly increase roadway complexity. Collision rates tend to increase on roads and at locations with high complexity (e.g., busy intersections, interchanges, weaving areas, work zones) and the presence outdoor displays at complex locations can contribute to higher collision rates. ▪ As driver demand load conditions increase, the response time to road signs increases which leads to negative impacts on road safety. Increasing visual clutter and driver workload decreases drivers' detection and response to official signs, decreases travel speed, increases the time to

Road characteristic	Description	Impact on road safety
		change lanes as directed by official signs, increases driving errors, and decreases time spent looking at the road. ■ While visual clutter comprises many elements (e.g., buildings, official road signs, traffic), research shows a strong correlation between the distraction caused by roadside advertising clutter and collision frequency. ■ However, there is no quantifiable metric for clutter. The literature reveals that older drivers have more difficulty locating information on official signs in areas of high visual clutter. ■ It also shows that drivers are more sensitive to changes in visual clutter when clutter is low and often do not detect changes in clutter when clutter is high.
Operations	Refers to the operational characteristics of a roadway including traffic volume, travel speed, and vehicle types using the road.	■ The negative effects distraction on road safety increases on roads with high traffic volumes or high operating speeds ■ A quantifiable relationship between traffic volume and operating speed in the vicinity of digital and other outdoor displays and collision frequency has not been established.

Experienced drivers, driving on familiar roads or for whom changes in road conditions are familiar, may automatically adapt their driving style to changes in conditions, whereas those less experienced in driving may react differently and be more aware of their decisions to change styles.

Adaptation of the road environment to accommodate human limitations could significantly address road traffic accidents (Theeuws, 1995). The presence or absence of roadside objects have an influence on the character of the road and are expected to influence road user behaviour accordingly. Borsos et al (2015) highlight that, by incorporating human centred principles into road designs, the risks of accidents are minimised. The characteristics of the information element (message on road signs) should follow ergonomic principles:

- Interaction between information elements should be clear (no conflicting messages between road traffic signs and markings);
- The road should be self-explaining (situational context);
- Human factors need to be considered for the driving task and traffic in general, along with the distinctive characteristics of diverse types of road users (older/novice/disabled);
- Critical locations are any locations within the road environment that require road users to adapt to a new situation (Borsos et al., 2015).

Devlin et al (2011) suggest that a comprehensive approach is essential in addressing road safety, and that all the elements in the Safe System should be addressed for the safest possible outcome and the SER concept can only be achieved if the geometrical design of the road is combined with clear markings and traffic signage (Devlin et al, 2011; Enzfelder, 2013).

4.5.3 Outdoor advertising's influence on drivers' abilities (performance)

A driving simulator study to investigate the distraction of the driver from the driving task by static and video advertising was conducted by Chattington et al in 2009. Visual distraction was assessed by analysing drivers' 'scanning behaviour' (left, right and central glances) using the output from an eye-tracking system. The research illustrated that roadside advertising has a negative effect on lane position control (Chattington, 2009). The research also suggested that the presence of advertising increased mental workload and eye fixations, drawing attention away from the driving task (Chattington, 2009). The results of the study suggested no matter where the adverts were placed (left, right or centre), the effect of advertising billboards may be more pronounced in scenarios which are monotonous or of lower

workload rather than an urban environment. Drivers drove slower past the video adverts, which indicate safer driving. However, visual behaviour analysis suggested that participants were slowing down to view the video adverts. This combined with greater variation in lane position (indicating poorer tracking ability) and harsher braking (indicating slower reaction times) suggests an overall impairment to driving ability when viewing video adverts (Chattington, 2009).

Bendak et al (2010) investigated roadside advertising with reference to electric signs (which are illuminated by internal lights), animated signs (which refer to any sign that moves or gives the effect of a moving display), banners (which are portable signs usually made of fabric), shop fronts, billboards (that consist of a number of standard-sized poster panels) and changing (variable) message signs (which are animated signs consisting of messages changing in sequence). This study included real-life traffic laws and environmental and traffic conditions including:

- Rain: no rain, rain, heavy rain;
- Fog: no fog, medium fog, heavy fog;
- Time: day, night;
- Traffic volume: no, low, medium, heavy traffic;
- Road type: lighted road, highway (without traffic lights).

Upon completion of the driving session, the simulator gave information pertaining to the session duration, occurrence of accidents (if the driver accidents into any surrounding object). The following driving performance indicators were investigated (Bendak 2010):

- Number of tailgating times;
- Number of over speeding occurrences;
- Number of times the car drifted from lane;
- Number of times of not signalling when passing other cars or turning;
- Number of times of crossing recklessly dangerous intersections.

Drivers' performance (intersection behaviour, lane-keeping, and errors) on all of the remaining three indicators was worse with the presence of advertising signs. The study found that roadside advertising was positively correlated with:

i) drifting unnecessarily from a lane;

ii) recklessly crossing dangerous intersections.

Maintaining lane position (driving in a lane between the two lines) and not drifting from lane requires continuous eye-hand steering coordination. Bendak et al (2010) stated that swinging and drifting from a lane in the presence of advertising signs is a strong indication of how such signs distract drivers and affect their performance. The other indicator (recklessly crossing dangerous intersections) shows the physical loss of fine coordination between paying attention and driving which the researchers attributed to longer reaction times needed, in the presence of hazards, due to being distracted. Additionally, the research found that the number of tailgating times, over-speeding and turning or changing lanes without signalling was more frequent in the presence of advertising signs than when no such signs were present (Bendak, 2010).

4.5.4 Outdoor advertising's influence speed behaviour

Perceptual components of an environment such as roadway/roadside characteristics (curvature, clarity of situation, vegetation right side of the road, and road width) significantly influence drivers' perceptions of safe travel speeds (Balk, 2011). Visually demanding tasks can lead drivers to reduce speed while the slowing in speed might result in traffic flow delays which contributes to congestion, monetary (productivity) lost and increases in travel times (loss in quality of life). This erratic behaviour (speed variability) leads to accidents, near misses, and frustration among fellow road users. In addition, when comparing speed for the various advert types, speeds were significantly higher in the long and medium exposure times for video adverts compared to static adverts (Chattington, 2009).

4.5.5 Roadside advertising's contribution to driver distraction

Distraction caused by aspects of the road environment is a major issue. Distraction levels of displays vary as a function of the complexity of the driving task where the adverse effects of distraction increase with greater driving task demands. Complex geometry and operational characteristics of the road environment, high visual clutter, work zone areas, and areas with road signs and signals that require drivers to make complex decisions have higher driver attention demand. The combined effect of the various distraction inducing roadway characteristics is more important that any single characteristic. In a worldwide trend, the amount of visual information presented to drivers is increasing and roadside advertising signs are considered a major source of that information overflow (Bendak, 2010). The level of distraction experienced by the road users is influenced by the type of adverts (moving or static) and the placement thereof and exposure time (duration over which advert is visible). Distraction levels of displays vary as a function of the complexity of the driving task where the adverse effects of distraction increase with greater driving task demands. Complex geometry and operational characteristics of the road environment, high visual clutter, work zone areas, and areas with road signs and signals that require drivers to make complex decisions have higher driver attention demand. The combined effect of the various distraction inducing roadway characteristics is more important that any single characteristic (Rempel et al., 2013)

Roadside advertising contributes to over-complexity of the visual field and that this result in driver distraction (Chattington 2009). Roadside advertising distracts or confuses road users if it appears cluttered, disordered, and poorly located, and the character of the individual sign too distracting. Thus, if not organised properly, outdoor advertisements influence the road character and might diminish the roads ability to safely guide and direct road users.

Roadside advertising signs can affect drivers by (Bendak, 2010):

- Directly distracting or confusing them while driving;
- Indirectly distracting drivers from the driving task by moving or giving the appearance of motion;
- Taking drivers' eyes off the road, which will give them a slower reaction time to road hazards;
- Obstructing visibility, e.g. at intersections or driveways;
- Presenting a physical obstruction to vehicles moving.

Driver reactions to roadside advertising examined by means of observational and simulation studies found that under the presence of advertising billboards (Gitelman et al., 2019):

- drivers look away from the road more often and for a longer time (Smiley et al. 2005; Young et al. 2009; Dukic et al. 2013);
- react more slowly to road signs and the traffic environment (Edquist et al. 2011);
- exhibit lower levels of vehicle control such as keeping optimal lateral position, speed, or headway distances (Young and Mahfoud. 2007; Chattington et al. 2009; Bendak and Al-Saleh. 2010);
- make more errors in performing driving manoeuvres such as switching lanes (Edquist et al. 2011) or crossing intersections (Bendak and Al-Saleh. 2010).

Diverting attention from important roadside warning signs can put the driver and other road users at risk. Distraction caused by these signs have the potential to disturb drivers' eye fixation on the road, lead to deterioration in driving. Attention to advertisements at the expense of processing vital driving information is distraction rather than attraction of attention and may lead to impairment of driving performance (Crundall, 2006). The few studies that have been conducted to determine the distracting properties of outdoor advertisements demonstrate that drivers do look at and process roadside advertisements and those fixations upon advertisements can be made at short headways or in other unsafe circumstances (Crundall et al., 2006).

Harasimczuk et al (2018) investigated whether longer exposure to messages, were more distracting to drivers than shorter messages. The findings indicated that driver reaction times were longer when they had to read longer slogans, and that driving performance (keeping to a lane) deteriorated under conditions where longer slogans were presented. The study concluded that long slogans, leads to an increase in mental load, and a reduction in the processing of information.

A Scandinavian naturalistic driving study conducted by Herstadt et al (2013), conducted with 233 participants in instrumented vehicles, measured eye glances and concluded that, a) drivers' attention is captured by roadside advertisements, and b) that drivers' visual attention to the roadside advertising signs does impact road safety.

With regards to a) drivers' attention captured by roadside advertising signs:

- In 69 % of all drives past outdoor advertising displays, the driver is glancing at least once at the advertising sign, and in half of all drive pasts, the driver is glancing twice or more at the same advertising sign;
- A glance duration of 1 sec. or more were registered in 18 % of the drivers' advertising glances;
- In 22 % of the drive pasts, the total glance duration of successive glances was 2 seconds or more. (Which according to Klauer et al, 2006 exponential raises the risk of being in an accident).

For b) results showing that the drivers' visual attention to the roadside advertising signs does impact road safety:

- In 25 % of the tracked advertising glances, the safety buffer to the vehicle ahead is less than 2 sec;
- In 20 % of the advertising glances, the safety buffer is lower than 1.5 sec;
- More than 20 % of the glances are a combination of horizontal angle and glance duration, which lies outside the normal range of road users' visual behaviour on rural roads;
- In more than every sixth drive past, visual distraction occurs because of the advertising sign.

The conclusion of the study was that advertising signs, adjacent to the road, do capture drivers' attention to the extent that it impacts road safety (Herrstedt, 2013).

As shown in Table 4-9 driver characteristics influenced by outdoor advertisements include: demographics age, gender, and driving experience, attention to the driving task, speed and deceleration, and lane position.

Table 4.8: Driver characteristics and responses to outdoor advertising displays (Rempel, 2013)

Variable	Description	Impact on road safety
Age, gender, and driving experience	Refers to the age and gender of a driver and the number of years a driver has driven based on the number of years the driver has held a valid driver's licence.	▪ Age, gender, and driving experience according to the authors do not affect the average glance duration toward outdoor advertising displays unsafe glance distribution patterns (i.e., glances longer than 2 seconds) or the ability to anticipate hazards in the presence of displays ▪ However, the maximum glance durations for inexperienced drivers is higher compared to experienced driver. ▪ Older drivers have difficulty finding and responding to official signs and detecting changes in the traffic stream under conditions of high workload and visual clutter (e.g. advertisement signs).
Attention to the driving task	Refers to the effect that displays have on diverting driver attention from the primary driving task.	▪ Drivers tend to look at digital and projective displays more frequently and with longer durations compared to other signs on the road ▪ Available research does not find a difference in glance duration between day and night conditions. ▪ As the driving task increases, there is conflicting results in the literature about the effect on glance frequency. ▪ Research shows that the driving task demand level does not affect the average and maximum glance duration toward DPADs.

Variable	Description	Impact on road safety
		Research shows that the chance of crash nearly doubles when glance durations off the roadway exceed 2.0 seconds and that there does not appear to be a correlation between crash probability and glance durations less than 2.0 seconds. ▪ The literature finds that drivers are often unable to ignore irrelevant stimulation (e.g., DPADs) even under highly demanding driving tasks and even if the driver is intending to concentrate on the driving task. ▪ Although drivers intend to direct their attention to perform the critical driving task first and then direct any spare attention to non-driving tasks, the distracting effects of DPADs can inadvertently assume primary importance. ▪ This effect is greatest among novice and older drivers. ▪ Some research suggests that DPADs on straight roads in monotonous environments where the driving task is under-stimulating can have a positive effect on road safety by increasing driver attentiveness; however, others suggest that there may not be a safety benefit due to phototaxis which refers to the human tendency to direct attention to bright lights.
Speed and deceleration	Refers to the effect of displays have on driver speed, deceleration, headways, and gaps (i.e., whether drivers increase or decrease their speed due to the presence of an outdoor display.	▪ There are inconsistent findings in the literature pertaining to the relationship between outdoor displays and travel speed and headways. ▪ Some studies find drivers are more likely to drive slower and with a shorter following distance in the presence of a distraction, which can cause safety issues due to speed variability.
Lane position	Refers to the impact that DPADs have on the ability of drivers to maintain proper and consistent lane position (i.e., whether DPADs cause drivers to increase lateral vehicle movements within or across lanes).	▪ Glances at outdoor displays tend to increase lane deviations along road segments but do not seem to impact lane deviation at intersections. ▪ When DPADs are present along a road segment, drivers are more than two times as likely to make a lane changing error.

4.5.6 Driver distraction and inattention while driving

Driver distraction occurs when a driver's attention is, voluntarily or involuntarily, diverted away from the driving task by an event or object to the extent that the driver is no longer able to perform the driving task adequately or safely (Regan et al., 2008). More specifically, driver distraction involves secondary task engagement, distracting driver attention from the primary driving task. This diversion of attention away from the driving task, means that the driver is not paying attention to activities critical for safe driving (Regan et al., 2011; Mrgole, 2017).

The level and duration of the distraction is subjected to (Vlakveld, 2019):

The source of the distraction: The source of distraction can be an object, such as a billboard, a person, such as a passenger or a pedestrian on the pavement, an event, such as a low flying airplane that is landing, or an activity of the driver, such as mobile phone use while driving.

The location: The source of distraction can be within the driver, inside the vehicle or outside the vehicle (such as a billboard).

Intentionality: The driver might be compelled to pay attention to the source because of its salience, e.g. a very bright external object, or the driver might voluntarily choose to pay attention, such as calling someone with a mobile phone.

Process: Because the driver is diverting his attention away from the driving task, attention can become insufficient because attention is diverted to other activities, or attention can get misallocated within the traffic task. This inefficiency means that the driver is not fully aware of the situation around him which increases risk that the driver will not have the ability (physical and mentally) to respond to critical events in traffic when they occur.

Outcome: The outcome of distraction is impaired performance of the driver, such as late responses (e.g. braking and/or swerving) when an acute threatening situation arises, or in terms of impaired mental capabilities of the driver, such as diminished situation awareness, diminished hazard anticipation, and degraded decision making. The outcome can also be described in terms of car performance, such as speed disruptions and poor lane keeping. Finally, the outcome can be an increase in crash rate (Vlakveld, 2019).

There are four types of distraction namely visual, acoustic, motor, and mental distraction, which is often difficult to isolate (Yannis, 2014). Recent research in this regard include Engstrom et al (2013) working towards a general conceptual framework for distraction and inattention and Goodwin (2001) who stipulates that distraction varies according to the degree of risk, frequency, duration, and context.

The European Road Safety Observatory (ERSO, 2018) estimated that around 30 % of driver-distracted accidents is caused by sources outside the vehicle. Sources outside the vehicle that can lead to driver distraction and contribute to accidents include landmarks, road signs, advertising billboards, animals, architecture, construction zones, traffic incidents (Regan et al., 2009). An earlier study summarised evidence pertaining to distraction as a contributory factor in crashes from across the world (RTMC, 2015). Table 4-10 provides a summary of the percentage distracted driving practices contribute to crashes according countries.

Table 4.9: Distraction as a contributory cause in crashes – international evidence

Country	**% contribution**
United States	80 % of all crashes 65 % of near-crashes involved some form of driver inattention within three seconds before the event (NHTSA, 2014)
Australia	14 % of crashes where drivers were hospitalised but not killed in the crash (Beanland et al. 2013)
New Zealand	10 % of fatal crashes 9 % of injury crashes (WHO and NHTSA, 2011)
Netherlands	8.3 % crashes resulting in fatalities –- mobile phone usage (SWOV factsheet, 2012)
Spain	37 % of all crashes (WHO and NHTSA, 2011)
Canada	10.7 % fatal crashes (WHO and NHTSA, 2011)
Great Britain	2 % of all crashes (Burton, 2011).
Columbia	9 % of all crashes 21 % involving pedestrian fatalities (WHO and NHTSA, 2011)

Hartley (2007, pp. 329) notes that “if we accept that the human brain has a limited capacity to process information, and then it follows that continually increasing the amount of information being processed by the brain must, ultimately

lead to the stage where it cannot all be processed in time to allow the driver to effectively and safely, carry out the driving task".

Theories of distraction originate from psychological theories of attention, many of which derive from Hebb's theory of arousal. Hebb argued that there was a relationship between arousal (to be excited or interested) and 'cue function' or ability to perform activities. Humans seek a balance between being under-aroused (bored) and over-aroused (stressed) for the 'optimal level of response and learning'. When people are bored, they seek out information that potentially raise their arousal level (Wallace, 2003). When in contrast people are 'stressed' (over-aroused), they attempt to remove the information with which that they cannot deal. In other words, the brain functions as a thermostat or control mechanism, attempting to self-regulate by modulating arousal. Two main modes of visual perception are important:

- 'Focal' vision refers to 'search mode'. This is narrow focus, and specific;
- 'Ambient' vision is the 'default' state, when the driver is not looking at anything.

Attention is 'broad', and the driver is more likely to notice objects at the periphery of the visual field. It can be argued that 'focal' vision is more likely to be associated with high arousal, and 'ambient 'vision with low arousal (Wallace 2003).

4.5.7 Types of distraction applicable to outdoor advertisements

A. Cognitive distraction

Wallace (2003) says that it is doubtful that drivers can cope with the volume of advertising and other distracting features found in the modern road environment. Drivers already lack mental capacity to process information (particularly visual) in busy road environments and drivers need to exceed this threshold due to the increased amount of advertising present around modern roads (Wallace, 2003).

In future, the human brain extracts information stored, from memory and executes or acts on the stored information. If for any reason the brain is overloaded with information these steps are severely affected (National Safety Council 2011). The brain juggles different tasks, and switches between primary and secondary tasks. When someone engages two or more cognitively complex tasks it causes the brain to shift focus causing brain to shift focus, leading to attention blindness, where the driver misses important ques in the road environment and are then not able to take appropriate and safe evasive actions (National Safety Council, 2011).

Once attention is captured or is strategically focused, the processing of the material within the focus of attention competes with other ongoing processing for cognitive resources (Roberts, 2013). Compared to visual distraction, the effects of cognitive distraction on driving performance may be more covert. Like visual distraction, cognitive distractions can undermine a driver's sensitivity to critical cues and traffic signals in the roadway environment (ERSO, 2018)

On-road and simulator studies have found that increasing the driver's mental workload lowers the driver's ability to detect potential hazards, particularly in peripheral vision. Edquist (2007) refers to a study done by Lee and Triggs (1976) that found that drivers missed more lights in a peripheral detection task while driving through busier and more complex environments. Both reaction time and hit rate for a peripheral detection task when driving task difficulty was increased by external causes such as narrow curves or the appearance of an unexpected obstacle deteriorated (Edquist, 2007).

Non-visual distractions increase driver workload, with resulting negative effects on the driver's ability to detect hazards and impair the driver's ability to make appropriate decisions such as taking correct gaps when turning. This is particularly problematic in external environments that are cluttered, as it affects the driver's ability to select correct and relevant information (Edquist, 2007). This is supported by McPhee et al (2004), who investigated the interaction between external stimuli and decision-making by asking participants to search for a sign in high or low cluttered scenes. Luoma (1988) studied drivers' eye movements and recollections of observations in the vicinity of various kinds of observed objects. The results indicated that drivers looked at roadside advertisements for longer than compared to looking at traffic signs (Edquist, 2007). These results suggest that the information presented in the advertisements cannot be perceived quickly and easily (longer glances), but also that the advertisements take glances away from the guiding signs that control and direct traffic movements.

Boersema et al (1989) studied how advertisements at a railway station affect the perceptibility of signs and found that object recognition slowed as the number of advertisements increased (Domke, 2011).

B. Visual distraction

Visual search, in the psychological literature, refers to searching for a target expected to be there (such as a stop or give way sign at an intersection). Visual searches are task-orientated, which means that when performing a visual task, the searcher is looking for something specific, the more clutter there is the longer it takes to complete the task (Balk, 2011). People tend to direct attention toward items of relevance or 'guide' attention to specific task-relevant areas of a visual environment (Balk, 2011). It is a challenging task to determine "how much information in the environment is too much (Domke et al., 2011). Balk et al (2011) states that when a visual road environment scene or array is discussed, clutter is often mentioned, and clutter refers to items (or areas) in the visual field-of-view that hinders performance on a specific search task. As such clutter is task- and environment-dependent; what is clutter (visually distracting) in one scenario may be unimportant in another (Balk, 2011).

Decker et al (2015) found evidence that: 10–20 % of all glances at billboards took +- ≥0.75 seconds; active billboards drew more and longer glances (≥0.75 - ≥2.0 s) than passive billboards but did not attract a longer average glance. In addition, there was a large variability in terms of glances among individual billboards within categories (e.g., active vs. passive).

Drivers also tend to fixate on task relevant signage (that control and guide the driver through the road environment) and in especially visually complex environments, excessive clutter may increase the time required to identify, to interpret, and to respond to task specific stimuli. Clutter in the road environment lead to drivers completely missing relevant signs (e.g. lane merging road markings) among a plethora of other signs amidst the busy road environment. This again leads to erratic behaviour, swerving, merging dangerously and so forth.

Despite the evidence cited above (that visual search behaviour is task-orientated), Roberts (2013) states that in some instances, such as where advertisements are changed every few seconds, the glances towards these images might be involuntary. Images flickering on the side of the road are noticed by drivers' peripheral vision, resulting in an automated response in that direction. In instances where the person is not driving, looking at the flickering image would seem to be safe. However, in instances where the person is driving, the mere fact that the peripheral vison is attracted to a source that is not directly related to the driving task is obviously problematic for road safety – in terms of a loss of situational awareness as well as the fact that the driver glances away from the road. Accident risk increases exponentially if glances are directed away from the driving task and road in front, even if only for 1.5 to 2 seconds (Klauer et al, 2006; Lee et al, 2011; Engström et al., 2013). If this is involuntary, Roberts asks whether it can truly be said that roadside advertising in this form, is not distracting stimuli (Roberts, 2013). Roberts (2013) also highlight that the appearance of new objects in the visual field was the key to predicting attentional capture while Theeuwes (1995) implied that at least luminance changes were necessary to capture attention.

Edquist et al. (2007) studied the effects of visual clutter on driving performance and found that distraction is but one of the effects that clutter from roadside advertising can have on driver performance. Other effects of visual clutter that have a negative effect on driver performance include having difficulty with visual search (searching for street signs) in which interferes with the immediate task of finding a particular street; the necessity of devoting more attention to the search task will increase driver workload. Increases in workload lead to cognitive distraction which affects the driver's ability to control the vehicle and drive safely. Visual search is necessary for two driving tasks: responding to traffic signs and signals; and navigating to the driver's destination. Visual search for a particular target is hindered by the presence of similar-looking 'distractors' in the driving domain, making visual search for traffic signs more difficult when there are advertisements of similar appearance in the vicinity (Edquist, 2007).

Edquist et al (2007) highlight studies where reaction times (to locate road signs) increased with the number of distractors, similarity of colours, and proximity to the target sign. Thus, more advertisements and/or larger advertisements decrease the probability of subjects correctly locating the routing sign (Edquist 2007). In addition, roadside clutter is associated with drivers making more errors, from which Edquist et al (2007) draw the conclusion that visual clutter caused by advertisements (and other objects) can interfere with drivers' ability to search for traffic signs.

C. Secondary tasks and driving task performance

Crundall et al (2006) reveal that an underlying factor for distraction is the level of cognitive demand placed on the driver at any one point, which dictates what the driver should be attending to. Eye movements, in the presence of external distractions, need to attend to a wider range and it has been found that in the presence of external distractions, drivers tend to focus more on lane markings and road edges in order to extract vital information for steering. These extra visual demands during for example curve negotiation result in less spare mental capacity (Crundall, 2006).

In the Strategic Highway Safety Research Programme 2 (SHRP2) Naturalistic Driving Study, data from 36 drivers was analysed to determine the frequency and conditions under which drivers engage in secondary behaviours, and to explore the relationship these behaviours might have with driving performance. A random selection of 1,440 five-second video clips of the drivers' faces was coded for the occurrence of specific secondary behaviours, and for the frequency and duration of glances. Corresponding performance data from the instrumented vehicles was used to calculate variability of steering angle, mean and variability of lane position, mean and variability of throttle position, and variability of speed. Contextual factors were examined, including road type, road curvature, and road condition. Drivers were observed to engage in secondary behaviours in approximately 34 % of the clips. Engagement in secondary behaviours was associated with higher variability in steering angle as well as harsh braking (Klauer et al., 2006).

Smiley (2005) states that in terms of human cognition, distraction can be defined as misallocated attention. In addition, Smiley states, that a driver who is tired, inexperienced or alcohol impaired should not driving distracted as such drivers are already in a compromised state where they take longer to collect driving-critical information and respond more slowly. A tired, or older or inexperienced driver requires all their mental faculties and attentional resources for driving (Smiley, 2005).

D. Driver perception of distracting content

Analysis of a self-report questionnaire showed that drivers believe that (Chattington, 2009):

- video adverts are more distracting than static adverts;
- video adverts are less safe than static adverts;
- there is no significant difference in distraction caused by adverts placed on the right or left of the road;
- adverts placed directly above the road is more distracting than advertising boards placed on either left or right of the road;
- adverts placed on the right, left and centre of the road is more distracting than any single board, placed on the left, right or centre of the road;

When compared to behaviour when passing static adverts, participants said that they:

- spent longer looking at video adverts;
- glanced at video adverts more frequently;
- showed greater variation in lateral lane position with video adverts;
- braked harder on approach to video adverts;
- drove more slowly past video adverts.

4.6 Outdoor advertising media and advances in technology contributing to driver distraction

Vlakveld et al (2016) states that not all objects attract the same attention. The way and extent to which attention is attracted depend on the following factors namely: Salience, Effort, Expectancy, and Value (SEEV). Vlakveld et al (2016) states that the SEEV framework provides a framework for understanding why drivers would be inclined to look at roadside advertising displays (Table 4-11). In addition, it is stated that it is difficult to quantify the deterioration of the driving task because of driver attention being diverted elsewhere (Vlakveld et al., 2016).

Table 4.10: SEEV Framework application to roadside advertising display and distracted driving (Vlakveld, 2016)

Factors influencing distraction	Description
Salience	▪ Where a person is compelled to look at something due to its appearance. ▪ An object has visual salience or conspicuity when it contrasts highly with its background. Size, flashing lights, sudden changes of colours and motions increase visual salience. ▪ Large illuminated digital billboards in the dark with changing colours and moving images are more salient than small traditional, unilluminated static. ▪ Salience is not only visual and as such sudden sounds and vibrations can also attract attention.
Effort	▪ Effort is an inhibitory component that discourages observers from scanning between two locations that are far apart. When for instance drivers need to turn their head to read an advertisement, they will be less inclined to take notice of that advertisement than when the advertisement is straight ahead. ▪ Effort is also related to workload. When drivers must allocate most of their attention to the driving task, for instance because the road and traffic situation is complex, they will be less inclined to look at billboards. In addition, the extent of visual scanning tends to decrease when mental workload increases. In other words, billboards that are further away from the forward road will be less likely to be noticed when drivers must concentrate on the traffic ahead.
Expectancy	▪ The tendency of drivers to scan for information that is relevant for the task at hand. ▪ For instance, they may search for a signage board that indicates that they have to leave the motorway in order to reach their destination.
Value	▪ People tend to seek information most relevant to the tasks they value; a hungry driver is more likely to scan for advertisements of restaurants than would otherwise be the case.

The effects of roadside advertisements on driver distraction and road safety has been researched since the 1930s but digital advertising is however a new form of advertisements Rempel et al (2013) emphasises that the effect of digital displays on road safety is still inadequately understood. Recent advancements in digital advertising technologies combined with the reduction in costs of these technologies have led to increasing pressure on governments to approve their installation adjacent to roads (Rempel et al., 2013).

Video adverts cause higher impairment to driving performance than static adverts (Chattington, 2009). Drivers tend to drive slower past the video adverts, which appear to indicate safer driving, however, on closer inspection Chattington, et al (2009) found that drivers were slowing down to view the video adverts which is an obviously concern as it leads to greater speed differentials, slower moving traffic, tail ending and so forth.

Driving slower to watch the videos also caused greater variation in lane position (indicating poorer tracking ability) and harsher braking (indicating slower reaction times) which showed a deterioration and overall impairment to driving ability when viewing video adverts (Chattington, 2009). Drifting into the offside lane or onto the nearside kerb, increases the risk of an accident or injury to self or other road users (Lazarus, 2008).

Lazarus (2008) notes that the position of the advertisements had predictable effects on participants viewing of the adverts. When the adverts were placed in a position requiring less effort to view, participants were more likely to look at the advert. However, if the position of the advert was on the left (for right driving countries) greater variation in lateral lane position was observed. This suggests that the position an advertisement is placed relative to the observer is significant in determining whether that advertisement can be considered safe. The questionnaire results support the findings from the simulator, where participants tended to be aware that their driving was more impaired by the presence of video adverts than with static adverts (Lazarus, 2008).

The size of Electronic Billboard Signs (EBBs), also referred to as Commercial Electronic Variable Message Signs (VMS) or Digital Billboards, makes them much clearer from a distance than older-generation signs (Roux, 2017). The intent of commercial electronic billboards is to relay advertising messages to the consumer, which places them in direct competition for the attention needed to operate a motor vehicle (Lazarus, 2008).

In a Polish study, Domke et al (2011) found that the negative impacts of billboards may be divided into two categories:

- Factors related to photometric parameters of large size billboards and their immediate surroundings influencing the vision process:
  - High-luminance of billboards with light emitting diodes at low background luminance causes glare for drivers.
  - Sharp contrast of displayed images causes glare for drivers.
- Factors related to perception of adverts and the process of seeing the road:
  - Dynamically changing images (video, animations, rapidly dimmed or brightened images) that distract drivers;
  - Distraction is caused by displaying content intended for memorisation (addresses, phone numbers, mails), location of billboards where increased concentration is required (intersections, roundabouts, road vicinity).

It is difficult for drivers to see road traffic signs when billboards are placed at low heights in relation to the ground. Digital advertising signs use light-emitting diode (LED) technologies to display dynamic messages with high luminance levels. These advertisements are specifically designed to attract maximum driver attention and subsequently creates maximum driver distraction.

When considering outdoor advertisements in the driver field of view, digital display density refers to the concentration of digital displays in a driver's field of view (MORR Transportation Consulting Ltd., 2017).

Figure 4-2 is example of three digital signs in the driver's field of view. Spacing is the longitudinal distance between signs. Density is the number of digital displays within a defined longitudinal distance. Density is used to determine if a area has capacity for adding a new digital display and spacing is used to determine the minimum distance between off-site digital displays. The premise is that all variables (e.g., frame duration, brightness, glance frequency and duration to digital displays (i.e., distraction) are equal, and that when digital display density increases, spacing decreases.

Frame duration is the elapsed time that a single static message is shown on a digital display before changing to the next static message. It is a major factor impacting the distracting effects of an individual digital display. The combination of frame duration and sign density/spacing determines how many frame changes will occur as a driver passes by digital displays. Research indicates that drivers should not observe more than three frame changes within their field of view (MORR Transportation Consulting Ltd., 2017).

As indicated earlier, glance frequency and duration towards digital displays tends to increase as the number of frame changes that occur increases. Increases in glance frequency to external distracting objects increases crash risk. For this reason, the duration of the glance needs to be considered with sign density and spacing. Frame duration, sign density, and sign spacing can be defined to control how many frames change a driver observes (MORR Transportation Consulting Ltd., 2017).

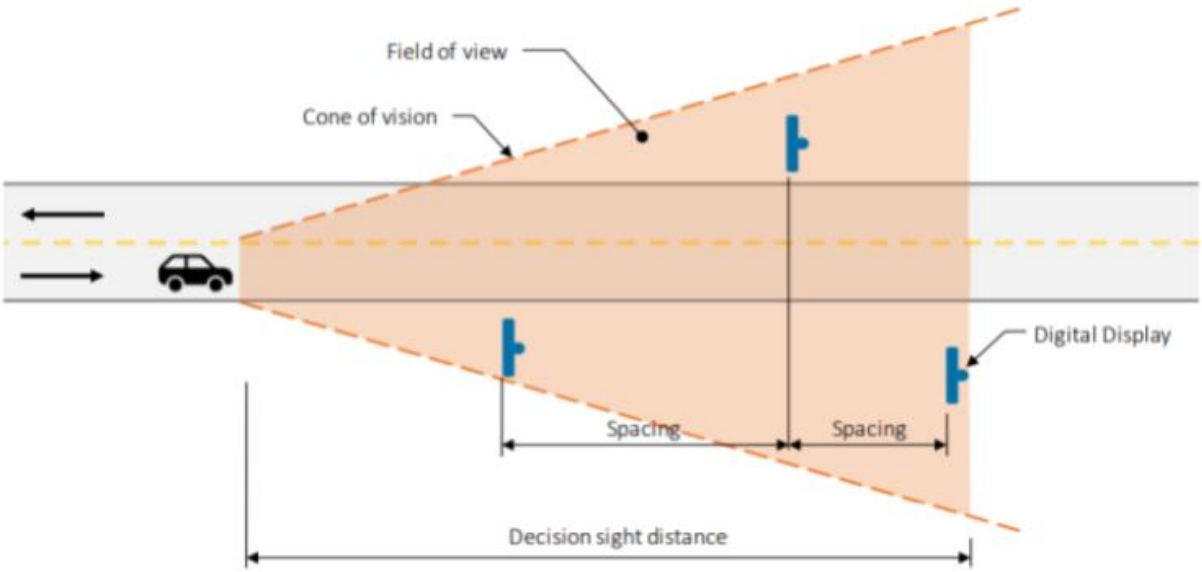


Figure 4-2: Digital display in field of view in Canada (MORR Transportation Consulting Ltd., 2017: 4)

4.6.1 Scrolling billboards

Scruby (2007) showed that although the roadscape is increasingly complex and aimed at distracting drivers, companies are increasingly employing technology with higher distraction features. One such a technology is that of scrolling billboards. According to this research (Scruby 2007), "two-thirds of people look towards a site when it scrolls, drawn by the movement, and of those two-thirds, nearly 100 % go on to look at the following panel". Scruby reiterates that in the five seconds that a driver looks at this scrolling billboard, a vehicle travelling at 40 km/h has travelled over 50 metres, without the driver watching the road. Scruby (2007) concludes that the extra distraction of scrolling billboards compound the existing problem of the placement of billboards obstructing sight distances between drivers and pedestrians. In a presentation for the pedestrian council of Australia, Scruby captioned the picture below (Figure 4-3) with:

"Double jeopardy – not only can pedestrians and motorists see each other: motorists are almost guaranteed to be distracted by scrolling billboards, strategically positioned in front of a pedestrian crossings."

DOUBLE JEOPARDY – NOT ONLY CAN'T PEDESTRIANS AND MOTORISTS SEE EACH OTHER; MOTORISTS ARE ALMOST GUARANTEED OF BEING DISTRACTED BY THE SCROLLING ADVERTISMENT – STRATEGICALLY POSITIONED DIRECTLY IN FRONT OF A PEDESTRIAN CROSSING

Figure 4-3: Double jeopardy (Scruby, 2007)

4.6.2 Automated vehicles aiding distraction/inattention

This is a new topic and research indicates that automated driving systems are not yet 100 % reliable and safe. This means that the driver still has a responsibility to participate and complete the driving task safely. However, in future, sensors and other automation will take over certain driving tasks, however, with inattentive and distracted drivers, there is no failsafe should anything go wrong as the driver is not attending to the task at hand (ERSO, 2018). In addition, automation is expected to reduce the effort of manual driving but will also reduce workload to a dangerously low level (ERSO, 2018).

ERSO (2018) states that "while driver inattention may not have consequences during periods of automation on less demanding roads, situations which require sudden human input may be met with a late response and therefore may fail to relieve the critical situation effectively and safely". Simulator studies reiterate this point, showing that drivers in situations where there are high levels of automated driving are more likely to have longer reaction times to braking and steering corrections in the face of a sudden emergency event.

Driver inattention (including distraction) degrades the ability of a driver to manually intervene an automated driving system and will contribute to a reduced driver situational awareness (SA). Situational importance is critical in driving as drivers need to monitor and understand the surrounding environment and road context (Endsley, 200). If a driver's level of SA is too low, actions and requests by the automated system can be unanticipated and surprising to the driver.

Overall, automated driving systems are aimed at relieving drivers of the effort associated with manual driving. However, drivers in autonomous vehicles that are incapable of driving autonomously in all traffic situations must still stay vigilant to the driving task at hand (i.e., stay attentive and not distracted) as this will degrade the timing and safety of manual re-engagements when automated systems fail or reach their limits of competence (European Road Safety Observatory, 2018).

4.6.3 Vehicle-to-Infrastructure communication

The use of digital display technology for outdoor advertising signs is highlighted by Roberts (2013) as a concern as the technology will enable the advertising industry to display more attention-getting messages likely to cause drivers to be less attentive to the driving task. The potential impact of these sources of distraction can be moderated to varying degrees through road design. ERSO (2018) states that there is a need to identify external sources of distraction that have the potential to adversely affect driving performance and safety.

In the United States (NCHRP Project 20-7: 256) reports are that the newest digital billboards are also increasingly capable of 'interacting' with approaching drivers. This includes the Radio Frequency Identification Device (RFID) embedded in a vehicle's key or on-board computer system that trigger a personalised message to the driver on a digital billboard. Similarly, the billboard can display a message tailored to the radio frequency of passing vehicles or encourage drivers to interact with the sign by 'texting' a message or calling a number displayed on the billboard.

4.7 Summary of findings

Outdoor advertising is seen as the last advertising space where consumers do not have control over whether they want to be exposed to the advertisements and messages. This makes outdoor advertising a sought-after medium as the audience is considered captive. Outdoor advertising practices have grown tremendously with new types of digital and interactive displays competing for advertising space. This is a trend that is seen internationally, in Africa, and although at a slower pace, in South Africa. Outdoor advertising space is popular and advertising agencies and advertisers actively seek these spaces to display their products, services, and events. In addition, the industry invests heavily in market and consumer research to understand target audiences.

Outdoor advertising falls under 'support media', working in conjunction with more traditional mediums to reinforce existing brands or brand messages. The motivation for outdoor advertising in and adjacent to the road reserve is simple. People spent more time on the roads and more time on unpredictable roads for commuters, mean that commuters need to be more aware of their surroundings which results on the increased consumption of roadside media. Due to changing patterns in urbanisation and centralisation of economic activities, consumers worldwide are more mobile than ever before. This is a trend that is fast developing and advertising space near roads have become prime locations.

The aim of outdoor advertising in and adjacent to the road reserve is to attract driver attention. In South Africa, advertising on roads are only permitted in some instances and in some formats, as prescribed by the SAMOAC and

SANRAL guidelines. Traditionally, outdoor advertising as applicable to road reserves, was mostly concerned with static billboards. Due to the potential distraction and contribution to traffic crashes, static billboards, in and outside the road reserve, have been the subject of road safety research since the 1950s. However, with the advent of the digital and technology era, the type of outdoor advertising displays utilised in the road environment, have seen significant development and changes. Advancements in technology and changing consumer patterns, have made digital and interactive outdoor advertising practices even more popular with the outdoor advertising industry. Advertising on freeways and major arterials is popular, as the advertisements are seen with high frequency although exposure viewing is brief. This type of high impact, ‘larger than life’ formats are one of the strengths of the traditional billboard medium.

5 International policy and best practices

5.1 Introduction

Chapter 5 provides an overview of international best practices for managing and controlling outdoor advertisements. This chapter considers best practices in terms of where the function lies, regulatory frameworks, and the specific criteria used for the placement and design of outdoor advertising displays. This includes criteria about what the sign can look like (content, message and illumination) as well as where signs are permitted, in terms of location, proximity to other road signs and critical locations such as roundabouts, intersections, signals and so forth.

5.2 United States of America

Historically roadside advertising in the USA was mandated or restricted by the Highway Beautification Act (HBA) of 1965 (Lazarus, 2008). Under this Act, advertising displays that could distract or impair the driver's vision was removed from United States highways (Farby, 2001). In the United States of America, the management of outdoor advertising practices, as a national function falls under the Secretary of Transportation. State Departments of Transportation are responsible for administering an Outdoor Advertising Programme along with enforcing federal and state laws. Experts within state authorities responsible for the management of outdoor advertising practices in the USA form part of the planning departments of state authorities. Each State Transportation Department is responsible for developing a set of rules and guidelines pertaining to outdoor practices within the State. Applications are evaluated according to the set principles and the evaluation of new applications include a public participation (comments) process.

5.3 Canada

The Transport Authority Canada (TAC) DPAD Guideline for regulating digital displays in the road reserve considers the following guiding principles as illustrated in table 5.1 (MORR Transportation Consulting Ltd., 2017). Each authority is responsible for managing outdoor advertising displays and all assessments are done considering the guiding principles, applicable by-laws, and road safety considerations (Table 5-1).

Table 5.1: TAC DPAD guiding principles for assessing digital display applications in Canadian road reserves

Principle	Description
Safety	▪ Public safety is the primary concern. ▪ Consequently, regulations and by-laws should control the distracting effects of digital displays to limit the increase in collision risk. ▪ This principle seeks to minimise increases in collisions within the context of freedom of speech rights, limited knowledge about the road safety impacts of digital displays, and the urgency to regulate digital displays from a road safety perspective.
Consistency	▪ Guidelines recommend regulating digital displays such that they emulate static advertising signs. ▪ The rationale for this principle is that the road safety impact of static advertisements is accepted while the road safety impacts of digital displays are generally unknown. ▪ By regulating digital displays so that they are perceived by drivers as static signs, the road safety impacts of digital displays can be approximated to the impacts of static signs. ▪ Assimilating digital displays to static signs can be achieved by regulating motion, frame duration, transition time and effects, message sequencing, and brightness. This principle still allows advertisers to take advantage of many digital display features; e.g., remotely changing content, multiple advertisements, and dayparting.
Specificity	▪ Digital display guidelines refer to issues unique to digital displays and not issues that are common to all advertising signs.

Principle	Description
	▪ This principle recognises that shared aspects of digital and traditional displays and applying this principle simplifies the regulation of roadside advertising signs and helps ensure that all advertising signs are regulated consistently
Evidence based	▪ Guidelines should be evidence-based, scientifically supported, and sensitive to local conditions as much as possible. ▪ This principle assists road authorities responsible for managing and controlling outdoor advertising displays to defend their policies, encourage road authorities to follow best practices, and recognises that a rigid, one-size fits-all approach to regulating digital displays is unlikely to be effective.
Pragmatism	▪ Regulations should be pragmatic and enforceable. ▪ The scientific research concerning digital displays can be complex and detailed. Some of this research includes complicated equations for determining appropriate digital display characteristics for different situations. ▪ Detailed regulations could be developed which scrutinise every aspect of a digital display and its location according to the scientific research; however, road authorities may not have the resources to conduct detailed analyses for each application or to enforce the regulations. ▪ Developing and applying commonly accepted heuristics or lookup tables as approximations for regulating certain digital display features may be an effective way to control digital displays within available resources without compromising road safety.

Following the guiding principles highlighted in Table 5-1 a set of assessment criteria is provided to Canadian road authorities to decide whether digital displays should be allowed in the road reserve. The criteria consider the principle, road safety considerations, applicable by-laws with which the criteria are associated as well as a proposed evaluation method. Assessment criteria for allowing digital displays in the road reserve include sign placement and display operations (MORR Transportation Consulting Ltd., 2017).

5.3.1 Sign placement guidelines

From a road safety perspective, digital display sign placement is governed by the maximum number of digital display frame changes that a driver could observe within their field of view. As defined in the TAC DPAD Guidelines, a driver's field of view is limited laterally by their cone of vision and longitudinally by their site distance (MORR Transportation Consulting Ltd., 2017)

- **Spacing and density:** The spacing between off-site digital display signs and density of on-site digital display signs within a driver's field of view are the first criteria assessed. Both spacing and density criteria must be met for a digital display permit application to be approved.
- **Lateral displays:** Digital displays located within a driver's cone of vision increase glance frequency, decrease glance duration, and increase the probability of a driver detecting the digital display. Based on human factors principles, collision risk increases with longer glance duration despite less glance frequency.
- **Proximity to traffic control devices:** Digital displays should not be located near traffic control devices. These guidelines provide guidance on areas of restriction around traffic control devices and will be subject to site specific evaluation. Digital displays and modern traffic signals both use light emitting diodes (LEDs) to illuminate their display or signal head. Digital displays located behind or close to traffic signals make it more difficult for drivers to detect the signal. This delay a driver's reaction and increase collision risk at the intersection. Consequently, digital displays are prohibited in direct vicinity to illuminated traffic control devices (e.g., traffic signals, pedestrian crossing beacons, and railway crossing flashers) and may be restricted in vicinity of other intersection controls such as signage that provide regulatory, warning or guidance to road users.
- **Proximity to decision-making areas**: Decision-making areas include intersections, interchanges, and roundabouts which comprise many conflict and decision-making points. Since the driver workload is high at these locations, drivers may not have spare attention capacity and distraction should be minimised. The distracting effect

of digital displays may reduce a driver's ability to perform near key decision-making areas throughout the transportation network. Drivers may miss critical roadside information that prevent them from navigating through conflict points like interchanges and merge points. It is important that these decision-making areas are well defined and there is a standard approach for defining the digital display restriction area.

5.3.2 Display operation guidelines

Digital displays display dynamic content and use motion and illumination to increase their conspicuity. These operational differences can make digital displays more distracting and increase collision risk. Criteria for display operations include prescriptions in terms of motion, frame duration, and brightness of digital displays that meet the sign placement criteria.

- **Motion effects:** Motion effects include animation, transition time and effects, message sequencing, and text scrolling. Motion effects is used in digital displays to increase the attractiveness of digital display content. Consequently, driver glance frequency, glance duration, and collision risk increases. Motion effects is prohibited.
- **Frame duration:** Refers to the time between successive frame changes on a single sign. Digital display frame duration is controlled in conjunction with minimum spacing and maximum density criteria to ensure that the number of frame changes within a driver's field of view does not exceed three. In recognition of unique on- and off-site owner needs duration may be controlled differently for on-site and off-site digital displays. Minimum spacing and maximum density criteria assist in the evaluation of applications for on- and off-site frame durations.
- **Brightness:** Digital display brightness is the appearance of the sign to a driver and depends on many factors that include sign luminance, ambient lighting, and distance from sign, atmospheric conditions, and driver eyesight. The brightness of digital displays should be measured by illuminance which is the amount of light shining on a surface or light meter. Illuminance accounts for ambient lighting and therefore best represents a driver's perception of digital display brightness. Digital displays with brighter illuminance attract more glances, increase glance duration due to longer visual adaption time, and cause visual glare – each of these have been shown to increase collision risk.

5.4 New Zealand

5.4.1 Responsibility

The New Zealand (NZ) Transport Agency (2011) is responsible for the managing of outdoor advertising displays. The NZ Transport Agency have developed a traffic control devices manual (TCD manual) which provides guidance on industry good practice, including, where necessary, practice mandated by law. The TCD manual is rooted in the NZ land transport Act 1998 and reference Austroads policies and best practice guides. The new TCD manual replace the joint Transit New Zealand and Land Transport NZ publication Manual of traffic signs and markings (MOTSAM).

5.4.2 Regulatory framework

Advertising signs is part of a suite of guidelines within the Traffic Control Devices manual (TCD manual) prepared by the NZ Transport Agency (NZTA or the Agency. Part 3 of the TCD manual considers the management of outdoor advertising signs. Part 3 was developed with guidance from a working group representing local government, New Zealand Road Safety Manufacturers Association, and the NZ Transport Agency (members from Highway Network operations and one member from Network Standards and Safety).

The intent of the document is to provide guidance and indicate best practice on the use of advertising signs to the transport industry, territorial authorities (TAs), practitioners and private operators. It considers both the safety and environmental or urban design issues that concern TAs or road controlling authorities (RCAs) when dealing with the effects of advertising signs. It sets out the legal framework and responsibilities for the design and installation of advertising signs, including the general principles behind their use at the time the document has been drafted. It should not be used in substitution of professional advice as to compliance with relevant central and local government requirements.

5.4.3 Guidelines and policies

The New Zealand guidelines for outdoor advertising state that:

- Outdoor advertising should have no more than eight elements: To prevent potential distractions, the NZTA restricts the number of elements that any outdoor advertising funded by the NZTA can have. An element refers to each individual item that appears in your advertising. In other words, a word is one element, an image is one element, and a logo is one element. There should not be any more than eight elements per advertisement and the words should not take up more than six elements (i.e. a maximum of six words). The words should use a maximum of 40 characters in total.
- Outdoor advertising is not allowed to show artwork that can be confused with official signs: No signs that are officially used to control or warn traffic is allowed (e.g. a stop sign or a speed limit sign). There is potential for distraction and confusion, which is why it is prohibited in the Traffic Control Devices Rule.
- Billboards should not be placed at an intersection: The guidelines state that drivers need to be fully focused at an intersection (areas where the risk of conflicts are higher) and could be distracted by a billboard.
- The NZTA state that, billboards should be placed at least 50 metres from an intersection; however, this is not always possible in an urban environment.
- State highway guidelines: NZTA states that state highway guidelines stipulate that billboards must not be more than 6 metres wide or 3 metres high.
- Pedestrian only outdoor panels (sometimes referred to as an adshel): NZTA state that adshel displays are not allowed in the road reserve. Adshels are of a complex creative nature and have more than 8 elements.
- Sites where dynamic advertisements are used cannot be positioned to face oncoming traffic. Dynamic outdoor displays are only considered in instances where the display faces the wrong way on for example a one-way street and are visible by pedestrians only or are in pedestrian thoroughfares.
- A dynamic billboard has or appears to have elements that move or change in any way, e.g. reflective material, and flashing lights. Extra attention is required from the driver to view a dynamic billboard and are therefore considered to be potentially distracting for drivers.
- The NZTA state that “It doesn’t matter how little or how much the elements move or change, or how subtle the changes are. As a driver’s attention is diverted from the road to the billboard, this increases the likelihood that the driver will have or cause a crash (New Zealand Traffic Control Device Manual Part 3 Advertising signs, 2011, pp 31)”

5.5 Australia

The departure point in Australia is that the road authorities are ultimately responsible for the safety of road users and that road authorities owe road users a ‘duty of care’ (Cairny, 2009).

Roberts (2013) state that Australia has embarked on a project to improve the understanding of the risks associated with roadside advertising in its various forms, and to upon completion develop guidelines for the regulation of outdoor advertising. This project was designed to facilitate the harmonisation of agency criteria for the management of roadside advertising devices and promote improved and consistent practice by road agencies. The aim of the guidelines is to assist road agencies to understand and address the emerging safety issue namely the use of digital display technology for outdoor advertising signs (Roberts 2013).

The Australian guidelines are based on the safe system and sustainable safety approaches to road safety, derived from the Swedish, Vision Zero and Dutch, Sustainable Safety. The guidelines therefore recognise that humans are fallible, and will make mistakes, even if alert and intending to comply with the road rules. The guidelines were developed based on the premise that vehicles and road infrastructure need to be designed to discourage errors and protect against the consequences of errors when they do occur and as such state that roadside advertisements as potential, and deliberate attempt to distract drivers (no matter how minor) cannot be justified

5.5.1 Queensland

A. Responsibility

The Queensland Department of Transport and Main Roads recognises that roadside advertising contributes to the Queensland economy by providing customer service to the community and opening commercial opportunities. As such the policy (2017) states that the Transport and Main Roads department need to balance the community's needs for safe and efficient roads with the desires and aspirations of business and industry, community, and local government. Applications are made to local government authorities that screen and manage applications and appeals.

B. Regulatory and policy framework

The Department of Transport and Main Roads' Policy for the Management of Roadside Advertising (Version 4, July 2017) describes the department's overarching position, direction and approach to the management of roadside advertising devices within, and outside the boundaries of, but visible from state-controlled roads. The policy must be read in conjunction with the Roadside Advertising Manual (2017) containing administrative, assessment and technical standards (Department of Transport and Main Roads, 2017)

All current and compliant advertising devices assessed and approved under the Roadside Advertising Guide and the earlier Guide to the Management of Roadside Advertising (1994–2009) are considered lawful until the end of the agreed term. The manual comprises three volumes:

- Administration volume: provides information for administration officers to assist in the application process and support customers' needs.
- Assessment volume: information about assessment and approval processes for the management of roadside advertising.
- Technical volume provides the safety and efficiency technical standards for management of advertising device types (Department of Transport and Main Roads, 2019)

The Department through the policy provides a framework within which roadside advertising may be approved where the location, placement, design and operation of the advertising device, does not distract drivers or adversely impact road safety and efficiency (Department of Transport and Main Roads, 2017).

Other applicable documentation includes:

- Manual of Uniform Traffic Control Devices;
- Traffic and Road Use Management Manual;
- Guideline for Tourist Signs for Commercial Tourist Attractions on State-Controlled Roads;
- Welcome Signs;
- Third Party Road Use Guideline: Roadside Service Centres;
- Traffic and Road Use Management Manual;
- Manual of Uniform Traffic Control Devices.

The Queensland Policy (Department of Transport and Main Roads, 2017) stipulates that the following principles are applicable to roadside advertisements:

i) Roadside advertising shall not compromise road safety or traffic efficiency. Roadside advertising devices have the potential to distract drivers. The department seeks to minimise the potential to distract by applying placement, location, design, and operational standards based on engineering and safety in design principles.

ii) Roadside advertising is supported through equitable access to transport networks. Transport networks provide services to the community and commercial opportunities for the department, the outdoor advertising industry, local businesses, community, and charitable organisations. The department supports roadside advertising devices in appropriate locations where road safety and efficiency standards are met.

iii) Roadside advertising devices are compatible with local and visual amenity. The department supports high quality advertising displays with a deliberate absence of advertising clutter and sign saturation to preserve

market value and the amenity of the local area. The department may set conditions for the spacing of roadside advertising devices and protect lines of sight to preserve roadside vistas.

iv) Placement and operation of roadside advertising devices protect cultural, historic, conservation and environment areas.

When assessing the placement and operation of advertising devices on SCRs, the department may not approve advertising devices within the boundaries of SCRs in the following areas:

- Cultural and historic sites;
- National parks;
- State forests;
- Areas classified as remnant endangered ecosystems;
- Areas classified as remnant of concern regional ecosystems;
- Areas of high nature conservation value;
- Areas vulnerable to land degradation.

5.5.2 New South Wales

A. Responsibility

The Australian Roads Act 1993 determines who controls and manages diverse types of roads. The RTA is the road authority responsible for all freeways and unincorporated roads (some 21,000 km) (Daluge, 2011). Local councils are the road authorities for regional and local roads (except where some other public authority is designated as the road authority).

B. Regulatory framework

The Roads Act 1993 requires advertisers to obtain consent from a local road authority before placing any structure in the right-of-way. The law also enables RTA to require the removal of signs and other objects or obstructions that constitute a traffic safety hazard. This authority extends to the removal of signs located on land next to the right-of way (Daluge, 2011).

Deluga et al (2011) state that the Australian Road Transport (Safety and Traffic Management) Regulation 1999 prohibits the installation of any object or structure likely to prevent drivers from clearly seeing traffic control devices. In 2001, New South Wales implemented a policy under the Environmental Planning and Assessment Act 1979 to regulate all signage (including advertising) visible from any public space in the state. The purpose of this policy, called the State Environmental Planning Policy (SEPP 64)—Advertising and Signage is as follows:

- Ensure that all signage (including advertising) is compatible with the desired visual character of the area, provides effective communication in suitable locations, and is of high-quality design and finish;
- Regulate signage (but not content) under the Environmental Planning and Assessment Act 1979;
- Provide time-limited consent to advertising.

In 2007 the Ministry of Planning published a set of best practices called Transport Corridor Outdoor Advertising and Signage Guidelines: Assessing Development Applications. The guidelines outline best practices for planning and designing outdoor advertising along transportation corridors.

C. Road safety and outdoor advertising

In terms of road safety, the following provisions are made in the guidelines (SEPP 64):

- Advertising signs visible from the road are designed to attract the attention of drivers and passenger and that drawing driver attention away from the road has the potential to create a traffic safety hazard;

- To minimise this hazard and improve road safety for all drivers, the SEPP 64 guidelines include a set of minimum traffic, bicycle, and pedestrian safety assessment criteria that must be addressed for all outdoor advertising proposals (Daluge, 2011).

The safety assessment criteria include items such as sign location and design, variable message signs, moving signs, video and animated electronic signs, illumination and reflectance, crash history, and sign content. To assist with the analysis, RTA uses the safety assessment matrix addressing the following (Daluge et al, 2011: 14):

- Advertising sign must not obstruct a driver's view of the road, other vehicles, bicycle riders, or pedestrians, particularly at crossings;
- An advertising sign must not obstruct a pedestrian or cyclist's view of the road;
- The placement of a sign should not distract a driver at a critical time;
- Signs should not obstruct a driver's view of a road hazard, an intersection, a traffic control device, or an emergency vehicle access point or driveway;
- An advertising sign must not distract a driver from or reduce the visibility and effectiveness of traffic control devices, or obscure information about the road alignment;
- An advertising sign should not give visual clues to the driver suggesting that the road alignment is different from the actual alignment;
- An advertising sign should not be located less than the safe sight distance from intersections, ramps, traffic control signals, or sharp curves; less than the safe stopping sight distance from pedestrian or bicycle crossings or hazards in the road environment; or so that it is visible from the stem of a T intersection;
- An advertising sign must not interfere with the effectiveness of a traffic control device (e.g., by imitating a traffic control device, by including content that can be construed as giving traffic instructions, or by using flashing lights in the vicinity of traffic lights);
- An advertising sign should not draw a driver's attention away from the road environment for an extended time period;
- When viewing a sign, all drivers should be able to see both the road and the main components of the traffic stream in peripheral view;
- The sign should not create headlight reflections in the driver's line of sight;
- Advertising sign must not create a physical obstruction or hazard;
- Signs with no breakaway supports must be placed outside the clear zone or behind an approved crash barrier;
- If a sign is proposed within the clear zone but behind an approved crash barrier, the sign must comply with relevant standards on lateral clearances, dynamic deflection, and width.

Variable message (non-scrolling) sign safety criteria include the following:

- The speed limit of the road must not be greater than 70 kilometres per hour (km/h);
- The time to change the display must not be greater than 1 second;
- The display must be completely static from its first appearance to the start of the transition to another display;
- The illumination level must adjust to ambient light levels;
- The sign must not contain any scrolling messages (e.g., text or graphics that move up, down, or across the screen).

Scrolling sign safety criteria include the following:

- The speed limit of the road must not be greater than 70 km/h;
- The display must be completely static from its first appearance to the start of the transition to another display;
- Under normal driving conditions, a driver should not expect to see more than one message during the exposure period.

According to the Roadside Advertising Guide, an advertising device may be considered a traffic hazard if any of the following apply:

- Interferes with road safety or traffic efficiency;
- Interferes with the effectiveness of a traffic control device;
- Distracts a driver at a critical time (e.g., while deciding at an intersection);
- Obscures a driver's view of a road hazard (e.g., at corners or bends in the road);
- Gives instructions to traffic to stop, halt, yield, or merge;
- Imitates a traffic control device;
- Is a dangerous obstruction to a road or other infrastructure, traffic, pedestrians, cyclists, or other road users;
- Is in an area where several devices are located, and the cumulative effect of those devices may be potentially hazardous;
- The traffic hazard potential depends on sign size, location, luminance, background, and distance from the road.

The guide also recognises that frequent changes to advertising content are more likely to distract a driver than a static sign and that well-known symbols and logos are less likely to distract a driver than words. To maintain safety and traffic efficiency for road users, the guide recommends controlling two critical aspects:

Site location: Site selection includes control for lateral and longitudinal placement. To control for lateral placement, the guide uses the clear zone guidelines in the American Association of State Highway and Transportation Officials' Roadside Design Guide. The exception is corridors with wide medians in which oncoming traffic is not visible because of topography or dense vegetation, advertising on medians is not allowed. To control for longitudinal placement, the guide considers advertising device density constraints and restriction distances on designated traffic situations and official traffic signs. To assist with analysis of specific situations, the guide includes diagrams and restriction areas and distances for a variety of road speeds, device locations, and device types and sizes.

Physical characteristics: Physical characteristics include shape, illumination, colour, and font size. Where both lateral and longitudinal placement requirements are provided for by a restriction distance, the guide recommends using the greater value. The guide also highlights that, in addition to the restriction further restrictions may be warranted if additional driver attention and decision-making are required. Examples of this type of situation include the following:

- High-speed diverging, merging, or weaving at intersections, such as Y intersections or large high-speed roundabouts;
- Near intersections where lanes merge or a divided motorway becomes a two-way road;
- Complex intersections or road sections that require an increased level of driver concentration (e.g., five-way intersections, back-to-back horizontal curves);
- Advertising on the outside curve of a divided road that is directed at traffic traveling in the opposite direction;
- Sections of road displaying several traffic control devices that, when considered individually or in combination, are significantly more complex than normal;
- Sections of road with a crash history higher than the system average.

Pedestrian crossing facilities: Restrictions apply to pedestrians crossing facilities.

5.5.3 Victoria

A. Responsibility

Local councils are responsible for reviewing and approving advertising sign applications. In practice, the level of compliance varies widely.

B. Regulatory and policy framework

In Victoria, like New South Wales and Queensland, planning legislation provides the foundation for advertising control (Daluge, 2011). The Planning and Environment Act 1987 contains provisions for implementing local and regional plans (called planning schemes) throughout the state. The act requires planning schemes that include state provisions (i.e., provisions selected from the series of Victoria Planning Provisions) and local provisions (which apply only to the area covered by the planning scheme).

The intent of requiring state-level provisions is to standardise practices across the state. Several Victoria planning provisions are relevant to advertising control (Deluga et al., 2011). VicRoads assess applications based on a 10-point checklist and provide guidance documentation to local authorities to help interpret the safety checklist (Daluge, 2011). In terms of safety considerations, the following applies (Clause 52.05) and a sign is a safety hazard in the following situations:

- Obstructs a driver's line of sight at an intersection, curve, or property driveway;
- Obstructs a driver's view of a traffic control device, or is likely to create a confusing or dominating background that might reduce the clarity or effectiveness of a traffic control device;
- Could dazzle or distract drivers because of its size, design, colouring, illumination, reflectivity, animation, or flashing;
- Is at a location where more driver concentration is required (e.g., at an intersection with high pedestrian volume);
- Is likely to be mistaken for a traffic control device;
- Requires close study from a moving or stationary vehicle at a location where the vehicle would be unprotected from passing traffic;
- Invites drivers to turn where there is fast-moving traffic or is so close to the turning point that there is no time to signal and turn safely.

5.5.4 Australian guidelines for advertising in and outside the road reserve

In 2014, the Government of South Australia, published an Advertising Signs Assessment Guidelines for Road Safety (Department of Planning, Transport and Infrastructure, 2014). This assessment guide was developed to ensure that there is a formal procedure in place to undertake roadside advertising assessments. The need for such an assessment guideline has been necessitated especially with the introduction of electronic signs, which continue to change the nature of advertising when compared to more traditional print-based signs. The guideline is in line with the South Australian advertisements module within the South Australian Planning Policy. The assessment guideline includes an overview of the (Department of Planning, Transport and Infrastructure, 2014):

- Assessment of advertising signs;
- Road safety assessment checklists for advertising signs;
- Electronic signs;
- Road reserves;
- Removal or enforcement of conditions of approval.

Appendices to the guidelines include an overview of crash rates, location and placements, content and presentation and guidelines on the development and application processes.

5.6 European practices and policies

5.6.1 United Nations – Inland Transport Committee

Advertising have a strong impact on the public at large especially when liable to affect drivers' behaviour. The United Nations Economic working group on inland transportation states that special attention should be paid not only to the messages conveyed in them, but also to their location by the roadside (UN Inland Transport Commission, 2006). As

such the working committee recommends that precautions should be in place to ensure that advertisements do not convey messages at variance with road safety and that they do not undermine road safety regulations.

In addition, the commission stipulate that (UN Inland Transport Commission, 2006):

"Because roadside advertisements and billboards are liable to distract drivers or limit the visibility of road markings, the authorities should take measures to ensure that such advertising and billboards do not reduce the visibility or effectiveness of regulation signs, do not dazzle road users and do not attract their attention in conditions jeopardising road safety. Article 4 (d) (ii) of the Convention on Road Traffic of 1968 obliges the contracting parties to take measures in this regard, but it gives no indications about what measures to take. The present recommendations are therefore aimed at setting out rules that may be adopted by the authorities."

General recommendations include (UN Inland Transport Commission, 2006):

- To provide for some level of oversight, the posting of advertisements, by the roadside, advertisements should be subject to an administrative authorisation issued by the competent authorities;
- The authorities should set out the conditions and formalities required to obtain and renew such authorisations. Standards should also be established for design, erection, and maintenance of advertisements, including for their supporting structures.

In addition, the regulations may:

- Prescribe special standards for the architectural look and design of advertisements in specified places;
- Establish the form and the content of the authorisation, and of an authorisation plate to be posted on the supporting structure;
- Specific recommendations include (UN Inland Transport Commission, 2006).

Content of advertisements: In the interest of road safety, on open roads used by public traffic and on their roadsides, it is recommended to prohibit advertising, signs, advertising signs and advance signs:

- Containing directions for a locality that include either an arrow or an indication of distance;
- Containing a reproduction of a regulation road sign or an advance warning symbol;
- Using shapes, colours, words, symbols or dimensions that are liable to be confused with road signs.

Illuminated advertisements: The authorities should regulate the conditions and standards applicable to illuminated or reflective advertisements visible from public roadways, as they may dazzle road users or distract them, thus presenting a hazard. Maximum levels of brightness should be established, and such levels may vary depending on the illuminated surface of the advertisement and its location (areas with intense lighting, well-lit commercial roads, and other roads with lighting, roads without lighting).

Illuminated advertisements with high-intensity light beams directed at road users, with fixed or mobile spotlights whose beams are permanently or temporarily aimed in a direction parallel to the road, should be prohibited.

Siting of advertisements: The location of advertisements should be regulated since the following principles:

Advertisements should be prohibited on public roads. Exemptions are made:

- In built-up areas, for advertising signs;
- Rules depending on the nature of the road:

  i) Motorways and other 2+2-lane roads

  - Outside built-up areas, advertisements and advertising signs should be prohibited in a band with a minimum width of 200 metres measured from the outside edge of each roadway on either side of motorways or other 2+2-lane roads; in built-up areas, the minimum width should be 40 metres.
  - The enforcement authorities may, however, permit advertisements and advertising signs within the limits and under the conditions that they establish;
  - The above provisions should not prevent signs from being put up to indicate, in conditions determined by road sign regulations, the presence of establishments providing services to users.

  ii) Other roads

- Outside built-up areas, advertisements, and advertising signs visible from roads other than motorways and 2+2-lane roads should be prohibited in a band with a minimum width of 20 metres measured from the outside edge of the roadway on either side of such roads.
- Dispensations may be made in accordance with the nature of the road, provided they do not hamper users' views of signs or pose a danger to traffic.
- The distances set out in (i) and (ii) above may be increased in areas with higher risks, such as school zones or pedestrian crossings, or on curves where reduced speeds are posted, or at intersections.

iii) **Dimensions of billboards and distance between them:** The authorities should also regulate the maximum dimensions of advertisements in accordance with their distance from the roadside and, when necessary, establish rules for spacing between billboards.

iv) **Monitoring and penalties:** To ensure observance of the measures taken, they should be the subject of monitoring by the competent authorities and should be enforced through the use of penalties. The latter may be progressive, ranging from a simple warning calling for corrective action to financial penalties (that can vary with the extent of the violation), including removal of the advertisement and the withdrawal of a previously issued administrative authorisation.

5.6.2 Finnish Road Administration

The state controls outdoor advertising on 78,000 km (49,000 mi), or about 75 %, of public roads in Finland. The remaining 25 % is controlled at the local level. There are also 350,000 km of private and forest roads in Finland, but they are minor roads with no advertising relevance (Daluge, 2011).

Several pieces of legislation in Finland are relevant to outdoor advertising, such as a new Highways Act signed in 2006, which assigns the responsibility to control roadside advertising to road authorities, and the Land Use and Building Act, which defines advertising in areas with a city plan and assigns levels of regulatory responsibility. Also relevant are the Road Traffic Act, which assigns responsibilities for installing traffic signs, and the Road Traffic Regulation, which defines official traffic signs and prohibits their use for advertising purposes. The Finnish approach to outdoor advertising is that if it can affect traffic safety by creating a sight barrier, creating the possibility of driver confusion and distracting driver attention from traffic or traffic control devices.

The Finnish Road Safety Administration (2004) put forward the following recommendations in terms of categorisation of advertisements for Finnish roads:

- Based on the inherent or potential distracting qualities in addition to size, content, and placement;
- Based on the relevance of the information the information may facilitate compilation of even more detailed, focused principles and instructions to guide the driver behaviour;
- The prerequisites of elderly drivers to drive vehicles should be better verified than they currently are;
- Vision, turning of the head and other health-related and functional disabilities that hinder observation should be examined sufficiently.

Policy objectives to address this issue include developing an aesthetic traffic environment and not permitting advertising without a permit. In general, the goal is to combine traffic safety and a pleasant traffic environment, while at the same time providing useful information to road users about services and activities along the road (Daluge, 2011).

5.6.3 Denmark

The outdoor advertising policy in Denmark is restrictive and follows the Danish Road Directorate's Signs and Advertising on Public Roads stipulations (Deluge, 2011). Traffic safety is the Road Directorate's main concern. Relevant legislation includes road legislation (which discusses special conditions for a permit), nature conservation legislation (which prohibits advertising on open land), and traffic legislation (which enables police agencies to remove distracting signs). In urban areas, municipalities issue permits.

In rural areas, the only signs allowed in the right-of-way are general information and service signs. The number of signs at any given site is limited to prevent road user overload. Signs providing directions to tourist or recreational attractions are allowed, but they must follow the same standards as other directional signs.

Billboards are not permitted in the right-of-way. Outside the right-of-way, the only signs allowed are on premise signs. In general, these signs should not predominate on the landscape and should not be visible over long distances. The regulations include specific requirements for size, content, and location. Recently, the Road Directorate began a study to measure the impact of road signage on road user attention in urban areas, which will include the use of an instrumented vehicle with an eye tracker device on board. However, the study does not include the impact of electronic signs.

5.6.4 Sweden

The state controls outdoor advertising on 98,000 km (about 68 %) of the roads in Sweden. The remaining 32 % is controlled at the local level.

The Swedish Road Administration's (SRA) Roadside Advertising Guidelines, ensure that travel and transportation in Sweden is a safe transportation system. To system users who travel on roads maintained by SRA, advertising could be perceived as positive as long as it provides information that appears relevant to those users. However, advertising could also be perceived as distracting or even dangerous if not correctly designed or located.

Interests of businesses might not be aligned with the interests of road users, and therefore the SRA's responsibility is to ensure that advertising along transportation corridors does not conflict with transportation safety policy objectives. SRA recognises that the purpose of advertising signs is for the signs to be seen and read as frequently as possible.

To read roadside advertising signs, drivers must shift their attention from traffic to the roadside. This issue is particularly sensitive in difficult and demanding traffic environments. Under these conditions, SRA's policy is that outdoor advertising should not be directed at road users. In less complicated traffic environments (e.g., along straight stretches of road without traffic signs or other elements that drivers must have time to observe) roadside advertising may be permissible. Under these conditions, SRA's position is that a static, short, simple advertising sign that can be seen quickly provides ample time for drivers to choose when to read the sign safely.

SRA's policy is to not permit outdoor advertising in the right-of-way. Several pieces of legislation are relevant to outdoor advertising in Sweden.

According to the Roads Act, the road authority can regulate advertising in the right-of-way, including issuing and revoking permits. For advertising outside the right-of-way, Clause 45 of the Roads Act indicates that the county administrative board is the consent authority for situations that can affect traffic safety or the condition or use of the road. Clause 45 prohibits installation of any structure or light that can have a negative impact on traffic conditions. Likewise, Clause 46 indicates that the county administrative board is responsible for issuing outdoor advertising permits within 50 m (164 ft) of the road. However, if the area is covered by a local plan, the municipality is the agency responsible for issuing outdoor advertising permits. If the location of the sign in the local plan is in an area where SRA or the county administrative board is responsible, a permit from one of these agencies is also required.

Advertising is allowed at designated locations in rest areas. Maintenance and upkeep practices can vary from region to region. In some cases, there are agreements with municipalities to handle specific maintenance activities at the rest area. If an illegal sign is in the right-of-way, SRA can require removal. If the sign is not removed, SRA can remove it and seek reimbursement. In 1992, SRA started issuing road maintenance contracts this included the scope of work for maintenance contractors is identifying inadmissible advertising in the right-of-way. After receiving confirmation of a sign's illegal status, the maintenance contractor takes a picture of the sign and the location, removes the device, and stores it for 3 months or discards it, depending on the value of the sign

The SRA's position is that a correctly designed sign may be acceptable even on busy roads if messages are short, simple, and clear so they can be understood quickly. The text should be as short as possible and not include phone numbers or Web addresses. The sign should not be confused with or have the same meaning as a road sign. S

Signs parallel to the road are not allowed. SRA also imposes limitations on distances from the right-of-way as a function of the posted speed limit. Moving or changing messages place greater demand on road users. SRA evaluates picture change rates on a case-by-case basis.

The Roadside Advertising Guidelines include criteria to help assess the feasibility of a proposed sign. The criteria apply regardless of whether the proposed sign is located in or outside the right-of-way.

5.6.5 The Netherlands

The SWOV in 2009 stated that studies have shown that it is better not to place advertising and information billboards at busy traffic spots (SWOV, 2009). It is also essential that they should not resemble traffic signs or other traffic indicators to avoid confusion. Furthermore, blinking and moving objects have proven to be difficult to ignore and should therefore be avoided. However, in the Netherlands, various levels of government have their own guidelines for the placing advertising and other objects on or alongside the road (SWOV, 2009).

5.7 Summary of findings

Countries such as the USA, Canada, Australia, and New Zealand recognise the significant role that the outdoor advertising industry play in their economies but highlight that there is a need to manage the placement, size, content and messages in order to protect the environment and tourism, and to consider road safety.

Best practices indicate that outdoor advertising practices are prescribed by the Departments of Transport or the Transport Authorities of the particular country. These departments or authorities prescribe the way in which outdoor advertising is controlled and managed by means of legislation and regulations. The development of the regulatory frameworks as well as the policies and guidelines are evidence-based and draw on scientific findings. Considerations in preparing guidelines for outdoor advertising include safety, consistency, specificity, and pragmatism.

Each regional authority or local authority is responsible for the way in which these prescriptions are implemented and followed. Regional and local authorities prepare policies and guidelines that assist in the management and control of outdoor advertising practices. The aim of these policies is to provide guidance around the type of advertisements that are permitted on the road network to the planning departments (where the function mostly lies) as well as to the outdoor advertising industry. The policy frameworks guiding where roadside advertising may be approved include reference to location, placement, design and operation of the advertising device, and considerations about the way in which advertisements influence the function of formal road traffic signs and road markings; add to complexity of the road environment; and intersect with mental capacity in relation to the function, design and operation of the road.

Most regional and local authorities have an assessment framework, which is used by the outdoor advertising industry to plan and by the road and planning authorities to evaluate the applications for roadside advertising displays.

6 Outdoor advertising role-players and practices in South Africa

6.1 Introduction

Chapter 6 considers the South African status quo in terms of outdoor advertising practices. This chapter provides an overview of stakeholders, including outdoor advertising industry bodies, media companies and government spheres responsible for managing roadside advertising and considers local processes in relation to applications for roadside advertisements in the context of national provincial and local requirements. Lastly the chapter concludes with an overview of challenges experienced by local authorities.

6.2 Private-sector outdoor advertising stakeholders in South Africa

6.2.1 Media groups and advertising agencies

The outdoor advertising market consists of advertising agencies that provide outdoor advertising space on various mediums and platforms to advertisers for a fee. As indicated in Chapter 3, the outdoor advertising industry in South Africa (Davidson, 2001) is represented by a broad cross-section of companies in terms of size. There are two large publicly listed companies, three or four large, privately owned companies and more than 30 regional companies, many of which operate in niche markets. The larger national outdoor advertising contractors offer a full range of outdoor media options, either by having taken over smaller specialist contractors or by natural expansion.

A number of companies specialise in manufacturing custom-made spectacular signs that are erected on prime urban sites next to major freeways and arterial routes (Davidson, 2001). Some regionally based companies specialise in a particular type of outdoor advertising medium (trailers, aerial banners, inflatables, etc.), or provide local retail outdoor advertising through a variety of structures such as bus shelters, litter bins and ID lights (street identification signs), etc.

South Africa's advertising sector is dominated by four foreign-owned international media groups: WPP (UK); Omnicom Media Group (USA); Publicis (France); and Interpublic (USA). Primedia, which is South African owned, is one of the largest outdoor advertising companies in South Africa.

Table 6.1: International OOH Advertising Companies

Country	Advertising agencies
United States	Adams Outdoor Advertising; Adspace Networks, Inc.; Captivate Network; Clear Channel Outdoor, Inc.; Burkhart Advertising, Inc.; Daktronics, Inc.; Fairway Outdoor Advertising; Lamar Advertising Company; Outfront Media, Inc.
Austria	EPAMEDIA
Switzerland	APG|SGA SA
Australia	APN Outdoor Group Ltd.
Germany	StrÃer Media SE
France	JCDecaux (Also South African branch)
Canada	Bell Media; Pattison Outdoor Advertising; Zoom Media, Inc.
China	Clear Media Limited; Focus Media Holding Limited; TOM Outdoor Media Group
Romania	Euro Media Group S.A

6.2.2 Outdoor advertising Industry bodies

A. Out of Home Media Association (OHMSA)

Out of Home Media South Africa (OHMSA) is the trade association for the outdoor advertising media industry. It provides members of the association with media platforms across the entire spectrum of OOH advertising including from ambient or alternative media through to airport advertising, giant billboards and brand activation. OHMSA is a member of the Global Outdoor Association Forum. This connects the Association with other OOH media associations across the globe as well as the latest global research and trends (OHMSA, 2018).

According to the OHMSA constitution, the OHMSA "seeks to promote and to protect the interests of the association and its members, while serving the needs of consumers, advertisers, and the public. This is achieved through co-operation between its members and affiliated associations, government, and local authorities. OHMSA aims to uplift the industry through skills development and encouraging fair and free competition in the out-of-home industry."

In addition, the OHMSA Code of Practice and Standards (2018) for Out of Home Media state that members are "conscious of their responsibility to the community and, in particular, to the users of out of home media all members of the Company bind themselves to the Code of Practice set out in this document, the Constitution and MOI of the Company and undertake faithfully to adhere to their provisions".

The OHMSA Board is elected from the members and administers the code and it is applicable to all members who undertake to abide to the terms and conditions contained in such Code.

By implementing the requirements of this code and standards, members of OMHSA will continue to enhance the position and status of the OOH media industry with users, the public, and government, provincial and municipal authorities. OMHSA accepts that a balance needs to be struck and maintained between:

- the needs of commerce and industry and their legitimate rights as entrenched in the Constitution on the one hand, and
- the outdoor advertising regulatory framework as promulgated by organs of state as well as formal public participation processes with organisations, bodies and individuals concerned with the environment including road safety, on the other.

B. Association for Communication and Advertising in South Africa (ACASA)

The Association for Communication and Advertising in South Africa (ACASA) is a voluntary organisation formed by a 100 or more interested stakeholders. Our members are committed to fostering trust between marketers and agencies and transforming the advertising and communications industry at large. The aim is to positively influence and impact the professional and operational standards of all South African agencies. The quest is to continually build the standards for the advertising profession (ACASA, 2019).

C. Advertising Regulatory Board (ARB)

Originally the Advertising Standards Authority (ASA) consisted of the Marketing Association of South Africa (MASA), the Association for Communication and Advertising (ACASA) and the Internet Advertising Bureau (IAB) – these associations are the founding members of the Advertising Regulatory Board (ARB).

The ARB administers the accredited Code of Advertising Practice which regulates the content of South African advertising. The ARB functions according to self-regulation in the industry and depends on Industry co-operation and support for responsible advertising (Advertising Regulatory Board, 2019).

More recently, on 1 January 2019, ARB of South Africa became a member of the International Council for Advertising Self-Regulation (ICAS) in replacement of the Advertising Standards Authority (ASA), the former self-regulatory organisation responsible for implementing advertising standards in the South African market (ICAS, 2019). ICAS is a global platform promoting responsible advertising through effective self-regulation. Its members include Self-Regulatory Organisations (SROs) and other national, regional, and international bodies.

D. Marketing Association of South Africa (MASA)

The Marketing Association of South Africa (MASA) is the professional body for the South African marketing profession and the representative voice for organisations and individuals within the South Africa marketing industry.

MASA represents the business interests of marketers, and promotes professional and ethical marketing practices, the adoption of common standards, self-regulation, and independent and credible marketing industry research. It seeks to provide leadership, support, and mentorship, and is the accredited custodian of the Chartered Marketer, Marketing Practitioner, and Associate Marketer designations in South Africa. MASA is active in leading and influencing transformation, policy, legislation, education, and training, learning and development, and best practices on marketing and related business issues.

E. Out-Of-Home Measurement Council

The founding members of the Council (JCDecaux, Primedia Outdoor, Outdoor Network and Ad Outpost) partnered with international market research and analysis companies to form the OOH Measurement Council (OOMC). OOHMC along with the market research companies has since 2015 used big data from global positioning systems and travel surveys to develop a planning tool for OOH in South Africa (Mokono, 2019).

Mokono state that research document “serves as a guide to assist in understanding the scope of OOH billboards loaded on Quantum software to understand the distribution of sites based on site audience reach and impacts. “The information will enable an assessment or evaluation of the audience volume delivered by set formats across all nine provinces as the population numbers and distribution are vastly different. Through the understanding of the volume of sites associated with a set audience volume, it is possible to consider or assess how different billboard sizes perform”.

6.2.3 Role players

A distinction must be made between the outdoor advertising contractor and the other companies or bodies such as the sign writer, the sign writing company, and many informal ‘advertisers’ who post pamphlets etc on lampposts or trees (Davidson, 2001)

In the chain of outdoor advertising, cognisance must be taken of the roles, responsibilities and the expectancies of the following stakeholders:

i) The advertiser: The person, business or institution that wants to communicate a message to the public. The advertiser needs maximum exposure to communicate the message as clearly and as widely as possible. As such, the advertiser wants as few as possible competing advertisements that may detract from the effectiveness of their advertisement. The advertiser wants to pay as little as possible for an advertisement, but is willing to pay a premium price if adequate exposure of the advertisement can be guaranteed;

ii) The advertising agent: The person or company that applies on behalf of advertisers for the approval of advertising rights. This role player normally acquires approval of advertising rights and leases the advertising opportunity to the advertiser. The advertising agent maximises financial benefit by securing advertising opportunities at exclusive locations and leasing it to the highest bidder. Advertising agents are normally large companies that manage advertising infrastructure that had been approved in the past. The advertising agent wants to develop as much as advertising opportunities from which financial benefit can be derived;

iii) The municipality: The regulating authority that must balance the demand side of advertising with the supply side in such a way that, while adequate advertising opportunities are created, the interests of advertisers and the public are protected. The municipality must ensure that advertising opportunities are not created that would harm the image of the city or impact negatively on traffic safety. Here, the municipality must rely on national legislation, national guidelines, and sound planning principles on which local by-laws should be based. The municipality also aims to generate income from outdoor advertising;

iv) Landowners: As indicated in chapter 3, the advertising platforms are situated on and adjacent to both public and private roads. Owners of the land on which the displays are situated are compensated monthly for hosting the displays or receive a share of the income generated by the advertising agency;

v) The target market: That part of the population that is looking for the message that the advertiser is aiming to communicate. The target market does not want a multitude of competing advertisements that will hide the

message among a hoard of other messages. The message should stand out from the surrounding environment;

vi) The public: The entire population, of which the target market normally comprises a small percentage. Most of the public has no interest in the advertising message being displayed and derives no benefit from the fact that the message is being displayed. For them, an advertisement is merely a sign that detracts from the visibility and conciseness of road traffic signs and the beauty of the environment.

Advertising agents generate income by means of either high- and low-impact advertising.

6.2.4 Process followed to advertise on outdoor media

The following summary outlines the process for outdoor advertising as a paid-for medium, where the outdoor advertising contractor rents out or sells advertising space on specially erected structures (Davidson, 2001):

- The selling mechanism is triggered only when an unconditional approval has been given by the appropriate authority, or all conditions have been satisfied;
- The contractor sells or rents out the advertising space to an advertiser, either directly or more usually through an Advertising Agency. The Advertising Agency is usually responsible for paying the contractor the agreed rental;
- The Advertising Agency receives a prompt payment discount of 16½ % if it pays the Outdoor Advertising Contractor within 45 days of date of statement. This was originally called the 'commission' for providing the creative expression for the sign and for negotiating and securing the space for the advertiser;
- The landowner receives a rental from the contractor for permitting an advertising structure to be erected on his property. The rental is negotiable, and if it is based on a percentage of the income received from the advertiser or from the agency, the property owner has a right to see the agreement the contractor has with the advertiser;
- The rental payable to the property owner is payable only when the sign is erected. The contractor will commence construction of the sign once an advertiser has been found. Depending on the site, it might take as long as 12 months for the contractor to find a suitable advertiser. After this time the contractor may well have the approval withdrawn by the authority, in terms of its by-laws;
- The nature of the Outdoor Advertising business is that there will always be outdoor operators erecting and renting out 'illegal' advertising structures;
- An illegal sign is one for which no written permission has been given for its erection by the parties involved in the process.

6.3 Road authorities responsible for managing outdoor advertising displays in South Africa

The road authorities in South Africa are divided over the responsibilities of different spheres of government as far as dealing with outdoor advertising is concerned (Rautenbach, no date). In a memorandum prepared to illustrate the legislative framework for road authorities in South Africa, Rautenbach stated that authorities do not want to be burdened with the politics that accompany outdoor advertising, while others are eager to cash in on the revenue that can be generated. On the one hand, some road authorities want to protect their own interests, while others want to assign responsibilities to other spheres of government. Some authorities view traffic safety as unnegotiable, while others do not consider the impact of advertising on traffic safety at all.

Road authorities responsible for managing outdoor advertising include:

- The South African National Roads Agency (SANRAL);
- Provincial road authorities;
- Municipalities and metropolitan councils.

Chapter 7 (Legal and regulatory framework) discusses the roles and responsibilities of South African road authorities in more detail.

6.3.1 South African National Roads Agency Limited (SANRAL)

The South African National Roads Agency SOC Limited, is an independent, statutory company registered in terms of the Companies Act. The South African government, represented by the Minister of Transport, is the sole shareholder and owner of SANRAL.

The South African National Roads Agency Limited (SANRAL) promulgated Regulations on Outdoor Advertising and Control in December 2000. The regulations provide specific rules for the control of the following:

- Positioning of advertisement structure;
- Size of advert;
- Controlling advertisement content (also known as faces).

6.3.2 Provincial road authorities

Provincial Government has been in the process of promulgating their regulations since 2000. Gauteng uses the concept of 'zone of provincial interest' along its roads to denote where an application for an outdoor advertising display, directed at provincial road traffic, must be subject to the controlling municipality. The controlling municipality have to obtain and consider the comment of the provincial roads department, should it be the intent of a municipality to consider an outdoor advertisement display in terms of its policy and by-laws.

At present the Western Cape Provincial Government is revising their regulations to ensure alignment with the Constitutional Court ruling that municipalities have the overarching responsibility of managing outdoor advertising regardless of the ownership of a road.

6.3.3 Local authorities (municipalities and metropolitan areas)

The Constitution, Section 156, and Part B of Section 5 gives local authorities the control over the 'erection of billboards and the display of advertisements in public places.' Local authorities are required to develop by-laws to address the issue of advertising signs in local authority jurisdictions, using SAMOAC.

SAMOAC defines three categories of control: maximum control (nature environments); partial control (rural environments); and minimum control (urban environments). Municipalities need to proactively demarcate these areas in the municipal area as a base map for the implementation of its outdoor advertising policy. It seems that few municipalities with policies have control maps readily available; these are usually compiled on an ad hoc basis depending on how and when areas are targeted for the display of advertisements.

Most of the metropolitan municipalities have by-laws that deal with outdoor advertising control (OAC) as well as policies that are based on SAMAOC. Smaller municipalities (e.g. district municipalities) in Gauteng typically do not have by-laws and deal with outdoor advertising applications in an ad hoc manner, with officials often being persuaded into accepting applications by operators using dubious tactics. The function of controlling outdoor advertising normally resides in the city planning departments. Where applications are referred to the traffic engineering or traffic departments (or functionaries), the comments or objections from these departments are often ignored (Rautenbach A. , no date). Although many of the metropolitan municipalities may have the capacity to make assessments regarding the impact of outdoor advertising displays on road safety, the respective functionaries often have to face accusations that they are just the stumbling block in the processes of approval – a situation that is likely induced by the fact that there is no formalised (or benchmarked) procedure to conduct such assessments.

Rautenbach (no date) states that:

- Municipalities are administratively the authorities that consider and approve or reject outdoor advertising applications.
- Unless deemed exempted in terms of applicable legislation, no advertisement may be displayed without prior written approval by the municipality in whose jurisdiction such advertisement is envisaged.
- A municipality may not consider an outdoor advertising application regarding a proposed sign/structure visible from a national or provincial road, without sourcing the input of the responsible road authority regarding the potential traffic safety implications thereof. (SANRAL or the provincial government is regarded as an affected stakeholder in this regard.)

- An applicant must thus first obtain the written input of the higher authority before an application is submitted to the municipality.
- A municipality may not approve an outdoor advertising application if such approval is negatively recommended by SANRAL or the provincial government.
- Either the responsible municipality or the higher order road authority can follow due process to have illegal advertisements removed.

6.4 Outdoor advertising: South African application procedures

6.4.1 Road Reserve Management

The National Road Traffic Act (NRTA) 93 of 1996 stipulates that a 'public road' means any road, street or thoroughfare or any other place (whether a thoroughfare or not) which is commonly used by the public or any section thereof or to which the public or any section thereof has a right of access, and includes:

- the verge of any such road, street or thoroughfare;
- any bridge, ferry or drift traversed by any such road, street;

or

- thoroughfare; and
- any other work or object forming part of or connected with or belonging to such road, street or thoroughfare;

According to the SANRAL Act 7 of 1998 a 'national road' refers to a national road as defined in section 1 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998) and the following definitions are important;

- 'road' means a road intended for vehicular or animal traffic, including cycle traffic, and includes a bridge or drift traversed by a road and intended for use in connection therewith;
- 'road reserve' means the full width of a road, and includes the roadside and the roadway;
- 'roadway' means that part of a road made and intended or used for traffic or usable by traffic in general;

A 'municipal road' means a road under the control of a municipality in terms of the Constitution, section 84(1)(f) of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998), or any other law.

Accordingly, "no person or institution, including an organ of state as defined in section 239 of the Constitution, may, unless authorised by this Municipal Structures Act without the permission, consent or authorisation of the MEC erect any structures in the road or road reserve".

Full ownership in National Road Reserves vest in SANRAL, pursuant to either an expropriation of that land or an agreement of sale and transfer of the land to SANRAL.

'Ownership' in Provincial and Municipal Roads differ. In some parts of the old Transvaal Province, Provincial Roads and Municipal Roads are mere servitudes registered over private property in favour the applicable sphere of Government. In other parts, full ownership is acquired by Provincial Government or Local Government, either in terms of a private treaty, subdivision, and eventual registration in the Deeds Office into the name of the applicable Provincial Government or upon expropriation thereof.

A clear distinction must be drawn between expropriation of land and proclamation of a road where only the right to use a specific portion of land is 'taken' by a government institution. Where land is expropriated, ownership of a property passes to the applicable authority upon the date of expropriation whilst, where a road is proclaimed, the right to use the portion of land for the purposes of a road, accrues in favour of Province from the day upon which that right was proclaimed. Municipalities also enjoy the powers to expropriate either land or a servitude (no right to proclaim or declare a road exists in favour of a municipality).

Where a right has been proclaimed, only the bare dominium (i.e. merely the ownership) of the property remains vested in the hands of the original owner and a 'statutory servitude' is created in favour of the applicable public body, i.e. proclamation / declaration is equivalent to 'rights to use' but not ownership.

About land affected by or required for road reserves of national roads, SANRAL will not acquire or expropriate only the 'rights to use' such land and always acquire or expropriate full ownership of the affected property.

6.4.2 Advertising on national roads (SANRAL applications)

A. SANRAL documents informing application process

SANRAL's procedures for the application and evaluation of outdoor advertising on national roads are informed by the following documents:

SANRAL and National Roads Act, 1998 (Act No.7 of 1998), specifically the following clauses:

- Section 50: details advertising on or visible from national roads and legality thereof; and
- Section 48: details about structures and other works on, over or below national roads or certain other land as well as the legal procedures to be followed.

SANRAL Outdoor Advertising Regulations, 2000. This document present regulations on advertising on or visible from national roads. The SANRAL Regulations on Advertising on or visible from National Roads of 2000 stipulate that the following elements are to be evaluated when considering road safety (Du Toit, 2001):

- Signs must not present a physical safety hazard to pedestrians or vehicles;
- Signs must not obscure the view of existing road signs;
- Signs must be certain minimum distances away from road signs and traffic signals;
- Size and the content of the advertisement (bits of information), and illumination thereof, graphics and so forth;
- Speed limit of the road;
- Disruption of the flow of information to the driver;
- Position of the advertisement should not distract the drivers' attention at merge areas, curves, interchanges etc.

Administrative forms to be used in application process, include:

- Outdoor Advertising application form;
- Customer registration form;
- Consent by property owner;
- General criteria used by SANRAL for consideration of advertising signs.

B. SANRAL application process

The process for the application for outdoor advertising at SANRAL is detailed below:

Step 1: Apply for approval from the landowner of where the sign will be installed;

Step 2: Apply for approval from relevant municipality. The approval provided should be on municipality Letterhead and should include the following;

- Full description of the property (erf / portion / extension);
- The current land use of the property and the classification of the area (area of maximum, partial or minimum control) (zoning); and
- The current building restriction area on a layout map.

Step 3: Complete SANRAL outdoor advertising application form in full. The completed form should be accompanied by the following:

- GPS coordinates for exact location of the advertisement;
- Exact distance from the nearest distance board, as well as a site sketch showing the proposed location of this sign and other road signs in the area;

- An elevation plan or photographs of the proposed structure in relation to the area;
- A non-refundable application fee of R2, 000.00 per application is payable at submission of the application.

C. Criteria used by SANRAL for consideration of outdoor advertising signs

- Proposed sign must be at least 250m away from any other billboard on the same side of the road on a national road where speed limit is > 80 km/hr;
- Proposed sign must be at least 200 m from all road signs on a national road where speed limit is > 80km/hr;
- Billboards will not be permitted in areas of maximum control;
- Areas where lane configuration changes will be considered carefully; All proposed locations inside the visual zones (visible from the national road/highway up to 250 m from the road reserve boundaries) need to be applied for;
- Application will not be considered without formal approval from the relevant municipality;
- Application will not be considered without full payment of the application fee.

D. Advertisements types permitted on national roads

There are several types of outdoor advertisements considered by SANRAL. These include:

- Electronic billboards;
- Large billboards;
- Small billboards and tower structures;
- Large posters and other advertising on street furniture;
- Flags;
- Suburban advertisements;
- Estate agents' boards;
- Advertisements for sale of goods or livestock;
- Sidewalk posters and notices;
- Project boards;
- Street name advertisements;
- Security advertisements;
- Product replicas and three-dimensional advertisements;
- Balcony or under awning advertisements;
- Forecourt advertisements;
- Residential or community advertisements;
- On-premises business advertisements;
- Tower, bridge, and pylon advertisements;
- Construction site advertisements;
- Advertisements for sponsored road traffic projects;
- Service facility advertisements;
- Banners;
- Development advertisements; and
- Aerial advertisements.

E. SANRAL specifications for all outdoor advertisements

SANRAL Outdoor Advertising Regulations; 2000, provides specifications for all outdoor advertisements considered by the agency. The specifications are as follows:

Road Safety and traffic considerations – advertisements should not:

- Cause danger to property and persons;
- Be so placed to distract the attention of drivers of vehicles in a manner likely to lead to unsafe driving conditions;
- Be illuminated to the extent that it causes discomfort to approaching pedestrians or drivers of vehicles;
- Be attached to traffic signs, create confusion with traffic signs, interfere with the functioning of traffic signs or create road safety hazards;
- Obscure the view of pedestrians or drivers, or obscure road or rail vehicles and road, railway or sidewalk features such as junctions, bends and changes in width;
- Project over pedestrian or cycle circulation routes, unless the clear height of the advertisement exceeds 2,4 metres;
- Obstruct fire escapes or the means of egress to fire escapes;
- Be placed closer than the minimum clearance about overhead power lines as prescribed by any law;
- Be erected in the vicinity of a signalised intersections which display the colours red, yellow or green if such colours will constitute a road safety hazard;
- Be erected without approval where such approval is required by the Act or these regulations or any other law.
- Compliance with Road Traffic Act (Act No.29 of 1998) requirements - the Agency must evaluate whether advertisement is compliant, according to road traffic sign standards published under applicable road traffic legislation, prevailing traffic conditions and the roadside environment;
- Minimum spacing between advertisements – the agency may increase the minimum spacing between advertisements, or place further restrictions on the position, size and content of any advertisement in the interests of road safety;
- Negative externalities – no advertisement will be permitted that emits a noise, sound, smoke, smell or odours;
- Concise – an advertisement positioned on or next to a national road and visible from a national road must be concise and legible;
- Design and construction – an advertisement must be neatly and properly constructed according to accepted design and construction standards;
- Glass – all glass used in an advertisement, other than glass tubing used in a neon and similar advertisement, must be safety glass at least three millimetres thick. Glass panels used in an advertisement must not exceed 0,9 square metres in area;
- Electrical – every illuminated advertisement and every advertisement in which electricity is used, must:
  - Have power cables and conduit containing electrical conductors positioned and fixed so that they are not unsightly;
  - Be provided with an external switch in an accessible position and at a height of at least three metres from the ground whereby the electricity supply to the advertisement may be switched off.

Maintenance – an advertisement must be:

- Located at a height that discourages vandalism;
- Serviced on a regular basis; and
- Maintained in good repair and in a safe condition.

Position of advertisements – an advertisement shall not be installed, except where specifically authorised by the following regulations:

- Cause any obstruction to a motorist's view of the roadway or its approaches, regardless of the direction the motorist is travelling;
- Be positioned on a road island or road median;
- Be suspended across a national road;
- Be erected within or suspended above a visual zone; and
- Be permitted at urban street corners.

  Illumination and electronic advertisement – illumination is permitted on an advertisement only if it does not lead to unsafe driving conditions, and where it is specifically not prohibited.

The luminance level on any advertisement where illumination is permitted, and where the applicable speed limit on the national road is higher than 60 km per hour, shall not exceed the following:

Illuminated area	**Maximum luminance**
Less than 0,5 square metres	1,000 candela per square metre
0,5 to 2,0 square metres	800 candela per square metre
2,0 to 10 square metres	600 candela per square metre
10 or more square metres in visual zones	350 candela per square metre
10 or more square metres in other areas	400 candela per square metre

A variable or animated message shall not exceed the following frame update limits:

Speed limit 60 km per hour or less	**Full video**
Speed limit more than 60 km per hour	One single complete frame that changes every 30 seconds as a maximum

Floodlighting – light source for an advertisement must be positioned to ensure effective distribution and minimise light wastage or 'spill. Any light source for an advertisement must not be visible to traffic travelling in either direction.

6.4.3 Advertising on provincial roads

Rautenbach (no date) state that provincial governments are responsible/mandated to:

- Monitor the way in which municipalities in their area of authority deal with outdoor advertising;
- Regulate the legislation formulated by municipalities to govern outdoor advertising matters;
- Support municipalities in creating enabling legislative environments; and
- Empower municipalities to enforce such legislation.

However, the responsibilities of provinces extend also beyond the above supervisory mandate.

A. Outdoor advertising regulations

The Constitution authorises a provincial legislature to promulgate outdoor advertising regulations related to traffic safety and operations along provincial roads. Such regulation can deal with any aspect of outdoor advertising that is deemed to have a potential traffic safety implication. The promulgated provincial outdoor advertising regulations can also address any aspect of outdoor advertising that has potential environmental implications, the most obvious of which is visual cluttering because of sign pollution and scarring of natural scenery.

B. Advertising on Roads and Ribbon Development Act

Provincial governments traditionally relied on section 2(1) of the Advertising on Roads and Ribbon Development Act, 1940 (Act 21 of 1940) when dealing with outdoor advertising. The relevant section states the following:

> *"No one shall display an advertisement which is visible from a public road, unless it is displayed in accordance with the written permission of the controlling authority."*

The relevant Act is in general (but not exclusively) applicable along roads outside urban areas. The provincial government (or national road authority) is by implication the controlling authority, unless such authority had been delegated to a Regional Services Council.

Section 14 of the act again confers on the 'Minister' the authority to make regulations related all aspects of outdoor advertising to enable the controlling authority to regulate outdoor advertising along the roads under its control. This includes the removal of illegal advertisements.

6.4.4 Local authority administrative procedures and evaluation of outdoor advertising

At a local level, various Metropolitan Councils have either drawn up, or are in the process of revising Advertising Policies and amending their by-laws using SAMOAC as a guideline. In general terms, both the SAMOAC document and some of the newer policies have demonstrated a more deregulatory approach based on the recognition of three landscape types: natural, rural and urban. These require three levels of control: maximum, partial, and minimum.

Most of the metropolitan municipalities have by-laws about outdoor advertising control (OAC) and they also have policies that are mostly based on SAMAOC. Smaller municipalities (e.g. district municipalities) in Gauteng typically do not have by-laws and deal with outdoor advertising applications in an ad hoc manner, with officials often being persuaded into accepting applications by operators using dubious tactics. The function of controlling outdoor advertising normally resides in the city planning departments. Where applications are referred to the traffic engineering or traffic departments (or functionaries), the comments or objections from these departments are often ignored.

Although many of the metropolitan municipalities are able to assess the impact of outdoor advertising displays on road safety, the respective functionaries often have to face accusations that they are just the stumbling block in the processes of approval – a situation that is likely induced by the fact that there is no formalised (or benchmarked) procedure to conduct such assessments. Mangaung Metropolitan Municipality has done significant development work on their outdoor advertising policy, application and evaluation procedure, and the requirements for the conducting of road safety impact assessments for advertisements that target road traffic.

One hurdle that prevents municipalities from fulfilling their constitutional mandate to control and manage outdoor advertising is the disparate ways in which the various municipalities around the country deal with outdoor advertising. There is a strong contention that when there is greater uniformity in the approach to manage outdoor advertising that the administrative burden on municipalities will be lessened; it will aid the development of the necessary capacity to exercise the respective functions and then it can also be expected that there will be a greater level of compliance by the outdoor advertising industry. Concomitantly, it will encourage municipalities to focus on achieving road safety results through improved efforts to manage road safety and to collaborate in alignment with the National Road Safety Strategy.

The process for the outdoor advertising agent/contractor to apply for the construction of a structure on a specific site to display an advertisement that would be visible from a road typically starts with an application form (an instrument of the OAC policy) obtainable from the local municipality. Traffic engineering and road safety related information (or what would be required for a road safety assessment) may be a requirement imposed on the applicant, who will then need the services of a qualified PSP. The municipality evaluates the application in terms of its OAC policy. When the application complies with the requirements, the municipality will approve the application subject to certain conditions. If not acceptable in terms of the OAC policy or on road safety grounds (as it is typically dealt with as a separate function at present), the application is rejected. When the road that the outdoor advertising display targets is a provincial or national road, or when such advertising display is visible from a provincial or national road (as per the confinements of the regulations of these authorities), the municipality must submit the complete application for comments to those authorities. In the final evaluation of the application, the municipality will consider all inputs and comments on the application, record its considerations for ignoring or not accepting any of the inputs or comments, and approve or reject the application.

6.5 Status and challenges of outdoor advertising in South Africa

6.5.1 Outdoor advertising media used by the outdoor advertising industry in South Africa

Freestanding outdoor advertising media are structures that are not attached to a building or to other physical constructions Roux (2017). In South Africa, the size of outdoor advertising formats ranges from small (3.6x2.5m, 3x2m, 3x6m) to much larger (3x12m, 4.5x18m, 9x6m, 12x12m) (OHMSA, 2016).

Large signs such as 'spectacular outdoor advertising signs, super-signs and gantries' are located facing major highways or close to the entrances to large cities. These larger signs are often used to target higher income groupings that work or live in these urban areas (Roux, 2017).

Super signs or super-outdoor advertising signs are large standard-sized outdoor displays between 36 m2 and 81 m2 found on major arterial routes and at major traffic convergence points in metropolitan areas (SAMOAC, 2010).

A popular location for advertising gantries is at the entrances to major centres or towns in South Africa. Gantries displays fixed advertisements on overhead structure, such as bridges, walkways, or free-standing boards to span a road, thereby offering maximum exposure – due to their position right in front of the approaching vehicular traffic (SAMOAC, 2010; Roux, 2017).

Davidson (2001) stipulates that:

- The outdoor advertising contractor has no say in what goes on a billboard or advertising sign – provided it conforms to the requirements of the Code of Advertising Practice as laid down by the ASA Advertising Standards Authority of South Africa members subscribe.
- The contractor's role is to find suitable sites for erecting advertising signs and to rent out the space to an advertiser.
- The contractor obtains the rights to erect an advertising sign on a site and negotiates a site rental fee with the property owner. The land may be privately owned, or State-, Provincial-, Railway-, Municipal- or township-property.
- The contractor then obtains permission to use the site for an advertising sign with the Government or Provincial body, the municipality or local authority concerned. The approval may be an unconditional or a conditional one where approval would be subject to several conditions such as approval by Traffic or Electricity Departments, or following an EIA, etc.

6.5.2 Concerns regarding outdoor advertising practices in South Africa

Historically advertising along national roads was regulated by Act 54 of 1971, which stated that no (or limited) advertising signs would be allowed along a national public road or in the road reserve of any road (Du Toit, 2001). However, Osrin (2001) stated that these regulations opened national roads for lucrative advertising practices and highlighted the need for legally managing these applications (Osrin, 2001).

Rautenbach (no date) state that: *"The outdoor advertising industry is a very lucrative industry and private companies invested in outdoor advertising are using the uncertainties among road authorities to broaden their reach and to advance the abuse of public land and infrastructure for own gain.*

If this trend is not checked in time, road authorities will not be able to resist the advances of the advertising industry and the already poor safety record of South African roads can only be expected to worsen.

It is necessary that the responsibilities of road authorities in this regard be clarified and that road authorities on all levels of government approach outdoor advertising in a consistent manner. The focus should be on traffic safety and authorities need to be capacitated to deal with outdoor advertising in a responsible manner".

A. Income generation from outdoor advertisements

Local authorities are cautioned not to develop by-laws to the detriment of traffic safety and visual pollution. The revenue that can be derived from relaxed advertising by-laws cannot be regarded as adequate or justified income to compensate

for the financial and social cost of serious and fatal accidents (Memorandum, 2010). Although there are opportunities for local authorities to generate income from both high and minimal impact outdoor advertising practices, these should be managed rigorously to ensure that the benefit of earning income does not proliferate safety and the environment

Rautenbach (2013) notes that advertisers put pressure on local authorities to approve advertising signs inside road reserves, as this will achieve better exposure and they can then negotiate higher income from their clients. Rautenbach reiterates that the road reserve belongs to the relevant roads' authority, and such an authority needs to protect the interests of its ratepayers by guarding against unnecessary traffic safety risks and advertising pollution. The potential income for advertiser and the potential income for the local authority from approving advertisements inside road reserves can thus not be promoted at the expense of traffic safety (Rautenbach, 2013).

B. Protection of the road reserve

Davidson (2001) notes that although earlier on there was a recognition that there were some operators erecting and renting out illegal advertising structures, the status at present is that this industry has grown to the point where all operators are guilty of illegal signs. In fact there are numerous rogue operators who run their business purely on a basis of erecting structures without permission, relying on municipalities to not being able to exercise their duties – and where cases do end up in court, by using delay tactics just to get an extra couple of months of exposure before they may be forced to remove the illegal structure. (Davidson, 2001)

Discreet and well-positioned advertising signs in rural areas have been seen to be of some value in reducing a motorist's boredom and thus making a positive contribution to safety (Davidson, 2001). The protection of the road reserve from advertising encroachment is seen as one of the most important functions of the advertising by-laws (Rautenbach, 2013). The City of Cape Town (2001) states that the road reserve is provided for the benefit of the road users. Outdoor advertising allowed inside the road reserve must therefore provide a positive result when the distraction effects of such advertising are weighed against the benefits that may result from their presence to firstly, road users, including pedestrians and commuters, and secondly, to the wider community (City of Cape Town, 2001; Cairny, 2009).

C. Road safety concerns

Weideman (2001) indicates that advertisements as a source of potential driver distraction are constrained by commercial interests. In addition, Weideman state that it is the responsibility of the road authorities to minimise risks to motorists, including the control of advertising (Weideman, 2001).

Weideman (2001) provides the following examples of why advertisements should be considered a risk to road safety:

- Distraction of the driver from the immediate needs of the driving task;
- Potential problems in the relative conspicuity of advertisements and nearby road signs;
- Advertising trailers are frequently parked in road reserves with total disregard for safety principles;
- Advertising structures close to the road present a collision hazard could be a greater hazard to other vehicles whilst falling or after falling due to a collision;
- Confusion caused where colours, symbols or shapes used on advertisements resemble those used on standard road signs, or where an advertisement might obstruct a driver's vision.

Du Toit (2001) notes that a critical element in the evaluation of applications for outdoor advertisements is the spacing of road signs. The South African Road Traffic Signs Manual (SARTSM) prescribes minimum distances that need to be provided for the spacing between road signs.

These prescribed distances allow adequate time for the driver to read, interpret and react on the information on the road sign. As an example, the distance recommended in SARTSM is 200m between road signs if the operational speed is 120 km/h. The distance of 200 m was included in the regulations on large billboards, as the minimum spacing between a road sign and a billboard. However, not all road signs are equal and such the following signs were at the time considered supplementary signs then and need to be excluded from evaluations (Du Toit, 2001):

- Road maintenance signs;
- Construction boards;
- Provincial border signs;

- Emergency numbers;
- Arrive Alive signs (which are not in use any more).

D. Environmental concerns

Jordaan (2019) writes that if outdoor advertising is not managed correctly in South Africa, it has the potential to:

- Overload senses, leading to a decrease in awareness, and a loss of the effectiveness for which the message was designed;
- A loss of 'a sense of place' detracting from the character of the rural or urban setting in which it is placed;
- Impact tourist impressions of South Africa as a tourist destination by creating cluttered and unattractive environments;
- Impact, road safety, traffic flow and quality of life;
- Devalue property and contribute to urban decay as well as encourage vandalism because of the unorganised environment;
- Influence the valuation of business properties;
- Contribute to light and noise pollution;
- Contribute to ecological degradation and consequent acts like littering within the environment and promote unsustainable use of scarce resources and finally; contribute to moral and ethical through the images and content that is advertised (Jordaan, 2019).

6.6 Summary of findings

The South African outdoor advertising community comprises several international and local stakeholders. Although there are several industry bodies responsible for the setting of standards, codes of practice ethics and so on, most of these bodies are voluntary organisations that promote self-regulation in the industry.

On the other hand, all spheres of government (national, provincial, and local road and planning authorities) have a role in the management of outdoor advertising displays in South Africa. All spheres of government also have a responsibility to protect the road reserve.

The roles and responsibilities are set out in national legislation and will be discussed in the next chapter. However, of note at a national level is the National Road Traffic Act 93 of 199, which prescribes the manner in which the road reserve needs to be managed and protected as well the SANRAL Act and Regulations on Outdoor Advertising and Control which was promulgated in December 2000. At a provincial level, provinces including Gauteng, KwaZulu Natal and the Western Cape are in the process of preparing regulation pertaining to outdoor advertising practices on provincial roads.

However, the Constitution of South Africa prescribes that the main responsibility for management and control of outdoor advertising practices lies with local authorities, through municipal by-laws. The three categories determined by SAMOAC refer to three categories of control: maximum control (nature environments); partial control (rural environments); and minimum control (urban environments); Municipalities are required to proactively demarcate these areas in the municipal area as a base map for the implementation of its outdoor advertising policy. The function of controlling outdoor advertising lies with the city planning departments, although indications are that when these applications are referred to the traffic engineering or traffic departments (or functionaries), the comments or objections from these departments are often ignored. This is a concern as although the Constitution provide local authorities with the mandate to manage and control outdoor advertising, municipalities do not necessarily have the skills and capacity to evaluate the applications. In addition, a key limitation is the fact that there are no guidelines that dictate a uniform approach to assessment of the evaluations.

This has resulted in ineffective municipal by-laws, which lead to the following outcomes:

- Local authorities tend to in the interest of generating income, allow illegal advertising in and adjacent to the road reserve to the disadvantage of road safety efforts;
- Neglecting to protect and preserve the road reserve;

- Negatively impacting on the environment through pollution, clutter etc;
- Advertisements are source of potential driver distraction and potentially increase the number of accidents at risk locations.

7 Legal and regulatory framework

7.1 Introduction

Outdoor advertising is regulated from the viewpoint of the environment, the right to freedom of speech, the right to do business and, as a minor part of the mix, a road safety point of view. While there are limited South African studies as to whether advertising visible from a road causes road crashes, there are international studies available that indicate that it does contribute to road crashes. It is important that the attention capacity of a driver in a specific stretch of road be considered when regulating outdoor advertising visible from a road.

From a road safety point of view, outdoor advertising should be uniformly regulated in terms of technical requirements, such as where a certain type of advertisement may be displayed if it is visible to drivers, which types are prohibited and if it is allowed, technical requirements in relation to for example the amount of information (bits) to be allowed on such advertisements.

Various pieces of legislation and policies already exist regulating advertising visible from roads, in the national, provincial, and local spheres of government. The Constitution of the Republic of South Africa (the Constitution) prescribes a system of cooperative government between three spheres of government with executive and legislative powers in relation to distinct functional areas. The application of the Constitution in relation to the road traffic regulatory aspects of outdoor advertising will be further unpacked below.

The impact and relevance of existing legislation and policy will be explored, and recommendations will be made towards achieving a uniform system regulating the technical road safety aspects of outdoor advertising. There is a need to distinguish the environmental and municipal planning aspects of outdoor advertising from its road safety aspects. The road safety aspects relate only to advertisements which are visible from a road.

While road management (including construction and maintenance) contain a certain element of environmental management, these aspects are regulated in terms of environmental laws. The question therefore is, whether or not road traffic safety aspects of outdoor advertising should be regulated in terms of roads and road traffic laws.

Outdoor advertising, especially in a local government context, has a municipal planning aspect to it, and has been regulated as such. However, even where road safety impact studies are required for the approval of the display of advertisements within a local authority, there is no uniform guidance document or standard in accordance with which a local authority can decide or be required to make a decision regarding the approval of an application for the display of billboard or other advertisement.

7.2 Constitution

7.2.1 Background

The Constitution of the Republic of South Africa determines the structure of government and divides in into three spheres, namely national, provincial, or local. The legislative authority for the national sphere of government is vested in the Parliament, the legislative authority of the provincial sphere of government tis vested in the provincial legislatures, and the legislative authority of the local sphere of government is vested in the municipal councils (Sec 43). Schedules 4 and 5 to the Constitution identify the subjects over which a specific sphere of government has executive or legislative power.

There are overlaps in executive powers relating to advertising in road reserves or advertising that can be seen from a road. This is exacerbated by the fact that roads and road traffic are both national and provincial powers while billboards and the display of advertisements in public places is listed in Part B of Schedule 5 of the Constitution as an issue over which the local government has executive power.

The Constitutional Court has held that the Constitution[3]:

[3] See Ex parte Chairperson of the Constitutional Assembly: In re Certification of the Constitution of the RSA 1996 1996 4 SA 744 (CC) para 364; Ex parte President of the RSA: In re Constitutionality of the Liquor Bill 2000 1 SA 732

- distributes authority amongst the national, provincial, and local spheres of government;
- provides that each sphere has the autonomy to exercise its powers and perform its functions within the parameters of its defined space;
- imposes a duty on each sphere not to assume any power or function except those conferred on it in terms of the Constitution; and
- confers extensive powers on parliament including the power to pass legislation on 'any matter', excluding only those matters that fall within the functional areas of exclusive provincial competence set out in Schedule 5.

Section 44(2) of the Constitution however qualifies the limitation on Parliament passing legislation on a Schedule 5 (exclusive provincial or local competencies) matter when it is necessary:

- to maintain national security;
- to maintain economic unity;
- to maintain essential national standards;
- to establish minimum standards required for the rendering of services; or
- to prevent unreasonable action taken by a province which is prejudicial to the interests of another province or to the country.

Outdoor advertising in road reserves and advertising that are visible from roads comprises the following constitutional competencies:

- Road Traffic Regulation: Concurrent between provincial and national government and encompasses legislative and executive powers;
- Provincial Roads and Traffic: Exclusive provincial executive competence;
- Billboards and the display of advertisements in public places: Exclusive local government executive competence;
- Municipal roads (exclusive local government executive competence); and
- Traffic and parking (exclusive local government executive competence).

7.2.2 Principles for the interpretation of the Schedules to the Constitution

In interpreting the Schedules to the Constitution relating to functional areas in relation to which the different spheres of government have legislative or executive competence (or both), the principles followed by the Courts should be considered.

Principle 1: The 'bottom-up' approach

In Habitat Council v Provincial Minister of Local Government etc., Western Cape 2013 6 SA 113 (WCC) 120H-I, the court stated: "When determining where apparently overlapping functional areas of respective spheres commence and end, therefore, a court must determine, first, what powers are vested in municipalities; second, what powers are vested in provincial governments; and third, what powers are vested in the national government."

Principle 2: Functional areas allocated to the various spheres of government are distinct from each other

In Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC) para 55, the Constitutional Court held as follows:

"It is, however, true that the functional areas allocated to the various spheres of government are not contained in hermetically sealed compartments. But that notwithstanding, they remain distinct from one another. This is the position, even in respect of functional areas that share the same wording, like roads, planning, sport and others. The

(CC) para 42; and Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC) para 43.

distinctiveness lies in the level at which a particular power is exercised. For example, the provinces exercise powers relating to 'provincial roads', whereas municipalities have authority over 'municipal roads. The prefix attached to each functional area identifies the sphere to which it belongs and distinguishes it from the functional areas allocated to the other spheres. In the example just given, the functional area of 'provincial roads' does not include 'municipal roads. In the same vein, 'provincial planning' and 'regional planning and development' do not include 'municipal planning'. **The constitutional scheme propels one ineluctably to the conclusion that, barring functional areas of concurrent competence, each sphere of government is allocated separate and distinct powers which it alone is entitled to exercise[4]."**

While this case related to municipal planning, the example provided by the Court is fortuitous as it relates to roads, which is relative to this assignment. The Constitutional Court further held that held that an important consequence of section 155(7) of the Constitution is that neither the national nor the provincial spheres of government can, by legislation, give themselves the power to *exercise* executive municipal powers or the right to *administer* municipal affairs. This is because, the Constitutional Court held further, the mandate of these two spheres is ordinarily limited to 'regulating'. The authority to 'regulate' does not include the power to exercise municipal competencies and perform municipal functions. Instead, it simply includes the power to establish a legal framework within which a municipality must perform.[5] Section 156(2) of the Constitution gives a municipality the right to make by-laws on the "matters which it has a right to administer". In accordance with Subsection (3), a by-law that conflicts with a national or provincial law on the matter is invalid. If the national or provincial government in the case of outdoor advertising visible from a road has promulgated in laws, a by-law promulgated in terms of section 156(2) of the Constitution would be invalid if it conflicts with the law promulgated by the national or a provincial government.

Principle 3: Identify the intended legislation's purpose and effect

In Western Cape Provincial Government: In re DVB Behuising (Pty) Ltd v North West Provincial Government 2001 (1) SA 500 (CC) para 36, the Constitutional Court held that when it comes to determining whether or not legislation falls into a particular legislature's field of competence, a court first has to determine "the subject-matter or the substance of the legislation, its essence, or true purpose and effect, that is what the [legislation] is about". In other words, the court has to look beyond the legislation's character or form and identify its true purpose and effect.

This case concerns the repeal of Proclamation 293 of 1962 which was issued in terms of the Native Administration Act, 38 of 1927. It made provision for the establishment of a special kind of township by the Minister of Bantu Administration and Development for African citizens in areas of land held by the 'South African Native Trust' which was established by the Native Trust and Land Act, 18 of 1936. The Proclamation made provision for the establishment of special deeds registries and for the registration of deeds of grant. The North West Local Government Laws Amendment Act, 7 of 1998 (Act 7). Section 6 of Act 7 purported to repeal the Proclamation in its entirety. This led to a situation where a person who bought land that fell within the type of township envisaged by the Proclamation, had nowhere to register its 'deed of grant' which was a limited type of ownership provided for in the Proclamation and which was not provided for in terms of the Deeds Registries Act, No 47 of 1937. The Constitutional Court found the repeal of the regulations under the Proclamation that dealt with the registration of those properties, to be unconstitutional and in its finding relied on the opinion of Chaskalson, P for the Constitutional Court in Ex Parte Speaker of the KwaZulu-Natal Provincial Legislature: in re KwaZulu-Natal Amakhosi and Iziphakanyiswa Amendment Bill of 1995 and Ex Parte Speaker of the KwaZulu-Natal Provincial Legislature: in re Payment of Salaries, Allowances and Other Privileges to the Ingonyama Bill of 1995, where he stated:

"If the purpose of legislation is clearly within Schedule 6 (of the Interim Constitution), it is irrelevant whether the Court approves or disapproves of its purpose. But purpose is not irrelevant to the Schedule 6 enquiry. It may be relevant to show that although the legislation purports to deal with a matter within Schedule 6 its true purpose and effect is to achieve a different goal which falls outside the functional areas listed in Schedule 6. In such a case a Court would hold that the province has exceeded its legislative competence. It is necessary, therefore, to consider whether the substance of the legislation, which depends not only on its form, but also on its purpose and effect, is within the legislative competence of the KwaZulu-Natal provincial legislature."

[4] Author's emphasis

[5] Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC) para 59

7.3 Application

Starting principle **1** above, (the bottom-up interpretation), the competencies regarding outdoor advertising visible from a road is depicted below:

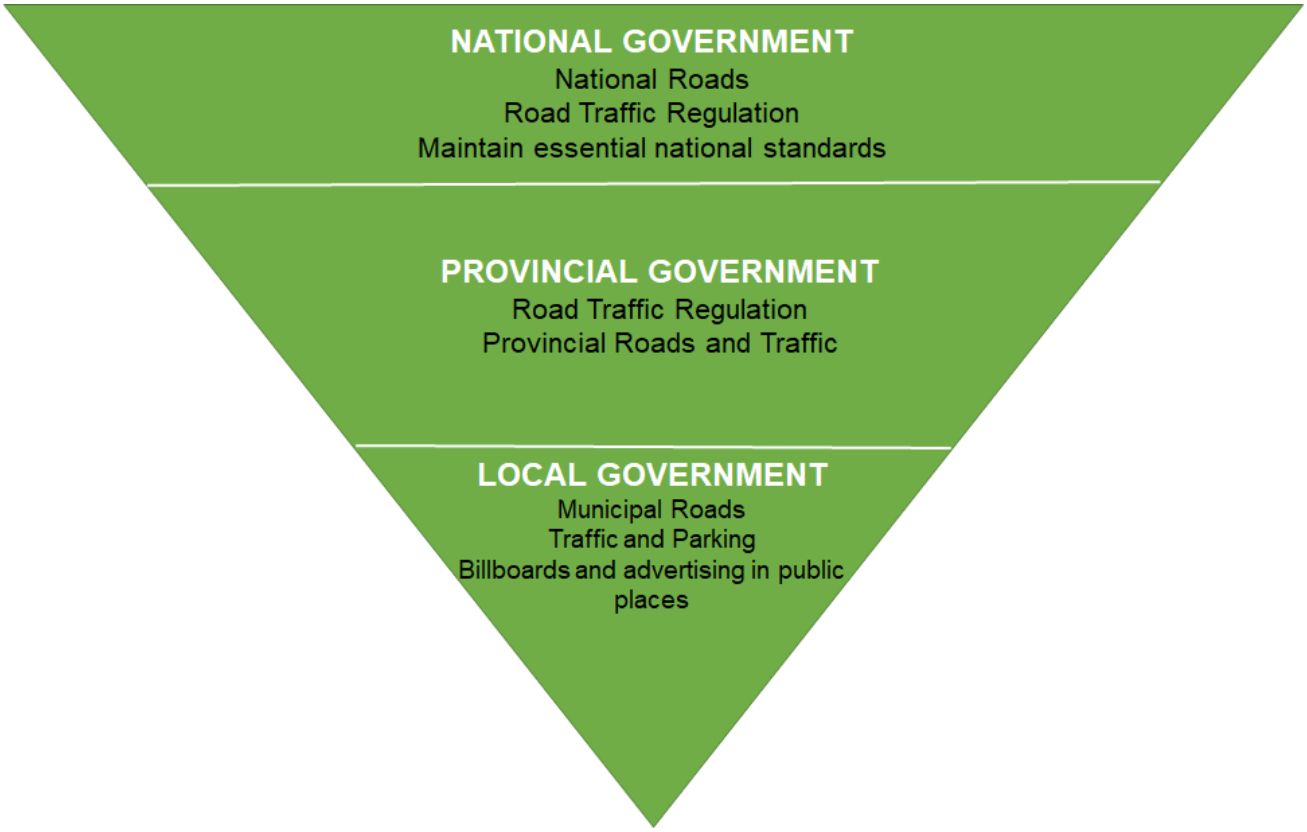


Figure 6-1: Government competencies regarding outdoor advertising

To apply **principle** 2 above (Functional areas allocated to the various spheres of government are distinct from each other), the functional areas need to be interpreted. The Constitution distinguishes between 'roads' and' road traffic regulation'. It follows that 'roads' would entail the 'hard' aspects such as road network management, which includes network planning, construction and maintenance. 'Road Traffic Regulation' on the other hand, includes everything that happens on the road, such as the regulation of drivers, vehicle quality, the quality of operators and authorised officers in accordance with the safe system approach. To enable the regulation of these aspects, information is needed and therefore the establishment of a different registers is necessary, such as the register of drivers, vehicles or operators. Establishing the registers require registering authorities to be appointed and authorised to obtain and maintain the relevant information needed.

The functional area of municipal roads would entail the planning of the municipal road network, construction and maintenance of municipal roads. Traffic, as it is distinguished from road traffic regulation, would entail the ordering of traffic specifically within the municipal area, but in accordance with the provincial or national legislation. Parking is self-explanatory.

Principle 3 in essence requires an ex post facto evaluation of whether a sphere of government had the competence to make a law on a specific subject and entails that a court needs to determine whether the substance of the legislation, which depends not only on its form, but also on its purpose and effect, is within the legislative competence of the relevant sphere of government. Applying this principle in advance confirms that spheres of government cannot interfere with the legislative competence of other spheres unless in accordance with the Constitution. Two factors relating to outdoor advertising visible from a road justify interference by one sphere of government in the legislative powers of another, namely:

- to maintain essential national standards;
- to establish minimum standards required for the rendering of services.

It is submitted that the regulation of the road safety aspect of outdoor advertising visible from roads, is an essential national standard as contemplated in the Constitution. It is necessary to find the correct legal vehicle to house such an

essential national standard. To find an answer, one could rely on the Constitutional Court in Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC) where the Court finds that while the national and provincial governments have the power to pass legislation with respect to the matters listed in Part B of Schedules 4 and 5, they do not have the power to implement that legislation. The power to implement national and provincial legislation dealing with the matters listed in Part B of Schedules 4 and 5 vests exclusively in local government. It follows that national government can legislate on outdoor advertising, but it cannot perform the functions in terms of those laws on a local authority level.

Applied to the road safety aspects of outdoor advertising, the national and provincial government is able to regulate advertising visible from national or provincial roads while national government is entitled to provide an essential minimum standard in this regard [sect 44(2)] of the Constitution. National or provincial government cannot prescribe to a local government which fees to charge for an application for approval to display an outdoor advertisement, or the process of approval or the process of determining whether the placing of the advertisement will comply with its municipal planning documentation. However, national and provincial government may prescribe these aspects *in relation to advertisements visible from a national or a provincial road*.

From a road safety management point of view however, these functional areas are disjointed and should be managed as effectively as possible to ensure a safe road environment. It would therefore be optimal if the national government could issue a national standard regulating the technical aspects of outdoor advertising visible on roads. This standard should give effect to traffic engineering principles that are aimed at preventing attention overload of the driver, through determining the possible location of different types of advertisements in relation to traffic volume and road design or the prohibition of certain types of advertisements.

Evaluating the relevant current legislative structure relating to road traffic regulation and local authority legislation will provide an indication of a suitable legal vehicle to house an essential national standard.

7.3.1 National legislation

A. The National Road Traffic Act

The National Road Traffic Act, no 93 of 1996, provides for the following aspects of road safety management:

- The establishment of registering authorities
- Minimum requirements in relation to authorised officers
- Registration and licensing of motor vehicles
- Fitness of drivers
- Operator fitness
- Road safety
- The transportation of dangerous goods
- Ancillary matters

Sections 52 and 53 of the Act, which provides the Road Traffic Management Corporation (RTMC) with road safety functions, unfortunately falls short of providing the RTMC with sufficient functions (and powers) to effectively regulate road safety. The only aspect addressed by these two sections is the promotion and education aspects, while the execution of this aspect together with the engineering (vehicles and roads), emergency services, and law enforcement should happen in terms of a single road safety management plan coordinated by the RTMC and supported by programmes and projects which are identified based on statistical information obtained from amongst others, the law enforcement and the accident information systems. A central budget to provide for the projects and programmes should be provided for and should be distributed by the RTMC in accordance with the performance of the executing agencies in terms of the goals set in the road safety plan.

Section 57 of the Act read with regulation 290, provides some relief in terms of advertising visible form a public road, but is limited to the regulation of advertising as it relates to road traffic signs.

Section 75 of the Act empowers the Minister to make regulations in terms of the Act and gives the Minister wide powers, including the power to make a regulations regarding the safety of traffic on a public road [section75 (1)(a)]

and the power to make regulations regarding any issue that the Minister believes that the Act does not make sufficient provision [section 75(10(zF)].

Section 76 empowers the Minister to incorporate into the regulations any standard by reference, giving such a standard the legal status of a regulation. 'Standards' are defined in this section to mean any code of practice, compulsory specification, specification, standard or standard method adopted by the SABS, as defined in section 1 of the Standards Act, 1993 No 29 of 1993).

In terms of the Road Traffic Act's empowering provisions, three possible legal vehicles can be identified to house an essential national standard regulating outdoor advertising visible from roads:

vii) Issuing an essential national standard, through the South African Bureau of Standards, and incorporate the standard into the Regulations. This method would give the standard the legal status of subsidiary legislation;

viii) Amend the Road Traffic Regulations, stating that the essential national standard is mandatory and attached as a Schedule to the Regulations;

ix) Incorporate the essential national standard into the Southern African Development Community (SADC) Road Traffic Signs Manual, which may not have the force of subsidiary legislation as would a standard incorporated into the regulations, but it will carry significant guiding 'weight': Regulation 287 of the National Road Traffic Regulations determines that any road sign or road signal should be displayed substantially in accordance with the relevant chapters of the SADC Road Traffic Signs Manual. Road traffic signs include road signs (usually displayed on a pole, road markings (painted onto the road surface) and road signals (lighted signals including traffic lights)]. Amending the SADC Road Traffic Signs manual will require the approval of all the SADC Member States, which is a long process;

x) Incorporate the Essential national standard into the SADC Road Traffic Signs Manual, together with an amendment To Chapter … of the Regulations which determines that the Chapter 21 of the SADC Manual regarding outdoor advertising is an essential national standard as contemplated in the Constitution and is therefore mandatory.

B. The Advertising on Roads and Ribbon Development Act

Advertising on Roads and Ribbon Development Act. No. 21 of 1940, regulates advertising visible from a public road through prohibiting the erection of an advertisement unless in accordance with the approval of a 'controlling authority'. Controlling authority is defined to mean in relation to a road, the Administrator (read: MEC) concerned: provided that in relation to any road within the region of a Regional Services Council in the province of Eastern Cape, Northern Cape, North-West or Western Cape, the said Council shall be the controlling authority if the Administrator of that Province is satisfied that the said Council is able and willing to carry out efficiently the functions entrusted to a controlling authority under this Act and has authorised that Council in writing to act as such controlling authority; and provided further that the Administrator may at any time withdraw that authorisation and thereupon the Administrator shall again be the controlling authority in relation to the road in question". The definition is outdated in terms of the new constitutional dispensation and the institutions concerned were replaced by either the local government legislation or the provincial roads or infrastructure legislation. The Act was assigned to the provinces and some provinces have repealed it, replacing the Act with their own roads' legislation. As far as could be determined, Eastern Cape, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga (not yet commenced) and the Western Cape have promulgated Roads (or Infrastructure) Legislation. These laws regulate advertising visible from roads.

The legal status regarding the Advertising on Roads and Ribbon Development Act, inconsistent and confusing and does not pose a viable manner of uniformly regulating advertising visible from roads across the three spheres of government.

C. The Local Government: Municipal Systems Act

The Local Government: Municipal Systems Act, No. 32 of 2000, provides in section 108 for the Minister responsible for local government to establish an essential national standard and minimum standard for any municipal service and any matter assigned to it in terms of section 156(1) of the Constitution, which will include for example the functions provided for Advertising on Roads and Ribbon Development Act. These include the approval of advertising visible

from a provincial or municipal road for provinces which have not yet promulgated legislation to substitute the Advertising on Roads and Ribbon Development Act. Such essential national standard or minimum standard may only be 'established' after consultation with the Minister of Finance, organised local government the MEC's for local government and any Cabinet member responsible for the regulation of the specific issue to which the standard relates.

It will be possible to use this section to issue an essential national standard relating to the road traffic safety aspects of outdoor advertising. However, this will entail a cumbersome process, led by a department for which road traffic safety is not a core function. In addition, it will only provide a 'Band-Aid' solution in relation to the provinces which have not yet regulated the roads environment, leaving other provinces to potentially regulate outdoor advertising in a dissimilar manner, and national government to regulate the issue in theoretically yet another manner. These factors render the route of the Local Government: Municipal Systems Act, not feasible.

D. The South African Roads Agency Limited and National Roads Act

The South African Roads Agency Limited and National Roads Act, No. 7 of 1995, (the SANRAL Act) in section 50 regulates advertisements visible form national roads. This Act describes the advertisements to be regulated in the correct manner. The mandate of the National Government is Road Traffic Regulation, which includes road traffic safety. As such, any advertisement *visible* from a road has the potential to be detrimental to driver behaviour. The various older pieces of (roads) legislation have not succeeded in achieving the true intent of regulating outdoor advertising, which is to reduce the detrimental impact of advertising on road users.

The SANRAL Act is limited to national roads and do not necessarily provide a solution for the entire country. However, the Act and its regulations could, together with the content of the by-laws of municipalities such as Mangaung, Ekurhuleni and Cape Town, provide an outline for an essential national standard for advertisements visible from any road in the country, provided the standard makes provision for the different traffic volumes and design of different classes of roads.

The SANRAL Act contains a general prohibition of advertising on a road, visible from a road, or visible from a national road in an urban area. It allows the display of advertisements where the advertisement:

- displayed on a building in which a business or undertaking is carried on, and contains no more than the name of the business or undertaking or description of its nature, the name of its proprietor and the further information (if any) as authorised by or under the regulations concerned;
- is displayed on any vehicle, or is displayed on any other machine or implement and contains no more than the trade name of that machine or implement and the name of its manufacturer, so long as the main purpose for which the vehicle, machine or implement is used, is not the displaying of the advertisement;
- is displayed in terms of an authorisation conferred, before or after the incorporation date, under the Advertising on Roads and Ribbon Development Act, 1940 (Act 21 of 1940)[6], for as long as the advertisement is displayed in accordance with the requirements which, in terms of that authorisation, are applicable to it or were applicable to it immediately before the incorporation date, as the circumstances may require;
- is lawfully displayed at any place immediately before the road or route in question is declared a national road, for as long as it is displayed continuously at the same place, unless its removal has been directed by SANRAL and the period within which it had to be removed, has expired; or
- is displayed by the State, or is displayed, in the performance of its functions, by a body established by or under any law, or has to be displayed, in terms of any law, at the place where, and under the conditions under which, it is in fact displayed.

E. The Regulations on Advertising on or Visible form National Roads, 2000- GN R1402 of 2000

The above regulations have been promulgated in 2000 and were based on the SAMOAC. Regulation 3 provides SANRAL with sufficient powers to regulate advertisements on or visible from a national road, include the prohibition of advertisements on certain sections of a road or a class of roads. As a general rule, the Regulations do not apply to

[6] This authorisation in some provinces has been superseded by provincial roads legislation in some provinces

advertising within a municipal urban area, but it is under the circumstances prescribed, mandatory for a municipality to obtain the approval of SANRAL for an application to display an advertisement.

Part B of the Regulations is of importance as it relates to road traffic safety considerations and covers most of the aspects that need to be considered in authorising an advertisement visible from a road. However, these aspects could be expanded on and quantified in engineering terms such as in the example of the Mangaung by-laws if it is included in a national standard. If at all possible, the standard should determine when an advertisement would be a safety hazard in relation to the types of road (curves, uphill, downhill, traffic volume speed etc.).

7.3.2 Provincial legislation

A. The Eastern Cape Roads Act:

The Eastern Cape Roads Act, Act No. 3 of 2003 regulates the display of advertisements:

- on a provincial road;
- outside an urban area that is visible from a provincial road;
- which is visible from a freeway in an urban area and is within 250 m from the road reserve boundary of the freeway;
- that is visible from a provincial road in an urban area or land adjoining the provincial road; or
- on land separated from a provincial by a street.

The above Act empowers the MEC to make regulations and it seems to be fashioned after the SANRAL Act.

B. The Free State Roads Ordinance Amendment Act

The Free State Roads Ordinance Amendment Act No. 6 of 1996 extends the application of the Free State Roads Ordinance to the entire province (Before 1994 separate legislation regulated the former homelands. The legislation usually copied the national legislation.) The Roads Ordinance does not regulate advertising on roads and the Free State is therefore limited to the Advertising on Roads and Ribbon Development Act.

C. The Gauteng Transport Infrastructure Act

Section 44 of the Gauteng Transport Infrastructure Act, No. 8 of 2001 authorised the regulation of outdoor advertising visible from provincial roads. This section however is yet to commence. Regulations have nevertheless been published in terms of section of the Act but have not yet commenced. These regulations have recently been reviewed, although the finalised reviewed regulations have not yet been promulgated. The Regulations are comprehensive and regulates all aspects of outdoor advertising visible from a road. These regulations could together with the SANRAL Regulations and examples of by-laws, provide a framework for the contents of a national standard.

D. The Limpopo Roads Agency and Roads Act

This Act is not available on the Jutastat subscription services or the Internet. It had to be promulgated as the Agency was established and notices issued in terms of the Act was found on the Internet.

E. The Western Cape Transport Infrastructure Act

Section 36 of the Western Cape Roads Act, No. 1 of 2013, regulates advertising visible from transport infrastructure (which include roads). The Act demarcates the physical area to be regulated and prohibits the display of advertisements within that area unless with the permission of the MEC. The MEC may impose conditions on the authorisation, if given. The section also authorises the MEC to make regulations regarding outdoor advertising, which empowerment includes all the necessary aspects of regulating outdoor advertising. The Act provides for the removal of illegally displayed advertisements. Furthermore, the Act in section 38A prescribes how a municipality may regulate outdoor advertising. Thus far the City of Cape Town has issued by laws regulating the matter.

7.3.3 Municipal By-laws

A. Mangaung Metropolitan Municipality

The Mangaung Outdoor Advertising by-laws, 2008 are a comprehensive piece of legislation that provides clear guidelines to a municipal decision maker in authorising the display of an outdoor advertisement. Section 4 of the by-laws states its policy framework as "the South African Manual for Outdoor Advertising Control issued by the Department of Environmental Affairs and Tourism and the relevant policy approved by the Council and dealing with matters of advertising." It distinguishes between rural and urban areas of maximum, partial or minimum control and areas of maximum control where advertising is prohibited entirely. Schedules indicate the types of advertisements that may displayed in the different areas of control. Areas where the display of advertisements is prohibited entirely, include President Brand Street (location of historic buildings), the Seven Dams Conservancy (environmental reasons) and a list of roads where an advertisement may not be displayed within 100m from the sharp curves identified in those roads (road Safety reasons). It would have been more effective if GPS coordinates for these curves could have been provided, or road node identification points. The prohibitions (limitations relating to the display of advertisements on Urban Freeways and at road crossings is e.g. illustrated in an annexure to the by-laws. The by-laws clearly establish liability by defining the words 'person who displays a sign'. As is done in the United Kingdom, there are advertisements for which there is 'deemed consent' and other for which specific consent has to be obtained. The by-laws provide for new signs that have not been included, to cover new developments in advertising. The by-laws provide detailed guidance to decision making with regards to all aspects, but also specifically regarding road safety aspects. It requires traffic impact studies in relation to classes of advertisements identified in the By-laws and Schedules, but also authorises the municipality to require traffic impact studies in the case of other types of advertisements to be displayed. Mangaung has a guideline document detailing the required content of a traffic impact study. This includes locational information, technical details of the proposed sign, traffic information, details of competing road elements, signage and advertising; the calculation of spare attention (of the driver) opportunities; the information and parameters used in the safety analyses; a summary and recommendations.

B. Cape Town

The City of Cape Town Outdoor Advertising and Signage By-law was published in 2001 and has as its objective "to regulate outdoor advertising in the jurisdiction of the City of Cape Town in a manner that is sensitive to the environmental quality of different parts of the City of Cape Town. It seeks to strike a balance between outdoor advertising opportunities and economic development on the one hand, and the conservation of visual, tourist, traffic safety, environmental and heritage characteristics on the other hand. The object of this By-Law is to ensure that outdoor advertising respects the integrity of any site on which it is displayed and complements the character of the locality in which it is displayed." The City of Cape Town's by-laws also identify areas of control (Schedule1). The City has on its website an Outdoor Advertising By-laws General Areas Control Map which shows areas of maximum, partial and minimum control. Sections 29 to 42 details road traffic requirements and are descriptive and detailed. A traffic impact assessment may be required by the municipality, but the by-laws do not prescribe under which circumstances it is mandatory to provide a traffic impact assessment. A Traffic Impact Assessment (TIA) is defined as a study carried out by a registered Professional Engineer with demonstrable experience in the field of traffic engineering that investigates the impact a proposed sign may have on vehicle/pedestrian/cyclist safety and traffic operation. The study should recommend any mitigating measures that may be required as a result of that impact. The City of Cape Town's by-laws are less detailed than the Mangaung by-laws but covers all the necessary issues.

C. Ekurhuleni

The Ekurhuleni by-laws state their scope of application as "The regulation of outdoor advertising in, on or visible from any public place within the area of jurisdiction of the Ekurhuleni Metropolitan Municipality". The area of jurisdiction of Ekurhuleni in defined as the area under the control of the Ekurhuleni Metropolitan Municipality according to the legally determined and declared boundaries of the Municipality. This may include national and provincial roads. If the advertisement applied for falls within the visual zone of a national or provincial law, the recommendation of SANRAL or the Province must first be obtained, but the advertisement may not be erected unless the Municipality has granted the final approval. This provision may potentially create a problem in relation to the mandate of the municipality as opposed to the Constitutional Mandate of the National and Provincial Department of Transport. The Municipality in

effect has a veto right over a decision of SANRAL or the Province. The by-laws distinguish between areas of partial control, minimum control and maximum control. Maximum control areas include for example National Parks, Nature Reserves, rural small holding, historical and architectural sites, and all residential areas. Examples of partial control areas are undeveloped open spaces, commercial ribbon development, sport fields or stadiums and agricultural land or farmland within the urban edge. Minimum control areas include commercial areas, office blocks, shopping centres, transport nodes (taxi ranks, railway stations, airports) and proclaimed road and road reserves of arterial roads complementing and accessing higher order routes. Advertisements in the road reserves are regulated in terms of size in relation to speed. The by-laws in sections 10 and 11 regulates advertisements in terms of road traffic safety but does not require traffic impact assessments.

Ekurhuleni Municipality has also published a policy on outdoor advertising.

7.4 Legal Framework: application procedures and removal of outdoor advertisements illegally displayed

7.4.1 Introduction

The application procedures and the requirements for display are similar for all spheres of government, with some differences in requirements and procedures. However, the relationships between national and provincial government with local government is constitutionally almost identical. Therefore, the national government relationship is dealt with in more detail than that of the provincial government.

7.4.2 National Roads

Any municipal by-law must be read with the South African National Roads Agency Limited and National Roads Act, 7 of 1998 (the National Act) and the Regulations on Advertising on or Visible from National Roads, 2000 (the National Regulations).

While all of the by-laws reviewed contain a provision that the South African National Roads Agency's (SANRAL) input must be obtained in the case where an advertisement applied to be displayed within a local authority jurisdiction, but will be visible from a national road, the by-laws do not seem to require the approval of SANRAL. This may lead to a situation where a municipality grants authorisation to display an outdoor advertisement contrary to the requirements of the South African National Roads Agency Limited and National Roads Act, 7 of 1998 (the National Act) and the National Regulations

The Ekurhuleni By-laws may be taken as an example: It determines in section 3(11) that "Applications for advertising signs in the national road reserve or within the visual zone of the national road reserve boundary of a freeway in an urban area shall be subjected to recommendation by South African National Road Agency Limited, after municipal principle-approval has been obtained. Such an advertising sign shall not be erected or displayed without the final written approval of Municipality."

The above means that an application is first approved in principle by the municipality, thereafter the 'recommendation" of SANRAL is obtained, where after a final approval is granted before the advertisement may be erected. The by-laws do not state that an approval will not be granted if SANRAL recommends that it be denied.

Section 3(12) differs from section 3(11) in relation to provincial roads, in that it requires 'positive comments' from the province, in the case of an advertisement visible from a provincial road. The process is the same as for national roads.

There is an anomaly if the by-laws are compared to the National Act and Regulations: The Act prohibits the display or permission to display an advertisement visible from a national road, whether outside or within an urban area, if it is not displayed in accordance with the Regulations on Advertising on or Visible from National Roads, 2000 ("prescribed requirements as referred to in section 50 of the Act"). It also authorises SANRAL to require from the person who displayed or permitted such a display to remove the advertisements, failing which, SANRAL is authorised to remove the advertisement itself.

The National Regulations determine in regulation 5 that it does not apply to urban areas where a municipality has promulgated a by-law dealing with the matters dealt with in the regulations and which is applicable to the national roads in the jurisdiction of the municipality concerned. It also does not apply in an area which the Minister declared it

by notice in the Gazette not to apply. However, the regulation determines that where the Regulations do not apply, the municipality must make approval of applications for the display of an outdoor advertisement visible from a national *conditional* on the applicant also obtaining approval from SANRAL, which may only consider the road traffic, road traffic signs and road safety aspects of the application. Regulation 40(5), reciprocates, stating that SANRAL must make approval of an application for the display of an advertisement in an urban area conditional on the approval of the relevant municipality.

This means that, considering the constitutional structure and powers, by-laws may not contain a requirement for only a 'recommendation' from SANRAL such as is contained in the Ekurhuleni by-laws, and approval should be made conditional on SANRAL approval in the case where the advertisement intended to be located in the visual zone of a national road.

The latter may lead to a chicken and egg situation, where simultaneous approval from SANRAL and the relevant municipality is required. The Ekurhuleni by-laws make provision for such a situation, providing for a three-step process, where an application is made to the municipality, accompanied by a recommendation by SANRAL with a final approval by the municipality after receiving SANRAL's recommendation. The by-laws however do not go far enough. It is still possible for the municipality to approve the erection of an advertisement in the visual zone of a national road despite a 'negative recommendation' from SANRAL.

7.4.3 Provincial roads

The metro municipalities have extensive by-laws and policies regarding outdoor advertising. In the case of the provincial roads, the example of Ekurhuleni and the Gauteng province provide an example of the interaction between the laws in relation to the application procedures. Regulation 5 of the Draft Gauteng Regulations on Advertising Visible from Provincial Roads, requires that in respect of any application for permission to display an advertisement in the visual zone of a provincial road, should firstly be approved by the municipality concerned. However, the municipality must on receipt of the application, refer it to the MEC for comment. For applications for the display of advertisements in a visual zone, outside the road reserve of a provincial road and within a building restriction area, the person intending to erect that advertisement must obtain the written permission from the MEC, applying to the MEC at the same time when the application is made to the municipality (applications in respect of advertisements displayed on a building or on a vehicle, machine or implement need not be referred to the MEC for comment). (Draft) Regulation 5(7) requires the relevant municipality to take account of the MEC's comments and to apply the Gauteng Regulations, despite any by-law to the contrary. This is an example of exercising the province's constitutional power exactly as explained in Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC), where the province regulates how a municipality may exercise its functions but does not exercise those functions on behalf of the municipality.

There are thus three variations of the application procedure in the case where an advertisement is intended to be displayed within the visual zone of a provincial road:

- Applications which have to be referred to the MEC for comment;
- Applications which requires the approval of the MEC; and
- Applications which do not have to be referred to the MEC for approval or comment.

Section 3(12) of the Ekurhuleni Billboards and Display of Advertising Bylaws, 2017, determines that applications for the display of an advertisement visible within 20m from a provincial road reserve boundary is subject to the 'positive comment' by the Provincial Authority, after in-principle approval has been obtained from the municipality. As in the case of national roads, the final approval of the municipality is required before the advertisement may be erected.

7.4.4 Municipal jurisdictions

The regulation of the display of billboards and outdoor advertising is rightfully an essentially local authority competence. In the metropolitan areas, the issues are well regulated and substantially in compliance with SAMOAC. Application procedures are well set out in the by-laws, and the Ekurhuleni for example, has a detailed policy document supporting its by-laws, while the Mangaung by-laws are detailed in relation to where and how advertisements will be allowed to be displayed. The municipal function regarding the display of billboards and outdoor advertising stretches much further than only road traffic and road safety and encompasses municipal planning and the environment. It is

common cause that exercising a municipal function is one of the most difficult governing functions in the country as the laws and interests of both provincial and national government have to be considered. So is the drafting of by-laws. The Integrated Development Plan of a municipality assists in the exercise of its functions, but the detailed legal procedures still have to be worked out by the municipal officials.

In addition to the locality of advertisements affection provinces and SANRAL, some advertisements also would affect neighbouring municipalities which necessitates consultation and cooperation amongst municipalities.

7.4.5 Removal of outdoor advertising illegally displayed

A. National roads

The Regulations on Advertising on or Visible from National Roads, 2000-GN R1402 of 2000 (the National Regulations) are clear with respect to the technical requirements for advertising as well as the processes for application and approval of outdoor advertisements visible for national roads.

The country is covered 'wall to wall' by municipalities and all national roads will transverse various municipal jurisdictions.

While the application of the National Regulations is excluded in urban areas within a municipality which have issued by-laws on the matter, the National Act does not contain such an exclusion and therefore section 50 of the National Act also applies to advertisements displayed in those areas. In this case, a constitutional interpretation is necessary. In Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC), the Constitutional Court determined that the national and provincial spheres of government may not by legislation, give themselves the power to exercise executive municipal powers or the right to administer municipal affairs. This is because, the Constitutional Court held further, the mandate of these two spheres is ordinarily limited to 'regulating' the exercise of executive municipal powers and the administration of municipal affairs by municipalities and the authority to 'regulate' does not include the power to exercise municipal competencies and perform municipal functions. Instead, it simply includes the power to by law establish a framework within which a municipality must exercise its executive and administrative powers. In other words, while the national government has the power, as is exercised through the National Act and Regulations to state how the provinces and the local authorities must exercise the function of approving the display of outdoor advertisements that are visible from national roads, it may not give the approval on behalf of the province or the local authority.

The National Act clearly state in section 50 that SANRAL is entitled to require the removal of illegally displayed advertisements, and if it is not removed, to remove the advertisement itself. Section 5(3) and (4) of the South African National Roads Agency Limited and National Roads Act, 7 of 1998, determine that an advertisement that is displayed or permitted to be displayed contrary to the Act, may be required to remove that advertisement. If that person does not remove it, SANRAL may remove it.

Section 50 is straightforward in relation to an advertisement illegally displayed in the visual zone of a national road that does not fall within an urban area of a municipality which have promulgated by laws regulating outdoor advertising. A distinction must be made between advertisements displayed in an urban area contrary to the national legislation and with the consent of the relevant municipality and advertisements displayed in an urban area contrary to the national legislation without the consent of the relevant municipality.

The Interpretation Act 33 of 1957, defines **person** to include the following:

(a) any divisional council, municipal council, village management board, or like authority;

(b) any company incorporated or registered as such under any law;

(c) any body of persons corporate or unincorporated.

The Interpretation Act applies to the interpretation of all laws in force in the country. This means that section 50 of the National Act and Regulations must be interpreted to include a municipality.

Advertisements displayed contrary to national legislation with the consent of the relevant municipality

A municipality which permits the display of an advertisement contrary to the National Act and Regulations may be instructed by SANRAL to remove the advertisement, (as it allowed its display) falling which, SANRAL may remove the advertisement itself.

The municipality may incur civil liability in this case, as it allowed the illegal display of an advertisement, and would therefore not necessarily be willing to instruct the removal of the illegally displayed advertisements. The owner of the advertisement would likely want (and be entitled to) compensation.

Advertisements displayed contrary to national legislation without the consent of the relevant municipality

Advertisements displayed illegally within the visual zone of a national road for which the municipality has not given permission to be displayed should be rather straightforward and a request from SANRAL to the municipality concerned to instruct the person who is responsible for the illegal display to remove it, should suffice. In this case, the municipality in terms of its by-laws, has the power to remove the advertisement itself if the responsible person does not heed the instruction. Where a municipality has not promulgated by laws regulating outdoor advertising, SANRAL should cooperate with the relevant provincial government in as far as the provincial government has promulgated legislation in this regard, as well as the municipality concerned, to remove the illegally displayed advertisements.

Recommendation

It is recommended that SANRAL make use of the powers afforded them in section 50 of the National Act to remove illegally displayed advertisements within the visual zone of national roads. It is appreciated that with regard to advertisements illegally displayed with the consent of a municipality, it is necessary in the spirit of cooperative governance to first embark on a cooperative programme to do so, failing which SANRAL has the legislative and executive power to remove such.

B. Provincial roads

Of the Provinces, the Eastern Cape, Gauteng, KwaZulu – Natal, Limpopo and the Western Cape have promulgated roads legislation, all of which regulate advertising visible for provincial roads in a similar manner, which in essence follows the international and SANRAL models. The Free State, Mpumalanga (until their Roads Act is promulgated), Northwest, and Northern Cape have not promulgated roads acts and are reliant on the Advertising on Roads and Ribbon Development Act, No. 21 of 1940. The latter Act and all of the provincial roads and infrastructure legislation allows for the removal of illegally displayed advertisements, following the same process as the national legislation. The Kwazulu-Natal Roads Act provides for the MEC to determine standards for advertising adjacent to provincial (main) roads and in the case where there is a safety hazard, also for district or local roads. The Gauteng Transport Infrastructure Act, 8 of 2001, is more restrictive in terms of the provincial government's powers, but still provides sufficient powers to remove illegally displayed advertisements.

With regards to the removal of illegally displayed advertisements within areas where a municipality has promulgated by-laws to regulate the display of outdoor advertising, the same interpretation of the word 'person' as that for national government will apply, meaning that the relevant laws must be interpreted to include a municipality in the word 'person'.

Recommendation

It is recommended that provinces make use of the power afforded them in terms of their own road roads legislation, including the Advertising on Roads and Ribbon Development Act, 1940, to remove illegally displayed advertisements. A distinction must be made between an advertisement illegally displayed with the consent of the municipality concerned and those that are displayed without such consent. In the case where the municipality has given consent, the province may instruct the municipality to have it removed in accordance with the municipal by-laws, failing which,

the province concerned may remove the advertisement itself. Where the municipality has not consented, a request to the Municipality making them aware of the illegal display and requesting action to be taken, should suffice.

C. Municipal roads

The sample of municipal by-laws studied provide for detailed processes of application for permission to display advertisements, as well as detailed requirements to be met before permission is granted for the display of advertisements visible form municipal roads or adjacent to municipal roads. Power to remove illegally displayed advertisements are also granted in terms of the relevant by-laws. Municipalities which have not promulgated any by-laws, should rely on the relevant provincial laws and assistance of the province to have illegally displayed advertisements removed.

Recommendation

It is recommended that municipalities in the example of the Johannesburg Roads Agency or the Limpopo Roads Agency, launch a programme to identify and remove illegally displayed advertisements.

D. Possible negative impact of removal of illegally displayed outdoor advertisements

While all spheres of government have all the power, they need to remove illegally displayed advertisements, removal without coordination between the spheres of government may prove problematic, leading to intergovernmental disputes and even litigation.

Push back in the form of litigation from the private sector, is to be expected and government should commit to funding a test case, if necessary, up to the Supreme Court of Appeal, provided the relevant legislation is in order. It is therefore proposed that the legislation of the Municipalities be aligned in relation to application procedures and authorisations and the powers of each government sphere be acknowledged by the other government spheres.

Recommendation

It is recommended that after the joint programme has been established and has agreed on issues relating to outdoor advertisements illegally displayed with the approval of a municipality, those advertisements should be removed, providing compensation to the owner of the advertisement, to prevent litigation, as a claim against a municipality in this case is likely to succeed.

It is further recommended that the joint programme with identifying all advertisements displayed illegally without the permission of a municipality and remove those in accordance with a carefully designed project plan.

7.5 Legal framework: international examples

International examples reviewed include Queensland and New South Wales in Australia, and the United States of America. All the countries are faced with a proliferation of authorities who have a stake in outdoor advertising. In all the countries, the roads authorities provide input into final decisions or take those final decisions on advertising on roads in accordance with a guideline.

7.5.1 Australia

Australia is a Commonwealth comprising a federal level of government, (6) states and (10) territories. Each state has its own constitution and parliament, judiciary and executive. As in South Africa, some legislative powers are exclusive to the federal parliament and others are exercised in concurrence with the sates. In case of conflict between laws, the federal law prevails. The federal government's powers are limited to the contents in section 51 of the Australian Constitution and covers a very wide area but does not cover road transport. The States remain free to make laws in relation to any functional area if it does not contradict a federal law.

7.5.2 New South Wales

The Government of New South Wales has published a Transport Corridor Outdoor Advertising and Signage Guidelines Document for Assessing Development Applications in July 2007. Section 3 of this document outlines the Roads and Traffic Authority's road safety guidelines in relation to all signage within 'road corridors'. The Document has been issued in terms of the State Environmental Planning Policy No 64-Advertising and Signage SEPP 64), which was issued in terms of the Environmental Planning and Assessment Act. No. 3 of 1979. In the case of conflict, the SEPP 64 prevails. The approval processes depend on where the advertisement is to be situated and advertising on toll ways, freeways and Road Traffic Authority owned, occupied land, are approved by the Minister for Planning with the input from the Road Traffic Authority, in accordance with Development and Control Guidelines which include the Transport Corridors Criteria and Road Safety Criteria.

On a local authority level, a distinction is made between signs that require Road Traffic Authority concurrence and signs that do not require such concurrence. Applications for consent to display signs that require Road Traffic authority concurrence is referred to the Authority.

The Road Traffic Authority has an approval/concurrence role under section 138 of the Roads Act, 1993 and in terms of its functions relating to traffic management and safety under section 52A of the Transport Administration Act, 1998. Approval is required for the erection of any advertising structure in, on or over a freeway within the local authority area, but concurrence with the local council is required for other roads. Guideline Document provides examples of general technical requirements which could contribute to clarifying the division of powers in South Africa between National. Provincial and Local Government in relation to outdoor advertising. Some of the criteria are international standards (such as in relation to luminance, clutter control, and size) and have found its way into the South African legislation.

7.5.3 Queensland

While it does not have the power to approve applications for the display of advertisements visible from roads, the Queensland Department of Main Roads Have compiled a Guidelines Document to assist local governments in the evaluation of applications. The Guidelines are limited to roads and road safety matters.

The following Legislation regulates outdoor advertisements from a roads' perspective:

Advertising within the boundaries of state-controlled roads: The Transport Infrastructure Act 1994 Schedule 3 defines traffic and service signs advertising signs or other Advertising Devices (within the boundaries of state-controlled roads) as Ancillary Works and Encroachments (AWEs) and the Act gives the Chief Executive the power to erect or prohibit the erection of AWE's or authorise its construction. A government notice has been issued in this regard but is peculiar to Queensland's circumstances and does not assist in relation to technical requirements.

Advertising outside the boundaries, but visible from state-controlled roads: The Sustainable Planning act regulates these advertisements and the Department of Main Roads need not to be consulted in relation to applications for the display of advertisements. Local governments, however, choose to refer the applications to the Department of Main Roads if the location is near a state-controlled road.

Advertising visible form motorways: The Transport Infrastructure Act 1994 s.43 allows a local government to obtain written approval by the Department where the local government intends to approve an Advertising Device beyond the boundaries of, but visible from, a motorway. It also allows the Department to make guidelines and permission criteria, including conditions, for such devices. The Act determines that local governments must have regard to the Guidelines so made in deciding on the approval of an application.

Advertising that may pose a danger to traffic: The Transport Operations (Road Use Management Accreditation & Other Provisions) Regulation 2005 s.111 (2)(a) relates to a light or sign that may create a danger to traffic. In considering an application for an Advertising Device visible from a state-controlled road, local government should consider whether the chief executive's (the Director General of the Department of Main Roads) exercise of this power is relevant. This guide may help determine whether a device may create a danger to traffic.

Hand-held and vehicle-mounted advertising devices: The Traffic Regulation 1962 s.126 outlines offences in relation to advertising, placards, handbills etc. This may only be done under the authorisation of a permit issued by either the issued by the chief executive (Queensland Transport) or commissioner (Queensland Police Service).

Local Government: Local government control over the display of Advertising Devices may be exercise through relevant local laws, local law policies and town planning provisions. The Transport Infrastructure Act 1994 s.45 provides for management of particular functions on state-controlled roads by local governments. The Act determines that a local government may exercise all the powers that it has in relation to local roads, in relation to state-controlled roads within its area of jurisdiction.

The Guidelines document indicates where to apply for approvals in relation to which types of advertisements and roads. The Guideline further provides general and technical criteria for the evaluation of applications for the display of advertisements and could together with the legislation already mentioned be used to determine the technical content of a national standard on outdoor advertising for South Africa.

7.5.4 United States of America

The United States of America is a federal republic consisting of 50 states, a federal district (Washington DC) and five major territories plus various minor islands. In terms of Article VI of the Constitution of the United States of America, federal laws, treaties and the US Constitution is the supreme law of the land. Federal and state governments have concurrent legislative powers over roads and transport. The Outdoor Advertising regulatory programme is based on federal law and regulations as well as state statute and rule. Federal law is set forth in the Highway Beautification Act, 1958, while federal regulations can be found at 23 Code of Federal Regulations Section 750. The purpose of the Federal Regulations giving effect to the Act

b) In section 12 of the Federal-Aid Highway Act of 1958, Pub. L. 85-381, 72 Stat. 95, hereinafter called the act, the Congress declared that:

To promote the safety, convenience, and enjoyment of public travel and the free flow of interstate commerce and to protect the public investment in the National System of Interstate and Defence Highways, hereinafter called the Interstate System, it is in the public interest to encourage and assist the States to control the use of and to improve areas adjacent to such system by controlling the erection and maintenance of outdoor advertising signs, displays, and devices adjacent to that system.

It is a national policy that the erection and maintenance of outdoor advertising signs, displays, or devices within 660 feet of the edge of the right-of-way and visible from the main-travelled way[7] of all portions of the Interstate System constructed upon any part of right-of-way, the entire width of which is acquired subsequent to July 1, 1956, should be regulated, consistent with national standards to be prepared and promulgated by the Secretary of Transportation.

c) The standards in this part are hereby promulgated as provided in the act.

The Federal Regulations prescribes the Federal Highway Administration (FHWA) policies and requirements relating to the effective control of outdoor advertising. The purpose of these policies and requirements is to assure that there is effective State control of outdoor advertising in areas adjacent to Interstate and Federal-aid primary highways. States are permitted to implement more stringent advertising control programmes. It limits the types of sings that may be displayed and provides general guidelines to states. The Federal Highway Administration oversees the implementation of the Highway Beautification Act, 1958.

7.5.5 Florida

State laws are found in Chapter 479 of the Florida Statutes. In addition to the state statutes (Acts), the Department of Transport writes administrative rules to interpret the intent of the statute for the public. Chapter 14-10 of the Florida Administrative Code is the Department's rule chapter which governs outdoor advertising. These rules only govern the administrative procedure for application for authorisation to display outdoor advertisements. Local governments often have their own ordinances which regulate outdoor advertising in their community. The Department cannot issue a permit for an outdoor advertising sign which is not allowed by local ordinances.[8]

[7] Main-travelled way means the travelled way of an Interstate Highway on which through traffic is carried. In the case of a divided highway, the travelled way of each of the separated roadways for traffic in opposite directions is a main-travelled way. It does not include such facilities as frontage roads, turning roadways, or parking areas.
[8] https://www.fdot.gov/rightofway/OutdoorAdvertising.shtm

An Outdoor Advertising Permit is required to have an outdoor advertising sign at a specific location along the Interstate, Primary or Secondary highway system. The permit identifies the sign as to location, size, configuration, lighting, and height above the level of the highway.

An Outdoor Advertising Licence is issued for persons who are in the business of outdoor advertising, which is, anyone advertising a business other than their own.

Chapter 479 of the Florida Statutes regulates outdoor advertising in relation to roads. The purpose of this law is states as follows: "*The control of signs in areas adjacent to the highways of this state is declared to be necessary to protect the public investment in the state highways; to attract visitors to this state by conserving the natural beauty of the state; to preserve and promote the recreational value of public travel; to assure that information in the specific interest of the traveling public is presented safely and aesthetically; to enhance the economic well-being of the state by promoting tourist-oriented businesses, such as public accommodations, vehicle services, attractions, campgrounds, parks, and recreational areas; and to promote points of scenic, historic, cultural, and educational interest.*"

The law requires applicants to prove that local authority requirements have also been satisfied. The US legislation seems to be aimed mostly at regulating the display of outdoor advertising visible form all roads in relation to height and distance from each other. In addition, zoning is done, in relation to which certain types of signs may or may not be displayed. There is a serious drive to remove illegally erected signs, but not much focus on the distractive driving aspects of outdoor advertising.

7.5.6 General observation of the USA

The legislation on Federal and State level seems to be aimed rather at 'beautification' than at road safety. The Federal Government approves and financially sponsors state programmes that aim to remove advertisements that do not fit in with the 'beautification' principles. The regulatory model seems to be similar to South Africa and Australia, except for the emphasis on 'beautification', which in South Africa could be classified under environmental aspects.

7.5.7 Summary of findings

From the above, the following aspects have been determined:

- Billboards and outdoor advertising are a local authority exclusive executive functional area;
- The Constitutional Court has ruled that the functional areas within and between government spheres are distinct from each other although some blurring of the lines may be accepted – as such, road traffic regulation, which is a national and provincial concurrent function, includes road safety regulation (the National Road Safety Act, 1972 was assigned to the Provinces), and issuing a national standard regarding outdoor advertising form the viewpoint of road traffic safety management is therefore authorised and does not encroach on the legislative authority of local government;
- The Constitutional Court has ruled that Provincial and National Government may promulgate legislation on exclusive local government functional areas, but may not implement such legislation, which is the exclusive prerogative of the local authorities;
- The Constitution allows national government to encroach on the legislative authority of other spheres of government if it is necessary to provide an essential national standard or minimum requirement;
- The Local Government: Municipal Systems Act provides for the Minister responsible for local government to issue an essential national standard – it is not believed that this provision excludes any other minimum requirement, as is provided already in terms of the Road Traffic Act;
- The National Road Traffic Act authorises the incorporation of a South African National Standard (issued by the South African Bureau of Standards) into the Regulations, which accords that standard the statues of a regulation;
- SANRAL, various provinces and local governments have issued legislation which could be compared to identify technical standards that need to be prescribed;
- The Australian states of New South Wales and Queensland have Guideline documents which address technical standards for outdoor advertising from a road traffic safety point of view, and which can be used to compare the South African standards identified from the legislation reviewed.

- The by-laws in some cases are inconsistent with provincial and national legislation with regard to the approval procedure and dos does not make approval by e.g. SANRAL conditional to municipal approval.
- A possible solution for the disparate application procedures is the establishment of a joint government application web page supported by a system to manage the applications, ensure that the approvals of all government spheres have been obtained and to simplify the application procedure for the private sector.
- All the legislation reviewed contain the power to remove illegally displayed advertisements. The USA example provides for removal programmes for which states and local governments may obtain federal funding. It is however difficult to empower the removal of illegally displayed signs from a national point of view, but it can be done provided that the administrative law is complied with and authorities' liability be limited.

7.6 Proposed interim agreed legal status

i) Municipalities are administratively the authority that considers and approve or reject outdoor advertising applications.

ii) Unless deemed exempted in terms of applicable legislation, no advertisement may be displayed without prior written approval by the municipality in whose jurisdiction such advertisement is envisaged.

iii) A municipality may not consider an outdoor advertising application regarding a proposed sign/structure visible from a national or provincial road, without sourcing the approval of the responsible road authority regarding the potential traffic safety implications thereof. (SANRAL or the provincial government is regarded as an affected stakeholder in this regard.)

iv) An applicant must thus first obtain the written approval of the higher authority in relation to road traffic safety, before an application is submitted to the municipality.

v) A municipality may not approve an outdoor advertising application if the application in terms of road safety is rejected by SANRAL or the provincial government, or an adjoining Municipality affected by the advertisement.

vi) Either the responsible municipality or the higher order road authority can follow due process to have illegal advertisements removed.

Practical implications

vii) All outdoor advertising applications must be submitted to the local authority in terms of the relevant authority's standard requirements.

viii) An application for a qualifying advertisement visible from a national or provincial road without the written approval from the relevant authority with regards to road safety, must be regarded as an incomplete application and that application must either not be accepted by the municipality, or must be rejected as incomplete.

ix) Municipalities must carefully screen outdoor advertising applications to determine whether proposed advertisements will be visible from national or provincial roads.

x) While national roads are normally properly identified, the same is not true for all provincial roads. The provincial government must ensure that the municipal units responsible for considering outdoor advertising applications are properly informed about the location and alignment of all provincial roads traversing the municipal area.

xi) Municipalities must accept that SANRAL and the provincial government remains responsible for traffic safety along national and provincial roads, even where such roads pass through urban areas.

xii) A municipality may not approve an outdoor advertising application that had not been approved in relation to road safety by SANRAL or the provincial government.

xiii) The local authority and SANRAL/Provincial government should collaborate in dealing with illegal outdoor advertisements. (Where such advertisements are located within public road reserves, the authorities can inter alia rely on the Public Finance Management Act (or Municipal Finance Management Act) and common

law principles to remove the problematic advertisements. In the latter regard, the principle applies that, once a service or structure had been erected/installed in the immovable property belonging to another, the owner of such immovable property also becomes the owner of the service/structure. This suggests that the owner of a road reserve can do as it pleases with an illegal advertisement erected within its road reserve. See Appendix A of TRH27 in this regard. Illegal advertisements located outside the road reserve require a more complicated approach. Road authorities normally rely on the removal procedures/processes stipulated in their outdoor advertising regulations to have such advertisements removed.)

xiv) xiv) Given advances made by influential companies in the advertising industry, where well-funded legal teams scored significant successes against inadequate and often uncertain legal responses from road authorities, legal precedents do not favour road authorities at this point in time. It will be necessary for road authorities to collaborate in order to counter historic legal precedents in this regard and to establish a favourable legal environment in which authorities can effectively deal with illegal and unsafe advertising, establishing a joint committee/forum as soon as possible. The Terms of Reference of this joint committee/forum needs to be developed in draft format before the joint programme contemplated in par 9.6.4 is established.

8 Policies, technical specifications and guidelines applicable to outdoor advertising practices in South Africa

8.1 Draft roads policy for South Africa

Lowe (2019) states that the Roads Policy for South Africa sets benchmarks on all matters relating to road regulation, roads infrastructure, road safety, road funding and non-motorised transport. It provides the necessary overarching framework to ensure that South Africa's roads are better managed, safer, and includes all modes of transport to deliver a sustainable approach to roads management (Lowe, 2019).

The Draft Roads Policy (2018) makes no mention of roadside advertising as an environmental or road safety issue. Although the Roads Policy (2018) highlights road safety as a key consideration, the policy does not address outdoor advertising as a road safety concern. However, the Draft Roads Policy does make provision for better planning of roads especially when integrating roads planning with land uses and protection of green areas and so forth.

8.2 South African National Road Safety Strategy 2011-2030

The South African National Road Safety Strategy (NRSS) refers to the various elements of the road or the traffic system – the road user, the vehicle, and the road environment – and the various collections of actions/strategies under the five pillars of the UNDoA are interventions that are designed to impact the three elements to better the safety performance of the system.

One of the key matters in the South African context is be driver education and training with respect to the risks associated with driving distracted and/or inattentively. This is a matter that has become significantly elevated since the onset of the UNDoA a decade ago as a prevalent issue that is undoubtedly contributing to escalated road safety risks. Yet outdoor advertising, features and activities that rely on their distracting characteristics, targeting unsuspecting drivers that are not trained to cope with distractions that can cause them serious harm or even death, are introduced along roads.

8.3 South African Manual for Outdoor Advertising Control (SAMOAC)

The South African Manual for Outdoor Advertising Control (SAMOAC) was first published in 1998 (and reviewed in 2010 with amendments to chapters in February 2011). It stated that advertising signs may be allowed along roads, but only in certain areas with specific rules and regulations.

The 1998 SAMOAC document was developed by DEAT in 1998 and no traffic engineering and road safety input was considered during the development. The SAMOAC is a compromise between the advertising industry and authorities. It is a guideline document only. The onus was placed on regulating authorities to give legal status incorporating it in their by-laws.

Weideman (2001) states that SAMOAC constitutes a framework and a guideline document for the standardisation of assessment criteria and the application of control measures in South Africa. SAMOAC is used by local authorities to develop and implement municipal by-laws. SAMOAC 2012 advocates that road reserves are kept clear of advertisements as far as possible. In this regard, the philosophy is to relegate advertising classes with low necessity value to outside the road reserve, leaving the road reserve and visual aisle between roadside properties as clear as possible for essential messages (without advertising pollution), giving preference to formal road traffic signage erected in terms of the South African Development Community Road Traffic Signs Manual (SADC RTSM) and thus the South African Road Traffic Regulations (Rautenbach, 2013).

The revised 2010 SAMOAC provides conditions and principles for the management and control of outdoor advertisements and signs. It is aimed at both the outdoor advertising industry and controlling authorities with the

purposed of encourage the standardisation of assessment criteria and uniformity in the application of these criteria. SAMOAC focuses on the control of advertisements and signs on an individual basis and recommends that an Environment Impact Assessment (EIA) be undertaken for any outdoor advertisement or sign larger than 36 m^2

An additional section, Chapter 6, was produced in February 2011, called A Procedure for Management and Implementation Conditions of Control. This section provides a novel approach to the management of outdoor advertising and the implementation of SAMOAC. This document still only makes provision for an Environmental Impact Assessment.

Local authorities have a mandate to control outdoor advertising in their total area of authority and should have by-laws in this regard, but these by-laws must take other higher-level legislation into account such as provincial or national regulations.

Weideman (2001) however also highlights that the SAMAOC document, even though it is intended to provide guidance on outdoor advertising practices, has no legal rigour and that this is a shortcoming in terms of managing outdoor advertising practices in South Africa.

8.4 SADC–RTSM AND SARTSM

8.4.1 Precedence of road traffic signs and markings

Section 3.1.9(3) of Chapter 3 (Regulatory and Warning Signs and Marking Applications) of Volume 2 of South African Road Traffic Sign Manual (SARTSM) states as follows:

'Road traffic signs' is a legal term and includes within its definition road signs, road markings and traffic signals. Only 'road traffic signs' should be erected within a road reserve. The only signs, markings or signals recognised as 'road traffic signs' are prescribed by the Minister of Transport by inclusion in Schedule 3 to the Regulations and the Act. 'Road traffic signs' are classified in a hierarchical manner. Signs, markings, and signals may be used to regulate, to warn or to guide or inform. Regulatory signs, markings and signals carry the force of the law and clearly are the most important. Warning signs, markings and signals have a different importance because of the responsibility on the road authority to see that they are used meaningfully and when necessary in the interest of road safety.

An interpretation of the legislative framework is as follows:

- The Road Traffic Act forms the basis of what needs to be considered
- The National Road Traffic Regulations are the regulations promulgated for the application of the Act

Regulation 287 (1) (c) of the National Road Regulations 2000 states that "a road sign or a road signal shall – be displayed substantially in conformity with:

- The Southern African Development Community Road Traffic Signs Manual (SADC-RTSM) Volume 1 and Volume 4; and
- The South African Road Traffic Signs Manual (SARTSM) Volume 2 and Volume 3."

This implies that the specifications contained in SADC–RTSM and SARTSM cannot be disregarded when considering the Regulations and the Act.

8.4.2 Potential issues with SAMOAC within SADC-RTSM and SARTSM

Some of issues (conflicts between permitting outdoor advertising displays and the road sign manual) that are of concern with the compliance of SAMOAC within the SADC–RTSM and SARTSM have been identified by Rautenbach (2013) as the following:

- Need to restrict the placement of formal road traffic signage, and to prescribe the spacing from traffic intersections, spacing between different signs etc.
- Need to restrict the use of colours on road traffic signs (colours regarding the background, the border, the legend, route numbers, symbols. etc.).
- Need to restrict the type of text and the size of text on a road traffic sign (e.g. the minimum text height depending on the type of sign, the type of road, the travelling speed, etc).

- Need to restrict the amount of information on road traffic signage.
- Need to restrict the size and height of formal road traffic signs.
- Need to consider restrictions on the number of signs.

8.5 Summary of additional documents submitted for the literature review

Table 8-2 provide an overview of additional documents that were submitted by local, provincial and national authorities in preparation of this literature review.

Table 8.1: Supplement information provided in support of the outdoor advertising literature review.

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
Lamppost advertising in Mangaung: investigation into desirability of formal lamppost advertising	Submission to the inter-departmental transport and traffic committee	March 2005	▪ By-laws and road traffic regulations	▪ Lamp post advertising impact traffic safety negatively in Bloemfontein ▪ Commissioned an enquiry into the implications of advertising on lampposts, as well as the agreements, conditions and regulations that govern the display thereof.	▪ Investigation uncovered large-scale and constant breach of contract, violation of every relevant advertising condition, principle and protocol, as well as serious violation of traffic and advertising regulations, the implications of which include unacceptable traffic safety risks and widespread sign pollution. ▪ It was also found that Council had been misled on several occasions to give approval for contentious applications and to cover up the extent of serious violations. ▪ Financial losses totalling hundreds of thousands of R have been uncovered, the extent of which can only be quantified once a formal audit is commissioned. ▪ The advertising agent refused to rectify blatant violations of contract conditions and is still violating these conditions on an ongoing basis. ▪ The negative sentiment towards lamppost advertisements, it is recommended that all existing agreements with respect to formal advertising on lampposts be terminated and that the concept of formal advertising on lampposts be done away with.

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
Outdoor advertising and signage by-law	City of cape town	December 2001	▪ Strike a balance between outdoor advertising opportunities and economic development on the one hand, and the conservation of visual, tourist, traffic safety, environmental and heritage characteristics on the other hand.	▪ Object of this By-Law is to regulate outdoor advertising in the jurisdiction of the City of Cape Town in a manner that is sensitive to the environmental quality of different parts of the City of Cape Town.	
Outdoor advertising and signage (policy number 12513)	City of Cape Town	28 August 2013	▪ The City of Cape Town controls outdoor advertising and signage in terms of a by-law ▪ The City's primary role in respect of advertising is as regulator in terms of the Constitution. ▪ The City's separate role as landowner should not become	▪ The purpose of the Policy is to provide additional explanation but as with all such tools, the by-law will prevail in legal application. ▪ Provides guiding principles and an implementation strategy, within the framework of the City of Cape Town's IMEP and IDP, to assist with using the City's by-law for the control and	▪ Provide a set of regulations governing the use of land and buildings for outdoor advertising and signage ▪ Apply precautionary principles ▪ Encourage a responsible and balanced approach and design excellence ▪ Provide implementation and control framework ▪ Categorise and map landscapes of varying sensitivity to signage impacts ▪ Apply appropriate levels of control to outdoor advertising in the jurisdiction of the City in a manner that is sustainable and is sensitive to the environmental quality of different parts of the City ▪ Guard the public's right to a safe environment and have regard for the public interest, ensuring

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
			confused with the control of signage and the Department of Environmental Affairs cautions, in the preamble to the 2011 SAMOAC, that local authorities should not over exploit outdoor advertising rights for short term monetary benefits. ■ The National Road Traffic Regulations, 2000, made under Section 75 of the National Road Traffic Act, 1996 (Act No 93 0f 1996) requires, in regulation 287 (1)(c), that road signs and road signals shall be displayed substantially in conformity with the SADC RTSM	regulation of Outdoor Advertising and Signage. ■ The requirements of the SADC RTSM in respect of sign sizes, clearances, reading times and warning distances are therefore to be taken as mandatory when evaluating advertising opportunities	public safety, including traffic, pedestrian, structural and fire safety. ■ differentiate among various forms of outdoor advertising and signs and categorise these into different sign types

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
Guidelines for traffic impact assessments for advertisements visible from a public road	City of Cape Town Department of roads and transport	1 August 2001	By-law relating to outdoor advertising and signage, the by-law, contains several sections in which the municipality may request a traffic impact assessment (TIA) of a proposed advertising sign.	Professionals intending to undertake TIA's for outdoor advertising shall apply to be approved to be included in the database of approved consulting service providers, which will be made available to outdoor advertisers for the selection of an analyst to undertake the TIA of a proposed advertisement. Aim of the TIA is to assess the traffic impact of the proposed advertisement, and in particular the road traffic safety impacts of the particular advertisement	Prescribe: ▪ Approach ▪ Minimum contents of a traffic impact assessment ▪ Evaluation of the existing road safety situation at the proposed location of the sign ▪ Content of and minimum character size on an advertising sign ▪ Location of advertising signs ▪ Illumination of advertising signs
Digital Sign Board (Electronic Billboard/Electronic Sign Board): Memorandum: Luminance Guidelines for City of Cape Town	ITSE	18 May 2016	▪ Areas of control: Schedule 1 of the (City of Cape Town, 2001) displays a table with a full explanation as to the specific areas of control.	▪ Luminance Guideline is intended as a safe and practical guide to achieving effective advertising in the City of Cape Town ('CoCT') area without increasing the risk for public safety. ▪ The scope of this guideline only covers maximum luminance levels of Digital Sign Boards (DSBs), and only defines criteria in terms of road and traffic safety and built in environmental benefits. ▪ Areas of Control: The CoCT is divided into maximum-, minimum- and partial areas of control.	

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
			▪ Location: Document name as defined in Section 27 of the (City of Cape Town, 2001), ▪ Within these areas of minimum- and partial control, the location of electronic billboards is regulated by Sections 30 to 42 of the (City of Cape Town, 2001). ▪ Size: Section 27 of the (City of Cape Town, 2001) states that even in areas where DABs are permitted, there are regulations	▪ Location: Electronic billboards/Digital sign boards (DABs) and internally illuminated signboards my only be displayed in areas of minimum- and partial control. Therefore, under no circumstances does the CoCT permit any electronic and/or internally illuminated signs in areas of maximum control. ▪ Size: Electronic signs and internally illuminated sign boards are not permitted in areas of maximum control but may be allowed in areas of minimum and partial control.	

Document	Author	Date	Considerations
SANRAL & national tourism signs	Advertising on Roads and Ribbon Development Act 21 of 1940 (ARRDA) South African	No date	▪ The Advertising Boards Acts apply to all persons and/or entities who display advertising boards on or near a public road, including billboards, posters and aerial displays, such as blimps. ▪ The billboard laws, read together with the relevant by-laws, regulate the display of advertisements at places visible from public roads

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
	National Roads Agency Limited and National Roads Act 7 of 1998 and the Regulations on Advertising on or Visible from National Roads South African Manual for Outdoor Advertising Control (SAMOAC)		▪ Compliance by an entity can be delegated to a department such as the marketing or advertising department, procurement, corporate affairs or, in the case of a small business, the owner of the business or a manager ▪ Before any advertising billboard is erected and displayed on a public road or which is visible from a public road, the person erecting the board must obtain an authorisation to erect and display that board from the municipality where the board is located. All advertising boards must be manufactured strictly in compliance with the specifications laid down and housed under the billboard laws, read together with the relevant by-laws. The erection, stability and display of the advertising boards must comply with any applicable health and safety and environmental laws and standards.		
Memorandum: The role of South African Road authorities in dealing With outdoor advertising	Rautenbach, A. Mangaung Metropolitan municipality	No date	▪ The applicable national legislative provisions give substantial guidance as to how the roles of various levels of government should be seen as far as outdoor advertising is concerned. ▪ Legislation include Constitution; Outdoor advertising by-laws; generic municipal outdoor advertising regulations; provincial outdoor advertising regulations; SANRAL act and Ribbon Act ▪ Significant that the South African Constitution specifically refer to "*billboards and the display of advertisements in public places*". ▪ This implies that the effects of outdoor advertising rank so high among the most important matters of national concern that it needs to be governed by the highest legislation of the country. It implies that outdoor advertising is a matter that must be taken seriously and that the different spheres of government must all fulfil their roles diligently to ensure that outdoor advertising does not harm the public interest, whilst creating opportunities for the advertising industry. (a) The road authorities in South Africa need to deal with outdoor advertising in a legally consistent manner. (b) Road authorities need guidance as to their legal responsibilities and mandate as far as outdoor advertising is concerned. (c) The legal responsibilities of road authorities are spelled out in the South African Constitution and other legislation that flows from that. (d) The Constitution declares the management of outdoor advertising as a local government matter, albeit not as an area of exclusive municipal legislative competence. Municipalities have executive authority over outdoor advertising matters.		

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
			(e) Municipalities have been assigned the authority to formulate their own outdoor advertising by-laws. (f) As all land within the national borders fall within some or other municipal area, all advertisements are subject to municipal approval. (g) Provincial governments must see to the adoption of appropriate outdoor advertising by-laws in municipal areas under their jurisdiction. (h) Provinces must monitor, regulate and support municipalities as far as their management of outdoor advertising is concerned. (i) The management of provincial roads and traffic matters along such roads are declared by the Constitution as an area of exclusive provincial legislative competence. (j) The management of environmental matters is a functional area of concurrent national and provincial legislative competence. (k) This allows provincial governments to promulgate outdoor advertising regulations based on traffic safety and environmental considerations. (l) Municipalities cannot disregard the view of provincial governments regarding the impact of outdoor advertising on traffic safety along provincial roads. (m) Municipalities cannot disregard the view of provincial governments regarding the environmental impact of outdoor advertising, irrespective of whether such advertising is visible from provincial roads or not. (n) The South African National Roads Agency Limited and National Roads Act, as well as the Regulations on Advertising on or Visible from National Roads 2000 defines the role of SANRAL in the management of outdoor advertising along national roads. (o) The development and maintaining of a safe national road network are the legal responsibility/mandate of SANRAL. (p) Municipalities cannot disregard the view of SANRAL regarding the impact of outdoor advertising on traffic safety along national roads. (q) The Advertising on Roads and Ribbon Development Act, 1940 (Act 21 of 1940) and the South African National Roads Agency Limited and National Roads Act (Act No. 7, 1998) authorise provincial governments and SANRAL to remove illegal advertisements once due		

Document name	Published by	Date	Framework	Purpose	Principles and other considerations
			process had been unsuccessfully followed to have the advertiser remove illegal advertisements.		
Memorandum: Addressing traffic crash rates by addressing incidents incorrectly classified as contributory human factors	Chairperson of the National Traffic Engineering Committee		▪ Causes of road crashes are misreported ▪ Drivers do not have capacity to process additional roadside information that compete with attention for formal road sign recognition ▪ Drivers drive inattentive and inattentive driving is considered a cause in crashes ▪ Roadside advertisements contribute to road traffic crashes.		
Memorandum: Focus of the Advertising By-Laws: Income Generating or Prohibitive		September 2010	▪ Revenue generation cannot be justified by local authorities if it compromises safety or pollution of the city or town. ▪ Advertisers aim to get as much exposure as possible for their advertisements, resulting in high demand for advertising where pedestrians are concentrated (such as at public transport transfer nodes) and where high traffic volumes are present; ▪ Advertisers are not inclined to pay for advertisements while it is easy to advertise illegally for free; ▪ Advertisers are not inclined to adhere to advertising regulations while their competitors are allowed to illegally display larger and more striking advertisements with a much higher impact; ▪ Competing advertisers will continue to erect larger and larger advertisements to get more exposure than their competitors, unless they are legally restricted in some or other way; ▪ Unless advertising regulations are enforced to limit the number and nature of advertisements at high exposure locations, the conspicuity and effectiveness of individual advertisements will be poor. Advertisers will not be willing to pay premium prices for poor exposure; ▪ Unless regulating specifications are supported by effective law enforcement and market related fines and penalties, it will not be possible to convince advertisers to pay premium prices for application fees and lease agreements; ▪ Unless adequate staff is employed to assist with effective law enforcement or unless a professional private company is appointed to enforce the by-laws on behalf of MLM, illegal advertising will keep on escalating.		

9 Conclusions and recommendations

9.1 Outdoor advertising industry

Outdoor advertising practices have grown over the decades, with new types of digital and interactive displays competing for advertising space. This is a trend that is seen in Africa as well as South Africa. The outdoor advertising industry is recognised as a large contributor to various economies., outdoor advertising space is popular, and advertising agencies and advertisers actively seek these spaces out to display their products, services, and events.

Outdoor advertising agencies and advertisers conduct in-depth target audience research and prepare audience profiles to inform the design of audience-specific messages. The outdoor advertising industry makes use of the same information and human qualities (e.g. demographics indicators; distraction etc.) to appeal to consumers (drivers) by advertising in road reserves that the Safe System approach (demographics in relation to vulnerability and frailty) aims to address to improve road safety. This is obviously in conflict with road safety efforts to reduce distracted and inattentive driving practices that are a significant contributor to road traffic accidents, deaths, severe and disabling injuries.

The aim of outdoor advertising in and adjacent to the road reserve is to attract drivers' attention. In this lies the dilemma, as these displays have long been considered a source of driver distraction, with the potential to cause accidents. Distraction and inattentive driving are increasingly recognised as among the key important contributory factors to road and traffic accidents world-wide.

Outdoor advertising practitioners and published literature describe the benefits of outdoor advertising in and adjacent to the road reserve (that they add festivity, colour and enhancing monotonous environments), but there is little peer-reviewed evidence to show that sufficient thought is given by the industry about the way in which these displays might impact road safety. This is concerning, as the Safe System approach clearly advocates that all stakeholders (business, government, and civil society) are equally responsible for road safety. With a road safety record such as that in South Africa, there clearly needs to be a concerted effort to address this situation. Although there are several industry bodies with various functions in relation to outdoor advertising control, most seem to promote voluntary self-regulation. The outdoor advertising industry are stakeholders in road safety, and as such the industry has a moral and ethical responsibility to step up to the role, they must play in road safety.

There are new indications that outdoor advertising is less effective than has been believed, and studies show that it is difficult to measure its impact. Outdoor advertising has also been criticised for its impact on the environment, and with arguments that it is correlated with crime and vandalism, poor community identity, devaluation of place and commercialisation of places, in addition to encouraging unsustainable consumption patterns, light pollution, direct environmental impact, devaluation of property values, and having a negative impact on tourism resources. An argument has also been made that the very characteristic that makes it so popular for advertisers (that people have no control over it) is a violation of human rights. Lastly, critics argue that outdoor advertising, and the fact that is inherently designed to distract drivers, is call to immediate action and stricter regulation.

9.2 Transport system management and outdoor advertising

Transport System Management is the process of co-ordinating the individual elements (transportation infrastructure; transportation modes; land use; and human factors) of the system through investment, regulatory, monitoring, pricing, operating, and servicing policies to achieve maximum efficiency and productivity for the system. It is the responsibility of the road authorities to minimise risks to motorists, including the control of advertising. This control needs be executed in terms of placement, content, messages, media, and type of displays.

The outdoor advertising industry rely on its economic contribution, the income streams they generate, job creation and so forth to motivate for the placement of outdoor advertising displays in prime locations such as intersections and roundabouts or on overhead displays. Advertising on roads are permitted in some instances and in some formats. Advertising on freeways and major arterials result in extremely high frequency albeit brief viewing and are used to maintain 'top-of-mind' brand awareness. Although popular, large format advertising is popular it is however not legal within all road reserves. Road reserves are to be protected and as such areas of maximum control include areas where high impact advertisements are to be prohibited. SAMOAC prescribes three areas of control – maximum control (nature environments), partial control (rural environments) and minimum control (urban environments) – and municipalities are

required to proactively demarcate these areas in the municipal area as a base map for the implementation of its outdoor advertising policy.

Within the transport system management process, outdoor advertising investments, pricing decisions as well as cost internalisation must be considered in the context of the transportation system with the specific endeavour to not harm people (users) and the environment. Poor regulation and poor implementation of policies in the long term have a negative impact on both the environment and road safety and should as such be managed rigorously to prevent harm to the environment as well as to ensure that the transport system function safely and efficiently (users and environment).

9.2.1 Road environment management and outdoor advertising

The outdoor advertising function typically lies within the town planning department, and planners need to note the importance of traffic and engineering principles in the evaluation and approval of outdoor advertising displays. From a planning perspective the following is important:

- Outdoor advertising applications form part of land-use management applications that need to be approved by the relevant road authority, as set out by the Constitution. In addition, the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA), sets out development principles which apply to all organs of state responsible for the implementation of legislation regulating the use and development of land. This legislative framework places on municipalities the responsibility to manage land development and to conduct proper planning. Municipalities execute their functions in compliance with legislation through a municipal by-law that contain provisions and principles to guide and inform all land development applications including outdoor advertisement applications.
- The principle of protecting the environment is also embedded in the Constitution and all spheres of government has a responsibility and duty to protect the integrity of the environment. The NEMA Act (Act 107 of 1998) provides for co-operative environmental governance under established principles for decision-making on matters affecting the environment, institutions that promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state. Applications for roadside advertisements should therefore be considered in terms of the impact (pollution, clutter etc.) that the displays can have on the environment.
- Traffic engineers, responsible for the network design and planning therefore pay special attention to the road environment with the objective to minimise any negative impacts, and to ensure that the road environment contribute to the enhancement of the human habitat and the natural environment– this approach is reinforced by an environmental assessment process. Road and planning authorities need to review the applications in terms of the medium and long-term impact thereof on the road and network.

9.2.2 Traffic management and roadside advertising

Traffic management entails the facilitation of safe traffic operations within and adjacent to the road. The function of the road (mobility or access) determines the type of traffic management measures that are implemented with consideration to traffic flow, volumes, composition, and speed, throughout or in specific parts of the network. The class of road has implications for the management of outdoor advertising displays on different classes of roads. In addition, the road function dictates the type of measures and structures that are allowed on the road. SAMOAC along with municipal outdoor advertising by-laws refer mostly to ‘arterial roads’ and ‘collector roads’ (Class 3-5 – lower speeds), dictating the spacing of advertisements such as billboards. Applications need to be reviewed and assessed with due consideration of the impact of these additions in relation to the character and function of the road as well as the impact of these additions on official signs and markings.

Traffic management directly affects the physical road environment in which road users operate, and thereby influences the behaviour of road users. Traffic management elements include traffic theory and analysis (characteristics of traffic), traffic control devices (guiding and controlling road users’ behaviour), legislation, standards, and guidelines (prescribing best practices and providing legal course of action), application of the theory, data, analysis, control devices, regulations, and standards as well as road environment safety. Outdoor advertising applications and approvals should consider the impact that the displays will have on the physical road environment, the traffic flow, and volumes (e.g. vehicles driving slower or faster due to the displays); whether the displays are present in areas that are typically considered areas with high volumes of vehicles (congestion) and consider the appropriate traffic controls needed to ensure the efficient and safe movement of vehicles and people without impeding traffic operations or situations where conflicts between users are created. The review and approval of outdoor advertising applications needs to consider safety and environmental

impact assessments. The way these applications are reviewed should be consistent and conducted similarly across jurisdictions. Traffic management approaches that allow for outdoor advertising displays in and adjacent to the road reserve must ensure that the approval for allowing these structures in the road adhere to the Safe System principles.

9.2.3 Road safety management

A. Safe System Approach – minimising harm

Road safety engineering, as an element of traffic management make use of specific (best practice) principles and guidelines (geometric) to improve the safety of the road environment and reduce the total cost of road accidents to the community in a cost-effective manner. Road and traffic engineers recognise the role that the road environment plays in the behaviour of road users and is guided by the fundamentals of road user performance, specifically driver performance, aimed at continuously improving design for road safety, road safety engineering and management practices. The Safe Systems approach is premised on a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles, and road users. It is an inclusive approach that caters for all users of the road system, including drivers, motorcyclists, passengers, pedestrians, cyclists, and commercial and heavy vehicle drivers. The Safe System approach recognises that people will always make mistakes – these mistakes could result in accidents —but the system should be forgiving, and those accidents should not result in death or significant injury. A Safe System is considered in terms of key interacting 'pillars':

- Safe roads and roadsides;
- Safe speeds;
- Safe vehicles;
- Safe road users.

Whilst road authorities traditionally used to be challenged with the trade-off between mobility objectives and road safety, the strict application of Safe System principles is about establishing the concept of safe mobility which is defined as 'mobility maximised within the limits of safe operation'. The implication is that the priority of the road authority will be, to establish safe operations. With outdoor advertising practices, providing a safer road environment involves the acknowledgement and application of road design and traffic management principles with a clear safety focus. Road authorities responsible for the road network should ensure that the road is designed and managed from a safety perspective, and that its operation is monitored and measured. Thereafter mobility can be maximised within the boundaries that do not compromise safe operation – the other way around to the traditional approach to first satisfy mobility (or other utility) requirements and then consider the level of safety that can be achieved. A consequence of this approach is that when the desired level of mobility cannot be realised after safety is appropriately addressed, the context and function of the road will need to be re-evaluated.

Central to the Safe System approach is the recognition that road users are fallible and will make mistakes, even if alert and intending to comply with the road rules. As a result, vehicles and road infrastructure need to be designed to discourage errors and protect against the consequences (damage and injury) when errors do occur. As such, outdoor advertising displays are designed to attract attention and are inherently distractive. The placement thereof in and adjacent to road reserves therefore needs careful consideration as justifying the adding of roadside features that has the potential, however minor, to encourage driver error through its distraction attributes, is particularly problematic as an ethical dilemma.

Due consideration should be given to human factor guidelines that suggest minimum requirements for drivers to observe and process information, sight and stopping distances as well as the distracting potential of advertisements taking cognisance of the road geometry and design, the complexity of the road environment, traffic flow and volumes and type of location that is considered in the application. All these considerations need to be interpreted, considering the impact on driver behaviour, distraction, and road safety.

B. Road Traffic Safety Management System

The Road Traffic Safety Management System (RTSMS) provides a practical approached to managing road safety. Elements include:

Institutional management functions: The seven identified institutional management functions are the foundation on which road safety management systems are built. The institutional management functions are essential to produce interventions which, in turn, achieve road safety results and for this reason they must receive the highest priority in road safety planning and policy initiatives. The institutional management functions relate to all government, civil society and business entities that produce interventions and results. With reference to outdoor advertising, institutional management functions will include the development of legislation (if not simply enforcing existing regulation) to address illegal or unauthorised outdoor advertising practices. As part of the institutional management functions the ideal would be to establish a partnership between road authorities and the outdoor advertising industry, whereby the outdoor advertising industry will be required to take ownership of the road safety implications and negative impacts that outdoor advertising displays have on unsafe driver behaviour, as well as other negative impacts such as the pollution of the environment. Addressing the problem through social corporate responsibility programmes that encourage an ethical approach to safe outdoor advertising should be a priority for both government authorities responsible for approval of applications as well as for the outdoor advertising industry that wants to act socially responsible.

Interventions: Interventions refer to system-wide strategies and programmes of interventions that aim to address road safety targets. Interventions cover the planning, design and operation of the road network, the entry and exit of vehicles, and users into the road network, and the recovery and rehabilitation of accident victims. At an intervention level, the aim is to manage exposure to the risk of accidents, prevent accidents, and reduce accident injury severity and the consequences of accident injury. They comprise safety designs, standards, and rules and well as a combination of activity to secure compliance with these such as information, publicity, enforcement, and incentive. In terms of outdoor advertising practices, the intervention level refers to the management of the road network. Clearly the management of outdoor advertising displays have a direct bearing not only to manage physical safety on the road network but also considering outdoor advertising from the perspective of driver (user) safety.

Results: Road safety results are expressed in the form of long-term goals and interim quantitative targets. Targets specify the desired safety performance endorsed by governments at all levels, stakeholders, and the community. The intent is that all stakeholders (government, civil society and business entities) need to be held accountable for their role in achieving the desired result (namely an environment that prevents serious injuries and deaths). Outdoor advertising therefore needs to be controlled through the setting of targets to manage, reduce, and monitor incidences of illegal and irresponsible outdoor advertising practices, in support of a safer road and traffic environment.

9.2.4 Transport system failures

A. Accidents and road unsafety

Traffic accidents are considered rare events, with the probability of being in an accident dependent on exposure to risk. Exposure is related to vehicle kilometres travelled, traffic volume, unsafe environments, and actions. In comparison to the amount of time road users spent on the road, compared to the probability that one would be in an accident, the risk is considered low.

Traffic risk is the chance of getting involved in a traffic accident resulting in death, injury and/or damage. Participating in traffic, is by nature unsafe, and many traffic situations are dangerous. The fact that people accept a certain level of risk does not mean that the risk of death or physical injury in traffic is socially acceptable. Acceptance of risk is influenced by the perception of risk. This is a subjective concept as different people with have different perceptions of what constitute risk in traffic and will differ in the manner to which they accept various levels of risk.

However, despite this being a subjective concept, road authorities and designers still have a responsibility to address all levels of risk within the road and traffic environment. By adding additional features such as roadside displays that due their distracting nature inherently raises the level of risk on and within a road environment is unacceptable.

Lack of road safety refers to the fact that at some point in time, a critical situation occurs in the traffic and transport process. This critical situation can be reversed if the parties react in the correct manner, but it can also become more critical if either of them fails to react or reacts incorrectly. Accidents take place due to the accumulation of a multitude of factors. The transport system therefore needs to be designed in such a manner that measures (barriers) are put into place to prevent these factors to align in a manner where accidents occur. With the occurrence of an accident, the system fails the road users as the measures that were put into place were not effective enough to prevent the accident. Each of the categories that constitute the road traffic system (infrastructure, users, vehicles, and environment) can

potentially affect its safety. The failures impact perception, planning and decision-making, and physical behaviour such as execution of vehicle control tasks.

Outdoor advertisements and the location thereof in and adjacent to the road reserve should therefore carefully considered within this framework as the addition of external structures in and adjacent to the road reserve, can contribute to inherent transport system failures.

B. People make mistakes: Driver error

High-accident locations (system failures) place large or unusual demands on the information-processing capabilities of drivers. The road design contributes to the inefficient operation and accidents occur where the chances for information-handling errors are high. At locations where the design is deficient, the possibility of error and inappropriate driver performance increases. To avoid system failures, approval of roadside advertising displays in and adjacent to the road should consider whether or not the placement of such displays might potentially exceed drivers' abilities and increase the potential for errors. If again considering older drivers as an example the literature review has emphasised that older driver performance and proneness to make errors reduce when sight distances are increased. However, if the road is already too complex it would be of obvious concern and make no sense to make additions to the road environment that have the potential to add to the complexity, reduces sight distances and make it less safe for those that are considered vulnerable.

C. Consideration of vulnerable road users

Elderly drivers and pedestrians are a significant and rapidly growing segment of the South African traffic stream with a variety of age-related sensory-motor impairments. As a group, they have the potential to adversely affect the road network system's safety and efficiency. Visual, cognitive, and mobility impairments are for example often associated with collisions involving older drivers. Data detailing the extent of these impairments are lacking which is problematic for the design and development of operational standards for roads. Basic policy decisions are also lacking. However, there is agreement that elderly road users require mobility, and that they should be accommodated by the road's design and operational characteristics to the greatest extent practicable. For every decade after age 25, drivers need twice the brightness at night to receive visual information. Hence, by age 75, some drivers may need 32 times the brightness they did at age 25.

On the other end of the scale, South Africa has a young driver population and driver training in many respects is not regarded as on par with countries with first world road networks to which that South African can be compared with. The disparity of driving skill levels and the expected erratic behaviour in situations with elevated risks that result from the low quality and non-uniformity of driver training is a dilemma which is intensified with the added issues of illegal licensed and unlicensed drivers. Thus, designers and engineers should be aware of the problems associated with vulnerable road users such as the elderly on the one side and an inexperience driver group on the other and consider applying applicable measures to aid their respective performances.

9.3 Outdoor advertising, road safety and the environment

9.3.1 International evidence

Traditionally, outdoor advertising as applicable to road reserves was mostly concerned with static billboards. Due to the potential distraction and contribution to traffic crashes, static billboards in and outside the road reserve have been the subject of road safety research since the 1950s. However, with the advent of the digital and technology era, the type of outdoor advertising displays utilised in the road environment have seen significant development and changes, so much so that static billboards seem to be the lesser of the evils.

Advancements in technology (RFID and social media) along changing consumer patterns, have made digital and interactive outdoor advertising practices even more popular with the outdoor advertising industry. The intentional and purposeful manner in which digital and interactive advertising practices in the road environment is being promoted is of obvious concern to road and traffic practitioners that have a duty to protect and preserve the integrity of the road and environment as well as the safety of its users.

The high-impact, larger than life format is seen as one of the strengths of the traditional billboard medium. The outdoor advertising industry is organised around the fact that a strong attraction (the stronger the better) of the attention of drivers can be created with the design and placement of an outdoor advertising display – thus by design meant to be distracting to the driver.

The extent to which outdoor advertising displays impact driver attention, behaviour, and subsequently road safety has been a source of debate for many years. Some studies suggest that there is no impact, or that the impact is not significant. These studies have been questioned by peers from a methodological and analysis point of view. Post-hoc collision studies, field investigations, and laboratory tests are common methods used to determine a relationship between displays and safety impacts; however, each has their own set of significant limitations. A limitation found across methodologies is the variability that exists between the several types of displays and the contexts in which they are placed. The variation in sign characteristics (e.g., size, luminance), message content (text, images, video), placement (e.g., urban, rural, lateral offset from road, height), and driver demographics create thousands of unique environments in which displays can be studied and each can lead to measurable differences in distraction regardless of the study method making it difficult to replicate the experiments and to establish the reliability of the results.

The fast pace at which technology is developing has implication for the use of methodologies and data collection techniques as it seems that modern data collection and analysis tools are able to better to detect human behaviour such as head movements and eye glances, measured in seconds. These advances in data collection and analyses now make it possible to notice record and report on behaviour which was previously not possible. This include NDS (use of in-vehicle cameras and CAN bus parameters) and analysis techniques to study and determine previously difficult to measure indicators of distraction such as for example glance behaviour.

With these modern technologies it becomes possible to observe specific behaviour on a second by second basis. Even though crashes are rare events, even more so in the proximity of the outdoor advertising displays, it has become possible to make use of surrogate measures (such as glance behaviour in the vicinity of billboards) to measure driver behaviour within the context of the environment and the vehicle. Surrogate measures (traffic conflicts) are used to identify behaviour that did not necessarily resulted in a crash but had the potential to.

Glance behaviour is used a surrogate measure for driver distraction. When drivers look for an extended period at an external object, the crash risk increases. Because there is a relationship between crash risk and gaze behaviour, gaze behaviour becomes a safety performance indicator (SPI) with which distraction can be measured. Accident risk increases exponentially if glances are directed away from the driving task and road in front, even if only for 1.5 to 2 seconds. The most common surrogate for measuring road safety is collision frequency (sometimes as a function of traffic volume, i.e., collision rate). Using glance behaviour and ‘time that eyes are not on the road’ as safety performance indicators have been found to increases crash risk exponentially, the longer eyes are diverted away from the road.

Driver distraction occurs when a driver’s attention is, voluntarily or involuntarily, diverted away from the driving task by an event or object to the extent that the driver is no longer able to perform the driving task adequately or safely. Driver distraction involves secondary task engagement, distracting driver attention from the primary driving task. This diversion of attention away from the driving task, means that the driver is not paying attention to activities critical for safe driving.

Driver distraction occurs when the driver’s attention is directed away from the critical driving task and can include cognitive, visual, and auditory distractions. Increasing the driver’s mental workload lowers the driver’s ability to detect potential hazards, particularly in peripheral vision. Drivers miss more lights and movement in a peripheral detection task while driving through busier and more complex environments. Both reaction time and hit rate for a peripheral detection task when driving task difficulty was increased by external causes such as narrow curves or the appearance of an unexpected obstacle deteriorated. Non-visual distractions increase driver workload, with resulting negative effects on the driver’s ability to detect hazards and impair the driver’s ability to make appropriate decisions such as taking correct gaps when turning especially in external environments that are cluttered, as it affects the drivers’ ability to select correct and relevant information. Research highlights that drivers tend to look at roadside advertisements for longer than compared to looking at official traffic signs. The implication hereof is that the information presented in the advertisements cannot be perceived quickly and easily (longer glances) which has implications for controlling the length and content of messages on displays, so that advertising messages do not interfere with the function of the road signs and markings. In addition, outdoor advertisements take glances away from the official road and guiding signs, that control and direct traffic movements. This is problematic as the road signs and markings present in road and traffic environments have a specific function (guiding driver behaviour) with which failure to comply has legal repercussions.

The level of distraction experienced by the road users is influenced by the type of adverts (moving or static) and the placement thereof and exposure time (duration over which advert is visible). Distraction levels of displays vary as a

function of the complexity of the driving task where the adverse effects of distraction increase with greater driving task demands. The review indicates that outdoor advertisements along roads add to visual clutter which has implications for the speed with which information from the road and environment is processed. This can be detrimental as safe driving is dependent on the driver being situationally aware and able to react when needed. The fact that processing speed is hampered means that the driver reacts slower in instances where required to act such as stopping or reacting to avoid hazardous situations. Outdoor advertising displays influences the drivers position on the road (passing manoeuvres, drifting from lanes) as well as the selection of safe speeds which in different environments have different consequences. In areas where displays are prominent in high volume traffic conditions, even at slow speeds the inattention might lead to rear-end collisions, drifting from a lane to head-on collisions or single vehicle run-off the road and failure to observe traffic signs/signals at intersection or roundabouts resulting in sideswipe type crashes. In high speed environments similar types of crashes occur, however depending on the speed and the impact infrastructure in the road environment, the severity of the crashes is much worse.

9.3.2 Challenges with outdoor advertising in and adjacent South African road reserves

Current outdoor advertising practices provides opportunities to the outdoor advertising industry to expand their footprint. This is problematic as there is already a detrimental proliferation of outdoor advertising displays in many areas. This situation leads to the conclusion that the management of outdoor advertising displays, specifically those that target road (motor vehicle) traffic, has become critical and it is essential to effectively control and regulate the application for, and placement of these advertisements in road reserves.

In already complex road environments such as that of South Africa, adding additional complexity to the road reserve is problematic. In South Africa different road users are already competing for road space, and even if infrastructure is available, construction of these spaces is poor or inadequate to allow for the volumes of users making use of them. The lack of proper planning and regulation give rise to frequent conflicts as the environment essentially fails to provide guidance to users and fail in facilitating a sense of community and belonging, elements, essential for establishing an environment where users feel compliant to behave according to a set of specific social norms.

Historically advertising along national roads was prohibited or limited along a national public road or in the road reserve of any road. However, two decades on these regulations opened national roads for lucrative advertising practices and highlighted the need for legally managing these applications.

- **Income generation in relation to safety:** Local authorities need to ensure that the approval and income generated by outdoor advertising displays do not negatively influence the road environment or road safety. As such there is a need to balance the income generated from the outdoor advertising practices with the potential cost of accidents. The income generated from these displays should therefore not add to the already high social and economic burden of crashes.
- **Pressure from advertising agencies and advertisers to put outdoor advertising displays in the road reserve**: Indications are that advertisers put pressure on local authorities to approve advertising signs inside road reserves, as this will achieve much better exposure and higher income. However, the road reserve belongs to the relevant roads authority and such an authority needs to protect the interests of its citizens by guarding against unnecessary traffic safety risks and advertising pollution.
- **Illegal structures:** Indications are that this industry has grown out of proportion. This is problematic as the literature review has highlighted that these illegal structures have the potential contribute to visual clutter, enhancing safety risks as well environmental pollution,
- **Protection of the road reserve**: Prescribed by the NRTA the protection of the road reserve from advertising encroachment is seen as one of the most essential functions which municipalities have the responsibility to manage through the development and implementation of advertising by-laws. The road reserve is provided for the benefit of the road users. Outdoor advertising allowed inside the road reserve must therefore provide a positive result, from a safety as well as road environment management perspective.
- **Environmental (visual clutter and pollution):** Protecting the environment is founded on the Constitutional principle that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and policy measures. If not managed correctly in South Africa it has the potential to significantly contribute to degradation, crime and visual pollution.

9.4 Outdoor advertising impact on road and driver behaviour

9.4.1 Information processing and the road environment

The road functions as an information system to the driver. The driver makes use of their senses to collect this information. The type and extend of the information collected from the road and its environment influences the efficiency with which information is processed. The information processing abilities and in turn the ability to act on the information are dependent on the drivers' age, driving experience and so forth.

The road provides the driver with the correct information, in the correct quantities to ensure that the processing of information will enable the driver to react adequately and safely to events in the traffic environment. This is the necessary information that a driver requires to make informed decisions about safe driving. This information is obtained visually, auditory and has an impact on the cognitive workload of the driver. The four elements associated with gathering information from the road environment are:

- Selecting information to attend to;
- Process the information;
- Encode the information to create memory;
- And then stores the information for future reference.

Many sources of information are irrelevant to the driving task, which leads to driver distraction. Outdoor advertising in road reserves are by nature distracting. Planners and designers acknowledge that in some instances there might be some spare mental capacity that allows for the placement of advertising signs in and adjacent the road reserve. The amount of distraction allowed is however carefully controlled. The premise behind this permission is that as drivers tend to have spare mental capacity, there are situations in which it allows the driver to safely direct attention, to stimuli and activities unrelated to the driving task (e.g., looking at scenery, talking to a passenger, reading a billboard). However, directing attention to objects and activities unrelated to driving can distract the driver, reduce situational awareness, and lead to driver error and/or a crash.

Indications are that a driver will do the critical driving tasks first, including control of the vehicle, navigating and if the driver has spare capacity, he will engage in secondary tasks such as looking around. Spare capacity is defined as a person operating at less than full information processing capacity and can cope with an additional task performed simultaneously.

However, it was found that if an advertising sign has a high 'attention getting' character, it will assume main importance and which in turn will require increased reading time. As such the amount of information (bits as defined in SARTSM) determines the time required for a driver to read outdoor advertisement. Thus, the more complex the content, the longer it will take a driver to read the information. The longer a driver diverts is eyes away from the road, the higher the crash risk.

9.4.2 Situational awareness and acceptance of risk

Contrary to belief, drivers cannot multi-task, and are only able to safely attend to one visual information source at a time. Drivers integrate the information inputs and maintain a level of awareness of the changing environment through an attention-sharing process – this is referred to as being situationally aware and situational awareness while driving is essential to safe driving. Situational awareness is influenced by the nature of the road environment, and the driver associate the road environment with a perceived level of risk.

Perceived level of risk influence driver behaviour in terms of choice of speed (driving faster in less complicated road environments) and the degree to which a driver is willing to take additional risks (unsafe passing manoeuvres, lane changes and unsafe gap acceptance). Overly complex road environments necessitate that drivers have to have spare mental capacity (in other words not overloading their mental workload) to select, process, encode and react to additional sources of information.

However, the literature review showed that additions such as outdoor advertising displays to already complex road environments (intersections, roundabouts etc.) is counterproductive as it adds additional workload, to already over

engaged drivers, making drivers less situationally aware and diminishing their capacity to process and interpret information for taking safe and appropriate actions.

9.4.3 Guidance to the driver

Road and traffic signs perform an important function in relation to guiding road users' behaviour. Official road and traffic signs are used as a method to warn and guide drivers, assist to regulate the flow of traffic among different types of modes and users along the road. Official road and traffic sign messages are simple, conveys a clear message, and are consistent (recognisable with the same message) across time and space (different areas). The most obvious example is a stop sign. No matter where you travel, a stop sign gives a clear and simple message, is recognisable anywhere and the driver is familiar with the signs and what is required of him. In addition, road traffic signs have been designed to minimise the amount of information that a driver needs to read with a negligible amount of distraction.

Proper care should therefore be taken to ensure that any additions to the road environment such as for example outdoor advertising displays do not diminish the role and function of official road traffic signs. In addition, it is important that advertising displays do not have similar content, colour or shapes, which can cause confusion with formal traffic signs and their functions.

Road designs need to facilitate driver decision-making, and the road needs to be designed in a manner that will assist the driver in making the correct choice to travel safely from origin to destination. The road therefore must be designed in a manner that is standardised and this standardisation contribute to the drivers' schematic representation of what to expect and how to behave on the road. Safe driver behaviour is linked to the road layout and geometry because the road influences driver perception in terms of safe travel. This perception relates to the road characteristics and the level of risk perceived by drivers. Similarly, the road environment affects speed choice as drivers adapt their speed to what they perceive as safe and appropriate for the road. Distraction levels of displays vary as a function of the complexity of the driving task where the adverse effects of distraction increase with greater driving task demands. Complex geometry and operational characteristics of the road environment, high visual clutter, work zone areas, and areas with road signs and signals that require drivers to make complex decisions have higher driver attention demand.

9.4.4 Physical influence on driver behaviour

A. Position on the road

No matter where the adverts were placed (left, right or centre), the effect of advertising billboards may be more pronounced in scenarios which are monotonous or of lower workload rather than an urban environment.

Drivers drive slower past the video adverts, which at first glance appear to indicate safer driving. However, visual behaviour analysis suggested that participants were slowing down to view the video adverts. This combined with greater variation in lane position (indicating poorer tracking ability) and harsher braking (indicating slower reaction times) suggests an overall impairment to driving ability when viewing video adverts.

Drivers' performance (intersection behaviour, lane-keeping, and errors) on worsen with the presence of advertising signs research found that drivers:

- drift unnecessarily from a lane;
- recklessly crossing dangerous intersections.

Driving in a lane (between the two lines) and not drifting from lane requires continuous eye-hand steering coordination. Swinging and drifting from a lane in the presence of advertising signs is a strong indication of how such signs distract drivers and affect their performance.

Recklessly crossing dangerous intersections shows a loss in situational awareness (look but did not see) as well as the physical loss of fine coordination between paying attention and driving which the researchers attributed to longer reaction times needed, in the presence of hazards, due to being distracted. In addition, research found that the number of tailgating times, over-speeding and turning or changing lanes without signalling was more in the presence of advertising signs than when no such signs were present.

B. Setting of speed limits and drivers' choice of speed

Setting of speed limits consider the function and design of the road as well as driver performance. Driver performance is influenced by the type and amount of information that a driver can process, interpret, and react to. It is obvious that the amount of information that can be processed reduces, the faster a driver travel. As such, the road environment needs to be designed in a manner that support the optimal flow of information from the roadway to the driver, giving the driver enough time to process and appropriately react on the information. Traffic engineers make use of human factor guidelines to design a road according to the anticipated time it would take a driver to recognise a warning, process the information and come to a safe stop. Human factor guidelines are essential in determining the speed in relation to adequate sight distance, stopping distance and reaction time.

Perceptual components of an environment such as roadway/roadside characteristics (curvature, clarity of situation, vegetation right side of the road, and road width) significantly influence drivers' perceptions of safe travel speeds. Visually demanding tasks such as adding advertising displays can lead drivers to reduce speed, while the slowing in speed might impair traffic flow causing delays which contributes to congestion, monetary (productivity) lost and increases in travel times (loss in quality of life). This behaviour (speed variability) can lead to accidents, near-misses, and frustration among fellow road users. When comparing speed for the various advert types, speeds were significantly higher in the long and medium exposure times for video adverts compared to static adverts.

C. Placement of media in the road reserve

The literature review indicated that roadside advertisements influence motorists' driving ability depending on:

- The condition of the road environment (amount of traffic, type of intersection controls, road location i.e. urban or rural, and traffic proportions);
- The location of the billboards (placed on a sharp bend or at an intersection and their location above the street);
- The types of billboards (sizes and colours, advertising contents, placement angles and distances, static or dynamic);
- Driver age – attention and visual processing speed degrade with age (particularly for drivers of over 55 years old);
- Visual clutter including other signage, sign size and the influence of the billboard if it is located amongst other signs.

The presence or absence of roadside objects have an influence on the character of the road and are expected to influence road user behaviour accordingly. To this end, elements or characteristics to be considered in the review of applications for roadside advertisements include:

- The characteristics of the information element (message on road signs) should follow ergonomic principles;
- Interaction between information elements should be clear (no conflicting messages between road traffic signs and markings);
- The road should be self-explaining (situational context);
- Human factors must be considered for the driving task and traffic in general, along with the distinctive characteristics of diverse types of road users (older/novice/disabled);
- Critical locations are any locations within the road environment that require road users to adapt to a new situation

The location, media, medium, content, size and placement of outdoor advertisements are thoroughly researched by the outdoor advertising industry to ensure maximum exposure for clients, products and services. However, during this review there was no evidence that the outdoor advertising industry consider the impact that these elements have on road safety. Factors for consideration when assessing the impact of outdoor advertisements and increases in potential risk of accidents:

- Location: The potential road safety impact on road users varies depending on the location in which an advertisement is placed;
- Surroundings: Billboards placed amid multiple outdoor advertising signs may result in visual clutter. The more visual clutter there is, the more likely drivers are to be distracted and fail to notice important traffic or information signs;

- Design: This may relate to a billboard's advertising content: length of the message, colours, and size of the font. It is evident that drivers' fixation duration on the billboard will vary depending on the advertising content/design being displayed.

Influencing the function of road traffic signs

SARTSM states that road traffic signs regulate traffic to achieve optimum traffic flow and road traffic safety. Traffic signs are used as a method to warn and guide drivers, assist to regulate the flow of traffic among modes and users along the road. Traffic sign messages are simple, conveying a clear message, and are consistent (recognisable with the same message). It is therefore important that advertising displays do not have similar content, colour, or shapes, which can cause confusion with formal traffic signs and their functions. In addition, advertising displays should not obscure official traffic signs.

The South African Road Traffic Signs Manual (SARTSM), prescribe minimum distances for the spacing between road signs. This is considered a critical issue in evaluation of applications for outdoor advertisements as these distances allow adequate time for the driver to read, interpret and react on the information on the road sign.

SARTSM also prescribes the legibility and information that can be contained in signs. These prescriptions are based on human sensory processing capacity which is 10^9 bits per second (1 MHz). The amount of information (bits) contained in an advertising message determine the time required for a driver to read outdoor advertisement. Road traffic signs have been designed to minimise the amount of information with a negligible amount of distraction. It is of fundamental importance that the definition of a 'bit' should also be extended to also include distraction, something which advertisers would like to maximise – against the basic principles on which the design of traffic signs has been developed. The more complex the content is, the longer it will take a driver to read the information. Accident risk increases exponentially the longer the driver averts his eyes away from the driving task.

Influencing the field of view

The design criteria used in the South African Road Traffic Signs Manual (SARTSM) include the stipulation that drivers need a horizontal cone of vision of 15 degrees – because beyond 15 degrees a driver cannot determine the alignment of the road. Evidence from the literature indicates that displays placed outside this field of view (or especially bright and flickering media) impact the peripheral vision of drivers negatively.

Influencing fixation

The SARTSM manual also state that drivers have a fixation rate of 1.0 to 1.5 fixations per second. This implies that a driver can focus and interpret 1 to 1.5 items per second. The design criteria used in SARTSM include the notion that a driver should not remove his focal vision for more than 1.5 seconds from the road to allow safe driving. This is supported by international research that stipulate that taking eyes away from the road for more than 2 seconds is detrimental to safe driving. The first two considerations (field of view, fixation duration) have obvious implications for deciding whether outdoor advertising displays should be allowed in a road environment. Displays that are placed outside the field of view will require a driver to look away from the road. In addition, any information on the display that require the driver to take his eyes of the road for longer than a second should not be allowed as the longer eyes are not fixed on the road the higher the risk of being involved in a crash.

Influencing information processing and reaction time

The information received from the environment takes time to process, and subsequently driver reaction times increase with amount of additional information they must process. The longer a driver takes to process information, the slower the driver becomes in attending to other essential information, increasing the chance for error. As such, road designs should consider reaction times and acknowledge that drivers vary in their response and take longer to respond when decisions are complex, or features are unexpected. Clear sightlines and adequate decision sight distances provide less margins for error. Drivers' reaction times increase as a function of decision complexity and the amount of information to be processed. Furthermore, the longer the reaction time, the greater the chance for error. Reaction time slows when the information processing capability is exceeded. Reaction time in overly complex environments where drivers must attend to various sources of information slows the rate at which drivers are able to process information and subsequently

safely react to adverse events. By adding advertising displays to these already complex environments, the driver's ability to efficiently process critical information needed for safe driving, is severely impaired.

Influencing the self-explaining properties of a road

Additions to the road environment need to be considered in terms of the function and characteristics of the road. This is important as the competing information contained in these displays and messages can influence driver perception of the road negatively and minimise the function and role of legal official signs, As an example, the driver control and guidance information (road signs and markings) are important and the road design should focus the drivers' attention on the design elements and high-priority information sources that provide control and guidance information. This goal may be achieved by providing clear sight lines and good visual quality. Competing information such as the presence of outdoor advertising displays have a negative impact on the function and purpose of guiding and control devices such as road signs and road markings. Any information source that attract a driver's attention away from these devices that provide safety critical information from the road should be discouraged.

Driver expectancies are formed by the experience and training of drivers. Situations that occur in the same way, and successful responses to these situations, are incorporated into each driver's store of knowledge. Expectancy relates to the likelihood that a driver will respond to common situations in predictable ways that the driver has found successful in the past. Expectancy affects how drivers perceive and handle information and modify the speed and nature of their responses. Reinforced expectancies help drivers respond rapidly and correctly. Unusual, unique, or uncommon additions to the road such adding outdoor advertisement displays has the potential to disrupt driver expectancies. If the driver is unsure of what to expect or how to react to information on the road it might cause longer response times, inappropriate responses and contribute to mistakes.

9.4.5 Self-explaining roads and forgiving roadsides to minimise harm

The Sustainable Safety approach promotes the notion that by minimising speed, the severity of injuries sustained in a collision is reduced. In addition, as discussed above where road users/vehicles with large mass differences use the same traffic space, the speeds should be sufficiently low that, in the event of a traffic accident, the most vulnerable road users and modes should be able to walk away without any severe injuries. The function of the road (mobility vs. access) influence the setting of speed for a specific road. High mobility roads have higher speeds where roads with an access function typically have lower speeds to minimise conflicts between vehicles travelling straight and vehicles slowing down to turn.

Any potential additions to road and traffic environment need to be considered in terms of the consequences when any type of vehicle collide with the structure. As such there is a need to take note of the:

- Mass of vehicles and the potential damage to the vehicle, structure, and human in the event of a collision;
- How vulnerable the road user is (difference in mass and ability to absorb the impact without causing an injury);
- Velocity and impact if there are a collision as the higher the speed and mass of the vehicle, the more severe the injury;
- Differences in direction as the severity of a conflict therefore also depends in part on the fact that the modes of transport and the vehicles, have a different level of resilience in different directions.

A. Intersections

Intersection designs are based on the premise that road users first realise that an intersection is present and then make the right decisions when using the facility. However, at intersections drivers are placed in situations that compromise their safety, and a key limitation of road design is the fact that current intersections design practices do not consider error types such as 'looked but failed to see' or causation of secondary crashes. Intersection collisions therefore need to be considered from a system failure perspective rather than as road user performance failure. Intersection designs that manage speeds on approach (such as roundabouts) or within the intersection footprint are associated with good safety performance (e.g. via vertical or horizontal deflection devices). Road designers design roundabouts to manage approach speeds, which when a primary accident occur, the severity of the accident is expected to be lower due to lower speeds. This means that no matter how well a roundabout is designed, the placement of outdoor advertising displays (and any other unofficial structures), in the vicinity of roundabouts need to be discouraged.

Higher accident rates are associated with billboards at intersections, where billboards function as visual clutter and interfere with the driver's ability to perceive important traffic signs; and on long monotonous stretches of road, when drivers may be surprised by the sudden appearance of a billboard, or fixate upon it as the brightest object in their visual field. Billboards erected along roadsides influenced the drivers' ability to see (visibility of) traffic lights. The literature review also indicated that drivers tend to have a longer eye fixation on advertisement billboards, as compared to traffic control signs such as pedestrian or speed limit signs. Signalised intersections have shorter headways and more variable traffic speeds compared to mid-block locations, where the risk of road users getting involved in rear-ends accidents due to distraction by outdoor advertisements is expected to be significantly higher.

Outdoor advertising favour intersections as prime locations for outdoor advertisement displays despite the fact that intersection collisions are one of the major sources of injury on the South African road network. Any addition of external structures, such as outdoor advertisement displays, contribute to intersection design limitation, by adding an additional layer of complexity to an already hazardous situation. The placing of outdoor advertising signs at intersections means that drivers who already need to judge and decide on the correct action now have to deal with additional information from the road, in an already complex and hazardous situation. There is thus a need to protect road users from an overload of information, and to protect drivers from the potential distraction of outdoor advertising displays at intersections.

The literature review highlights that clear zone approaches contribute to safer roads and roadsides. By introducing clear zones, it becomes possible to manage potentially harmful structures that do not contribute to forgiving roadside principles. Clear zones should include the concept of 'run-out' areas where attention is focused on ensuring safe vehicle departures, from the roadway, free of non-survivable impacts and rollover.

B. The role of speed in road design

The effect of speed on a collision plays a key role in the severity of a collision. When a road user must react to avoid a collision, the vehicle speed determines the amount of time available to respond. Driving at high speeds requires greater anticipation (additional mental capacity) than driving at low speeds. In addition, the higher the speed, the higher the velocity and impact with a person, other vehicle, or structure increasing the risk of death or severe injury. The literature review indicated that in addition to the placement of the outdoor advertising display, the type of message may also impact driver behaviour such as slowing down or speeding up. The presence of outdoor advertising displays in the road create an inherent danger for increases in accidents. Controlling authorities therefore have a duty to assess outdoor advertising applications in the context of the function of the road, the design speed of the road as well the impact the display might have on risk associated with driving on that road.

9.5 Outdoor advertising control and management in South Africa

Much effort has gone into the development of legislation and guidelines as to what would be acceptable advertising on roads and in human settlements. Examples include the Advertising on Roads and Ribbon Development Act, Act No. 21 of 1940 and the SANRAL and National Roads Act, 1998 (Act No.7 of 1998) as well as the SANRAL guidelines for control over advertising on national roads, which was promulgated in 2000.

The backbone of control and management of outdoor advertising is, however, the SAMOAC 1998 document which was replaced by the revised SAMOAC 2010. SAMOAC has long served as a national guideline and reference document to review, manage, and control outdoor advertising practices as a national guideline for road authorities (national, provincial and local) as well as the outdoor advertising industry. However, Outdoor advertising does not address road safety nor the complications that result from outdoor advertising in road reserves.

The Constitution provides for road authorities at all spheres of government, to have the sole responsibility for the management of the road transport system to deliver the mandated services at agreed service levels by applying appropriate systematic procedures that will ensure coordination of all respective activities, projects and programmes to achieve performance targets. Road authorities responsible for managing outdoor advertising include:

- The South African National Roads Agency (SANRAL) promulgated regulation in 2000;
- Provincial road authorities currently preparing guidelines for the advertisement along provincial routes include the Western Cape and Gauteng;
- Municipalities and metropolitan councils.

Although there are national and provincial initiatives to address outdoor advertising practices on national and provincial roads, the function lies primarily with local authorities.

The Constitution, Section 156, and Part B of Section 5 give Local Authorities the control over the “erection of billboards and the display of advertisements in public places”. Local Authorities are required to develop by-laws to address the issue of advertising signs in local authority jurisdictions, using the SAMOAC manual. SAMOAC defines three categories of control; maximum control (nature environments), partial control (rural environments) and minimum control (urban environments). Municipalities are required to proactively demarcate these areas in the municipal area which then serves as a base map for the approval and implementation of its outdoor advertising policy. It seems that few municipalities with policies have control maps readily available – accepted that it may be an ad hoc exercise depending on how and when areas are targeted for the display of advertisements.

Road authorities in South Africa are divided over the responsibilities of different spheres of government as far as dealing with outdoor advertising is concerned. In addition, that authorities do not want to be burdened with the politics that accompany outdoor advertising, while others are eager to cash in on the revenue that can be generated. On the one hand, some road authorities want to protect their own interests, while others want to assign responsibilities to other spheres of government. Some authorities view traffic safety as unnegotiable, while others do not consider the impact of advertising on traffic safety at all.

9.6 Legal and regulatory framework

9.6.1 Constitutional framework

The Constitutional framework and relationship between the different spheres of government have been clearly interpreted in various cases serving before the Constitutional Court. Applying the interpretation of the Constitutional Court in relation to the legislative and executive powers of the three spheres of government in relation to outdoor advertising visible from a road, it is concluded that the Constitution needs to be interpreted as follows:

- Each sphere of government has exclusive executive power over the roads failing under its jurisdiction.
- National and provincial government have concurrent legislative and executive powers over road traffic regulation
- National and provincial government may promulgate legislation regarding outdoor advertising as described in the Constitution with regards to outdoor advertising but may not *execute* the functions or perform the duties on a local government level.
- Local government has exclusive *executive* powers over outdoor advertising and may issue by-laws in this regard, but those by laws are invalid if they are on conflict with provincial or national government.

It is recommended that the legal status be discussed at an intergovernmental platform to agree on an “Interim Agreed Legal Status” with regard to as a minimum – the authorisation process for outdoor advertising, as is described in 7.6.

9.6.2 Application procedures

As shown in the examples of the application procedures for permission to display advertisements in the visual zones or provincial or national roads in par 7.3, it is difficult to give effect to the constitutional mandates of all three the spheres of government in different sets of legislation to which is in effect a single application procedure. A practical solution should be sought for the application procedure, giving effect to the constitutional mandates of all three spheres of government in an equitable manner and in the spirit of cooperation. While this document addresses only road traffic and road traffic safety, such a solution should include the environmental and planning elements, where necessary.

A solution as described above could be to establish a joint government application website that provides a ‘one stop service’ to applicants, following the example of the Wayleave system. This website should contain all the relevant information on requirements for a successful application and have a functionality for online documentation upload (in support of the application), in the example of the SARS website. The first step in such an electronic process would be the classification of the application in relation to geographic positioning, determining to which municipality the application should be referred. Based on the proposed geographic position of the intended advertisement, the system

needs to be able to identify whether will be in the visual zone of a national or provincial road and automatically refer the application to the relevant municipality for approval, subject to approval of the relevant province or SANRAL (or both). The evaluations should be able to follow each other closely, or even run concurrently. The approval of the provinces or SANRAL should be restricted to road traffic and traffic safety matters.

A helpful functionality would be that the system could perform a preliminary identification of whether the intended location of the advertisement is allowed in terms of the essential national standard. This, however, need not be added from the start.

An electronic 'one stop service' for the application for the display of outdoor advertisements is a mammoth task and will have to be implemented in phases and will require the commitment and possible financial support of all three spheres of government.

Prerequisites for the successful implementation of such a system will be the implementation of a national standard for the display of advertisements in the visual zones of national, provincial and local roads, and the alignment of by-laws with provincial and national legislation, allowing each sphere of government to fully exercise its mandate.

It is recommended that the programme recommended in par 9.6.4:

- initiate the establishment of a joint government website supported by suitable ICT system;
- Investigate whether the existing wayleave systems could be expanded to accommodate a joint website to cater for applications ensuring that the necessary approvals be obtained.

9.6.3 Removal of illegally displayed outdoor advertisements

All the spheres of government have the power to instruct the advertiser to remove an illegally displayed advertisement. On the national level, SANRAL has the power to instruct the advertiser or in the case of an advertisement that is displayed illegally with the consent of a municipality, to remove that advertisement, failing which SANRAL may remove the illegal advertisement. The removal of an illegal advertisement should only be problematic in the case where the advertisement is displayed with consent of the municipality concerned, as it carries the risk of liability for compensation because the municipality authorised the erection and display of the advertisement.

On a provincial level in provinces that have promulgated roads acts and issued regulations in terms of them, the same legislative interpretation applies. It is however more problematic in provinces where the Advertising on Roads and Ribbon Development Act is still applicable as the latter Act, after the new constitutional dispensation, is open to interpretation and therefore abuse.

On the local government level, the situation is rather less complicated and the municipalities that have promulgated by laws may directly require the advertiser to remove the illegally erected and displayed advertisement. The only challenge in this regard is where the illegally erected sign was so erected with the consent of the municipality, in which case the court will not find for the municipality or if it finds for the municipality and orders the removal of the advertisement, it will most probably also order compensation.

It is recommended that:

- SANRAL make use of the powers afforded them in section 50 of the National Act to remove illegally displayed advertisements within the visual zone of national roads. It is appreciated that with regard to advertisements illegally displayed with the consent of a municipality, it is necessary in the spirit of cooperative governance to first embark on a cooperative programme to do so, failing which SANRAL has the legislative and executive power to remove such.
- Provinces make use of the power afforded them in terms of their own road roads legislation, including the Advertising on Roads and Ribbon Development Act, 1940, to remove illegally displayed advertisements. A distinction must be made between an advertisement illegally displayed with the consent of the municipality concerned and those that are displayed without such consent. In the case where the municipality has given consent, the province may instruct the municipality to have it removed in accordance with the municipal by-laws, failing which, the province concerned may remove the advertisement itself. Where the municipality has not consented, a request to the Municipality making them aware of the illegal display and requesting action to be taken, should suffice.

- It is recommended that municipalities in the example of the Johannesburg Roads Agency or the Limpopo Roads Agency, launch a programme to identify and remove illegally displayed advertisements.

9.6.4 Cross-government conclusions and recommendations in relation to the removal of illegally displayed outdoor advertisements

As the constitutional dispensation with overlapping jurisdictions between the different spheres of government complicates the effective regulation of outdoor advertising that impact on road safety, only a joint effort will assist in the removal of illegally displayed advertisements. The United States' Highway Beautification Act, 1965, and its history of implementation provides a source of issues that need to be attended to in setting up a joint effort to address the issue of illegally displayed outdoor advertisements. The issues that have been repeatedly addressed in legislative amendments in the USA since the Beautification Act's initial promulgation include:

- Funding: Funding for compensation of removing legally displayed advertisements which after promulgation or issue of a new law or standard is borne by the states from its roads budget, but the federal government's contribution is 80%;
- Illegal Signs: Owners of an illegal sign (unlawfully erected) must remove the sign 90 days after enactment of the bill, failing which the authority removes the advertisements and holds the owner of the advertisement responsible for the costs;
- Control Routes: The roads to which the Act apply, must be clearly stated;
- Compliance of different spheres of government-compliance have been assured in the USA through withholding funding;
- Scenic Byways: This aspect relates to the issues already addressed by SAMOAC.

The issues from the viewpoint of the advertising industry and the tourism industry in South Africa is the same as that of the USA. While the Beautification Act originates from an aesthetic point of view, the issues with regards to removing illegally displayed advertisements are the same as with legislation authorising the removal of advertisements with the view to improve road safety. The latter, in fact provides a more compelling reason for removal than the aesthetics of the roadways.

It is possible for South Africa to implement a joint government programme to eliminate illegally displayed advertisements, provided that:

- Funding is agreed on;
- The owners of existing advertisements displayed illegally but with the consent of one of the three spheres of government, be equitably compensated for the removal of the advertisement;
- No compensation is awarded to owners of advertisements who is displaying and advertisement without the consent of any or the spheres of government;
- A timeframe for the removal of illegally displayed advertisements is agreed on and executed;
- No new advertisements may be displayed other than in accordance with the national standard to be incorporated into the Road Traffic Act;
- A method of compliance by all spheres of government be agreed on: compliance is most successfully ensured through the funding mechanism.

The programme could be initiated by a national government body but should include all role-players. A good start would be to establish a forum/committee comprising the National Department of Transport, SANRAL, the RTMC, representatives of provinces' relevant roads authorities (departments or agencies), as well as the metros. The most important issue to be thrashed out by this forum/committee, is funding. Hardly any funds are available for maintenance of roads and funding for removal of advertisements and compensation should possibly be found elsewhere than from the road maintenance budgets.

At the outset, illegally displayed advertisements should be identified. This step could be followed by a mapping of legally displayed advertisements, starting with the newly approved advertisements, and gradually adding existing legal displayed advertisements, until a proper cross-government database is achieved.

It is recommended that:

- A joint government programme to remove illegally displayed advertisements be initiated by the RTMC. This programme should be given an easier name of which the acronym could easily be remembered and pronounced, for example the 'PRIDA' = Programme for the Removal of Illegally Displayed Advertisements'
- The joint government programme to remove illegally displayed outdoor advertisements follow the following guidelines:
  - Agree on funding (other than the roads budgets, probably donor funding)
  - The owners of existing advertisements displayed illegally but with the consent of one of the three spheres of government, be equitably compensated for the removal of the advertisement;
  - No compensation is awarded to owners of advertisements who is displaying and advertisement without the consent of any or the spheres of government;
  - A timeframe for the removal of illegally displayed advertisements is agreed on and executed;
  - No new advertisements are allowed to be displayed other than in accordance with the national standard to be incorporated into the Road Traffic Act;
  - A method of compliance by all spheres of government be agreed on: compliance is most successfully ensured through the funding mechanism, in other words withholding funding from an entity that does not comply with the requirements.
- A mapping of advertisements is embarked on, identifying illegally displayed advertisements;
- The joint government programme evaluates the by-laws of all the metros in relation to that of the provinces against the background of the manual to be incorporated into the SADC Road Traffic Signs Manual and made compulsory by the Road Traffic Act, identifying discrepancies and assisting the amendment of the legislation that require amendment;
- The removal programme should initially target only areas where the legislation is velar and in line with the constitutional dispensation and where procedures are sure to be followed correctly.
- The removal programme should:
  - initiate the establishment of a joint government website supported by suitable ICT system;
  - Investigate whether the existing wayleave systems could be expanded to accommodate a joint website to cater for applications ensuring that the necessary approvals be obtained.

It is recommended that:

- The legislation and guidelines reviewed be compared to crystallise the truly technical minimum technical standards for outdoor advertising (considering any technical guidelines to be developed – see Section 7);
- The contents so crystallised be included in the SADC Road Traffic Signs manual which is already incorporated into the National Road Traffic Regulations and made compulsory as an essential national standard.
- The National Road Traffic Regulations be amended to require outdoor advertising regulatory systems to be substantially in compliance with the Schedule and to allow the immediate removal without notice and including a post-removal appeal process as well as the limitation of liability of the authorities involved.

Table 9 – provide an overview of available options to make changes to the legislation and regulatory framework for outdoor advertisements.

Table 9.1: Options available for changes to current outdoor advertising legislation and regulatory framework

Option	Description	Con	Pro
Option 1	Incorporate a technical standard issued by SABS into the National Road Traffic Regulations To provide an essential national standard for outdoor advertising from a	The SANS drafting process is cumbersome and subject to a series of reviews and may take years to complete.	This option provides an objective manner of deciding on the content of the standard, opportunity for peer review and input

Option	Description	Con	Pro
	traffic safety management (regulation) point of view, the following options are possible: This option entails that the SABS be requested to compile such a standard and its minimum content be proposed to SABS.		from all government spheres, and may, if the process from the RTMC's side in conjunction with SABS, be efficient and not excessively cumbersome.
Option 2	Incorporate a technical standard on outdoor advertising into the SADC Road Traffic Signs Manual that has been incorporated into the National Road Traffic Act	The National Road Traffic Regulations contains the minimum content that is made mandatory, but the technical requirements are determined to be 'substantially in accordance with the SADC Road Traffic Signs Manual', which may lead to insecurity regarding the legal status of the Manual. However, the Regulations may be amended to determine that the Manual is mandatory, and the only deviations are allowed are those that are allowed in the Manual. The duration of the process to incorporate the standard may be problematic, as the entire SADC will be involved. As the Road Traffic Signs Manual is an international document and the NDOT and RTMC will have to consult the document within South Africa before embarking on the SADC process.	Making the technical standards on outdoor advertising part of the SADC Road Traffic Signs Manual, make logical sense in that many of the pieces of legislation as well as the Australian Guidelines reviewed reference the respective road traffic sings manuals. In addition, the process remains under the control of the transport-related authorities which the RTMC will be able to manage together with the National Department of Transport.
Option 3	Issue the technical standard on outdoor advertising in terms of the Municipal Systems Act	Issuing an essential national standard or minimum requirement in terms of this Act makes it applicable to only local government and leaves a vacuum relating provincial roads. The review has shown that some provinces do not have roads legislation and still regulate outdoor advertising in terms of the Advertising on Roads and Ribbon Development Act.	Since this option leaves a vacuum in relation to provincial roads, there does not seem to be any pros relating to the option.
Option 4	Issue the technical standard as part of the National Road Traffic Regulations, adding it as a Schedule to the Regulations, determining that it is an	The process may take long.	This option will require the normal regulation-making consultative procedures, which is supported as all

Option	Description	Con	Pro
	essential national standard as contemplated in the Constitution		spheres of government provides input into the regulations. The National Road Traffic regulations may be amended to determine that outdoor advertising visible from any public road must comply with the Annexure (which is the technical standard for outdoor advertising). This will give standard the legal status of a regulation. This option offers the shortest process towards the formalisation of minimum (road traffic safety) standards for outdoor advertising. The immediate (without notice) removal (by the relevant authority) of illegally displayed advertisements that pose a road traffic hazard may also be authorised in terms of these regulations, provided that an appeal process is provided for.

REFERENCES

Abbott, P G., Hartley, S., Hickman, A.J., Layfield, R.E. and McCrae, I.S., Nelson, P.M., Phillips, S.M and Wilson, J.L. 1995. The environmental assessment of traffic management schemes: A literature review TRL Report 174. Transport Research Laboratory, Berkshire United Kingdom.

Adeloye, D., Thompson, J.Y. Akanbi, M.A., Azuh, D. A. Samuel, V., Omoregbe, N and Ayo, C.K. 2016. The burden of road traffic crashes, injuries and deaths in Africa: a systematic review and meta-analysis. *Bulletin of the World Health Organization*, pp. 94:510-521.

Ahmed, I. 2013. Road infrastructure and road safety. *Transport and Communications Bulletin for Asia and the Pacific* 83, pp. 19 -25.

Alexander, G.J. and Lunenfeld, H. 1986. Driver Expectancy in Highway Design and Traffic Operations. U.S. Department of Transportation Federal Highway Administration, Washington D.C.

American Association of State Highway and Transportation Officials. 2011. *A Policy on Geometric Design of Highways and Streets.* AASHTO, Washington D.C.

American Association of State Highway and Transportation Officials. 2018. A Policy on Geometric Design of Highways and Streets (7th edition). American Association of State Highway and Transportation Officials (AASHTO).

Aronssen, K, F.M. 2006. Speed characteristics of urban streets based on driver behaviour studies and simulation. Doctoral Thesis in Infrastructure, Royal Institute of Technology Stockholm, Sweden.

Astarita, V and Giofré, V.P. 2019. From traffic conflict simulation to traffic crash simulation: Introducing traffic safety indicators based on the explicit simulation of potential driver errors. Journal of Simulation and Modelling 4, pp. 215-236.

Austroads. 2009. Guide to Traffic Management Part 13: Road Environment Safety. Austroads Ltd, Sydney.

Austroads. 2019. Guide to Traffic-Management Part 1 Introduction to Traffic Management AGTM 01-19. Austroads Ltd, Sydney.

Australian Road Research Board. 2020. Human factors in transportation available from: **https://www.arrb.com.au/human-factors-transport**.

Backer-Grondahl, A., Phillips, R., Sagberg, F., Touliou, K., and Gatscha, M. 2009. Naturalistic driving observation: Topics and applications of previous and current naturalistic studies. *PROLOGUE Deliverable D1.1*. TØI Institute of Transport Economics Oslo, Norway.

Balk, S., Inman, V & Perez, W. 2011. Developing a driver-centric roadway classification system with multidimensional scaling. *Proceedings of the Sixth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design.* Squaw Creek, Olympic Valley. Lake Tahoe, California, USA, pp. 158–164.

Beauchamp, T. 2019. The Principle of Beneficence in Applied Ethics. *The Stanford Encyclopaedia of Philosophy* (Spring Edition), Zalta, E. (ed.) available online from: **https://plato.stanford.edu/archives/spr2019/entries/principle-beneficence**.

Benatar, G. 2019. #Biztrends2019: A new golden era for OOH advertising in South Africa, available from: https://www.bizcommunity.africa/Article/410/424/185979.html.

Bendak, S and Al–Saleh, K. 2010. The role of roadside advertising signs in distracting drivers. *International Journal of Industrial Ergonomics* 40, pp. 233–236.

Bevrani, K. 2013. The development of a naturalistic car following model for assessing managed motorway Systems' safety effects. School of Civil Engineering & Built Environment, Queensland University.

Bliss, T and Breen, J. 2009. Implementing the Recommendations of the World Report on Road Traffic Injury Prevention: Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms, Investment Strategies and Safe System Projects. World Bank Washington D.C.

Bloom, D. 2000. Measuring the audience to poster advertising. International Journal of Market Research 42(4), pp. 395–412.

Borsos, A., Birth, S and Vollpracht, H. 2015. The role of human factors in road design. *6th IEEE International Conference on Cognitive Information Communication*, Gyor, Hungary, pp. 363–367.

Burke, R.J. 2009. Behavioural Effects of Digital Signage. Journal of Advertising Research 49(2), pp. 1–6.

Cairny, P. 2009. *Guide to road safety part 1.* Sydney, Australian Road Research Board, New South Wales.

Chattington, M., Reed, N., Basacik, D., Flint, A and Parkes, A. 2009, Investigating Driver Distraction: The Effects of Video and Static Advertising. Transport for London (TfL).

Chou, M. 2008, 'Billboard best practice', Christchurch, New Zealand: Abley Transportation Engineers.

City of Cape Town. 2001. *Guidelines on outdoor advertising and signage within the road reserves of public roads.* Cape Town: Department of Roads and Transport.

City of Johannesburg. 2009. *Outdoor Advertising By-laws Published in Gauteng Provincial Gazette no. 277.* 18 December. **https://openbylaws.org.za/za-jhb/act/by-law/2009/outdoor-advertising/eng**.

Coetzee, J.L. 2003 . Evaluation of content outdoor advertisements. *Proceedings of the 22nd Southern African Transport Conference (SATC2003).* Pretoria, pp. 1–13.

Committee of Land Transport Officials. 2003. Road Traffic Management Coordinating Committee (RTMCC) Minutes for the RNRTSSC Meeting held on Friday 21 November at 10:00 in Fish Eagle Boardroom, Forum Building, Struben Street, Pretoria.

Committee of Land Transport Officials. 2012. South African Road Classification and Access Management Manual Technical Recommendations for Highways 26. Department of Transport, Pretoria.

Committee of Urban Transport Authorities. 1991. Draft Urban Transportation Guidelines (UTG) 9: Guidelines for the Transportation System Management Process. Department of Transport Pretoria.

Commonwealth of Australia. 2011. Reclaiming Public Space: Inquiry into the regulation of billboard and outdoor advertising.

Considine, G. 2019. Outdoor media = digital media… when creatives get it right, April. Available from https://themediaonline.co.za/2019/04/outdoor-media-digital-media-when-creatives-get-it-right.

Constant, A and Legarde, E. 2010. Protecting Vulnerable Road Users from Injury. *PLoS Med* 7(3), published online 2010 Mar 30. doi: 10.1371/journal.pmed.1000228 e1000228.

CROW. 2009. Road safety for all: Road safety manual. Netherlands Information and Technology Platform for Transport, Infrastructure and Public Space. Ede, Netherlands.

Crundall, D., Van Loon, E and Underwood, G. 2006. Attraction and distraction of attention with roadside advertisements. *Accident Analysis and Prevention* 38, pp. 671–677.

Daluge, J.K., DeLong, M., Hanig, L., Kalla, H., Klauer, C., Klein, K., Klekar, S., McMillan, L., Quiroga, C., Soule, J., Tracy, M and Wessinger, B. 2011. *Outdoor Advertising Control Practices in Australia, Europe and Japan.* FHWA International Technology Scanning Program, Washington D.C.

Davidson, T. 2001. Outdoor Advertising: an industry view. *20th Southern African Transport Conference South Africa, 16 – 20 July 2001.* Pretoria, pp. 1–12.

Dawood G and Mokonyama, M. 2014. Chapter 8: Effective Assignment of Transport Functions to Municipalities: Towards an Optimal Transport Technical Report – Submission for the Division of Revenue 2015/2016. Financial and Fiscal Commission, Midrand, pp. 214 –244.

De Bruijn, A., Ferreira–Borges, C., Engels, R and Bhavser, M. 2014. Monitoring outdoor alcohol advertising in developing countries: Findings of a pilot study in five African countries. African Journal of Drug and Alcohol Studies 13(1), pp. 13–29.

De Ceunynck, T. 2017. Defining and applying surrogate safety measures and behavioural indicators through site-based observations. Doctoral Thesis, School of Transportation Studies, Department of Technology and Society, Lund University.

Decker, J.S., Stannard, S.S., McManus, S., Wittig, S.O.M, Sisiopiku, V.P and Stavrinos, D. 2015. The Impact of Billboards on Driver Visual Behavior: A Systematic Literature Review. *Traffic Injury Prevention* 16, pp. 234–239.

DEKRA 2019. Road safety report: Children on the Road DEKRA Automobil GmbH. Stuttgart, Germany.

Dennis C, Newman A, Michon R, Brakus J and Wright LT. 2010. The Mediating Effects of Perception and Emotion: Digital Signage in Mall Atmospherics. Journal of Retailing and Consumer Services 17 (3), pp. 205-215.

Dennis C, Michon R, Brakus J, Newman A and Alamanos E. 2012. New insights into the impact of digital signage as a retail atmospheric tool. Journal of Consumer Behaviour 2012, 11(6), pp. 454–466.

Department of Transport. 2018. Draft White Paper on Roads Policy for South Africa No: 41488. Government Gazette, 8 March.

Department of Planning, Transport and Infrastrucutre . 2014. *Advertising Signs Assessment Guidelines for Road Safety: A guide for the Department of Planning and Transport,* Government of South Australia.

Department of Transport and Main roads . 2019. *Practitioner Manual Roadside Advertising Manual Edition 3 Technical Volume September.* Government of Queensland.

Department of Transport and Main Roads. 2017. *Engineering Policy 162: Policy for the management of roadside advertising (October) .* Government of Queensland.

Devlin, A., Candappa, N., Coben, C and Logan, D. 2011. Designing Safer Roads to Accommodate Driver Error. Curtin – Monash Accident Research Centre, Bentley, Western Australia.

Domke, K., Wandachowicz, K., Zalesińska, M and Mroczkowska, S. & Skrzypczak, P. 2011. Digital billboards and road safety. *WIT Transactions on the Built Environment* 121, WIT Press. doi: 10.2495/LIGHT110111.

Du Toit, E.M and Coetzee, J.M. 2001. Advertising boards on or visible from national roads. *20th Southern African Transport Conference South Africa*, 16 – 20 July. Pretoria, pp. 1–13.

Edquist, J., Horberry, T. Regan, M. & Johnston, I. 2007. Visual clutter' and external-to-vehicle driver distraction. *In Distracted Driving*, by M. Regan, M. Stevenson, J. Brown, A. Porter & J.D. Irwin (Eds.). In: I.J. Faulks, 413 – 432. Australasian College, Sydney, NSW.

Eluru, N., Sharma, A and Tay, R. 2018. Editorial: Highway Design and Road Safety. Journal of Transportation Safety & Security 10(4), pp. 408–410.

Edquist, J., Rudin-Brown, C.M. and Lenne, M.G. 2009. Road Design and their Interactions with speed and speed limits. Monash University Accident Research Centre, Victoria, Australia.

Endsley, M. 2000. Direct Measurement of situation awareness. In Situation Awareness Analysis and Measurement: Validity and use of SAGAT, by M and Garland, D.J. (Eds) Endsley, pp. 1–21. Lawrence Erlbaum Associates. Mahwah, New Jersey.

Endsley, M.R, 2000. Theoretical Underpinnings of Situational Analysis: A Critical Review. In Situation Analysis and Measurement, by M.R and Garland, D.J. Endsley, pp. 1–24. Mahwah, NJ Lawrence Erlbaum, and Associates.

Engström, J. 2011. Understanding attention selection in driving from limited capacity to adaptive behaviour. Vehicle safety division department of applied mechanics. Chalmers University of Technology, Göteborg, Sweden.

Engström, J and Monk, J.A. 2013. A conceptual framework and taxonomy for understanding and categorising driver inattention. EU US ITS Cooperation.

Enzfelder, K. 2013. 'New Types of Road Marking for Standardised and Self Explaining Roads. P r a c e n a u k o w e p o l i t e c h n i k i . W a r s z a w s k i e j, pp. 171–181.

Etezady, A and Kim, K. 2016. Human Factors in Traffic Engineering CEE–6603: Final Report, Georgia, Atlanta: Georgia Institute of Technology.

European Commission, Directorate General for Transport. 2018. Driver distraction. European Road Safety Observatory (ERSO).

European Commission 2018. Pedestrians and Cyclists. European Road Safety Observatory (ERSO).

Farbry, J., Wochinger, K., Shafer, J., Owens, N and Nedzesky, A. 2001. Research Review of Potential Safety Effects of Electronic Billboards on Driver Attention and Distraction. Federal Highway Administration, Washington, DC.

Federal Highway Administration. 1989. FHWA Functional Classification Guidelines: Concepts, definitions, and characteristics. Federal Highway Administration, Washington DC: available from **https://pdfs.semanticscholar.org/b586/3024fdf7072d979cfbbfa7b1851408dfa68e.pdf.**

Federal Highway Administration. 1989. Traffic Conflict Techniques for Safety and Operations- Observers Manual. United States Department of Transport.

Federal Highway Administration. 2006. Technical Summary: Roundabouts FHWA-SA-10-006. US Department of Transportation.

Federal Highway Administration. 2017. Developing and Sustaining a Transportation Systems Management & Operations Mission for Your Organization: A Primer for Program Planning, 22 September accessed on 12 January 2020 from: **https://ops.fhwa.dot.gov/publications/fhwahop17017/ch6.htm**

Finnish Road Administration. 2004. Effects of roadside advertisements on road safety Internal report 25/2004. Technical Services Finnish Road Administration, Helsinki.

Fuller, R. 2005. Towards a general theory of driver behaviour. *Accident Analysis and Prevention* 37, pp. 461–472.

Fuller, R., Pender, S and McHuch, C. 2008. Task difficulty and risk in the determination of driver behaviour. *Revue Européenne de Psychologie Appliquée* 58 (1), pp. 13–21.

Gitelman, V., Doveh, E and Zaidel, D. 2019. An examination of billboard impacts on crashes on a suburban highway: Comparing three periods—Billboards present, removed and restored. *Traffic Injury Prevention*, pp. 1–7, doi:10.1080/15389588.2019.1645330.

Glendelle, G., Christian, A., Aldous, S., Maida C.D and Noe, E. 2008. Analysis of the Effects of Billboard Advertisements to Drivers' Attention for Road Safety. *South East Asian Ergonomics conference*, Seoul, pp. 1–12.

Goodwin, A. 2001. Distractions and Risky Driving Among Teenagers: Findings from a Naturalistic Study. M–CASTL Transportation Research and Education Conference. University of North Carolina, Highway Research centre Ann Arbor, Michigan, pp. 1–27.

Gozar, G., Allingag, C., Salta, A., Della Cueva, M., Enriquez, N. 2008. Analysis of the Effects of Billboard Advertisements to Drivers' Attention for Road Safety. South East Asia Conference for Ergonomics, Bangkok, 1–12. Thailand, pp.

Groeger, J. 2000. Understanding driving. East Sussex: Taylor & Francis.

Gugerty, L. 2011. Situation Awareness in Driving. Clemson University.

Guttmann, A. 2019. Advertising spending in South Africa 2018-2021 by medium, available online at: **https://www.statista.com/statistics/386540/advertising-expenditures-by-medium-south-africa**.

Hakkert, A.S and Braimaister, L. 2002. The uses of exposure and risk in road. Leidshendam, The Netherlands: SWOV Publication R-2002-12.

Hall, F.L. 1992. Traffic flow theory: traffic stream characteristics, Federal Highway Administration **https://www.fhwa.dot.gov/publications/research/operations/tft/chap2.pdf**

Han, C and Luk, J. 2015. Guide to traffic management Part 1: Introduction to Traffic Management Austroads. Sydney New South Wales.

Hansen, F.D. 2006. Human error: A concept analysis. *Journal of Air Transportation* 11 (3), pp 61–77.

Inman, P. 2018. Reaching your target audience with outdoor marketing, *Airoutdoor,* 21 February. https://airoutdoor.co.uk/blog/target-audience-outdoor-advertising**.**

Hansen, F.D. 2006. Human error: A concept analyses, *Journal of Air Transportation* 11 (3), pp. 61–77.

Hartley, J. 2007, 'Driver distraction: A law enforcement perspective. In Distracted driving by M. Regan, M. Stevenson, J. Brown, A. Porter & J.D. Irwin (Eds.). In: I.J. Faulks, Sydney, NSW: Australasian: College of Road Safety, pp. 329-344.

Helmers, G. 2014, Nordic Human Factors Guideline: Explanatory model for road user behaviour. Implications fit the design of road and traffic environment. Trafitec Nordic Road Geometry Group, Lyngby, Sweden.

Herrstedt, L., Greibe, P and Andersson, P. 2013. Roadside Advertising Affects Driver Attention and Road Safety. *Proceedings of the 3rd International Conference on Driver Distraction and Inattention*, Gothenburg, Sweden, pp. 1-14.

Hollnagel, E., Nãbo, A., and Lao, I. V. 2003. A systemic model for driver-in-control. *In proceedings of the Second International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*. Park City, Utah, USA, pp. 86–91.

Inman, V.W., Bertola, M and Philips, B.H. 2015. Information as a source of distraction. FHWA-HRT-15-027. Federal Highway Administration, Washington D.C.

Jordaan, F. 2019. The Impact of outdoor advertising, available from: https//:**www.deat.gov.za**.

Justyna Harasimczuk, J., Maliszewski, N.E., Oleiczak-Serowie, A and Tarnowsk, A, 2018. Are longer advertising slogans more dangerous? The influence of the length of ad slogans on drivers' attention and motor behaviour. *Current Psychology*, pp. 1–13.

Jurewicz, C. and Troutbeck, R. 2012. A Safe System-based approach to selection of clear zones, safety barriers and other roadside treatments. Australasian Road Safety Research, Policing and Education Conference. Wellington, New Zealand.

Kane, T. 2011. AASHTO's Highway Safety Manual and Performance Measures / Targets. *International Road Forum,* pp. 1–22.

Larsson, P., Dekker, S.W.A and Tingvall, C. 2010. The need for a systems theory approach to road safety. *Safety Science*, 48 (9).

Lerner, N., Llarenas, R., Smiley, A., Hanscom, F. 2005. Comprehensive Human Factors Guidelines for Road Systems. Transportation Research Board, Washington, D.C.

Kerr, A. 2015. Tax(i)ing the poor? Commuting costs in South Africa. Southern Africa Labour and Development Research Unit: Working Paper Series, Cape Town, pp.156.

Klauer, S.G., Dingus, D.R., Neale, T.A., Sudweeks, J., Ramsey, D.J, 2006. The impact of driver inattention on near-crash/crash risk: an analysis using the 100-car Naturalistic Study data. National Highway Traffic Administration, Washington D.C.

Knoll, J. 2016. Advertising in social media: a review of empirical evidence. International Journal of Advertising: The Review of Marketing Communications 35(2), pp. 266–300.

Kruger, S.J. 2015. The relationship between land use management practice and outdoor advertising in Mangaung Metro Municipality. Thesis: Department of Urban and Regional Planning Faculty of Natural and Agricultural Sciences at the University of the Free State.

Labuschagne, F.J.J. De Beer, E.C., Roux, D and Venter, K. 2016. Cost of Crashes in South Africa 2016. *Southern African Transport Conference*, CSIR ICC Pretoria.

Larsson, P., Dekker, S.W.A and Tingvall, C. 2010. The need for a systems theory approach to road safety. *Safety Science* 48 (9), p. 1–10.

Lazarus, J.M. 2008. The use of commercial advertising on large scale electronic billboards for highways and their relation to driver safety and driver distraction: Literature review, Oregon Department of Transportation Research Unit, Salem OR.

Lee, S.E., Simons-Morton, B.G., Klauer,S.E., Ouimet, M., Dingus, T.A. 2011. Naturalistic assessment of novice teenage crash experience. *Accident Analysis and Prevention*, 43, pp. 1472–1479.

Lerner, N., Llarenas, R., Smiley, A., Hanscom, F. 2005. Comprehensive Human Factors Guidelines for Road Systems. *Transportation Research Board (TRB),* Washington, D.C.

Lowe, J. 2019. "SANRAL Investing in road safety, available from https://www.nra.co.za/content/SANRAL-Investing-in-Road-Safety-2019.pdf.

Łukasik, Z and Szymanek, A. 2012. Safety and risk in road traffic: selected problems*. Transport problems* 7(2), pp. 83-94

MacLeod, C., Mathews, A and Tata, P. 1986. Attentional bias in emotional disorders. *Journal of Abnormal Psychology*. **https://doi.org/10.1037/0021-843X.95.1.15**.

Medino, R and Tarko, A.P. 2006. Relationships between road design, driver behaviour, and crashes. *Fourth LACCEI International Latin American and Caribbean Conference for Engineering and Technology*, Mayagüez, Puerto Rico, pp. 1-10.

Mixed Media Group. 2018. Mixed Media Group. *Do People Notice Billboards?* 11 July, available from: https://www.mixedmediaoutdoor.com/do-people-notice-billboards.

Morrow, P.C. and Crum, M.R. 2004. Antecedents of fatigue, close calls, and crashes among commercial motor-vehicle drivers. *Journal of Safety Research* 35, pp. 59–69.

MORR Transportation Consulting Ltd. 2017. St. Albert Digital Display Guidelines: Road safety assessments. City of St. Albert.

Mrgole, A.L. 2017. The Influence on Road Safety Due to Driver Distraction from Outdoor Advertising: Case Study. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)* 35 (1): pp 42–49.

Moutchou, F., Cherkaoui, A. and El Koursi, E.M, 2012. Integrating human factors in the analysis of the tram-car drivers. *CETRA 2nd International Conference on Road and Rail*, Dubrovnik, Croatia.

Muller, G. 2013. Advertising in the OOH Zone: A guide to out-of-home media strategy. Johannesburg: Advertising Media Forum. Available at: http://www.ohmsa.co.za/downloads/OOH_Zone-LoRes1.pdf.

Nagel, P and Louw, S. 2004. Mass media advertisements: Responses to selected advertisements in semi-urban Limpopo. Communicatio: South African Journal of Communication Theory and Research, 30(2), pp. 98–113.

National Department of Transport. 2018. Draft Roads Policy for South Africa. Government Gazette, 9 March, No. 41488, pp. 130 – 213.

National Safety Council. 2011. White paper: Understanding the distracted brain, pp.1-30. http://www.nsc.org/safety_road/Distracted_Driving/Pages/CognitiveDistraction.aspx.

Neuman, T.R., Schwartz, M., Clark, L and Bednar, J. 2002. A Guide to Best Practices for innovative solutions. National Cooperative Highway Research Programme NCHRP report 480, Washington D.C.

New Zealand Transport Agency. 2011. *Traffic Control Devices Part 3: Advertising signs.* New Zealand Transport Agency.

Ogden, K., Newstead, S.V., Ryan, P.K and Gantzer, S. 1994. Factors affecting crashes at signalised intersections. Monash University Accident Research Centre, Victoria, Australia.

Osrin, L. 2001. An overview of the legal aspects of outdoor advertising. 20th South African Transport Conference, Pretoria, pp. 1–6.

Oneyear, N., Hallmark, S and Wang, B. 2016. Evaluating the relationship between the driver and roadway to address rural intersection safety using the SHRPII database. Centre for Transportation Research and Education, Iowa State University, Ames, Iowa.

Organisation for Economic Co-operation and Development. 2010. Regulatory Policy and the Road to Sustainable Growth available from http://www.oecd.org/gov/regulatory-policy.

Organisation for Economic Co-operation and Development. 2019. Health Statistics: Definitions, Sources and Methods Injuries in road traffic accidents available online at: http://www.stats.oecd.org.

Oviedo-Trespalacios, O., Truelove, V., Watson, B and Hinton, J.A. 2019. The impact of road advertising signs on driver behaviour and implications for road safety: A critical systematic review. *Transportation Research Part A: Policy and Practice,* pp. 85–98.

Pradhan, A., Simons-Morton, B., Lee, S and Klauer, S. 2013. Hazard perception and distraction in novice drivers: effects of 12 months driving experience. *Proceedings of the Sixth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design,* pp.1–13.

Peden M, Scurfield R, Sleet D, Mohan D, Hyder A. 2004. World Report on Road Traffic Injury Prevention. World Health Organization, Geneva.

Peden, M. 2008. Summary of the World Report on Road Traffic Injury Prevention. World Health Organisation, Geneva.

Petak, M. 2019. Method to assess and enhance vulnerable road user safety during impact loading. *Applied Sciences* 9, 1000; doi: 10.3390/app9051000.

Porter, B.E. 2011. Handbook of Traffic Psychology. Academic Press, Elserivier.

Price Waterhouse Coopers. 2013. South African entertainment and media outlook: 2013 – 2017, available from: https://www.pwc.co.za/en/assets/pdf/entertainment-and-media-outlook-2013-2017.pdf.

Provincial Gazette (Limpopo). 2019. Local Authority notice 161 of 2019: Local Government Municipal Systems Act, 32 of 2000. Control of Outdoor Advertisement and Signage Bylaw, available from: https://www.greengazette.co.za/notices/local-government-municipal-systems-act-32-2000-control-of-outdoor-advertisement-and-signage-bylaw_20190927-LIM-03036-00161.pdf.

Rautenbach, A. 2013. *Comments on the revision of the SAMOAC 2010 document.* Unpublished.

Rautenbach, A. no date. *Memorandum: The role of South African road authorities in dealing with outdoor advertising.* Mangaug Metropolitan Council: Internal memo. Unpublished

Regal, D. M, Rogers, W. H, and Boucek, G. P. 1988. Situational awareness in the commercial flight deck – definition, measurement, and enhancement. *In Proceedings of the 7th SAE Aerospace Behavioral Technology Conference.* Anaheim Convention Center, California, Society of Automotive Engineers, pp. 65-69.

Regan, M.A., Hallett, C and Gordon, C.P. 2011. Driver distraction and driver inattention: Definition, relationship and taxonomy. *Accident Analysis and Prevention* 43, pp. 1771–1781.

Rempel, G., Moshiri, M., Montufar, J., Dewar, R and Forbes, G. 2013. Considerations for assessing the road safety impact of digital and projected advertising displays in Canada. *Road Safety Strategies and Intelligent Transportation Systems (ITS) Session.* Manitoba Annual Conference of the Transportation Association of Canada Winnipeg.

Republic of South Africa. Municipal Systems Act, Act No.21 of 2000. Available from: http://www.energy.gov.za/files/policies/act_municipalsystem_32of2000.pdf.

Republic of South Africa. 1998. National Environmental Management Bill. Available from: https://www.environment.gov.za/sites/default/files/legislations/national_environmental_management101_0.pdf

Republic of South Africa 1998. National Environmental Management Act, Act No. 107 of 1998 (NEMA). Available from: www.ndmc.gov.za.

Republic of South Africa. National Land Transport Act. Act No. 5 of 2009. Available from: https://www.gov.za/documents/national-land-transport-act.

Republic of South Africa. Spatial Planning and Land Use Management Act. Act No 16 of 2013. Available from: https://www.gov.za/documents/spatial-planning-and-land-use-management-act.

Retting, R.A. Ferguson, S.A and McCartt, A.T. 2003. A review of evidence-based traffic engineering measures designed to reduce pedestrian–motor vehicle crashes. *American Journal of Public Health*, 93(9), pp. 1456–1463.

Roads and Traffic Authority of New South Wales, 2011. How does speeding increase the chances and severity of a crash? Fact Sheet 4 of 6, New South Wales Department of Transport.

Road Traffic Management Corporation. 2019. Road Fatality Report: January to December 2018. Department of Transport, Pretoria.

Roberts, P. 2013. Designing Evidence-Based Guidelines for the Safe Use of Digital Billboard Installations: Experience and Results from Australia. *16th Road Safety on Four Continents Conference*, Beijing, China, pp. 1–14.

Rolison, R., Regev, S., Moutari, S. and Feeney, A. 2018. What are the factors that contribute to road accidents? An assessment of law enforcement views, ordinary drivers' opinions, and road accident records. *Accident Analysis and Prevention* 115, pp. 11–24.

Roux, A.T. and Van der Waldt, D.L.R. 2014. Out-of-home advertising media: theoretical and industry perspectives. *Communicate, pp.* 19.

Roux, T. 2017, Finding Cinderella's Shoe: Guidelines for the Planning of Contemporary Outdoor Advertising Media. *African Journal of Hospitality, Tourism and Leisure,* 6 (2) open access- online at http//: www.ajhtl.com.

Sayer, J.R., Devonshire, D.M and Flannagon, C.A. 2005. The Effects of Secondary Tasks on Driving Performance. University of Michigan, Ann Arbor, Michigan.

Scruby, H. 2007. Roadside advertising-A driver distraction by design. In Distracted driving, by M. Regan, M. Stevenson, J. Brown, A. Porter & J.D. Irwin (Eds.) In: I.J. Faulks, Pages 433-456, Australasian College of Road Safety, Sydney, New South Wales.

Shah S.A.R., Ahmad, N., Shen, Y., Pirdavani, A., Basheer, M., and Brijs, T. 2018. Road Safety Risk Assessment: An Analysis of Transport Policy and Management for Low-, Middle-, and High-Income Asian Countries, *Sustainability*, 10, pp. 389, doi:10.3390/su10020389.

Shelby, S.G. 2011. Delta-V as a measure of traffic conflict severity. *3rd International Conference on Road Safety and Simulation*, September 14-16, Indianapolis, USA.

Silvano, A.P. 2013. Impacts of speed limits and information systems on speed choice from a safety perspective, KTH - Royal Institute of Technology, Stockholm, Sweden.

Smiley, A. 2005, 'What is distraction? *International Conference on Distracted Driving*. Toronto, Canada, pp. 1–8.

Smiley, A., Persaud, B., Bahar, G., Mollett, C. 2005. Traffic safety evaluation of video advertising signs. *Transportation Research Board (TRB)*, Washington D.C, pp. 1–12.

South African Manual for Outdoor Advertising and Control. 2011. Chapter 6: A Procedure for Managing Outdoor Advertising and Implementing Conditions of Control. Available from: **https://www.environment.gov.za/sites/default/files/docs/samoac_section6_outdooradvertising_management_procedure.pdf.**

South African National Roads Agency Limited. 13 July 2000 – Regulation Gazette Regulations on Advertising on or Visible on National Roads. Vol. 421: 6844 (685) Government Gazette, 13 July.

South African National Roads Agency Limited. 2003. Procedures for Road Planning and Geometric Design, Chapter 6 Intersection design available from:
https://www.nra.co.za/content/proceduresforroadplanninganddesignapprovedJanuary2003.pdf.

Sucha, M. 2015. 'Road design: Human factors perspective', Department of Psychology 1 June. Accessed August 10, 2016. **http://psych.upol.cz/wp-content/uploads/2015/06/Presentation7_road_design.pdf**.

Summala, H. And Timo, M. 1994. Fatal Accidents among Car and Truck Drivers: Effects of Fatigue, Age, And Alcohol Consumption. *Human Factors: The Journal of The Human Factors and Ergonomics Society* 36 (2), pp. 315-326.

Svenson, O. 1978. Risks of road transportation in a psychological perspective. *Accident Analysis and Prevention*, 10(4), pp. 267-280.

SWOV. 2007. Fact sheet: The relation between speed and crashes. SWOV, Leidschendam, the Netherlands.

SWOV. 2012. Fact sheet: Vulnerable road users. SWOV, Leidschendam, the Netherlands.

Tantala, M.W and Tantala, A.M. 2009, 'A study of the relationship between digital billboards and traffic safety in Cuyahoga County, Ohio. The Foundation for Outdoor Advertising (FOARE), Washington D.C.

Tantala, M.W. & Tantala, P.J. 2005. An examination of the relationship between advertising signs and traffic safety. *84th Annual Meeting of the Transportation Research Board*, Washington D.C, pp. 1–23.

Taylor, C. R. 2015. Creating win–win situations via advertising: new developments in digital out-of-home advertising. International Journal of Advertising 34(2), pp.177–180.

Technavio blog, 2019. Top advertising trends available from https://blog.technavio.com/blog/top-advertising-trends

Theeuws, J. 1995, 'Towards a Structurally Safe Traffic System: The Development of Self-Explaining Roads. *Ana'lise Psicologica* 3 (XIII), pp. 287-290.

The Operators. 2015. The History of Outdoor Advertising. *The Operators* 15 February. **https://medium.com/@the_operators/the-history-of-outdoor-advertising-445a351f3dca**.

Turner, B and Woolley, J. 2018. Towards Safe System Infrastructure. Austroads Webinar, 18 May available from: https://austroads.com.au/resources/documents/supporting-documents/webinars/Austroads_Webinar_Towards_Safe_System_Infrastructure.pdf.

Tsolakis, D., Naude, C and Evans, N. 2009. Guide to Road Transport Planning. Austroads Sydney New South Wales.

Tsunokawa, K and Hoban, C (eds). 1997. Roads and the Environment: A Handbook Technical Paper no. 376. The World Bank, Washington D.C.

Ulak, M., Ozguven, E., Moses, R., Sando, T., Boot, T., Razig, Y., Sobanjo, J. 2019. Assessment of traffic performance measures and safety based on driver age and experience: A microsimulation-based analysis for an unsignalized T-intersection. *Journal of Traffic and Transportation Engineering*, 6(5), pp. 455–469.

Underwood, R.T. 1990. Traffic management: An Introduction. Hargreen Publishing Company, North Melbourne, Victoria Australia.

United Nations Economic Commission for Europe. 2010. Consolidated Resolution on Road Traffic Working Party: Road Traffic Safety, New York and Geneva.

United Nations Inland Transport Commission. 2006. *Advertising and road safety.* Economic Commission for Europe: Working Party on Road Traffic Safety 50th session.

United States Federal Highway Administration. 2009. Technical summary of the Surrogate Safety Assessment Model and Validation: Final Report. FHWA-HRT-08-051 Technical brief, 10 October, pp. 1–4.

Vasconcelos, L., Neto, L., Maia Seco, A and Bastos Silva, A. 2014. Validation of the Surrogate Safety Assessment Model for Assessment of Intersection Safety.*Transportation Research Record: Journal of the Transportation Research Board,* (Transportation Research Board of the National Academies) 2432.

Venter, K., Labuschagne, F.J.J. Phasha, S., Gxowa, M and Khoza, S. 2016. Indications of inattentive and distracted driving in South Africa. *36th Southern African Transport Conference*, CSIR ICC Pretoria, pp.1-10.

Venter, K., Sinclair, M and Lennox, L. 2019. Novice driver training within the South African NRSS 2016-2030. *39th Southern African Transport Conference*, CSIR ICC Pretoria, pp.1-10.

Vermaak, L., Van Niekerk, E., Nkosi, S., Magolego, S., Moeketsi, P. Drotske, T., and Mynhardt, C. 2000. Safe Communities: Feasibility study in Phokeng, North West. Technical Report 2000/6. CSIR Transportek. Pretoria, South Africa.

Vlakveld, W and Helman, S. 2019. The safety effects of (digital) roadside advertising: An overview of the literature, In ADVERTS *Assessing Distraction of Vehicle drivers in Europe from Roadside Technology-based Signage.* CEDR Call 2016 Conference of European Safety Directors of roads., Belgium.

Wallace. 2003. Driver distraction by advertising: genuine risk or urban myth? *Proceedings of the Institution of Civil Engineers: Municipal Engineer*, 156, pp. 185-190.

Wakil, K., Hussnain, M.Q. Tahir, A and Naeem, M.A. 2016. Regulating outdoor advertisement boards; employing spatial decision support system to control urban visual pollution. 8th International Conference and Exhibition on Remote Sensing & GIS. IOP Conf. Series: Earth and Environmental Science 37. doi:10.1088/1755-1315/37/1/012060.

Wang S., Dulaimi, M. and Aguira, M. 2004. Risk management framework for construction projects in developing countries. *Construction Management and Economics* 22, pp. 237–252.

Wang, W., Xi, J and Chen, H. 2014. "Modelling and Recognizing Driver Behaviour Based on Driving Data: A Survey." Mathematical Problems in Engineering 2014: 1–20. doi: **http://dx.doi.org/10.1155/2014/245641**.

Weideman, J. 2001. Advertising along provincial roads. *20th South African Transport Conference.* CSIR ICC Pretoria, pp. 1-12.

Wickens, C.M., Toplak, M.E. and Wiesenthal, D.L. 2008. Cognitive failures as predictors of driving errors, lapses, and violations. *Accident Analysis and Prevention* 40, pp. 1223–1233.

Wilding, D., Fray, P., Molitorisz, S. & McKewon, E. 2018. The Impact of Digital Platforms on News and Journalistic Content, University of Technology Sydney, New South Wales.

Williams, K.C and Page, R.A. 2010. Marketing to the Generations, Journal of Behavioural Studies, pp 1-17.

Wilson, R.T. and Casper, J. 2016. The role of location and visual saliency in capturing attention to outdoor advertising: how location attributes increase the likelihood for a driver to notice a billboard ad. *Journal of Advertising Research* 56(3), pp. 259–273.

Wittink, R. 2001. Promotion of mobility and safety of vulnerable road users: Final report of the European research project PROMISING, SWOV Institute for Road Safety Research, Leidschendam, the Netherlands.

Woolley, J., Stokes, C., Turner, B., and Jurewicz, C. 2018. Towards Safe System Infrastructure: A Compendium of Current Knowledge, Austroads Sydney NSW, Australia

World Bank. 2019. Good practice note: Environment & Social Framework for IPF Operations: Road Safety, available from: **http://pubdocs.worldbank.org/en/648681570135612401/Good-Practice-Note-Road-Safety.pdf**

World Health Organisation. 2008. Speed management: A road safety manual for decision-makers and practitioners. Global Road Safety Partnership, Geneva Switzerland.

World Health Organisation. 2008. Implementing specific interventions to prevent road traffic injuries. Global Road Safety Partnership, Geneva Switzerland.

World Road Association. 2015. Road safety manual: A manual for practitioners and decision makers on implementing safe system infrastructure, available online at: https://roadsafety.piarc.org/en/road-safety-management-safe-system-approach/safe-system-principles.

Wu, K.F and Jovanis, P.P. 2013. Defining and screening crash surrogate events using naturalistic driving data. *Accident Analysis and Prevention* 61, pp. 10–22.

Yannis, G., Papadimitriou, E., Papantoniou, P and Voulgari, C. 2014. Driver distraction and road safety in Greece and internationally. National Technical University of Athens School of Civil Engineering: Department of Planning and Engineering, Athens, Greece.

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Annexure C

DRAFT ENGINEERING MANUAL

SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL

3rd Edition

VOLUME 2
ROAD TRAFFIC SIGN APPLICATIONS

Chapter 22
OUTDOOR ADVERTISING

Note: This cover page is for illustration purposes only. Chapter 22 will be included under the Volume 2 cover page once the stakeholder engagement process is finalised.

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This chapter 22 of the SARTSM Volume2 will be finalised after stakeholder engagement.

OUTDOOR ADVERTISING

SECTIONS

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CHAPTER 22

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KEYWORDS

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CHAPTER 22:
OUTDOOR ADVERTISING

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22.0.1 Sections and Subsections

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CHAPTER 22:
OUTDOOR ADVERTISING

22.1 INTRODUCTION

22.1.1 General

1 Chapter 1, Volume 2 explains the objectives of Volume 2 and how the various chapters should be read in conjunction with their respective chapters in Volumes 1 and 4. This chapter on Outdoor Advertising (Chapter 22) differs from the approach in the preceding chapters in that it does not provide guidance on how to combine road traffic signs, road markings and traffic signals for practical roads and traffic applications. Outdoor advertising targeted at road traffic has the inherent potential to diminish the effectiveness of road signs and cause distractions to road users, particularly the drivers of vehicles, which negatively impacts the safety performances of roads. This chapter thus provides guidance about managing outdoor advertising displays targeted at road traffic, in order to ensure and preserve the integrity, credibility and effectiveness of the road traffic signs and markings, as well as the road traffic signing system. The intended outcome is that outdoor advertising displays do not contribute to road unsafety (including elevated road risk exposure), and that when outdoor advertising is placed within visual range of roads, they also do not negatively impact the safety performance of such roads or the road network in general

2 The South African Manual on Outdoor Advertising Control (SAMOAC) is the main document to which controlling authorities refer in order to manage outdoor advertising through regulations and by-laws. The broad objectives of SAMOAC are to contribute to the conservation of the aesthetic environment and tourism resources in natural, rural and urban environments; to contribute to the creation of more acceptable human living environments; to promote traffic safety; to promote sustained economic growth and sustainable development; and to foster a balanced approach between economic development, on the one hand, and traffic safety and the conservation of the perceptual environment, on the other. However, road safety is in effect only included as a passive concept in the SAMOAC, leaving the document without the traffic and road safety engineering guidance necessary to evaluate and manage the road traffic signing system, and the road safety performance impacts of the outdoor advertising as described in (1), above. **The purpose of this chapter is to provide the required guidance to traffic engineers, engineering technologists and technicians so that they are able to actively manage outdoor advertising from a road safety performance perspective; integral to this is the protection of the integrity, credibility and effectiveness of the road traffic signing system, in the context of the inherent limitations of road user aptitudes and capacities**

3 'Road traffic signs' as per Chapter 3 Paragraph 3.1.9 (3), is a legal term and includes within its definition road signs, road markings and traffic signals. Only 'road traffic signs' should be erected within a road reserve. The only road signs, markings or signals recognised as 'road traffic signs' are prescribed by the Minister of Transport by inclusion in Schedule 3 to the National Road Traffic Act: Regulations. 'Road traffic signs' are classified in a hierarchical manner. Road signs, markings and signals may be used to regulate, to warn or to guide or inform. Regulatory signs, markings and signals carry the force of the law and are therefore the most important. Warning signs, markings and signals have a different importance, and it is the responsibility of the road authority to see that they are used meaningfully and when necessary in the interest of road safety

22.1.2 Road safety management approach

1 Safe System principles (drawn from the sustainable safety development initiative in The Netherlands in 1990) have been acknowledged by countries with the lowest accident and road fatality rates in their road safety strategies and action plans. Following suit, the South African National Road Safety Strategy 2016 – 2030 (SANRSS) includes the Safe System as the foundation of its road safety interventions and programmes. This approach demands an integrated approach to the safety of the road system, with the aim that no person is killed or seriously injured on the road network. All elements of the road system, including safe roads, safe vehicles, safe road users and safe speeds, are incorporated in this approach with responsibility required from stakeholders, including road authorities, governments and road users.

2 A safer road environment requires the application of road design and traffic management principles that have a clear road safety focus. The road authorities responsible for the road network should ensure that the road is designed and managed from a safety perspective, and that the network operation is monitored and measured.

3 Safe System-based measures aimed at improving the safety of the road environment can be 'primary' with the focus on reducing the severity of accidents with 'supporting' techniques, the focus is on reducing the number of accidents. **The strict application of a 'Safe System', which establishes the concept of safe mobility ('mobility maximised within the limits of safe operation')** reduces the challenge in finding an equitable trade-off between mobility objectives and road safety. With a safe system, the priority of the road authority will be to first establish safe operations, and thereafter mobility or utility can be maximised within the boundaries that do not compromise safe operation. This deviates from the traditional approach of first satisfying mobility (or utility) requirements and then considering the level of safety that can be achieved. A consequence of this approach is that when the desired level of mobility (or utility) cannot be realised after safety is appropriately addressed, the context and function of the road will need to be re-evaluated.

4 Central to the Safe System approach is the recognition that road users will make mistakes, even if alert and intending to comply with the road rules. Vehicles and road infrastructure therefore need to be designed to discourage errors and protect against the consequences (damage and injury). **Within this context, it will require careful consideration to justify any addition of roadside features, such as outdoor advertising displays, that have the potential, however minor, to evoke and encourage driver error through its distraction attributes**.

5 The 'Towards Zero - ambitious road safety targets and Safe System approach' strategies implemented in European countries have driven down road traffic fatalities significantly - in

some countries down from already low levels. Figure 22.1.1 shows the average decrease of road traffic fatalities of the 32 countries monitored in the European Transport Safety Council (ETSC) 13th Annual Road Safety Performance Index (PIN) Report of June 2019. Notable is the dramatic initial decrease of fatalities over the first three years of the United Nations Decade of Action for Road Safety 2011 – 2020 (UNDoA) and the flattening out since. It means that it becomes increasingly challenging to drive down road traffic fatality rates when countries get into the lower range rates. It becomes a matter of making sure that every effort should go into saving that one more fatality. The second graph from the ETSC report (see Figure 22.1.2) indicates that 18 out of the 32 countries monitored, achieved 20 percent or better reduction of fatalities (Norway achieved 49 percent) from 2010 to 2018.

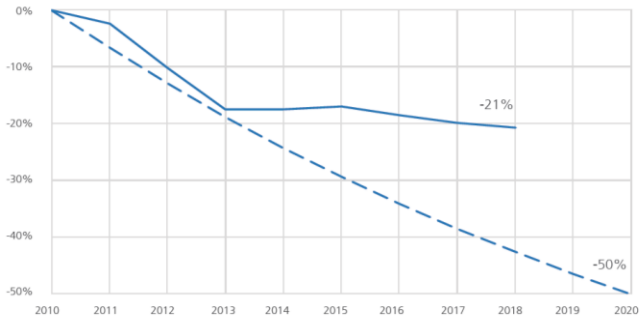


Figure 22.1.1: Reduction in the number of road deaths since 2010 (blue line) plotted against the EU target for 2020 (blue dotted line)

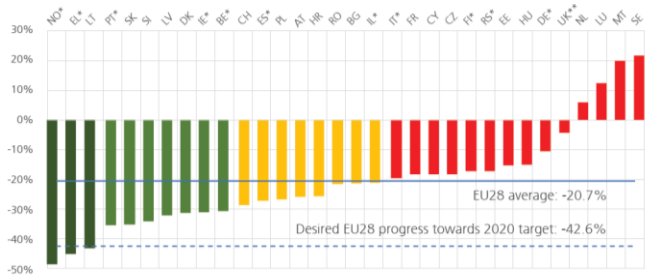


Figure 22.1.2: Relative change in road deaths between 2010 and 2018

6 The Safe System approach starts from the acceptance of the likelihood of human error and thus the realisation that traffic accidents cannot be completely avoided. The goal of a Safe System is to prevent accidents from happening through proactive actions and when accidents do occur, to ensure that they do not result in serious human injury. South Africa has adopted the Safe System approach as the overarching strategy of the SANRSS to drive down road casualties.

7 The SANRSS divides the traffic system into three categories: the road user, the vehicle, and the road environment. Each collection of actions/strategies under the five pillars of the UNDoA are designed to impact the three categories, to improve the safety performance of the system. Under Pillar 2: Safer Roads and Mobility, an intervention aims to raise the inherent safety and protective quality of road networks through the implementation of road infrastructure assessment and improved safety conscience planning, design, construction, and operation of roads; here the Clear Zone concept is key to limiting harm and damage. In South Africa there may be every effort to conduct road safety audits to ensure that new roads comply with safety performance standards, yet once a road is built, the road environment may change through the introduction of outdoor advertising displays that nullify the road readability design and regulatory parameters that rely on the attentiveness of drivers in particular. Further, under Pillar 4: Safer Road Users, is included the objective to develop comprehensive programs to improve road user behaviour. **One of the key matters in the South African context is driver education and training with respect to the risks associated with distracted and inattentive driving**. Yet despite the elevation of this concern since the inception of the UNDoA a decade ago, features and activities are permitted along roads that rely on their distracting characteristics, targeting drivers not trained to cope with potentially fatal distractions.

8 The extent of inattentive and distracted driving (or walking) in the South African traffic context should not be underestimated. Research about countries with accidents rates of a tenth or better than those of South Africa, indicated that driver inattention was a contributory factor in 19 percent of severe accidents (the particular research also indicates that this percentage is regarded by traffic officials as significantly underreported). Other research found that a third of the cases of inattention or being distracted are due to external (outside the vehicle) distractions of which a non-negligible proportion is said to relate to outdoor advertising as the specific distraction.

9 Inattentive and distracted driving is most likely significantly more prevalent in South Africa. Omnipresent pedestrian activity along main roads, and neglected access control, are among the contextual peculiarities to take account when considering replicating international interventions in the South African situation. South African drivers, for instance, generally inadequately adjust speed to what the traffic conditions dictate, which may be related to inattentiveness and although not necessarily caused directly by distractions, incessant attention demanding distractions (also associated with visual clutter) and information overload can contribute to general driver inattentiveness. In accident investigations and studies like the USA Strategic Highway Research Programme (SHRP) 100-car study, the cause of non-accident and accident incidents, in the absence of clear evidence of acts of distraction, is often recorded as “looked, but failed to see”. In South Africa - given that out of a total of ± 832 000 accidents there are possibly about 279 000 fatal and injury accidents per year based on the estimated accident proportions applied in the RTMC Cost of Crashes 2016 report, the threat of harm in the form of death, injury and damage that may result from roadside outdoor advertising displays that distract driver attention away from the roadway and prevailing traffic conditions ahead is very real.

10 Severe accidents involving inattentive drivers occur among differing accident types, with 46 percent intersection-related and 39 percent lane departure-related. Intersection accident types (typically right-angle and rear-end) occur predominantly on straight segments (92%), but the presence of curves nearly doubles the occurrence of lane departure accident types (36%) as a result of inattentiveness. Severe accidents involving inattentive drivers are notably represented in both rural (54%) and urban (44%) areas. Incidents and accidents that result from

driver inattention or distractions are typically associated with a vehicle leaving the roadway and encroaching on the roadside. Other reasons include, driver fatigue, excessive speed, driving under the influence of drugs or alcohol, accident avoidance (which may also be as a result of inattention or distraction), adverse roadway conditions, such as debris and potholes, or rain, vehicle component failure, poor visibility, etc.

22.2 ROAD DESIGN CONSIDERATIONS

22.2.1 Design for driver performance

1 A road designed within the limits of prescribed geometric standards is not necessarily safe. A road can usually be made more safe, or it may become less safe, but it can never be made safe (Wolhuter, 2015). Although geometric design standards have taken account of human fallibility and performance limitations in traffic, it is not possible to accommodate all driver aptitudes, attitudes, and physiological states in the road design. Road designers typically design for the 85-percentile driver (or up to the 95-percentile for some critical parameters, e.g. stop reaction time) to make it possible to have roads at all. Much effort goes into understanding driver performance and the influence of the road environment created by design, so as to exercise optimal control over what can feasibly be controlled from a road and traffic management perspective. **The introduction of extraneous influences (e.g., outdoor advertising), other than that related to guidance and control, to road traffic jeopardises the already compromised standards and inevitably makes the roads less safe**. **This is particularly concerning when these extraneous influences have the potential to induce driver behaviours that cannot be predicted, directed and/or controlled.** When considering such introductions, it is important to recognise the intricacies of the tasks involved in using the road traffic system, and how road design facilitates the effective and safe execution of these tasks at acceptable levels of skill. Road design manuals such as AASHTO 2018, Wolhuter 2015, etc. contain extensive information about designing roads for the optimal performance of road users and specifically the drivers of motor vehicles. The various tasks are described below.

2 **The driving task** - The driving task depends on drivers receiving and using information from the road and environment correctly. Drivers compare the information they receive from the road with information they have previously collected. Decisions are then made by drivers based on the information available to them and appropriate control actions are taken. Driving encompasses a number of discrete and interrelated activities. These activities, when hen grouped by performance, form the components of the driving task and typically fall into three levels: control, guidance, and navigation. These activities are listed in order of increasing task complexity and in order of decreasing importance for safe driving. At the basic level of the scale a driver needs to attend to the simple control tasks namely steering and speed control. Road following and path following in response to road and traffic conditions are at midlevel of the scale (guidance). At the more complex level of the scale are trip planning and route following (navigation). The driving task may be complex and demanding, and several individual activities may need to be performed simultaneously, with smooth and efficient processing and integration of information. Driving often occurs at high speeds, under time pressure, in unfamiliar locations and under adverse environmental conditions. On the other hand, the driving task may at other times be so simple and undemanding that a driver becomes inattentive. A key to effective driver performance in this broad range of driving situations is error-free information handling.

Driver errors result from the interactions among different driver, vehicle, roadway, and traffic factors. Some driver errors occur because drivers may not always recognise what actions are appropriate in particular roadway traffic situations, situations may lead to task overload or inattentiveness, and deficient or inconsistent designs or information displays may cause confusion. Driver errors may also result from complexity of decisions, profusion of information, or inadequate time to process and respond to the information. Control and guidance errors by drivers may also contribute directly to accidents. In addition, navigational errors by drivers cause delay, contribute to inefficient operations (e.g., engaging in higher risk manoeuvres and extended exposure to risk) and may lead indirectly to accidents. **The deliberate introduction of extraneous distractions, e.g., outdoor advertising displays, adds unpredictability in already taxing road traffic situations. It places additional stresses on drivers through the higher demands on the driving task by taking away recognition and reaction time, which can result in unnecessary rapid and potentially erroneous decisions.**

3 **Guidance task** - Of the three major components of the driving task, road design and traffic operations have the greatest effect on guidance. An appreciation of the guidance component of the driving task is needed by the road designer to aid driver performance.

- *Lane placement and road following* - Lane placement and road-following decisions, including steering and speed control judgements, are basic to vehicle guidance. Drivers use a feedback process to follow alignment and grade within the constraints of road and environmental conditions. Obstacle-avoidance decisions are integrated into lane placement and road-following activities. This portion of the guidance task level is continually performed both when no other traffic is present (singularly) and when it is shared with other activities (integrated). **Inattention and distraction are often the most observable in the lane placement and road following behaviour of drivers – typical accidents that occur as a result are run-off-the-road accidents.**
- *Car following* - Car following is the process by which drivers guide their vehicles when following another vehicle. Car following decisions are more complex than road-following decisions because they involve speed-control modifications. In car following, drivers need to constantly modify their speed to maintain safe gaps between vehicles. To proceed safely, drivers have to assess the speed of the lead vehicle and the speed and position of other vehicles in the traffic stream and continually detect, assess, and respond to changes. **Inattention and distraction are often associated with rear-end accidents, but inattentive car following also result in run-off-the-road accidents when avoidance manoeuvres are opted to avoid rear-end crashes.**
- *Passing manoeuvres* - The driver decision to initiate, continue, or complete a passing manoeuvre is even more complex than the decisions involved in lane placement or car following. Passing decisions involve modifications in road and car-following behaviour and in speed control. In passing, drivers must judge the speed and acceleration potential of their own vehicle,

the speed of the lead vehicle, the speed and rate of closure of the approached vehicle, and the presence of an acceptable gap in the traffic stream.

- *Other guidance activities* - Other guidance activities that involve complex decisions, judgments, and predictions include: merging, lane changing, avoidance of pedestrians, and response to traffic control devices.

22.2.2 Road information design

1 The information organisation task - Each element that provides information to drivers is considered part of the information system of the road. Formal sources of information are the traffic control devices specifically designed to display information to drivers. Informal sources include elements such as roadway and roadside design features, pavement joints, tree lines, and the traffic on the road. Combined, the formal and informal sources provide the information drivers need to drive effectively. Formal and informal sources of information are interrelated and should reinforce and augment each other to be most useful.

- Traffic control devices - Traffic control devices provide guidance and navigation information that often is not otherwise available or apparent. Traffic control devices comprise regulatory, warning, and guide signs, and other route guidance information. In addition, traffic control devices, such as markings and delineation, display additional information that supplements and enhances particular roadway or environmental features. It is the purpose of these devices to assist drivers perceive information that might otherwise be overlooked or difficult to recognise. This chapter is part of the South African Development Community Road Traffic Sign Manual and the South African Road Traffic Sign Manual which present the information on the appropriate use of traffic control devices.
- The roadway and its environment - Selection of speeds and paths is dependent on drivers being able to see the road ahead. Drivers need to see the road directly in front of their vehicles and far enough in advance to perceive the alignment, profile grade line, and other related aspects of the roadway. The view of the road also includes the environment immediately adjacent to the roadway. Such appurtenances as shoulders and roadside obstacles (including sign supports, bridge piers, abutments, guardrail, and median barriers) affect driving behaviour and, therefore, should be clearly visible to the driver.

2 **The information interpretation task** - Drivers use their senses to gather information. Most information is received visually by drivers from their view of the roadway alignment, markings, and signs. Drivers also detect changes in vehicle handling through other senses, e.g., by feeling road surface texture through vibrations in the steering wheel and hearing emergency vehicle sirens. Drivers look at information sources, make numerous decisions, and perform appropriate control actions that require them to perform several driving functions almost simultaneously. Information sources of which some are needed and others not, continuously compete for the attention of drivers. Thus, essential information should be in the driver's field of view, available when and where needed, in a usable form, and capable of capturing the driver's attention. Since drivers are physically unable to attend to more than one visual information source at a time, they integrate the various information inputs and maintain an awareness of the changing environment through an attention-sharing process. Through sampling abilities, drivers obtain visual information in short duration glances, shifting their attention from one source to another, then make some decisions immediately, and delay others, through reliance on judgment, estimation, and prediction to fill in gaps in available information.

- *Reaction time* - Information takes time to process. Drivers' reaction times increase as a function of decision complexity and the amount of information to be processed. Furthermore, the longer the reaction time, the greater the chance for error. Studies of brake reaction time for expected and unexpected events show that when an event is expected, reaction time averages about 0.6 seconds, with a few drivers taking as long as 2 seconds. With unexpected events, reaction times increased by 35 percent. Thus, for a simple, unexpected decision and action, some drivers may take as long as 2.7 seconds to respond. A complex decision with several alternatives may take several seconds longer than a simple decision. Figure 22.2.1 shows this relationship for median-case drivers, whereas Figure 22.2.2 shows this relationship for 85th-percentile drivers. The figures quantify the amount of information to be processed in bits. Long processing times decrease the time available to attend to other tasks and increase the chance for error. Road designs should take reaction times into account. It should be recognised that drivers vary in their responses to particular events and take longer to respond when decisions are complex or events are unexpected.
- *Primacy* - Primacy indicates the relative importance to safety of competing information. The driver control and guidance information are most important because the related errors may contribute directly to accidents. Navigation information has a lower primacy because driver errors may lead to inefficient traffic flow, but are less likely to lead to accidents. Accordingly, the design should focus the drivers' attention on the design elements and high-priority information sources that provide control and guidance information. This goal may be achieved by providing clear sight lines and good visual quality.

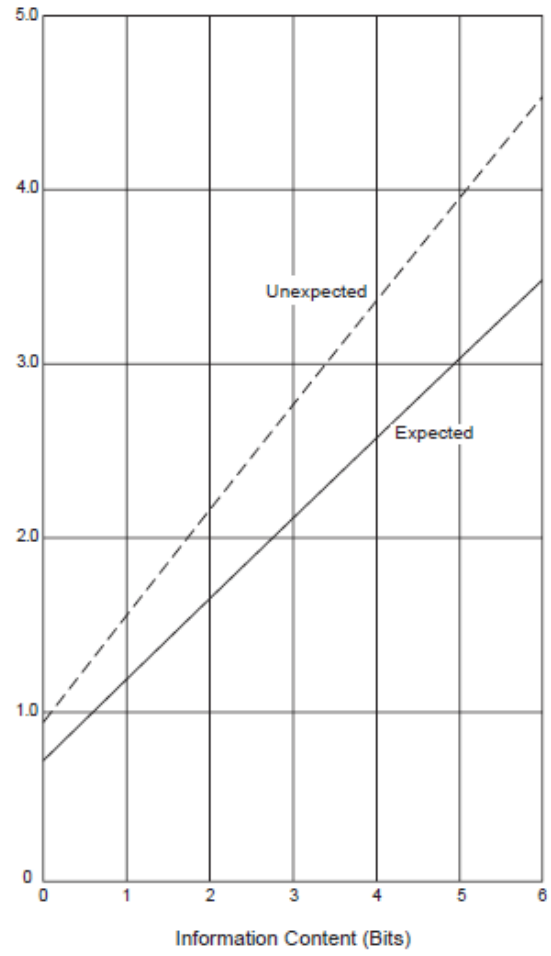


Figure 22.2.1: Median driver reaction time to expected and unexpected information

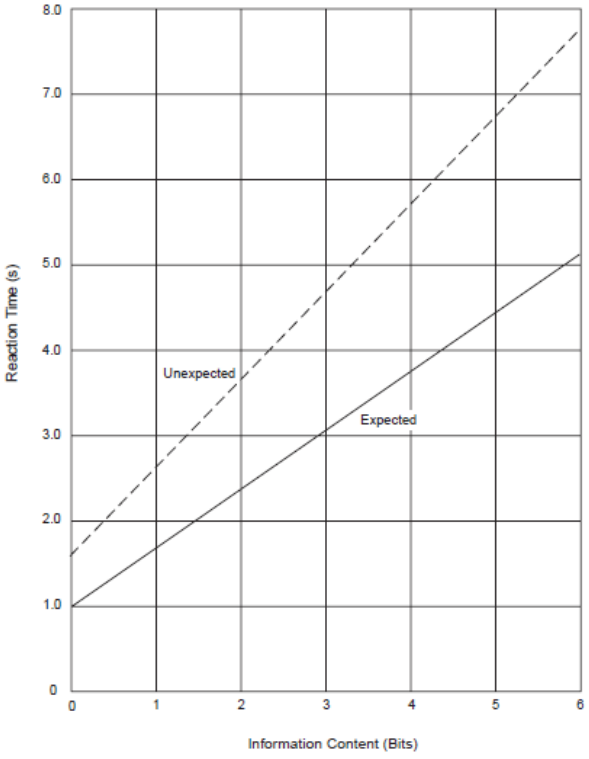


Figure 22.2.2: 85th-Percentile driver reaction time to expected and unexpected information

- *Expectancy* - Driver expectancies are formed by the experience and training of drivers. Situations that generally occur in the same way, and successful responses to these situations, are incorporated into each driver's store of knowledge. Expectancy relates to the likelihood that a driver will respond to common situations in predictable ways that the driver has found successful in the past. Expectancy influences how drivers perceive and handle information and causes drivers modify the swiftness and nature of their responses. Consistent presentation of information helps reinforcing expectancies that again aids drivers respond rapidly and correctly. Unusual, unique, or uncommon situations that violate driver expectancies may cause longer response times, inappropriate responses, or errors.

It is the normal endeavour for road designers to design road features that are sufficiently similar to create driver expectancies related to common geometric, operational, and route characteristics. E.g., freeway interchanges are typically designed with the exits on the left-hand side of the road and drivers thus generally expect to exit from the left. This aids performance by enabling rapid and correct responses when exits on the left-hand side are to be negotiated and, importantly, it contributes to more uniform responses of drivers and to improved operational safety. When expectancies are violated, e.g., if an exit ramp is on the right, then the left-exit expectancy is incorrect, and response times may be lengthened or erratic behaviours may result.

Best practice to aid driver performance is to develop designs that take prevalent driver expectancies into account. Unusual design features should be avoided, and design elements should be applied consistently throughout a road segment. Maintaining consistency from one road segment to another also requires particular care to manage driver expectancies and to establish more uniform responses. Obtaining information from the road and its traffic control devices according to expectations, enhances the potential error free performance of drivers. Where they do not get what they expect, or get what they do not expect, confusion and errors may result. When designs deviate from typical driver expectations, road designs will need to consider compensations in the form of guidance information design and adjustments in reading and reaction time will be required.

3 A key aspect of the Safe System approach (or in general contemporary sustainable road safety strategies) is the recognition that humans, and thus drivers make errors. Although educational, training and law enforcement programmes can and should be devised to appropriately prepare and maintain safe drivers, significant reductions of accidents are achieved by road and traffic operation and design practices that are accommodative of human fallibility and the errors drivers make.

- *Errors due to driver deficiencies* - Deficiencies in the capabilities or temporary states of drivers are the causes of numerous errors they make. Where these combine with situations where designs are inappropriate or the traffic is challenging, failure in judgment may result. E.g.,

insufficient experience and training may contribute to a driver's inability to recover from a skid. Similarly, inappropriate risk taking by drivers may lead to errors in gap acceptance while passing. In addition, poor glare recovery may cause older drivers to miss information at night. Adverse psychophysiological states also lead to driver failures. These include decreased performance caused by alcohol and drugs, for which a link to accidents has been clearly established.

The effects of fatigue, caused by sleep deprivation from extended periods of driving without rest or prolonged exposure to monotonous environments, or both, also contribute to accidents. Although opinions among experts are not unanimous, there is agreement that advancing age has a deleterious effect on an individual's perceptual, mental, and motor skills. These skills are critical factors in vehicular operation. Therefore, it is important for the road designer to be aware of the needs of the older driver, and where appropriate, to consider these needs in the roadway design.

Some of the more important information and observations from research studies concerning older drivers are: slower information processing, e.g. slower reaction times, slower decision making, visual deterioration, decline in ability to judge time, speed, and distance, etc. Countermeasures that may make driving easier for older drivers are for example:

- assess all guidelines to consider the practicality of designing for the 95- or 99-percentile driver, as appropriate, to represent the performance abilities of an older driver
- improve sight distance by modifying designs and removing obstructions, particularly at intersections and interchanges,
- assess sight triangles for adequacy of sight distance,
- provide decision sight distances,
- simplify and redesign intersections and interchanges that involve multiple information reception and processing,
- provide larger and brighter signs,
- reduce sign clutter,
- provide more redundant information.

In roadway design, perhaps the most practical measure related to better accommodating older drivers is an increase in sight distance, which may be accomplished through increased use of decision sight distance. Having to accommodate "older drivers", also noting the gradual aging of the driver population, suggests that increased use of decision sight distance may help to reduce future accident frequencies for older drivers. Where provision of decision sight distance is impractical, increased use of advance warning or guide signs may be appropriate.

4 **Speed and Design** - Speed reduces the visual field, restricts peripheral vision, and limits the time available for drivers to receive and process information. Roads built to accommodate high speeds help compensate for these limitations by

- simplifying control and guidance activities,
- aiding drivers with appropriate information,
- placing this information within the cone of clear vision, by eliminating much of the need for peripheral vision, and
- simplifying necessary decisions and spacing them farther apart to decrease information processing demands.

Current freeway designs are close to the goal of allowing drivers to operate at high speeds in comfort and with low likelihood of accidents. Control of access to the travelled way reduces the potential for conflicts by giving drivers a clear path. Clear roadsides have been provided by eliminating obstructions or designing them to be more forgiving. The modern freeway provides an alignment and profile that, together with other factors, encourages high operating speeds. Although improved design has produced significant benefits, it has also created potential challenges. For example, driving at night at high speeds may lead to reduced forward vision because of the inability of headlights to illuminate objects in the driver's path in sufficient time for some drivers to respond. In addition, the severity of accidents is generally greater with increased speed. Freeway standard roads encourage drivers to extend the customary length and duration of their trips. This results in driver fatigue and slower reaction as well as a reduction in attention and vigilance. Road design should take these potential adverse effects into account and seek to lessen their consequences.

22.2.3 Situational awareness and visual clutter

1 Situational awareness is associated with the ability to perceive hazards in the road traffic environment. In a visually complex environment, the presence of, for example, a billboard might be clutter to a driver unfamiliar with the driving environment, for a driver familiar with the environment, its presence possibly goes unnoticed. Any environment element (task or system factors Figure 22.2.3) that detract from the primary driving task is considered an influence of the situational awareness of a driver and potentially dangerous as it influences perception, the ability to make the right decision and importantly influence reaction time and taking the right evasive manoeuvre. Secondly if the type of information presented by the environment, exceeds the capability of the driver to internalise and act upon the information, the overload of information leads to a loss of control.

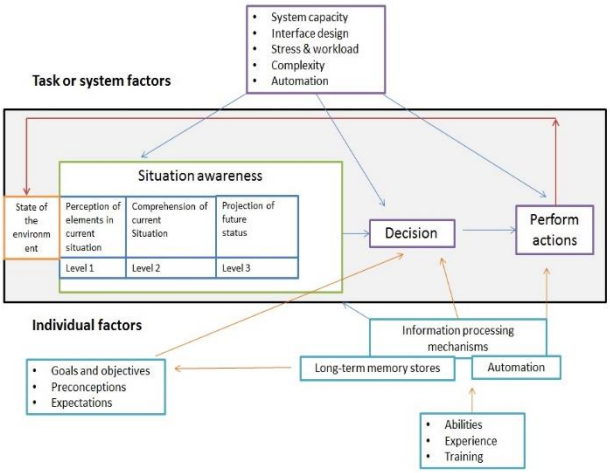


Figure 22.2.3: Critical factors influencing situational awareness in traffic (reconstructed from Endsley 2000b)

2 **Visual clutter** - Visual searches are task-orientated which means that when performing a visual task, the searcher is looking for something specific. The more clutter there is, the longer it takes to complete the task. It is human and thus natural for drivers to tend to direct attention toward items of relevance or guide attention to specific task-relevant areas of a visual environment. It is a challenging task to determine how much information in the environment is too much. Researchers often use the attribute "clutter" in analyses of visual road environment scenes. It refers to items (or areas) in the visual field-of-view that hinders performance on a specific search task. As such clutter is task and environment dependent. What is considered to be clutter in one scenario, may be unimportant in another. Researchers found that 10 to 20 percent of all glances at billboards took ± ≥0.75 seconds; active billboards drew more glances and longer glances (respectively ≥0.75, ≤2.0 seconds) than passive billboards, but did not attract a longer average glance. In addition, there was a large variability in terms of glances among individual billboards within categories (e.g., active vs. passive).

Drivers also tend to fixate on task relevant signage (that control and guide the driver through the road environment) and in especially visually complex environments, excessive clutter may increase the time required to identify, to interpret, and to respond to task specific stimuli. Clutter in the road environment lead to drivers completely missing relevant signs (e.g., lane merging road markings) among a plethora of other signs in the busy road environment. This again leads to erratic driver behaviour, swerving, merging dangerously and so forth. In addition, where advertisements are changed every few seconds, the glances towards these images might be involuntary. Images, flickering on the side of the road, are noticed by drivers' peripheral vision, resulting in an automated response in that direction. In instances where the person is not driving, looking at the flickering image would seem to be safe. However, in instances where the person is driving, the mere fact that the peripheral vison is attracted to a source not directly related to the driving task is obviously problematic for road safety as it attracts glances away from the road. Accident risk increases exponentially even if attention is away from the roadway for only 1.5 to 2 seconds.

Distraction is, but one of the effects that clutter from roadside advertising can have. Other instances where visual clutter has a negative effect on driver performance include having difficulty with visual searches (searching for street signs), which interferes with the immediate task of finding a particular street. The necessity of devoting more attention to the search task will increase driver workload. Increases in workload in turn lead to cognitive distraction, which affects the driver's ability to control the vehicle and drive safely.

Visual search, in the psychological literature, refers to searching for a target one expects to be there (such as a stop sign or a yield sign at an intersection). Visual searches are required for two driving tasks: 1) responding to traffic signs and signals, and 2) navigating to the driver's destination. Visual search for a particular target is hindered by the presence of similar-looking 'distractors' in the driving domain, making visual search for traffic signs more difficult when there are advertisements similar to road traffic signs in the vicinity. Studies also found that reaction times (to locate road signs) increased with the number of distractors, similarity of colours, and proximity to the target sign. Thus, more advertisements and/or larger advertisements decrease the probability of subjects correctly locating the guidance/routing sign. Studies also associated roadside clutter with drivers making more errors from which conclusions that visual clutter caused by advertisements (and other objects) can interfere with drivers' ability to search for traffic signs.

22.2.4 Distraction and inattention

1 Driver distraction occurs when a driver's attention is, voluntarily or involuntarily, diverted from the driving task by an event or object to the extent that the driver is no longer able to perform the driving task adequately or safely. More specifically, driver distraction involves secondary task engagement, where the driver's attention is shifted away from the primary driving task. There are four distinct elements to distraction, which are often difficult to isolate: visual; acoustic; motor; and mental distraction. Recent research in this regard focussed on developing a general conceptual framework for distraction and inattention and investigation of distraction that varies according to the degree of risk, frequency, duration and context.

2 The European Road Safety Observatory (2018) estimated that around 30 percent of driver-distracted accidents are caused by sources outside the vehicle. External sources include landmarks, road signs, advertising billboards, animals, architecture, construction zones, and traffic incidents. The human brain has a limited capacity to process information. Continuous increases in the amount of information being processed by the brain must ultimately lead to the stage where it cannot all be processed in time to allow the driver to effectively and safely carry out the driving task. Theories of distraction build on psychological theories of attention, most of which derive from Hebb's theory of arousal. Hebb argued that there is a relationship between arousal (i.e., to be excited or interested') and 'cue function' (i.e., the ability to perform activities). Humans seek a balance between being under-aroused (bored) and over-aroused (stressed) for the optimal level of response and learning. When human beings are bored, they seek out information that potentially raises their arousal levels. On the other hand, when humans are stressed (over-aroused), they will attempt to remove the information with which that they cannot

deal. In other words, the brain functions as a control mechanism, attempting to self-regulate by modulating arousal. Two main modes of visual perception are important:

- 'Focal' vision is what one might term 'search mode'. This is 'narrow focuses, and specific.
- 'Ambient' vision is the 'default' state, when the driver is not looking at anything in particular.

Attention is 'broad' and the driver is more likely to notice objects at the periphery of the visual field. It can be argued that 'focal' vision is more likely to be associated with high arousal and 'ambient vision' with low arousal. Existing research has not reached a definitive conclusion regarding the impact of outdoor advertising, including the digital display derivatives, on accident frequency. The lack of conclusive findings is primarily due to the limitations in testing methods and data availability and not necessarily the lack of actual impact of these signs have on road safety. For example, historical accident record typically lacks essential information about the presence of an outdoor advertising display, it's operational characteristics at the time of the accident (e.g., content, colour application, brightness, changeability, frame duration, video, etc.), and/or the extent that the outdoor advertising display contributed to an accident (e.g., information about whether distraction from the sign was the only cause of the accident or one of many causes). In the absence of a definitive conclusion, human factors and road safety engineering principles can be applied to understand the accident risk attributed to outdoor advertising displays. **These principles indicate that driver distraction caused by outdoor advertising displays is a consequence of increased glance frequency and duration; where glance frequency is a form of visual distraction and glance duration is a form of cognitive (mind or attention) distraction.**

22.3 ROAD TRAFFIC ACCIDENT RISK

22.3.1 Accidents as low probability incidents

1 Managing road safety is complex and the complexity lies in the fact that an accident seldom results from a single cause. There are usually several influences affecting a road traffic situation at any given time. These influences are separated into three groups; the human elements, the vehicle elements, and the road elements. It is the intricacies and mechanisms with which these elements interact, that make the search for road accident causes so complex. Further making it more complicated is that accidents are also low probability incidents.

2 One of the ways in which accident rate is reported, is accidents per 100 million vehicle-kilometres travelled. In South Africa this rate equates to ±820 accidents per 100 million vehicle-kilometres travelled (the fatal accident rate is ±11 fatalities per 100 million vehicle-kilometres). Driving about one million kilometres (which may be a lifetime of driving for some), will result in an involvement in 8.2 accidents with the chance of one of them being a fatal accident about 0.11 (incidentally this is 15 times higher than in the State of Minnesota, USA and 23 times higher than Australia, for instance). If a person drives 9.1 million kilometres in his lifetime, assuming that he will not encounter other health threats, the chance is that he will likely perish in a motor vehicle accident. The probability of dying in a road traffic accident is therefore low, but it is a catastrophe that about 12 000 people die annually in road traffic accidents as a result of low probability incident risk activity – driving a motor vehicle or walking alongside a road. This is a rudimentary explanation, among many other, why drivers (or road users) find it difficult to perceive (or feel) road risks. Even more so to understand the risks of taking eyes off the road to take a glance at a roadside advertisement.

3 Accidents generally manifest as random incidents although patterns of similar type accidents may develop over time at specific locations, along routes or within a region/community, which may be identified as an accident blackspot and other theme-based road safety performance failure depending on the relative frequency and spatial distribution of such accidents/failures. Accidents are thus typically random type low probability incidents that can have countless permutations of contributory factors that combine extra-ordinarily for a crash to result. Distraction is an added potential accident contributory factor with a plethora of more ways to combine with other demands on drivers in situations that are unpredictable or for which drivers are not appropriately prepared to cope with.

22.3.2 Road unsafety and consequences

1 Unsafety refers to a situation in which safety is lacking. In essence, traffic is unsafe and many traffic situations are dangerous. But ostensibly people accept a certain level of danger and sometimes even look for it, not just in traffic but also in other areas of daily life, such as sport. Nevertheless, the risk of death or physical injury in traffic is socially unacceptable. Lack of road safety can be defined as:

- the presence of danger in traffic;
- an unacceptable degree of risk in traffic.

4 **The presence of danger** - Danger can be described as a critical combination of circumstances that occurs and/or may occur in traffic and that may result in an accident. All accidents are accompanied by a transfer of energy onto structures. In road traffic, those structures are not, or not sufficiently, protected and are, therefore, vulnerable. An accident by definition involves damage - 'Damage' in traffic may refer to fatalities, injuries, psycho-traumatic effects, material damage and damage to the road environment. Lack of road safety is:

- the total of potential and existing critical combinations of circumstances in the process of traffic and transport;
- unplanned events or an unplanned series of events that involve the transfer of energy onto vulnerable structures that are not protected against it;
- the possibility of damage to or loss of people or materials as a result of traffic (death, injury, permanent disability, psychological trauma, material damage and damage to the road environment).

5 Essentially, lack of road safety means that, at some point in time, a critical situation occurs in the traffic and transport process. An example is an encounter between two road users crossing each other's paths that threatens to turn out badly. This critical situation can be reversed if the parties react in the correct manner, but it can also become more critical if either of them fails to react or reacts incorrectly. An incorrect reaction will lead to a succession – a chain – of ever more critical (combinations of) circumstances. If that chain is not broken, an accident is inevitable. The series of critical combinations of circumstances may even continue as the accident takes place and the damage occurs. For example, if the necessary medical assistance is slow in arriving at the scene of an accident, injury may become worse due to blood loss. **The introduction of extraneous distractions, e.g., roadside outdoor advertising displays targeted at road traffic (the allowance of which may regarded as a deliberate act of a road authority) can be a cause for drivers not affording necessary attention to road and traffic conditions and it can be expected that such distractions can frequently be the start of that series of critical combinations of circumstances that end up in a potentially severe accident**.

6 The consequences, or the outcomes of incidents, of which accidents with various degrees of severity are possibilities, provide perspectives on the tasks to prevent accidents or to mitigate the severity of the consequences when they happen. A lack of road safety is manifested in the different forms of damage that are caused by traffic accidents. The definitions of the consequences are categorised in accordance with accident registration:

- death: death occurring within thirty days of an accident (the internationally recognised definition);
- hospital: hospitalisation for at least one night, but no death occurring within thirty days;
- emergency assistance: transported to hospital by ambulance, but not hospitalised;
- not hospitalised: injured, but not transported to hospital;
- material damage only: no personal injuries.
- In addition, the following groups are distinguished:
    - serious injuries: fatalities and hospitalised injuries combined.
    - slight injuries: emergency assistance and

not hospitalised together.

Current injury registration does not properly distinguish between emergency assistance and not hospitalised. Emergency assistance casualties are often worse off than not hospitalised casualties, but they are often registered as not hospitalised casualties. Permanent consequences such as disability, psychological trauma, permanent sorrow due to the loss of loved ones and its effects are not registered. Every year, the numbers of people disabled in traffic accidents increases.

7 **The introduction of distracting roadside devices elevates road unsafety. There should be efforts to also introduce measures that will directly contribute to the improvement of safety of road elements where added exposure to inattentiveness and distraction is anticipated**.

22.3.3 Unacceptability of the risk

5 Risk can be defined as the chance of an unwanted or harmful consequence of participating in an activity or of exposure to a dangerous situation. 'The chance of' is the probability of an unwanted event occurring with all the related harmful effects. Traffic risk is the chance of getting involved in a traffic accident resulting in death, injury and/or damage. How much damage is acceptable? The significance and benefits of participating in a certain activity must be weighed against the sacrifices that may have to be made and the harm caused by the damage that may result. The more benefits an activity has, the higher the acceptance of risk. A driver who starts out too late for an important meeting will accept more risks than one who has left on time for a leisure destination. In the first instance, the chance of arriving too late outweighs the increased chance of an accident. Peer group norms play a role in that consideration as well. Young drivers take more risks because their peers find daring and 'testing limits' important and, moreover, because they underestimate the risk. Whether a traffic risk is acceptable is a social and political issue. The answer is influenced by a variety of factors, which are roughly the same as those that determine how people generally experience risks.

- *The voluntary nature of participating in traffic and taking risks* - A playing child does not participate in traffic voluntarily. Socially speaking, the death of a playing child in a traffic accident is given about a thousand times more weight than the death of a motorist, who is assumed to have chosen to drive to his destination voluntarily. Risks taken voluntarily on an individual basis (including deep-sea diving, driving a motorcycle and bungee jumping) are also given much less weight than danger faced involuntarily.
- *The catastrophic or chronic nature of the risk* - Socially, a single plane accident with a hundred fatalities is given more weight than a hundred traffic accidents that occur over a longer period of time and have a single fatality each. In society, the severity, scope and concentration of an accident are more important than its frequency.
- *The degree to which people think they can control the risk themselves* - Much less risk is accepted for plane, train and bus passengers than for motorists or cyclists. After all, public transport passengers depend on a driver without being able to influence his behaviour, while motorists and cyclists take part in traffic themselves, often contribute to the risk by their behaviour, and control the risk themselves.
- *The degree of protection* - The risk for unprotected pedestrians is socially less acceptable than the risk for a motorist in his steel cage.
- *The degree of familiarity with the risk* - Children are hardly capable of estimating the risk they run in traffic, whereas in most cases adults are. Risks that cannot be perceived or assessed by traffic participants are given more weight than risks that can.
- *The avoidability of risks* - In situations in which the risk could have been avoided – for example by means of a solution implemented by the road authority – the risk is considered less acceptable than in other situations.

In terms of risk homeostasis theory, if drivers (or road users) subjectively perceive that the level of risk is less than acceptable they will then modify their behaviour to increase their exposure to risk. Conversely, if they perceive a higher than acceptable risk, they will compensate by exercising greater caution. Therefore, people don't always respond as expected to, e.g., education (or warnings and law enforcement) about unsafe situations, circumstances and actions, typically part of traditional road safety interventions, but rather adjust their response to their own target level of risk. '**Roadside outdoor advertising displays should be regarded as an exposure of drivers to the involuntary risk of being distracted at a critical moment in traffic and over which they are likely to at best have marginalised cognitive control. On the other hand, road authorities can control the posting of roadside outdoor advertising displays and can avoid the added risk of extraneous distractions**.

22.4 ROAD SAFETY CONTROLS

22.4.1 Road user characteristics

1 Theories on road safety have changed dramatically over the years. Where initially only one dominant cause was sought, this has now shifted to a systems approach in which all factors that determine road safety are considered in their interrelations. The Sustainable Safety principle was developed on the basis of the available knowledge. The frame of reference forms the basis for describing road safety and motivating measures. Most unsafe traffic situations can be traced back to human errors. This was discussed in terms of unsafe behaviour by road users, a general description of the driving task, the cycle of human information processing (perception, assessment, decision, action) and the way in which people perform tasks. The individual characteristics of, and main differences between humans and the relationship with accident risk were also discussed. Laws of physics are also relevant alongside human behaviour. This refers to the mechanical characteristics of the traffic system. A collision causes a transfer of energy that is determined by speed, mass, resilience and differences in directions. This transfer of energy may cause injury and damage, and as such, it is crucial to the end result of the accident.

2 **Psychological and cognitive aspects** - The human factor is instrumental in almost all accidents. It is important, therefore, to take the possibilities and limitations of road users as starting point for designing the road and traffic environment: man as the measure of all things. People are imperfect, make mistakes or are still learning. Moreover, some people deliberately look for risks. As such, 'man as the measure of all things' does not refer to a perfect human being, but to a regular, 'standard', vulnerable road user with all his shortcomings who should be taken into consideration as much as possible in the traffic system.

3 **Human causes of accidents** - A study of human errors showed that almost half of all accidents with human causes had to do with perceptual errors:

- Improper lookout occurred frequently on intersections. Drivers would look, but failed to see other road users, did not pay attention, or failed to look in the right direction.
- Inattention often had to do with drivers failing to see on time that the car before them stopped or braked.
- Internal distraction also played a key role.

With training, however, people can get better at performing a task, perform it more smoothly and make fewer mistakes. Moreover, people have certain skills that technology cannot yet take over, such as anticipating complex situations and dealing with them instantly. Every time they make a journey, people make decisions, and most of them are the right ones. The pyramid in Figure 22.4.1 illustrates that most of the time most of what happens in the traffic process turns out right, with only the occasional incident.

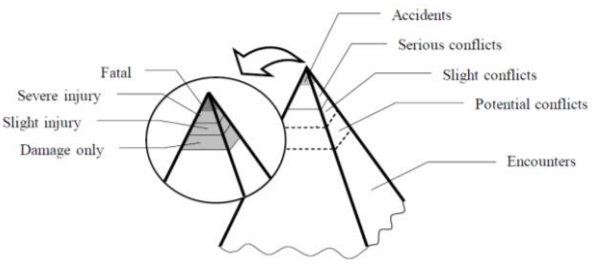


Figure 22.4.1: "Safety pyramid" (adapted from Hydén, 1987)

The "safety pyramid" also demonstrates the concept of severity. The proximity to an accident is only one dimension of "severity". The potential consequences in case an accident had taken place is another aspect that should be taken into account. For example, minor accidents between cars in parking lots are hardly any concern for road safety, as they almost never result in any injuries for car occupants. On the other hand, a near-miss (or non-accident) between a cyclist and a heavy truck moving at high speed would be perceived as a very severe situation as, had it become an accident, the consequences would be very dramatic. Considering South African road accident statistics, it is estimated that fatal accidents per year account for roughly 1.43 percent of all the accidents (RTMC CoC 2016) (which exclude the near-misses).

4 **Road unsafety caused by the road user** - Human errors are the main cause of traffic accidents. Based on this general observation, it would seem useful to investigate what type of human error immediately precedes an accident. The question remains as to how the cause of the accident came about. For example: what was the reason why a driver was distracted from driving? Was he under the influence of alcohol? Countermeasures cannot be taken until the real reason is known. An inventory that drew a lot of attention from road safety experts was the '100 car naturalistic driving study' in the USA. As part of this study, 100 cars were fitted with a video camera filming the driver's face and events outside. This showed what happened immediately prior to an accident and under what circumstances, such as roads, weather conditions, and what the driver was doing. If, for example, an accident happened while the driver was making a phone call, this could be compared to other situations in which drivers were calling but no accident happened. This gave a good assessment of the real risk related to making phone calls while driving. This is an extremely valuable study, because it also provided information on the non-occurrence of accidents under the same circumstances.

A special category of disturbed concentration is thinking about other things, such as home, work, daydreaming and the like. This is not a case of deliberate external distraction, but rather internal distraction. Obviously, it is difficult to ascertain what proportion of accidents is caused by this type of distraction. The '100 car naturalistic driving study' does give an impression of external distraction, but, understandably, gives no indication of the driver's thoughts. At best, the observation made in the event of an accident is 'looked but failed to see'. It will then be necessary to study why the object in question was not seen. Research has shown that 'looked but failed to see' played a role in 10% of the accidents studied. If accidents caused by alcohol and drowsiness/fatigue are disregarded, the percentage 'looked but

failed to see' was as much as 22.8%. Accident analysis only yields information about the accident and seldom provides any pre-accident information. The above study shows that doing something else (a secondary task) while driving affects the chance of an accident. However, fatigue is one of the principal contributors to the chance of an accident (see Table 22.4.1).

Table 22.4.1: Type of distraction and the factor with which the chance of a (near) accident

Type of distraction	Increase/decrease in chance of accident or near-accident (1 = neutral)
Moderate to severe fatigue	**6.23**
Complex secondary task1)	**3.10**
Normal secondary task2)	**2.10**
Simple secondary task3)	(1.18)
Reaching for a moving object	**8.82**
Insect in car	(6.37)
Looking at external object	**3.70**
Reading	**3.38**
Applying make-up	**3.13**
Dialling a number on mobile phone	(2.79)
Changing CD	(2.25)
Eating	(1.57)
Reaching for non-moving object	(1.38)
Talking in or listening to mobile phone	(1.29)
Passenger on passenger seat	**0.50**
Passenger on back seat	(0.39)
Child on back seat	(0.33)

Comment:
Factors that deviate significantly from one (1) are presented in bold; these lead to an increased or decreased chance of an accident.
The figures between brackets do not differ significantly from one (1) (no increased or decreased chance of an accident).
1) A complex secondary task includes dialling a phone number, using a PDA, reading, applying make-up, et cetera.
2) A normal secondary task includes having a telephone conversation, holding a mobile phone, changing a CD, eating, et cetera.
3) A simple secondary task includes adjusting the radio, talking with a passenger, drinking, smoking, et cetera.

This shows that certain activities considerably increase the chance of a (near) accident. In general, the processing of information is understood as a cycle of perception > assessment > decision > action. Seeing (visual perception) plays a key role in road use. It should be noted that not everything that is visible is always seen. Perception is not a passive process, but an interaction between seeing and the road user's expectations.

22.4.2 Road design parameters

1 The road design parameters that are deemed relevant in determining the dimensions of Sustainable Safety Zones of Interest and related outdoor advertising display placement specifications are stopping sight distance, decision sight distance horizontal alignment, vertical alignment, clear zone and operating speed.

2 **Stopping sight distance** - Sight distance is the length of the roadway ahead that is visible to the driver. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. Although greater lengths of visible roadway are desirable, the sight distance at every point along a roadway should be at least that needed for a below-average driver or vehicle to stop. Stopping sight distance is the sum of two distances: (1) the distance traversed by the vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied, and (2) the distance needed to stop the vehicle from the instant brake application begins. These are referred to as brake reaction distance and braking distance, respectively. The selected design speed of a roadway determines the horizontal and vertical alignment design elements based on an achievable stopping sight distance. The stopping sight distances at various operating speeds, are provided in Table 22.4.2.

Table 22.4.2: Stopping sight distance for selected operating speeds (AASHTO, 2011)

Operating speed (km/h)	Stopping sight distance
50	65
60	85
70	105
80	130
90	160
100	185
110	220
120	250
130	285

2 **Decision sight distance** - Decision sight distance is the distance needed for a driver to detect an unexpected or otherwise difficult to perceive information source or condition in a roadway environment that may be visually cluttered, recognise the condition or its potential threat, select an appropriate speed and path, and initiate and complete complex manoeuvres. Decision sight distance offers drivers additional margin for error and affords them sufficient length to manoeuvre their vehicles at the same or reduced speed, rather than to just stop, and therefore its values are substantially greater than stopping sight distance.

Drivers need decision sight distances whenever there is likelihood for error in either information reception, decision making, or control actions. Examples of critical locations where these kinds of errors are likely to occur, and where it is desirable to provide decision sight distance, include interchange and intersection locations where unusual or unexpected manoeuvres are needed, changes in cross section such as toll plazas and

lane drops, road sections on which sudden operating speed changes occur (e.g., as a result of high differential speeds and shockwave effects) and areas of concentrated demand where there is apt to be "visual noise" from competing sources of information, such as roadway elements, traffic, traffic control devices, and advertising signs. **For purposes of determining the control parameters used for the dimensioning of the Sustainable Safety Zones of Interest applicable to the acceptable location of outdoor advertising displays alongside the road reserve, decision sight distance is deemed applicable.** Table 22.4.3 below provides the decision sight distances for various operating speeds (based on the AASHTO 2011 formula for decision sight distance) for the dimensioning of the Sustainable Safety Zones of Interest as relevant for the acceptable location of outdoor advertising displays alongside the road reserve outside the building restriction area.

Table 22.4.3: Decision sight distance for outdoor advertising display restriction area determinants (adapted from AASHTO, 2011)

Operating speed (km/h)	Decision sight distance
50	195
60	235
70	275
80	315
90	360
100	400
110	430
120	470
130	510

3 Horizontal alignment - The design speed of a road is an overall design control and is typically applied to achieve a balance among all design element often in terms of practical and economic consideration. The design of roadway curves depends on an appropriate relationship between design speed and curvature and on their joint relationships with super-elevation and side friction. For purposes of this chapter, the horizontal alignment of a road, and sometimes is combination with the vertical alignment, may have an effect on whether decision sight distance is available on a section of road. Assessing such will likely require necessary field investigations which will be relevant for the evaluation of outdoor advertising display placement along road reserves.

4 **Vertical alignment** - The topography of the land traversed has an influence on the alignment of roads and streets. Topography affects horizontal alignment, but has an even more pronounced effect on vertical alignment. Variations in topography are characterised to terrain— level, rolling, and mountainous. As for horizontal alignment, for purposes of this chapter, the vertical alignment of a road, and sometimes is combination with the horizontal alignment, may have an effect on whether decision sight distance is available on a section of road. Situations may also exist where stopping sight distance is available but as a result of non-recurring incidents that bring about sudden speed changes, decision sight distance with high levels of driver attention is required. Assessing such situations will likely require necessary field investigations which will be relevant for the evaluation of outdoor advertising display placement along road reserves.

5 **Clear zone** - Clear Zone means that part of roadside border area, with a specified minimum width, starting at the edge of the travelled way outwards, which is available for safe use by errant vehicles and the display of official traffic signs. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope and/or a clear run-out area. The minimum clear zone width depends on the speed environment and roadside geometry. The process of applying the clear zone concept to design involves determining the width of the required clear zone to establish an area (or corridor) of interest in which hazards will be identified, noting that the width at any particular point will depend on several factors. The widths and area of interest may be marked up on plans. For each road section, the base clear zone width (i.e., prior to allowance for non-recoverable slope and provision of a run-out area at the toe) is obtained from the applicable design specification. Each direction of travel is considered separately. Plotting the area of interest on plans will ensure that wherever practicable roadside furniture and features (e.g., landscaping, sign supports, culvert end treatments, etc.) are designed to be outside the clear zone, or to be frangible or are provided with an adequate shield (e.g. road safety barrier, crash cushion) to protect errant drivers.

6 **Speed** - The speed limit on a road is set with a road traffic sign posted on a road in terms of the road traffic regulations and the speed so indicated with the number on such speed limit sign (sign R201) shall not be exceeded by drivers. The posted speed limit is by interpretation the maximum speed at which a vehicle may be driven on a roadway "under ideal conditions". Ideal conditions relate to good weather conditions, the road geometry and road design speed, the location (whether it's in the urban area or a rural area), the functional classification of the road, the presence of pedestrians and numerous other factors that are also taken into account. A 'speed limit' may be regarded as a theoretical value that is determined through a technical process with the objective to derive a fair indication of the safe operating speed under ideal conditions (note that it will probably always be problematic to establish 'safe speed' for a road). The technical process, which is set out in Chapter 20: Setting of speed limits, takes account of the human sense of a safe (comfortable) travelling speed through what is the 85-percentile speed measurement. The 85-percentile speed is the speed at which 85 percent of drivers travel equal, or below to under free-flow conditions (typically at headways in excess of 7 seconds). The speed limit as the maximum speed to drive at under ideal conditions places the responsibility on drivers to adjust their speed according to prevailing conditions. It is not possible to indicate safe speed on a road exactly because of conditions that can change in an instant and drivers must be continuously aware of prevailing conditions and need to adjust accordingly to ensure that they drive safely as dictated by such conditions. Speed limits cannot be set for the worst conditions that may develop on a road. The technical process is an attempt to consider all factors (road environment, road, vehicles, road users, behaviours) that will influence the driver's selection of driving speed. **For**

purposes of determining the control parameters used for the dimensioning of the Sustainable Safety Zones of Interest relevant for the acceptable location of outdoor advertising displays alongside the road reserve, the speed limit as determined through the procedures as set out in Chapter 20 and certified by a professional engineer, engineering technologist or -technician of the respective road authority will apply. In the absence of engineering certification of the speed limit, the 85-percentile free-flow speed, determined through the accepted methodology shall be applied instead. Speed limits must be credible, reflecting the characteristics of the road and the road environment. If a speed limit is not credible, drivers tend to choose their own speed at will. Moreover, if there are many situations with speed limits that are not credible, the credibility of speed limits in general and speed law enforcement efforts are affected negatively. With prevailing poor speed discipline and control on South African roads (that include practices of ad-hoc posting of speed limit signs), and the problem of drivers not adapting speeds according to road, traffic, weather and visibility conditions, the use of the 85-percentile speed on road sections, as alternative to the Chapter 20 speed limit setting certification, is deemed appropriate as an interim safe system application for determining the operating speed for the purposes of this chapter.

22.5 ROAD AND TRAFFIC CHARACTERISATION

22.5.1 Road classification

1 The classification and management of the road network is a fundamental component for the planning and development of road infrastructure. TRH 26: South African Road Classification and Access Management Manual refers as the basis for the hierarchical organisation of the roads to deliver a road network that efficiently and effectively provides the functions of land access and traffic mobility. There is an obligation on all tiers of road authorities to provide a reliable, effective, efficient and integrated transport system that supports the sustainable economic and social development of the South African society by:

- planning, designing, constructing and maintaining the road network,
- protecting the public investment in the road infrastructure,
- ensuring the continued functionality of the transportation system, and
- promoting the safety of traffic on the road network.

Outdoor advertising, with billboard type displays, among other, targets road traffic and poses particular challenges to road authorities with respect to the abovementioned obligations. In considering outdoor advertising displays alongside road reserves, the classification of the road according to the road classification system is relevant for the characterisation of the road to provide insight into the potential impact of the introduction of an extraneous distraction to drivers on the roadway. Protecting the integrity and effectiveness road traffic signing system on the road would be one objective. The class of road determines the road traffic sign specifications as well the level of signage as per the SADC Road Traffic Signs Manual signing classification. Continuous monitoring of the road network is part of ongoing management of the road system under the jurisdiction of a road authority, which includes making necessary changes as a result of land development, traffic operations management, etc. Depending on the class of road, it can be expected that the signing system may have to be updated/upgraded due to evolving needs, e.g., the expansion of tourism facilities that can be supported with the posting of SARTSM tourism signs, among other.

2 **The approach to considering the potential impact of outdoor advertising displays on the road traffic signing system is that the placement of such a display should not distract driver's attention away from important road traffic sign messages, be it for traffic control, warning or guidance purposes.** Apart from possibly some road traffic information signs, all posted road traffic signs are regarded as containing important messages to road users. Read time of outdoor advertising displays shall not exceed 2 seconds regardless of the type (class) of road (also refer to Volume 1, Chapter 4, Sections 4.3 and 4.4). The spacing of outdoor advertising displays alongside the road reserve (measured perpendicular to the roadway in relation to important traffic signs (including road traffic markings), shall be so that reading a display will be completed in time for a driver to continue to observe, read, interpret and act on the posted traffic information. In this regard the operating speed of the road traffic will be the parameter to determine the respective distances. This is generic determination and will thus be applicable to all classes of roads.

3 The main elements of traffic characterisation are traffic volume, traffic operating speed and accident risk. These in combination are likely relevant determinants of the accident profile of road. However, traffic flow information describe the operational conditions of the road and which will ideally align with the functional classification of the road. Volume-capacity ratio, peak hour factor, delay and queue lengths, etc. further describe the quality of the service. Traffic volume is also an indicator of accident risk. However, comparisons across road classes may show that a Class 1 facility will move high volumes of traffic at significantly lower accidents rates (sometimes lower frequencies) than a lower-class facility with typically even lower traffic volumes. Traffic volume is used in the risk mapping of roads, e.g., the Road Assessment Programme, which is a systematic programme of risk assessment with the objective to identify major safety shortcomings that can be addressed by practical road improvement measures - implemented on prioritisation - benefit/cost being one of possible methods of prioritisation. The approach with assessing the impact of outdoor advertising displays on road safety due to their distracting intent is not to determine the relative potential contribution to the accident risk profile of a road, but aligned with the Safe System, accept that such a distraction of drivers' attention away from the driving task is likely to add to accident risk and thus consider measures, e.g., outdoor advertising display locality and placement outside the road reserve, to as best possible manage the potential of distraction, and if distraction do contribute to a driver erring, to mitigate against the severity of a likely accident.

4 Cognisance must be taken that South Africa's road safety record is dismal. It cannot be acceptable that so many people die or get (seriously) injured in road accidents. It is a situation that demands that road authorities should continuously engage in programmes to identify road system safety performance failures, high frequency accident locations, and other road safety problems to investigate, analyse, develop solutions and interventions and, implement suitable countermeasures. While work is done to improve accident data and statistics crucial for road safety management and engineering, engineers and engineering technologists and technicians have to make do with the accident information available. Countries with commendable road safety management systems have comprehensive reliable data on at least location coded fatal and serious injury accidents. Fatal and serious injury (FSI) accident data are used to determine critical accident rates for sections of roads. Based on this criteria, the requirement is that outdoor advertising displays must be located clear of any sections of road that have an actual accident rate above the critical accident crash rate. For intersections, for instance, with more than three (3) FSI accidents over a period of five (5) years, any restriction distances pertaining to the location of outdoor advertising displays are doubled. Accident data in South Africa are limited to fatality statistics with locational information mostly road description based (better data are sometimes collected on national roads with operational management systems, e.g., toll concession roads). Proportional expansion factors derived from historical

data (RTMC Cost of Crashes 2016) can be used to estimate FSI accident numbers from the fatal accident counts on roads.

22.5.2 Accident risk assessment

1 Regardless of the state of road traffic accident recording, the need to consider the road safety impact of a display of outdoor advertising alongside a road, often as a result of commercial and market demands, emphasise that road safety management should be an ongoing active function within a road authority. Whilst there may be on going (ad hoc and proactive) accident and road safety investigations, road safety assessment, road safety audit, road safety impact study, etc., it is deemed feasible to utilise tools like a road assessment programme (RAP), e.g., SafeNet/iRAP/SARAP, to conduct risk assessments to aid strategic decisions on route improvements, crash protection and standards of route management. A RAP produces a rated accident risk output for roads - e.g., iRAP uses a 5-star rating system, which gives a clearer recognition of the influence of road design on accident risk and how it can vary on different types of road. Such a rating system also illustrates more generally how high-level infrastructure variables, such as roadway type and road standards, influence accident risk.

2 Countries that utilise RAP tools usually aims to have no roads with a worse than 3-star rating. Implementing a RAP may not be in the immediate realm of road authorities, but it appears that the rating scale of the RAP system of 3-star suggests the norm for what could be an allowable risk level. The dilemma of adding additional risk, in the form of devices that are distracting to drivers, can be addressed with the postulation that no outdoor advertising displays should be allowed along road reserves of roads with a star rating of 2-stars and below. This provides the direction to the application of Safe System principles in terms of what would be required to achieve 3-star status, which means achieving the maximum risk threshold that may allow outdoor advertising (under certain controls) alongside the road reserve. The types of accidents that form the basis of the RAP Star Rating attributes that are captured for road assessments are:

   1. Accidents with vulnerable road users (pedestrians and cyclists)
   2. Single vehicles leaving the roadway
   3. Accidents at junctions
   4. Head-on accidents between oncoming vehicles

   All four accident types have the probability for inattention or distraction as a contributory factor, but one to three (not necessarily excluding four) can be the types of accidents for which roadsides and intersections can be evaluated for Safe System compliancy in terms of which some additional demands on driver attention with limited outdoor advertising plays can be considered. This is thus an alternative approach if a RAP-type rating system is not available to assess the level of accident risk on roads targeted for outdoor advertising. **It is nevertheless the prerogative of the municipality (or the responsible road authority) to require traffic impact studies to be conducted in assisting with the evaluation of any application to introduce extraneous distracting features, including outdoor advertising displays, into the road environment or to conduct studies for routes or areas to determine appropriateness and/or feasibility to introduce such extraneous distracting features that target road traffic**.

   Roads with high traffic volumes are the roads that outdoor advertising agents have the greatest interested in. High traffic volumes mean high exposure to their displays. The benefit of deploying Safe System practices, have the potential to deliver significant road safety performance results at very high internal rates of return particularly when concerned with roads carrying high volumes of traffic.

3 Pedestrian fatalities are of the greatest concern - accounting for around 40 percent of all road fatalities. Bicycle accidents are also overrepresented in accident statistics given the low proportional road use of cyclists. The lack of facilities along roads is the most pertinent contributing factor in pedestrian and cycle accidents. Lacking of acute attention/concentration, or the underestimation of the need for extraordinary attention by drivers is also likely a key contributor to unsafety in situations with pervading pedestrian activity. The unique context in South Africa, due to the development history of the country, is high volumes of pedestrians along higher order roads and also crossing these (often freeway standard) roads. With the exclusion of specific pedestrianised areas like in CBDs, it is deemed illogical, or even cynical, to allow the introduction of distracting features alongside roads, particularly the higher order roads, with pedestrian presence. The assessment of the state of the roadside will thus have to afford a critical view of what should be in place for pedestrians (and cyclists) at a minimum to allow the adding of further potential accident risk, particular involving pedestrians/cyclists, by the intentional placement of distracting outdoor advertising displays alongside the road reserves. It is a requirement that roads that may be considered for roadside outdoor advertising outside the road reserve should have Safe System-ready roadsides (with the clear zone portion essentially being road safety managed. Availability of appropriate facilities for pedestrians (but also for cyclist and other vulnerable road users) will be one of the important elements to take account of in any clear zone Safe System readiness assessment.

4 Intersection performance – The assessment of the state of intersection safety performance (to determine the gap to Safe System readiness) can be based on the following principles:

   - adequate visibility
   - minimising potential for conflict
   - managing priority movements
   - managing speeds
   - clear and easy to understand design and layout.

5 Ensuring adequate visibility - Adequate visibility of the intersection, of any traffic control devices on the approach and within the intersection, and of other vehicles approaching or standing at the intersection must be available to permit drivers to undertake reasonable actions to ensure safe progress through the intersection. There are four sight distance criteria applicable to intersections:

   - approach sight distance (ASD)
   - entering sight distance (ESD)
   - safe intersection sight distance (SISD)
   - minimum gap sight distance (MGSD).

   ASD and SISD should be achieved for all intersections, ESD where possible and MGSD where appropriate. It is particularly important that sight distance considerations be examined in situations where a new intersection with an existing road is being

proposed or where there is likely to be a significant increase in traffic volumes at an existing intersection.

Heavy vehicles accelerate and decelerate much slower than cars and it is important that this be considered when assessing the adequacy of sight distances, noting however that the truck drivers' eye height is significantly higher than that for car drivers. Trials of reducing sight distance on the approach to intersections have been undertaken, in order to encourage drivers to slow on the approach to the intersection.

6 Minimising potential for conflict - The potential for conflict within an intersection should be minimised through reduction of the number of points of conflict, their spatial separation and/or minimising the area of conflict. Points of conflict can be separated or reduced by the addition of deceleration lanes, realignment of the intersection, turn bans, etc. It is known that the number of conflict points at cross-intersections is much greater than for T-intersections or roundabouts. Notably the impact angle is more favourable for a roundabout design than for the angles associated with some of the conflict points at cross-intersections and T-intersections.

Intersection manoeuvres involving conflicts are:

- merging
- diverging necessitating the vehicle following to slow down
- weaving
- crossing.

7 Managing priority movements - Consideration should be given, with a Safe System perspective, to managing priority movements at intersections in line with driver expectations. In general, preference should be given to major movements. There is high driver expectation that major rural routes will have a free-flowing alignment and priority and drivers who have travelled for long, uninterrupted distances at high-speed will be slow to react to a sudden change in alignment or to the entry of a high-speed vehicle from a minor road. Minor movements should be clearly subordinated to major or high-speed movements by design, signing and/or speed control. Adequate warning should be provided:

- on major priority approaches through provision of adequate ASD and SISD
- on minor approaches by providing adequate ASD, and ESD where practicable or MGSD where appropriate.

8 Managing speeds - Vehicle speeds through an intersection should be managed safely. Low relative speed provides a safer environment for conflicting manoeuvres and enables drivers to accept smaller gaps thus reducing delays and increasing capacity. The relative speed between two vehicles approaching each other from various angles can be determined by the construction of a vector diagram. Crossing manoeuvres that produce high potential relative speeds should be made preferably at right-angles, although 70º to 110º/120º is acceptable to minimise driver estimation errors. In such cases, it is usually necessary to reduce approach speeds by altering approach alignment and channelisation (e.g. converting a skewed intersection to a T-intersection) or the installation of traffic control devices. It should be noted that a 70º skew can present difficulties for truck drivers, and therefore provision of an auxiliary left turn lane may be considered rather than an island. The direction of skew makes a difference in terms of safe operation of the intersection, particularly in relation to the ability for drivers to clearly see intersection, and traffic on intersecting road, in advance.

9 Road Lighting - Intersections are locations where the driving task is generally more complex than elsewhere along a route. In urban areas they are the source of most accidents, and lighting of urban intersections to appropriate standards is usually justified even with low traffic volumes. In urban areas the need for other road users (such as pedestrians and cyclists) to see and be seen should be taken into account, as well as the lighting of physical devices (e.g., channelisation, roundabouts, local area traffic management (e.g., traffic calming). In rural areas it is common not to illuminate a route, but intersection lighting may be used to indicate the presence of an intersection or to illuminate vehicle paths through a channelised treatment. This is particularly important if signage (directional, regulatory, or warning) or delineation is insufficient to provide cues to enable deceleration to a safe manoeuvring speed. At isolated rural intersections that have raised medians on the through route it is desirable to illuminate the nose of the median island on the external approaches. At these locations, care needs to be taken to control glare and to avoid providing excessive light, which can lead to driver difficulty in adapting to darkness on the road immediately beyond the intersection. Notably, road lighting would be part of possible measures to achieve Safe System readiness. However, road lighting can have other positive and negative effects such as improving the safety and personal security of people (including pedestrians and cyclists) and creating light-spill and glare that can be annoying to abutting residents.

There are two basic lighting situations at intersections:

- flag-lit – used at minor rural intersections that are remote and do not have channelisation and comprises one or two luminaires specifically to indicate the presence of the intersection
- normal – used at intersections where one of more of the following apply:
    - high conflicting traffic volumes
    - channelisation/islands at the intersection
    - it would be difficult for drivers to readily identify in advance the general layout of the intersection or their desired route through the intersection
    - significant crossing movements, especially by pedestrians or cyclists (significant pedestrian movement across a road requires floodlighting of the facility).

10 Roadside state - A vehicle will leave the roadway and encroach on the roadside for many reasons, including the following:

- Driver fatigue
- Driver distractions or inattention
- Excessive speed
- Driving under the influence of drugs or alcohol
- Accident avoidance
- Adverse roadway conditions, such as ice, snow, or rain
- Vehicle component failure
- Poor visibility

Regardless of the reason for a vehicle leaving the roadway, a roadside environment free of fixed objects and with stable, flattened slopes, enhances the opportunity for motorists to regain control of their vehicles and reduce accident severity. The forgiving roadside concept allows for errant vehicles leaving the roadway and supports a roadside design in which the serious consequences of such incidents are reduced. Through decades of experience and research, the application of the forgiving roadside concept has been refined to the point where roadside design is an integral part of the transportation design process. Design options for reducing roadside obstacles, in order of preference, are as follows:

- Remove the obstacle.
- Redesign the obstacle so it can be safely traversed.
- Relocate the obstacle to a point where it is less likely to be struck.
- Reduce impact severity by using an appropriate breakaway device.
- Shield the obstacle with a longitudinal traffic barrier designed for redirection or use a crash cushion.
- Delineate the obstacle if the previous alternatives are not appropriate.

The use of rumble strips to supplement pavement edge lines as an on-roadway safety feature on facilities experiencing a significant number of runoff-the-road accidents. These indentations in the roadway shoulders alert motorists through noise and vibration that their vehicles have departed the travelled way and afford them an opportunity to return to and remain on the roadway safely.

22.6 ROADSIDE ADVERTISING ASSESSMENT

22.6.1 Sustainable safety zones

1 The approach to the management of the extraneous distractions of outdoor advertising displays on roads, for purposes of limiting road safety and traffic operational impacts, builds on the following:

- South African drivers, road users and citizens in general face an unacceptable high risk of incurring damage, getting seriously injured and being killed in road traffic incidents on the country's road network;
- Outdoor advertising displays next to roads increase the risk of accidents due to its inherent distraction attributes and the intent of advertisers to attract attention. In the South African context, with omnipresent pedestrians alongside high-trafficked roads, it is anticipated that the impact of such distractions will likely be greater than what is typically the case in available international research;
- It is deemed illogical to allow the addition of more road risks or the exacerbation of existing road risks in the road environment through extraneous elements and other effects that compromises of the effectiveness of the road traffic information system and distracts the attention of drivers whilst the country finds itself in a situation where accident and fatality rates that are among the worst in the world. **It would be reasonable, if it is the endeavour to achieve sustainable road safety, should it be considered to under appropriate regulation allow for a level of extraneous distractions to drivers and cluttering of the environment, that it be commensurate with some necessary steps to mitigate against such added road safety risks.** The alternative is that such consideration would contribute to unsustainable road safety management practice;
- Accidents that occur at road intersections and accidents that involve vehicles leaving the travelled way represent of the higher proportions of accidents in road traffic accident statistics. These types of accidents are typically also associated with "distraction" in various forms as a contributing factor in accidents. Implementing mitigation measures that can reduce the incidences of these distraction induced types of accidents, or when they do occur, limit the severity of the accidents by Safe System-based interventions and treatments, is deemed the responsible way to respond to requests to add extraneous roadside distractions to roads;
- Roads that have functional clear zones in accordance with Safe System principles, including provisions for pedestrians where of relevance, will allow the support of roadside outdoor advertising display proposals in terms of certain content, location and spacing requirements. The road safety performance of intersections and other traffic conflict zones can also be significantly improved by ensuring that adjacent clear zones are functional and compliant with Safe System principles;
- The following **Sustainable Safety Zones of Interest** are defined:
    - The **road reserve** including the roadway (an area of maximum control defined in sub-section (2) below),
    - The **Clear Zone** (an area of maximum control defined in sub-section (2) below) has two roles in the methodology of this chapter:
        - The availability of a Safe System compliant clear zone on a road section, unlock the potential to consider the support of an outdoor advertising display in the area outside the road reserve adjacent to the road with a Safe System compliant clear zone,
        - The availability of a Safe System compliant clear zone at an intersection or junction and the approaches and exits to it for distances equal to decision sight distance, will allow the reduction of the longitudinal dimensions of the respective outdoor advertising restriction area to stopping sight distance should traffic operational conditions be favourable.
    - A **Traffic Conflict Area** (defined in sub-section (2) below),
    - A **Turbulence Zone** (defined in sub-section (2) below),
    - An **Outdoor Advertising Display Restriction Area** (defined in sub-section (2) below), is an area outside the road reserve:
        - Adjacent to a conflict area;
        - Adjacent to a turbulence zone,
        - Adjacent to a road traffic sign, and
        - The area outside the road reserve with an already allocated position for an outdoor advertising display.
    - A **Display Zone** is a zone adjacent to a road reserve of a road section and outside the building restriction area, where the Clear Zone of the respective road section with the same parallel longitudinal dimension as the DISPLAY ZONE, is Safe System compliant (i.e., must have a safe hard shoulder, frangible structures, drivers protected against hard structures, provision for, and protection of pedestrians, etc.) and falls outside any Outdoor Advertising Restriction Area, and on which an outdoor advertising display may be supported.
- The typical actions of road authorities for the management of road safety include the establishment and maintenance of the clear zones of roads and the improvement of the safety performance of intersections and junctions, among other. These two activities, however, have the potential, if managed well, to improve road safety at high benefit-cost ratios. The attention to achieving Safe System readiness or compliance for clear zones and intersections should be the everyday practice in road departments and it should not be seen as anything additional or separate for purposes of curtailing roadside distractions to drivers;
- Achieving Safe System compliance for roadsides (including the respective clear zones) and intersections will contribute significantly towards improved accident risk assessment ratings. For example, where the iRAP star rating is used, it is desirable for countries to not have any

roads with a lower than three-star rating in terms of the iRAP star rating system. A three-star rating would typically be the indication that the accident rate on a road has been curbed. Four and five star rated roads will constitute significant progress towards to the goal of reducing accidents by 50 percent over a period of ten years (the UNDoA goal). Ensuring Safe System compliant roadsides and intersections will thus aid the achievement of three stars for road safety performance. It would be rational to not allow additional extraneous distractions on roadsides for roads that have a poor road safety performance - i.e., using the iRAP example, roads with a road safety performance of less than three stars should not have any added accident risk exposure elements on it. In the likelihood that an accident risk rating system would not be generally available to road authorities and/or that determining maximum road unsafety levels for roads would be problematic without good accident data, using the Safe System compliancy requirement to establish minimum safety levels for roadsides and intersections to consider the potential support of extraneous distraction element under certain conditions, is deemed a reasonable sustainable safety approach. In the future, when minimum evidence-based road safety levels can be set or when an accident rating system would be in general use, this approach can be further augmented – rather than deviated from.

- The methodology of this chapter may be perceived as being mainly applicable to large format road advertisements. However, the concept of "Clear Zone" as well as the Safe System approach to improve the safety performance of road sections and intersections is applicable anywhere and to anything that would impact the risk exposure and safety behaviour of road users as well as the severity outcomes of accidents. 'Small format' advertisements are inherently still distracting although they may have other unsafety and damaging implications. These problems are exacerbated by the tendencies of advertisers to clutter the roadside environment with small advertisements. Apart from provision for these, SAMOAC also provides for possible concessions on some other large format outdoor advertising displays to be posted within the road reserve, i.e., gantry billboards, gateway signs, advertisements on towers, bridges and pylons, etc. This is obviously a problem as it may be deemed to contravene the National Road Traffic Act, is counterproductive with respect to sustainable safety endeavours and such concessions are inevitably not compatible with the Safe System approach - the foundational concept of the SANRSS. Section 22.7.3 Concessions contemplated in SAMOAC provides more information about the relationship of this chapter and SAMOAC; particularly Section 5.1.5 of SAMOAC.

2 Applications for outdoor advertising displays can be considered by a municipality (or road authority) on the basis of mapped areas of control. Two levels of control are in operation;

1) designated areas of control on a spatial development level (in alignment with SAMOAC), and

2) areas of restrictions and the DISPLAY ZONE on a traffic operational level defined as Sustainable Safety Zones of Interest.

Areas of control Level 1 consists of the areas:

- Areas of maximum control
- Areas of partial control
- Areas of minimum control

In the demarcation of these areas of control, provision must be made for national and provincial roads that are situated within municipal boundaries as follows:

a) areas outside of urban areas in which national and provincial roads are situated must be designated as either rural areas or natural areas;
b) urban areas in which national and provincial roads are situated must be designated as:
   i. **urban areas of maximum control** - are urban areas which are deemed sensitive to visual disturbance and include, but are not limited to, natural open spaces in urban areas, urban conservation areas, interface of natural landscape with built-up areas, gateways, bodies of water, rivers, ridges, forests, open recreational areas, characteristic vistas, heritage sites or buildings, special tourist areas, skylines, residential areas, and zones of national or provincial interest along freeways in urban areas, unless the municipality after obtaining a strategic environmental assessment designates areas along such freeways as urban areas of partial or minimal control;
   ii. **urban areas of partial control** - are urban areas characterised by a greater degree of integration and complexity of land use which require a lesser degree of control, and include a 50 metre band between an area of minimum control and an area of maximum control measured from the edges of such areas, and including, but not limited to, small commercial enclaves in residential areas, suburban shopping centres and office parks, ribbon development along main streets, educational institutions, institutional premises, sports fields or stadia, commercialised squares, government enclaves and small-holdings of an urban nature with a higher population density than rural smallholdings, or
   iii. **urban areas of minimum control** - urban areas which require minimum control such as centres, areas and nodes of concentrated economic activity where business is the main focus, commercial districts, shopping centres, office precincts, commercial enclaves and shopping centres in industrial areas and industrial parks, entertainment districts or complexes and prominent transport nodes excluding nodes of an exceptional historical or architectural value.
c) Where a national or a provincial road falls within an area that has not been designated any of the abovementioned control categories, the area in which it falls must be designated as area of maximum control.

Area of control Level 2 has three (3) road level restriction areas, i.e., the **Sustainable Safety Zones of Interest excluding the**

DISPLAY ZONE.:

a) The **Road Reserve** (which is an area of maximum control) - the full width of a road including the roadside and the roadway within which the construction/installation of any ground mounted, cantilever, portal or any overhead fixtures to existing road structures to house an outdoor advertising display will not be supported;

b) The **Outdoor Advertising Display Restriction Area** - an area outside the road reserve of a road, based on a determined traffic conflict and/or turbulence zone on the roadway, for which it has been determined the installation of an outdoor advertising display will not be supported. Traffic conflict and turbulence zones are defined as follows:

- A **Traffic Conflict Zone** is an area on a roadway, indicated on diagrams/drawings, where vehicle paths may intersect or where other traffic conflicts, including with pedestrians, exist. Vehicle interactions may involve diverging, merging, crossing, turning and weaving vehicle movements including sudden speed changes (e.g. at locations of recurring traffic shockwaves). At intersections and T-junctions, the conflict zone will include pedestrian crossings (or where absent, as they would be generally marked for the particular intersection geometry) and, where there are public transport facilities, formal or informal, upstream or downstream of the intersection, include the total area of the lanes approaching or exiting the intersection and fronting such facilities. The area fronting such public transport facilities must be integrated with the traffic conflict zone of the intersection to form one continuous area.
- A **Turbulence Zone** is an area indicated on the diagrams/drawings associated with an off-ramp, on-ramp or terminating lane (or lane drop) on a roadway. Traffic flow within the turbulence zone is disrupted by the influence of the on- or off-ramps or merging prior to returning to free-flowing conditions. This zone is intended to minimise any possible distraction by outdoor advertising displays so drivers within the turbulence zone may be attentive to identifying vehicles, pedestrians, changing traffic conditions and any other hazards. Typically, drivers within this zone may change lanes, alter travelling speed and exit or enter the roadway suddenly.

c) The **Clear Zone** - the area starting at the edge of the travelled way, available for safe use to display road traffic signs in accordance with the National Road Traffic Regulations and for use by errant vehicles that leave the travelled way. The Clear Zone (not indicated in the restriction area diagrams in Figure 22.6.3, Figure 22.6.4 and Figure 22.6.5 below) is part of the roadside. The roadside is the area from the edge of the travelled way to the road reserve border. The Clear Zone may consist of a shoulder, a recoverable slope, a non-recoverable slope and/or a clear run-out area. The minimum Clear Zone width depends on the speed environment and roadside geometry and is determined in accordance with Figure 22.6.1. (For purposes of this chapter, the slope is measured as the general slope from the road shoulder break point to the outer extreme of the Clear Zone.) An effective, Safe System conformant, Clear Zone must be available to:

1) warrant the display of outdoor advertising anywhere adjacent the Clear Zone outside the road reserve and outside the building restriction area in the DISPLAY ZONE, and
2) allow, if there is conformance with Safe System requirements, the use of stopping sight distance (instead of decision sight distance) for determining the dimensions (dimension “d” in Table 22.6.1 below) of the outdoor advertising display restriction area.

3 **An application for the placing of an outdoor advertising display in an urban area of minimum control adjacent to, but outside the road reserve, may be supported when all three the following warrants (WARRANT A, B and C) are complied with:**

WARRANT A: The area in which the display is proposed to be placed is determined as an urban area of minimum control and the respective area(s) are so formally published by the local municipality concerned, or where the local municipality has not published a map demarcating the urban areas of minimum control, as may be determined as an area of minimum control by the national or provincial authority (NOTE: In the absence of any formal area of control demarcation, area of maximum control shall be assumed and no outdoor advertising display will be supported), AND

WARRANT B: The Clear Zone of the roadway over the full distance of exposure to the outdoor advertising display in the DISPLAY ZONE, must be Safe System compliant, i.e., must have a safe hard shoulder, frangible structures, drivers protected against hard structures, provision for, and protection of pedestrians, vehicle restraint systems designed for containment and working width, all guardrails at minimum length of >38 metres etc., AND

WARRANT C: The area in which the outdoor advertising display is proposed to be placed, does not fall in any restricted areas with the dimensions as indicated on the diagrams in Figure 22.6.3, Figure 22.6.4 and Figure 22.6.5.

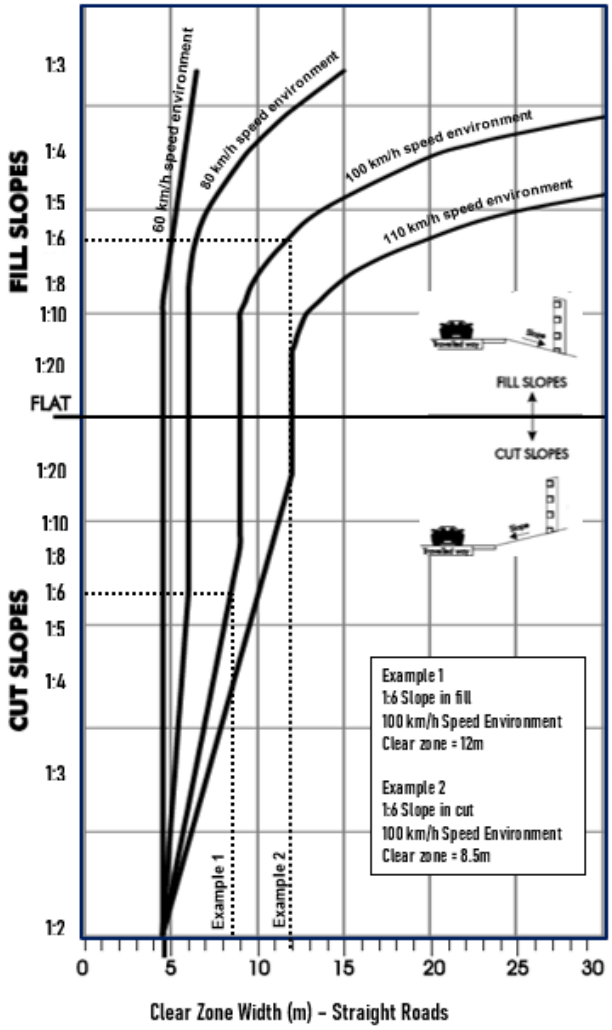


Figure 22.6.1: Clear zone width in metres based on certified speed limit or 85-percentile free-flow speed along straight roads (adapted for outdoor advertising control from SANRAL GDG 2003, AASHTO 2011)

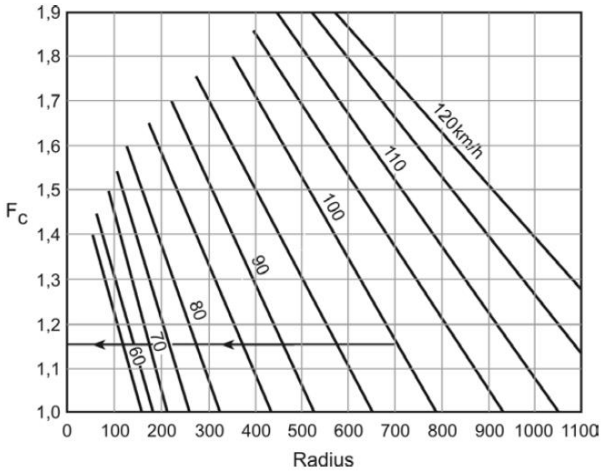


Figure 22.6.2: Adjustment factors (F_C) for Clear Zones widths on curves (SANRAL GDG, 2003)

4 As mentioned in Section 22.5.2, it remains the prerogative of the municipality (or the responsible road authority) to require traffic impact studies to be conducted in assisting with the evaluation of any application to introduce extraneous distracting features, including outdoor advertising displays, into the road environment or to conduct studies for routes or areas to determine appropriateness and/or feasibility to introduce such extraneous distracting features that target road traffic.

22.6.2 Advertising display restriction area distances

Table 22.6.1: Distances "d", "e" and "V" in Figure 22.6.3, Figure 22.6.4 and Figure 22.6.5

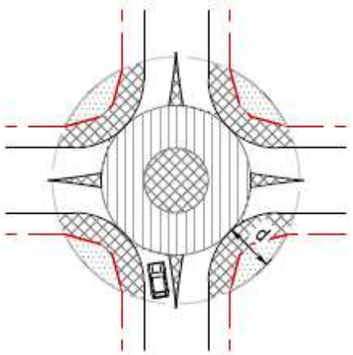
Speed Limit (km/h)	Advertising display restriction area distance "d" (m) (1)	Advertising display restriction area lateral dimension "e" (m) (2)	V (m)(3)
50 or less	195	65	50
60	235	85	60
70	275	105	70
80	315	130	80
90	360	160	90
100	400	185	100
110	430	220	110
120	470	250	120

(1) *The distance "d" in Table 22.6.2 is an assigned value (derived from decision sight distance calculated individually for each location) which is based on decision sight distance which have been extrapolated to form the one set of distances purely based on operating speed criteria. No further adjustments (that is, for grade, vehicle type, etc.) to distances in this table is necessary. If drivers are not distracted within the distance "d" from a conflict point, the chance of avoiding a potential accident is improved. Queue length and distance between the display and vehicle (when the driver can no longer see it) are assumed to be approximately equal. If a junction or intersection is Safe System ready, stopping sight distance (dimension "e" in Table 22.6.1) instead of decision sight distance may be applied by the road authority.*

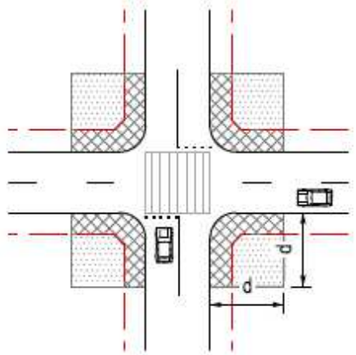
(2) It is required that a freestanding advertising device shall not be located closer to the outer border of the road reserve than the height of the advertising device. A freestanding advertising device with a height higher than the distance from the closest structural device element to the road reserve boundary, measured perpendicular to the roadway, will not be supported.

(3) "V" is the certified posted speed limit or otherwise the 85-percentile free-flow speed at the reference point on the road. "V" is applied as a distance for the dimensioning of the Sustainable Safety Zones of Interest. The maximum value of "V" is limited to 120 km/h. The lateral offset distance (out from freeway) and the longitudinal advertising device restriction distance (along a freeway) is 2.5V m from the road edge line. The Outdoor Advertising Display Restriction Area and Clear Zone concepts have been applied to mitigate the driver distraction potential of outdoor advertising displays in areas where a high level of driver attention and decision making is required.

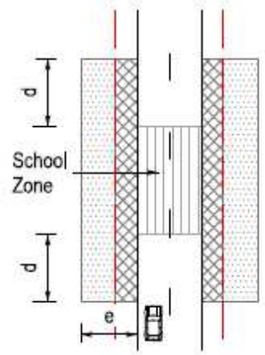
22.6.3 Restriction area diagrams



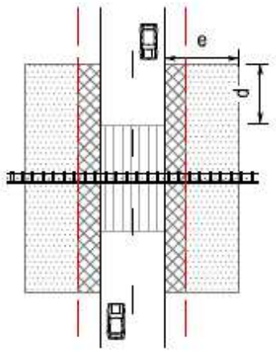
(a) Roundabout



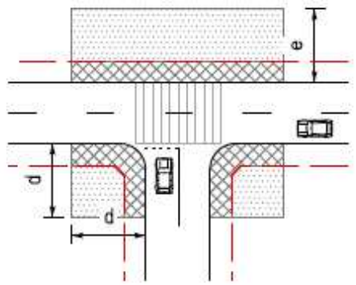
(b) Intersection



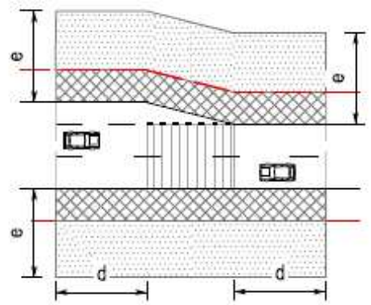
(c) School Zone



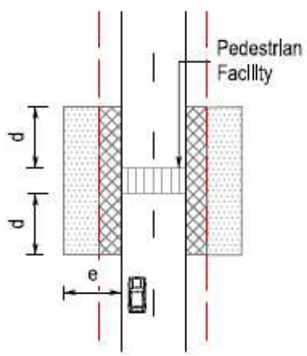
(d) Railway Level Crossing



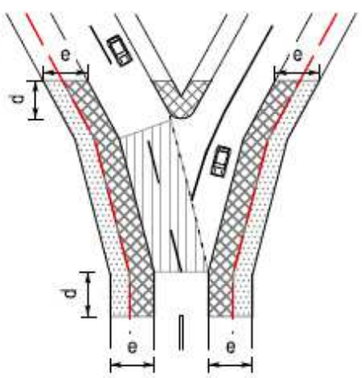
(e) T-Junction



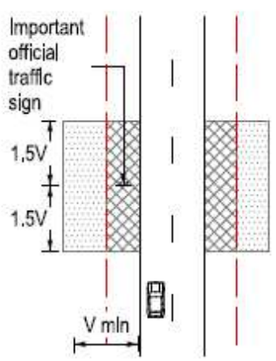
(f) Terminating Lane



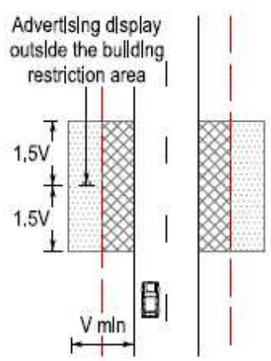
(g) Mid-block Pedestrian Facility
(Not applicable to roads with speeds of ≥ 80km/h)



(h) Y-Intersection
(applies to one way and two way operation)



(I) Traffic Sign with "Important" Message
(refer note 1)



(j) Other Large format Outdoor Advertising Displays outside the road reserve

Conflict Areas

Clear Zone Safe System Compliant Area (Inside Road Reserve)

OA Display Restriction Area (Subject to Municipality Control /Enforcement) (Outside Road Reserve)

"d" OA Display Restriction Area Dimensions (m) - Refer to Table 22.6.1

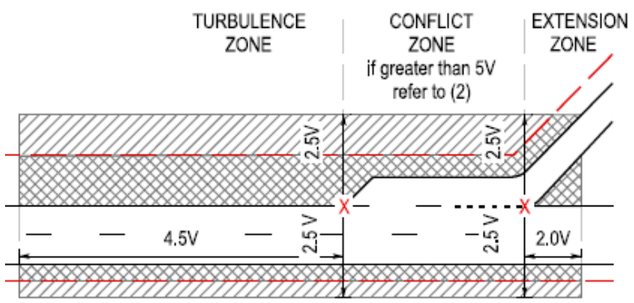
"e" OA Display Restriction Area Lateral dimension (m) - Refer to Table 22.6.1

Road Reserve Boundary

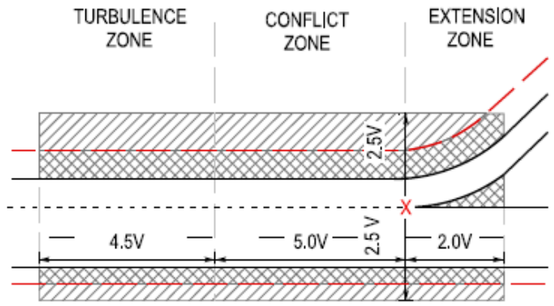
Notes:

1. "Important" road traffic signs are limited to signs that require a driver decision or response to be made.
2. In addition to the above situation it may be necessary for the road authority to designate restriction areas for other critical traffic situations not listed above.
3. Outdoor advertising displays are not permitted on traffic islands.
4. The distance "d" is to be measured from a traversal line marking - e.g., a yield or stop line. The distance "e: is to be measured from a road edge or edge line marking.
5. For a change in speed limit sign (from diagram (I) above), use the lower value of the two speed limits as "V".
6. Outdoor advertising displays may be located in accordance with Figure 22.6.3 (f) where restriction areas abut but do not overlap.
7. "V" is the certified posted speed limit or otherwise the 85-percentile free- flow speed at that location.
8. The maximum value of "V" is limited to 120km/h.
9. "Conflict Areas" for diagram (a), (b), (c), (d) and (e) is specifically defined in Section 22.6.2(2)(c)(II).
10. Electronic billboards are subject to the requirements in Section 22.7.

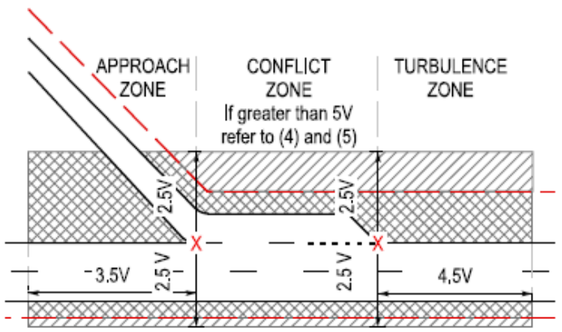
Figure 22.6.3: **Restriction areas for outdoor advertising displays visible from public roads excluding freeways or urban freeway standard roads**



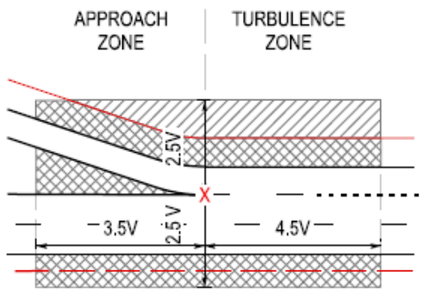
(1) Freeway - Off-ramp



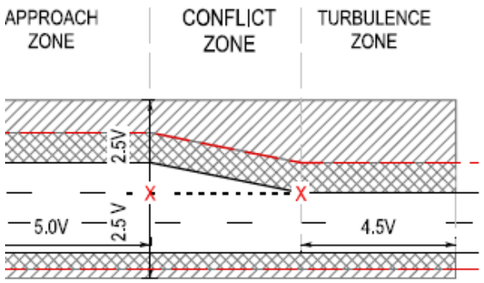
(2) Freeway - Off-ramp with Added lane



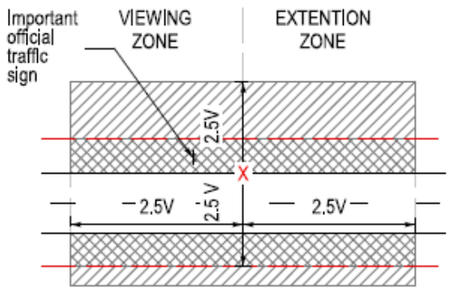
(3) Freeway - On-ramp



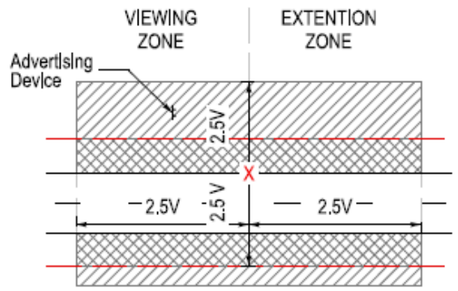
(4) Freeway - On-ramp with Added lane



(5) Freeway - Terminating Lane



(6) Traffic Sign with Important Message (refer note 1)



(7) Other Large format Outdoor Advertising Displays outside the road reserve

Clear Zone Safe System Compliant Area (Inside Road Reserve)

OA Display Restriction Area (Subject to Municipality Control / Enforcement) (Outside Road Reserve)

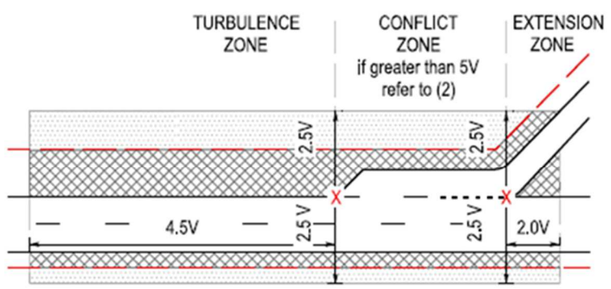
Road Reserve Boundary

X Reference point for restriction distances

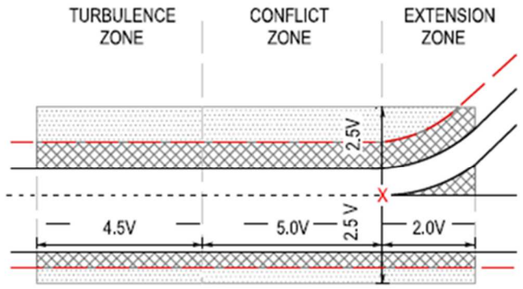
Notes:

1. “Important” road traffic signs are limited to signs that require a driver decision or response to be made.
2. In addition to the above situations it may be necessary for the road authority to designate restriction areas for other critical traffic situations not listed above. E.g. larger restriction distance can be applied if there are incidents or accidents that can be attributed to increased driver demand in the vicinity of interchanges
3. Outdoor advertising displays are not permitted within or over the road reserve or the roadway and not on traffic islands
4. “V" is the certified posted speed limit or otherwise the 85-percentile free-flow speed at that location
5. The maximum value of “V” is limited to 120 km/h
6. For a change in speed limit sign (from image 6 above), use the lower value of the two speed limits as “V”
7. Outdoor advertising displays may be located in accordance with Figure 22.6.4(7) where restriction areas abut, but do not overlap
8. Electronic billboards are subject to the requirements in Section 22.7.

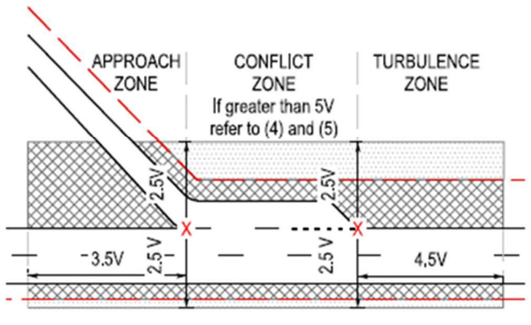
Figure 22.6.4: Restriction areas for advertising displays visible from a freeway



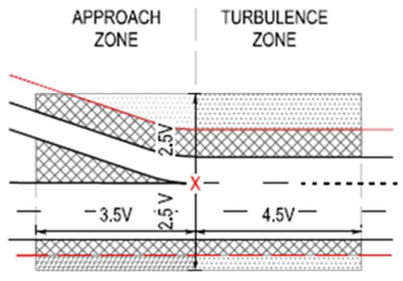
(1) Freeway - Off-ramp



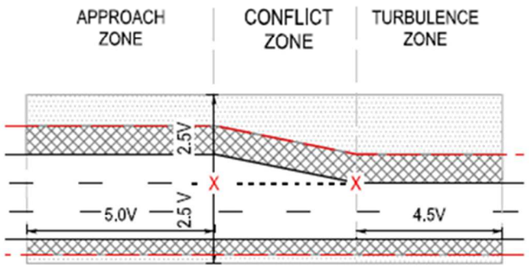
(2) Freeway - Off-ramp with Added lane



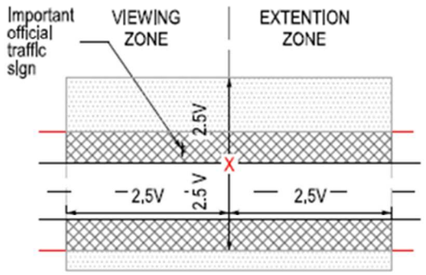
(3) Freeway - On-ramp



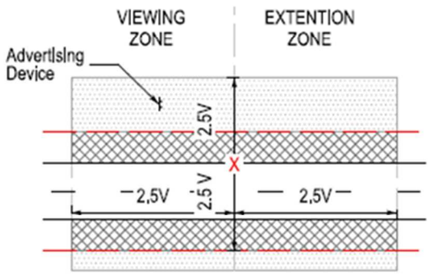
(4) Freeway - On-ramp with Added lane



(5) Freeway - Terminating Lane



(6) Traffic Sign with Important Message (refer note 1)



(7) Other Large format Outdoor Advertising Displays outside the road reserve (refer note 6)

Clear Zone Safe System Compliant Area (Inside Road Reserve)

OA Display Restriction Area (Subject to Municipality Control / Enforcement) (Outside Road Reserve)

Road Reserve Boundary

X Reference point for restriction distances

Notes:

1. "Important" road traffic signs are limited to signs that require a driver decision or response to be made.
2. In addition to the above situation it may be necessary for the road authority to designate restriction areas for other critical traffic situations not listed above.E.g larger restriction distance can be applied if there are no incidents or accidents that can be attributed to increased driver demand in the vicinity of interchanges.
3. Outdoor advertising displays are not permitted on traffic islands.
4. V" is the certified posted speed limit or otherwise the 85-percentile. free-flow speed at that location.
5. The maximum value of "V" is limited to 10 km/h.
6. For change in speed limit sign (from image 6 above), use the lower value of the two speed limits as "V".
7. Outdoor advertising displays may be located in accordance with Figure 22.6.5(7) where restriction areas abut but do not overlap.
8. Electronic billboards are subject to the requirements in Section 22.7.

Figure 22.6.5: Restriction areas for outdoor advertising displays visible from urban freeway standard roads

22.6.4 Criteria for location, size and height of certain billboards

The following criteria are applicable to the location, size and height of billboards (outside the road reserve):

Table 22.6.2: Location, size and height of certain billboards

	Super billboards	**Large billboards**	**Small billboards**
Area of control	Only allowed in areas of minimum control	Only allowed in areas of minimum and partial control	Only allowed in areas of minimum and partial control
Description of size	Larger than 40 up to 81 square metres	18 to 40 square metres inclusive	Less than 18 square metres
Speed	Allowed adjacent to any road	Only allowed adjacent to roads with speed limits less than or equal to 80 km/h	Only allowed adjacent to roads with speed limits less than or equal to 80 km/h
Total maximum height(1)	12,5 metres	8,5 metres	5 metres

(1) It is required that a freestanding advertising device shall not be located closer to the outer border of the road reserve than the height of the advertising device. A freestanding advertising device with a height higher than the distance from the closest structural device element to the road reserve boundary, measured perpendicular to the roadway, will not be supported.

22.7 POSITIONING, SPACING AND OTHER REQUIREMENTS

22.7.1 Criteria for positioning and spacing of billboards and advertising display trailers

1 The following criteria are applicable to the position and spacing of billboards (including advertising displays with variable displays) and trailer advertising displays, visible per direction of travel, subject to Section 22.6:

Table 22.7.1: Minimum spacing from billboards, advertising display trailers and road signs

Speed	Small billboards <18 m^2 (include trailer advertising): Minimum distance from other small billboards (m)	Minimum distance from road signs (m)
Up to and including 60 km/h	400 (2)	85 (1)
Higher than 60 up to and including 80 km/h	600 (2)	130 (1)
Exceeding 80 km/h	750 (2)	250 (1)
	Large billboards (≥18 and ≤40 m^2): Minimum distance from other billboards (m)	
Up to and including 60 km/h	660 (2)	140 (1)
Higher than 60 up to and including 80 km/h	990 (2)	215 (1)
Exceeding 80 km/h	1240 (2)	413 (1)
	Super billboards (>40 m^2 and ≤81 m^2): Minimum distance from other billboards (m)	
Up to and including 60 km/h	1320 (2)	280 (1)
Higher than 60 up to and including 80 km/h	1890 (2)	430 (1)
Exceeding 80 km/h	2475 (2)	825 (1)

(1) Distance is the minimum distance between billboard to billboard, billboard to road traffic sign or road traffic sign to billboard. The distance is measured between two lines perpendicular to the roadway through the positions of the respective signs. Dimensions derived from diagrams (i) and (j) in Figure 22.6.3, Figure 22.6.4 and Figure 22.6.5 will be subject to the minimum dimensions in Table 22.6.1.

(2) For the spacing between different sized billboards, the spacing distances of the larger of the billboards or outdoor advertising displays in general apply.

22.7.2 Advertising display prohibited areas

1 Subject to Section 22.6 which will have precedence over minimum distances relevant to a specific location and circumstances, no advertisements may be erected, displayed or, in the case of trailer advertisements, parked−

a) in the road reserve of a road;

b) in an Outdoor Advertising Display Restriction Area closer than 200 metres from any point where the lanes merge or diverge on a Safe System compliant road for a distance of 20 metres outside the road reserve boundary of such road, or between any off-ramp or on-ramp on such road and closer than 200 metres from any traffic sign indicating the off-ramp or on-ramp;

c) in a building restriction area or portion thereof where−

i. in the case of a free-standing advertisement the height of the advertisement equals or exceeds the distance between the advertisement and the road reserve boundary, or

ii. which has been designated by notice in the Provincial Gazette as an area where it is unsafe or prohibited to erect or display advertisements;

d) on bridges over roads regardless of the ownership of the bridge;

e) in the case of an advertising trailer, closer than five metres outside the road reserve boundary of a road in a manner that−

iii. affects or obscures the illumination of the roadway, or

iv. obscures any gantry or camera erected by an organ of state for the purpose of traffic surveillance or recording the liability to pay tolls or any other similar purpose.

f) along a road section between a warning sign and a subsequent potential hazard.

g) along road sections with high crash rates (To be determined by the road authority).

h) along scenic routes, unless specific approval had been obtained from the environmental authority.

i) on heritage streets, routes and areas, unless specific approval had been obtained from the responsible heritage council.

j) on natural open spaces with well-known natural attractions (in the view of the controlling authority).

k) in conservation areas, unless specific approval had been obtained from the environmental authority.

l) on traffic islands, including median islands.

m) on sections of road where motorists must follow sign sequences (official road traffic signage).

n) on new or changed road sections where motorists must still get accustomed to road alignment, traffic control measures, traffic conditions, etc. (Roadside advertising not allowed within 3 months from the opening of new or revised road infrastructure).

o) on streetscaping projects including where the controlling authority has declared a prohibition on roadside advertising.

22.7.3 Concessions contemplated in SAMOAC

1 In SAMOAC Section 5.1.5 various concessions that would allow advertising displays within the road reserve were contemplated. Whilst any exceptions in terms of compliance with the National Road Traffic Act and Road Traffic Regulations (as regards no advertisement within road reserves) and the strategies to improve the road safety performance of, and to curb the carnage on, the road network, would be a general concern in terms of the approach taken in this chapter, it is of specific concern that there may be exceptions with regard to gantry billboards and advertisements on towers, bridges and pylons. The impact of these types of advertising displays within road reserves on accident risks are far worse than any other advertising displays, apart from the dangers of the mere presence of the respective

holding structures in the road reserve.

2 Municipalities (and road authorities where it is a jurisdiction matter) are required to take steps, possibly through transitional arrangements, to remove these from the road reserves. In the interim, it will be required to mitigate the road traffic accident risks through appropriate (Safe System-based) measures to ensure that the respective clear zones of roads (in accordance with Section 22.6.1) where these gantry billboards and advertisements on towers, bridges and pylons occur, are not compromised.

3 In areas of minimum control, that have sub-areas that may be zoned for high density business activity (e.g., Central Business Districts, small towns, etc.) or business enclaves of particular artificial character, where a municipality (or road authority) may want to consider concessions for advertisements within the road reserve in terms of SAMOAC Section 5.1.5, excluding gantry billboards and advertisements on towers, bridges and pylons, particular care must be given to the protection of the Clear Zone with respect to Safe System requirements (Section 22.6.1) and to the specific road safety and traffic considerations in Section 22.7.4. High density business activity zones and business enclaves are typically characterised by visual clutter and view obstructions as a result of on-road- and roadside parking, street furniture and others. Care must be given to ensuring that road traffic signs and traffic signals are clearly visible and legible under all conditions and circumstances and are not diminished by background clutter (including advertising displays). No features shall be introduced on roadsides that would impede the view of drivers of pedestrian and cyclist (or non-motorised transport) activity. It should be the endeavour to, as a minimum, maintain a distance “V” (as per Table 22.6.1) on the approaches and exits of intersections and non-motorised transport crossings clear of extraneous visual distractions with precedence to the minimum dimensions provided in Section 22.6.3.

22.7.4 Specific road safety and traffic considerations

1 No advertisement in a DISPLAY ZONE may -

a) be so placed as to distract, or contain an element which distracts, the attention of drivers of vehicles in a manner likely to lead to unsafe driving conditions or obstruct a motorist’s view of the roadway or its approaches;
b) be attached to traffic signs, combined with traffic signs (unless specifically authorised by the National Road Traffic Act or any other law), obscure traffic signs, create confusion with traffic signs, interfere with the functioning of traffic signs or create road safety hazards;
c) obscure the view of pedestrians, cyclists or drivers, or obscure road or rail vehicles and road, railway or sidewalk features such as junctions, bends and changes in width;
d) obstruct the passages of pedestrians and cyclists (where permitted for cyclists) on roadsides for which purpose the minimum width of such passages must be in accordance with the Non-motorised Transport Guidelines of the Department of Transport regardless of whether facilities are formally constructed and subject to a minimum of 1,5 metres in all instances.
e) be erected in the vicinity of signalised intersections and display the colours red, yellow or green if such colours will constitute a road safety hazard;
f) contain a colour or combination of colours that predominantly corresponds with those prescribed for road traffic signs in the National Road Traffic Regulations;
g) distract the attention of drivers or lead to unsafe driving conditions either as a result of the size of the advertisement or its colour, letter size, symbol, logo, graphics, illumination or by exceeding the amount of information contained in the advertisement as prescribed in Section 22.7.5, or
h) emit any noise, sound or smoke.

2. In considering applications for the support of outdoor advertising displays in a DISPLAY ZONE (outside the Outdoor Advertising Display Restriction Areas depicted in the diagrams of Figure 22.6.3, Figure 22.6.4 and Figure 22.6.5 in Section 22.6.3), the municipality, or the road authority of a subject road, must evaluate whether according to road traffic sign standards published in the National Road Traffic Regulations, prevailing traffic conditions and the state of roadside environment, -

i) the size of the advertisement, together with other advertisements in the area, if any, will affect the visibility and legibility of road traffic signs by virtue of potential visual clutter;
j) the number of road traffic signs and advertisements in any area constitute a driving hazard, due to the attention of drivers of vehicles being distracted, thus leading to unsafe driving conditions;
k) the speed limit, and the measure of the traffic's adherence thereto, the traffic volume, the average following headway and the accident history of the road demand more stringent control of outdoor advertising;
l) the position of the advertisement will negatively affect the visibility of, sight distance to or efficiency of any road traffic sign, or series of such signs;
m) the advertisement could be mistaken to represent a road traffic sign;
n) the position of an advertisement would disrupt the flow of information from road traffic signs to drivers. Among other things, on freeways this will imply that no advertisement may be located between the one (1) kilometre road sign to an off-ramp and the off-ramp itself, and for at-level intersections that no advertisement may be located between the advanced and direct guidance road signs to the intersection;
o) the position of any advertisement would potentially distract drivers' attention at places where traffic turns, negotiates curves, merges or diverges, or in the area of intersections or interchanges, or where drivers’ uninterrupted attention to the driving task is important for road safety, and
p) the distance of any advertisement before any road traffic sign, an advertisement's position in between road traffic signs or an advertisement's distance behind any road traffic sign is of such a nature as to distract a driver's attention from any road traffic sign.

3. The municipality (or road authority) may increase the minimum spacing between advertisements, or place further restrictions on the position, size and content of any advertisement, where the municipality (or road authority) considers it necessary in the interests of road safety, either in specific cases or generally in terms of by-laws, after consulting interested and affected parties.

4. An advertisement may not, except where specifically authorised by regulations -

a) cause any obstruction to a motorist's view of the roadway or its approaches, regardless of the direction in which the motorist is travelling, or
b) be suspended across or above a Sustainable Safety Zone of Interest accept when it is a DISPLAY ZONE subject to Section 22.6.

22.7.5 Advertising display content

1 An advertisement must be concise and legible and comply with the following requirements:

a) No advertisement displaying a message or messages may exceed the allowable bits of information or the allowable letter size or height as specified in Table 22.7.2.

Speed limit applicable to road in kilometres per hour (km/h)	Allowable bits	Minimum size and height of letters
0 - 60 km/h	10	150 millimetres
More than 60 km/h up to and including 80 km/h	8	150 millimetres
More than 80 km/h	6	350 millimetres

Table 22.7.2: Allowable bits and minimum size and height of letters

b) No combination sign, or any other advertisement displaying more than one advertisement or message, may contain in total more than six bits of information per enterprise, service or property or per individual advertisement or message displayed on a combination sign, and every five letters or numbers (digits) shall be counted as one bit of information and every symbol or logo as half a bit of information.
c) No telephone numbers may be displayed, except where specifically allowed in regulations and no numbers longer than 10 digits are permitted.
d) Street numbers indicating specific premises must have a minimum size of 200 millimetres and a maximum size of 500 by 750 millimetres.
e) No message may be spread across more than one advertisement or sign panel.
f) All messages must have a neat appearance in terms of content and sign writing, and may not contain untidy handwritten messages.
g) No sign displaying a single advertisement or message may exceed 10 bits of information.
h) The colours red, amber and green may not be displayed on any advertisement which is positioned within the line of sight of any traffic signal, as required by the Road Traffic Signs Manual forming part of the National Road Traffic Regulations.

22.7.6 Illumination and electronic advertisements

1. Illumination is permitted on an advertisement only if it does not lead to unsafe driving conditions.
2. The luminance level on any advertisement where illumination is permitted may not exceed the values in Table 22.7.3.

Illuminated area	Maximum luminance
Less than 0,5 square metres	1000 candela per square metre
0,5 to 2,0 square metres	800 candela per square metre
2,0 to 10 square metres	600 candela per square metre
10 or more square metres in visual zones	350 candela per square metre
10 or more square metres in other areas	400 candela per square metre

Table 22.7.3: Maximum luminance of electronic advertising displays

3. In a DISPLAY ZONE an advertisement may not be illuminated unless the road is lit by road lighting over the full distance within which the advertisement is visible from such road and the source of the illumination is concealed from oncoming traffic.
4. No animated advertisements are allowed.
5. An electronic advertisement may not inhibit the view of a driver or pedestrian or be in the direct line of sight of a traffic light.
6. An electronic advertisement may not have subliminal flashes.
7. No one may display light not meant for illumination in a visual zone, or in a natural area, or in an urban area of maximum control if it will be visible from a road.
8. No one may display light not meant for illumination in a rural area of economic activity visible from a road, or in an urban area of partial or minimum control visible from a road, without the written permission of the municipality (or road authority).
9. No light beam may be moved or directed in such a manner as to distract the attention of drivers of vehicles from the task of driving.
10. No light source or beam of light may be positioned or aimed so as to shine directly onto, or at, a road.
11. An advertisement may not be illuminated in such a manner as to—
    i) cause discomfort to or inhibit the vision of approaching pedestrians or drivers of vehicles, or
    j) be likely to distract drivers' attention from road traffic signs which are not illuminated.
12. No illuminated advertisement or advertising structure may be erected in such a manner as may have a detrimental effect on the amenity of a residential building on land zoned for residential purposes or, in the opinion of the relevant municipality (or road authority), will be detrimental to the character or amenity of the neighbourhood.

22.7.7 Floodlighting

1 Subject to Section 22.6, a light source for an advertisement must be positioned to ensure effective distribution and minimise light wastage or "spill".

22.7.8 Variable advertisements

1. No variable advertisement is allowed where the image or message on such advertisement changes or moves more frequently than once every 30 seconds.

2. No variable advertisement is allowed on any vehicle, whether stationary or moving.

22.7.9 Amenity and decency

1 No advertisement may -

a) be detrimental to the environment or to the amenity of a human living environment by reason of size, colour, texture, intensity of illumination, quality of design or materials or for any other reason;
b) be in its content objectionable, indecent, offensive or suggestive of indecency or prejudicial to public morals or be in conflict with the guidelines or standards if any laid down from time to time by the South African Outdoor Advertising Association or any similar body recognised by the municipality (or road authority) or other executive authority as representing the industry;
c) obscure, partially or wholly, an advertisement owned by another person that has been erected previously and legally displayed, or
d) be displayed in places or in a manner which could be detrimental to the amenity of the neighbourhood or disfigure the surroundings.

22.7.10 Design and construction

1. All advertisements must—

a) be neatly and properly constructed according to generally accepted design and construction standards as contemplated in the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977) or other applicable legislation;
b) not be detrimental to or have a negative aesthetic impact on the streetscape or character of the surrounding area by way of the design of the structure or device;
c) have a neat appearance and consist of durable materials suited to the function, nature and permanence of the advertisement, and materials such as cloth, canvas, cardboard, paper or synthetic cardboard may be used only when essential to the nature and function of a particular advertisement;
d) not deface building facades with electrical services provisions and other accessories;
e) be rigidly and securely attached, supported or anchored in a safe manner so that unwanted movement in any direction is prevented;
f) be capable of effectively securing, supporting and maintaining not less than twice its mass with the addition of any force to which the advertisement may be subjected, including wind pressure;
g) not be secured by water soluble adhesive, adhesive tape or similar material to display the advertisement;
h) have all exposed metalwork painted or otherwise treated to prevent corrosion and all timber treated to prevent decay;
i) have measures taken to prevent entry of water into and the accumulation of water or moisture on or in the advertisement or any part of its supporting framework, brackets or other members;
j) wherever necessary in accordance with the nature of the sign and when attached to brickwork, masonry or concrete, be securely and effectively attached thereto by means of bolts securely embedded in the brickwork, masonry or concrete or passing through the same and secured on the opposite side;
k) when attached to conservation-worthy buildings, be attached with the necessary expert advice to prevent damage to such buildings, and
l) be constructed and located at a height which discourages vandalism.

2. All glass used in signs, other than glass tubing in neon and similar signs, must be safety glass at least three millimetres thick.

3. Glass panels used in signs may not exceed 0,90 square metres in area, and each panel must be securely fixed in the body of the sign, structure or device independently of all other panels.

4. Before any advertising structure is erected, the advertisement must be suitably positioned and orientated.

5. No advertisement may—

a) obstruct any window or opening provided for the ventilation of a building or obstruct any stairway or doorway or other means of exit from a building or prevent any movement of persons from one part of a roof to another part, or obstruct any fire escape or the means of egress to a fire escape;
b) be painted on any fence or boundary wall in an area of maximum or partial control;
c) exceed the height restriction in terms of any relevant land use scheme as amended from time to time, unless a relaxation has been obtained in terms of such scheme;
d) encroach on building restriction areas unless a relaxation has been obtained in terms of the relevant land use scheme as amended from time to time, or in terms of the Act, or
e) exceed the minimum clearance regarding overhead power lines as prescribed in regulation 15 of the Electrical Machinery Regulations No. R1593 in Government Gazette 11458 of 12 August 1988 or any replacing regulations, in terms of which permission must be obtained from the relevant supply authority before any advertising structure may be erected in a power line servitude.

6. The structural design of an advertising structure must be certified by a professional structural engineer where the municipality (or road authority) requires it, or where the advertisement is a billboard larger than 18 square metres or the foundation of the structure is required to be deeper than 600 millimetres.

22.7.11 Electrical

1 Every illuminated advertisement and every advertisement in which electricity is used, must be wired and constructed in accordance with and subject to the provisions of all applicable laws, and must—

a) have power cables and conduit containing electrical conductors positioned and fixed so that they are not unsightly;
b) be constructed of material that is not combustible;
c) be provided with an external switch in an accessible position and at a height of at least three metres from the ground whereby the electricity supply to the advertisement may be switched off;
d) not be connected to any electricity supply without the prior written permission of the relevant electricity supply authority and comply with the applicable standard regulations for the wiring of premises, proof of which must be submitted to provincial or municipal inspectors on request, and
e) be fitted with adequate suppressors if there is a danger of

interference with radio reception.

22.7.12 Maintenance

1. All advertising structures must—
   a) be serviced on a regular basis, and
   b) be maintained in good repair and in a safe condition according to the highest standards as regards quality of structures, posting and signwriting.
2. The area surrounding the advertising structure must be maintained in a neat and tidy condition.
3. The owner of any land or building on which an advertisement is displayed or erected, or to which it is attached, and the owner of the advertising structure are jointly and severally responsible for−
   a) the maintenance thereof in a safe and proper condition;
   b) the cleaning and repairing thereof and the surrounding area, and
   c) undertaking regular inspections of the advertisement or structure with a view to satisfying themselves of the safety thereof, and are liable for the consequences of failure to do so.
4. If any advertising structure is not maintained or has been allowed to fall into a state of disrepair so that it is in a dangerous or unsafe condition or interferes with the functioning of any traffic sign, the municipality (or road authority) may serve a notice on the owner of the advertising structure requiring such owner to remove the structure or do other work specified in the notice within a period so specified, and the owner must comply with such notice.
5. All advertising structures must be maintained and secured in a manner as not to constitute a danger to the public and the owner of the advertising structure assumes all responsibility and liability to indemnify the responsible municipality (or road authority) against any claim which may arise in connection with such a structure.
6. Any advertisement displayed, either for the purpose of advertising or conveying information, regarding the name of the occupier of premises or nature of the business conducted on premises, must be removed forthwith upon the owner of the advertisement ceasing to occupy the premises.
7. If an approved advertising structure fails to display an advertisement or message for a period of more than six months, the municipality (or road authority) may serve a notice on the owner of the advertising structure requiring such owner, at his or her own cost, to remove the structure or have an advertisement or message displayed within the time specified in the notice.

22.8 OUTDOOR ADVERTISING CLASS AND CHARACTERISATION

22.8.1 Electronic billboards

1 In deciding to support or not support an application for an electronic billboard the following must be taken into account:

a) An electronic billboard may not be erected in a road reserve,
b) the nature of the proposed messages, and
c) other factors, specifically including road safety factors, specified in legislation or otherwise prescribed in best practice methods, or that the municipality (or road authority) regards as relevant.

2 The size of an electronic billboard is limited to the category small billboard of <18 square metres. The billboard must be equipped with an automatic brightness control system, that satisfactorily adjusts the display brightness according to ambient light conditions, within the limits set in Section 22.7.9, and switches any light emission off between the everyday hours from 23:59 in the evening to 06:00 in the morning. In the absence of such a control system, all longitudinal distance criteria in Section 22.7.1 that apply, subject to Section 22.6, must be increased by 50 percent.

3 An electronic billboard must be displayed perpendicular to oncoming traffic.

3 The clear height of an electronic billboard may not be less than 2,4 metres.

22.8.2 Large and super billboards

1 Large billboards will only be supported in areas of minimum and partial control, but not closer than 50 metres to the edge of an area of maximum control.

2 In deciding to support or not support an application for a large or super billboard the municipality (or road authority) must have regard to—

a) Large and super billboards may not be erected in a road reserve,
b) the nature of the proposed messages, and
c) other factors, specifically including road safety factors, specified in legislation or otherwise prescribed in best practice methods, or that the municipality (or road authority) regards as relevant.

3 The clear height of large and super billboards shall be not less than 2,4 metres.

4 The criteria in Sections 22.6 and 22.7 apply to large and super billboards.

22.8.3 Small billboards and tower structures

1. Small billboards and tower structures may not be erected in a road reserve.

2 Small billboards must have a clear height of not less than 2,4 metres.

3 Tower structures may be pole-mounted units of not more than four panels.

4. No panel or board on a tower structure may exceed 4,5 square metres.

5 The clear height of a tower structure may not be less than 2,4 metres.

6. The criteria in Section 22.6 and 22.7 apply to small billboards and tower structures.

7 In deciding to support or not support an application for a small billboard or tower structure the municipality (or road authority) must have regard to -

i. the nature of the proposed messages;
ii. the consideration that tower mounted advertisements must be “internally oriented” and not be aimed at road users outside the shopping centre or transport node;
iii. the consideration that tower structures must be of a high visual standard and harmonize with buildings and streetscapes, and
iv. other factors specified in legislation or that the municipality (or road authority) regards as relevant.

22.8.4 Posters

1 A poster -

a) is not allowed in a natural or rural area;
b) may not be used for the primary purpose of directing or guiding travellers (thus, may not display any navigational information);
c) is not allowed next to a freeway;
d) may not be closer than distance “V” in Table 22.6.1 of Section 22.6.2 to another poster,
e) must be displayed at least 2,4 metres above ground level and not be higher than 3.3 metres above ground level,
f) may not encroach over any roadway,
g) may not be displayed on any structure on a median island where such median island is less 2,4 metres wide, and
h) is not allowed on light- or other utility poles and street furniture, unless permissions, subject to Section 22.7.4 and sub-section 1(d) above, for the attachment of advertising posters to such specific light-, other utility pole or street furniture are provided by the municipality or road authority.

2 Only events of national or international importance may be advertised on posters. No commercial advertising of companies, products and services is allowed on posters

3 Only one poster is allowed per light-, other utility pole or street furniture subject to sub-section 1(d) above.

4 No permanent poster frames or receptacles may be attached to light-, other utility pole or street furniture,

5 Posters may not be erected or removed during peak traffic periods, which will be between 06:30 and 08:30 during the morning and between 15:30 and 18:30 in the afternoon unless otherwise formally permitted by the municipality or road authority.

6 The size of a poster facing in any one direction may not exceed 0.5 square metre (or an A1 size) in area.

7 A poster may not be illuminated or animated.

8 Posters advertising events other than those contemplated in sub-section (10) may not be erected more than 14 days prior to the relevant event.

9 All posters, backing boards, cords or string must be removed within seven days of the passing of the relevant event.

10 Election or referendum posters to elect representatives in any sphere of government may not be displayed longer than the period starting from the beginning of the proclamation in the Government Gazette announcing the election or referendum to the end of the fourteenth day after the date of the election or referendum.

22.8.5 Flags and banners

1 A flag or banner may be used only for—

a) locality-bound advertising of functions or events conducted for religious, educational, social, welfare, animal welfare, sporting, civic or cultural purposes or functions or events relating to municipal, provincial or parliamentary elections or referenda;
b) locality-bound advertisements displaying the name, corporate symbol and nature of enterprises;
c) streetscaping urban areas such as pedestrian malls and gateways, or
d) non-locality bound advertisements of campaigns supported by government (only flags).

2 A flag or banner is not permitted in a natural area.

3 No flag or banner may be larger than five (5) square metres in a rural or urban area of maximum control and six (6) square metres in an urban area of partial or minimum control and the maximum total area per event or street front is seven (7) square metres in a rural area or urban area of maximum control, and 12 square metres in an urban area of partial or minimum control.

4 Subject to Section 22.7.4, no flag or banner may be displayed with any part of it encroaching on the Clear Zone as determined in Section 22.6.1.

5 A flag or banner must be attached to, or supported by, poles or other supports on the site, or against the building where the function or event is to be held or where the enterprise is located.

6 A flag or banner may not be attached in such a manner as to interfere with or constitute a danger to passing pedestrians or traffic.

7 A flag or banner for a function or event contemplated in sub-section (1)(a) may be erected no earlier than the day before the function or event in question and must be removed not later than one day after such function or event.

22.8.6 Estate agents' boards

1 Estate agents' boards are not allowed in the road reserve. Any permissions by a relevant municipality are subject to the Clear Zone widths in accordance with Section 22.6.1 and to the road safety and other considerations in Section 22.7.4.

2 An estate agent's board may not contain information other than the words "for sale", "to let" or "sold" and the name and logo of the selling or letting agent, but may contain telephone numbers.

3 An estate agent's board is permissible in any area, but not more than one such board per estate agent may be erected on any erf and not more than three agents may display their boards simultaneously on the same erf.

4 An estate agent's board may only be a single board or two duplicate boards joined together.

5 The maximum size of an estate agent's board is 0,6 metres by 0,45 metres, i.e. 0,27 square metres, but an estate agent's board for a vacant erf may be a maximum size of six (6) square metres provided that it is erected within the boundary of such erf.

6 An estate agent's board must be attached to the boundary fence of the property concerned or displayed within the boundaries of premises.

7 An estate agent's board must be removed not later than 14 days after conclusion of a contract of sale or lease for the property in question.

8 An estate agent's board may not be illuminated or animated.

22.8.7 Advertisements for sale of goods or livestock

1 Only one advertisement for sale of goods or livestock per sale is allowed facing a provincial road, but not along a freeway.

2 The size of such an advertisement may not exceed two square metres in a natural or rural area or an urban area of maximum or partial control, and 2,8 square metres in an urban area of minimum control, and no part of the advertisement may be higher than three metres above the ground.

3 Such an advertisement may be displayed only on the premises or property where the advertised sale is to take place, or be attached to the boundary fence of such a property or premises.

4 No illumination or animation of such an advertisement is allowed.

5 Such an advertisement may be erected no earlier than one week before the sale in question and must be removed not later than two days after such sale, and advertisements of a permanent nature are not allowed.

22.8.8 Project boards

1 A project board must be approved by the relevant developer or employer, and may display only—

a) a description of the building or structure being erected or other work or activity being carried out;
b) the names and the company symbols or logos of the contractors or consultants;
c) the branches of their industry or profession;
d) a description of the development being carried out, and
e) where relevant, details of the type of accommodation being provided, floor space available and the name, address and telephone number of the developer or the agent of the developer.

2 Only one combined project board listing contractors or consultants is allowed per street front of a site.

3 A project board may not exceed 1,5 square metres in area per consultant or contractor, and may not exceed a total area of nine square metres.

4 A project board may not be erected next to a freeway.

5 A project board concerning road construction may be erected without the permission of the municipality (or road authority).

6 A project board may not be illuminated or animated.

7 A project board may be displayed only while the relevant works are actually taking place on the site.

22.8.9 Neighbourhood watch and security advertisements

1 A security advertisement must refer only to the existence and

operation of a commercial security service, burglar alarm system, neighbourhood watch, farm watch or similar system or scheme and may include the name, address and telephone number of a security company contracted to protect the premises on which the advertisement is displayed.

2 A security advertisement may not exceed 0,35 square metres in area, except a farm advertisement and advertisements for neighbourhood watch and similar schemes, which may not exceed 1,5 metres in area and all such advertisements may not exceed three metres in total height.

3 In an urban area only one security advertisement per 30 metre length of street boundary of the premises may be erected and must be firmly affixed to the building, boundary wall, fence or gate on the street frontage or within the boundaries of the erf.

4 A security advertisement on a farm may be displayed at the intersection of a provincial road and private access road or at the entrance to the property, but not in the road reserve of a provincial road, and only one advertisement per farm or holding is allowed.

5 A neighbourhood watch or similar scheme advertisement is only permitted at an intersection of a provincial road and private access road, and then not in the road reserve of a provincial road, and not on a road island or median of the private road.

6 A neighbourhood watch or security advertisement may not be illuminated or animated.

22.8.10 Product replicas and three-dimensional advertisements

1 A product replica or three-dimensional advertisement if used as a third party advertisement is allowed only in an urban area of partial or minimum control and then only in a shopping centre or other commercial area or in an entertainment or industrial area, and if used as an on-premises business advertisement, it will be subject to Section 22.8.12.

2 The highest point of a free-standing product replica or three-dimensional advertisement above ground level may not exceed three metres in an urban area of partial control and four metres in an urban area of minimum control.

3 In an area of partial control, the vertical dimension of the product replica or three-dimensional advertisement itself may not exceed 1,5 metres, and it may not exceed one metre in diameter, while in an area of minimum control the vertical dimension may not exceed two metres and it may not exceed 1,3 metres in diameter.

4 A product replica or three-dimensional advertisement aimed at road users and used as a third-party advertisement is subject to the criteria in Sections 22.6 and 22.7, reading in the necessary changes.

22.8.11 Balcony and under-awning advertisements

1 A balcony and under-awning advertisement may be erected only on premises used for commercial, office, industrial or entertainment purposes, and in a natural or rural area, only in centres of economic activity.

2 A balcony and under-awning advertisement may be suspended above a sidewalk.

3 The maximum size of a balcony and under-awning advertisement is one square metre per sign face, and a total sign area of two square metres, with a maximum vertical dimension of two metres, and the clear height must be at least 2,4 metres.

4 A balcony sign may not be above the lower edge of a second floor window.

5 Under-awning signs must be aimed at pedestrians.

6 No illuminated advertisement or advertisement designed to reflect light may be attached to or displayed on a splayed or rounded corner of a balcony at a street intersection, unless the bottom of the advertisement is at least six metres above the street immediately below it.

22.8.12 Forecourt advertisements

1 A forecourt advertisement may be displayed in an urban area, and in any other area may only be displayed in a centre of economic activity.

2 An individual, free standing forecourt advertisement may not exceed 0,7 square metres in area for a single sided advertisement and 1,5 square metres for a double-sided advertisement.

3 The total area of all free-standing forecourt advertisements may not exceed three square metres on each forecourt frontage per premises, except in the case of filling stations and roadside service areas, where it may not exceed 8,0 square metres, and in the case of filling stations and roadside service areas, additional non-free standing advertisements with a maximum area of 0,15 square metres per advertisement are allowed if attached to fuel pumps, vending machines and other non-advertising structures.

4 A forecourt advertisement must be free-standing, except for an advertisement attached to a fuel pump, vending machine or other non-advertising structure in a filling station or roadside service area.

5 A forecourt advertisement is aimed at pedestrians, not motorists, and may not interfere with pedestrian circulation.

6 Forecourt advertisements must be erected in the forecourt of a business.

7 A forecourt advertisement may be illuminated, but may not be animated.

22.8.13 Residential or community advertisements

1 A residential or community advertisement may be displayed only on the property at which the activity to which the advertisement relates, takes place.

2 A residential or community advertisement may be affixed flat or painted on a gate or wall, or on a pole mounted advertisement or an advertisement with supporting structures forming a visual structure around the sign panel.

3 A direction or warning sign may not exceed 0,5 square metres in total area per premises, except where there is more than one entrance to the same premises on different road frontages, where a total sign area of 0,5 square metres per frontage, is permitted, with a total maximum area of one square metre.

4 In the case of an advertisement showing the name and nature of an enterprise or place of residence or the name of a proprietor

or practitioner, one advertisement per premises is allowed, which may not exceed 1,5 square metres in area per premises, but where there is more than one entrance to the same premises on different road frontages, two advertisements with a total sign area of 1,5 square metres each may be displayed, each on a different frontage.

5 Despite sub-sections (3) and (4), where the advertisement has a solid supporting structure other than a framework, the maximum area per advertisement may be three square metres, of which fifty percent of the area may be used.

6 Where more than one enterprise or property is involved, a combination advertisement may be provided with not more than one square metre per premises or per property.

7 The highest point of a free-standing advertisement may not exceed three metres above ground level, except for a combination sign, where the highest point of the sign may not exceed four metres above ground level.

8 In the case of a residential or community advertisement, a name or logo of a sponsor of the advertisement may not be displayed except on the name of a farm or smallholding, and the sponsor advertisement may not exceed one third of the total area of the advertisement.

9 A residential or community advertisement may be displayed only on the premises to which it refers, or on the boundary wall, fence or gate of such premises.

10 A farm or smallholding name sign must be displayed next to the entrance of the access road thereto or affixed to the gate at the entrance of such access road, but where more than two farms or smallholdings share an unnumbered or private access road, a direction traffic sign must be used to indicate the access road.

11 A free standing residential or community advertisement is allowed only where it is not aesthetically or practically acceptable to attach a sign to a building or boundary wall, fence or gate.

12 A residential or community advertisement may not be animated, and may be illuminated only in an urban area, and must harmonise with the buildings and other structures on the premises as to materials, colour, texture, form, style and character.

22.8.14 On-premises business advertisements

1 An on-premises business advertisement must be locality bound and may provide information only of the name and nature of the enterprise, the nature of goods sold or services provided and the names of the proprietors or practitioners and may be erected as a free-standing advertisement.

2 An on-premises business advertisement may not be displayed unless—

a) the building housing the enterprise is situated in relation to the road which it faces such that passing pedestrians or motorists may have difficulty noticing advertisements affixed to the building;
b) it is not structurally possible or visually feasible to affix appropriate advertisements to a building;
c) the advertisement is needed to locate the entrance to business premises or the private access road to a business, or
d) there are no tourism direction signs reducing the need for such advertisements.

3 In deciding whether to grant or refuse permission for an on-premises business advertisement, the municipality (or road authority) must have regard to the manner and type of illumination of the advertisement, if applicable, and the consideration that—

a) proliferation of advertisements must be prevented and that combination advertisements must be promoted;
b) the design of combination advertisements must harmonise with the architecture of shopping centres or other buildings or structures;
c) messages on individual panels of combination advertisements must be concise and legible;
d) advertisements at access roads to farms and smallholdings must be co-ordinated with residential and community advertisements to form combination advertisements, and
e) combination advertisements must be harmonious in terms of form, letter types and colour.

4 Only one on-premises business advertisement is allowed per enterprise, unless there is more than one entrance on different road frontages, where two will be allowed, one per frontage.

5 An on-premises business advertisement in an area of maximum control may not exceed six square metres in area and a height of seven metres.

6 In an urban area of partial or minimum control an on-premises business advertisement may not exceed 12 square metres in area and a height of 7,5 metres, but the municipality (or road authority) may consider increasing the height to a maximum of 10 metres if this is allowed for in the land use scheme of the relevant municipality (or road authority).

7 In the case of an on-premises business advertisement, the name or logo of the sponsor of the advertisement may be displayed but may not occupy more than one third of the total area of the advertisement.

8 An on-premises business advertisement may not have letters, figures or symbols or similar features that exceed 0,35 metres in height in a natural or rural area and an urban area of maximum control, and 0,75 metres in an urban area of partial or minimum control.

9 As with all advertisements, an on-premises business advertisement may not be closer than five metres to the road reserve boundary, and must be placed close to the enterprise or building in question or, if not visible from the relevant provincial road, may be placed at an entrance road.

10 An on-premises business advertisement may be illuminated but may not be animated.

11 An on-premises business advertisement may refer only to the name and nature of the business on the premises, the brand name and nature of goods for sale or produced or the nature of the service provided and the name of the person or firm who owns the business or provides the goods or services.

22.8.15 Tower or pylon advertisements

1 No one may erect or display a tower or pylon advertisement in a Sustainable Safety Zone of Interest in a natural or rural area, or an urban area of maximum control, or over a road in any area, and in granting permission for such an advertisement in a

DISPLAY ZONE in another area, the municipality (or road authority) must consider whether such advertisements are allowed for in its environmental plans.

2 The maximum area of such advertisements per structure may not exceed 36 square metres.

3 The diameter of a pylon sign may not exceed six metres and the height thereof may not exceed 12 metres.

4 The clear height of a pylon advertisement if it protrudes from the pylon, may not be less than 2,4 metres.

5 No one may erect or display a tower or pylon advertisement that is illuminated or animated except in an urban area of minimum or partial control.

6 No one may attach an advertisement to a pylon unless the pylon is independently supported without the aid of guys, stays, brackets or other restraining devices, and is properly secured to an adequate foundation in the ground.

7 If the size of a tower or pylon advertisement exceeds 4,5 square metres, the criteria in Sections 22.6 and 22.7 apply.

22.8.16 Service facility advertisements

1 A service facility advertisement may refer only to the name or logo of a business providing a service, and the type of service provided.

2 A service facility advertisement must be locality-bound and may be erected or displayed only in service facilities adjacent to and directly accessible from a provincial road at which the advertisement is directed, and may be double sided, but is not allowed on both sides of the road, i.e. only one such advertisement per direction of traffic flow is allowed.

3 A service facility advertisement must be located as close as possible to the access to the relevant provincial road.

4 An applicant for permission for a service facility advertisement must submit with the application a location plan, detailed drawings of the advertisement and a certificate issued by an engineer verifying that it was designed by such engineer.

5 No service facility advertisement may exceed the following dimensions:

Along roads with a speed limit of 60 km/hr and less	Maximum height: 7 metres Maximum width: 2 metres
Along roads with a speed limit exceeding 60 km/hr up to and including 80 km/hr	Maximum height: 10 metres Maximum width: 3 metres
Along roads with a speed limit exceeding 80 km/hr	Maximum height: 20 metres Maximum width: 6 metres

6 A service facility advertisement may not be animated, and illumination is allowed only while the services concerned are being provided.

7 No advertisement is allowed in a roadside service area except a service facility advertisement permitted under this section, unless used for internal direction and orientated and aimed at motorists within the facility.

22.8.17 Development advertisements

1 A development advertisement board must be approved by the relevant developer or employer, and may display only—

a) description of the building or structure being erected or other work or activity being carried out;
b) a description of the development being carried out, or
c) where relevant, details of the type of accommodation being provided, floor space available and the name, address and telephone number of the developer or the agent of the developer.

2 Only one advertisement describing the type of development is allowed per development.

3 An advertisement describing a type of development may not exceed three metres in height and may not exceed six square metres in area in an area of maximum control and 12 square metres in any other area.

4 Development advertisements may be illuminated but may not be animated.

5 A development advertisement may be displayed only while the relevant works are actually taking place on the site.

22.8.18 Construction site advertisements

1 Construction site advertisements may−

a) be erected only for the duration of the relevant construction works;
b) not exceed a height of three metres;
c) not exceed 18 square metres in area;
d) not be displayed on or along freeways, and
e) be illuminated but not animated.

22.8.19 Aerial advertisements

1 No one may display an aerial advertisement that is visible from a road in a natural or rural area, and in an urban area. No one may do so in a Sustainable Safety Zone of Interest, including a DISPLAY ZONE (since an aerial advertisement will be visible from a road which is specifically prohibited).

2 Such an aerial advertisement may not be illuminated or animated, except that an airship may be illuminated.

3 With the exception of a moored airship, an aerial advertisement may be displayed only in daylight hours.

4 The maximum height allowed for an aerial advertisement is 45 metres, unless a greater height is approved by the South African Civil Aviation Authority established by section 71 of the Civil Aviation Act, 2009 (Act No. 13 of 2009), or other authority authorised to grant approval.

5 An aerial advertisement may not be closer than five nautical miles from the aerodrome reference point of any aerodrome defined in section 1 of the Civil Aviation Act, 2009.

6 No aerial advertisement may be displayed for longer than 14 days.

22.8.20 Trailer advertising

1 Trailer advertising consists of advertisements displayed on trailers that are designed or adapted for the sole purpose of advertising (referred to in these requirements as advertising trailers).

2 Advertising trailers may be parked only in urban areas of partial and minimum control and on sites designated by the relevant municipality (or road authority) in advance, and must be properly

secured at both ends to withstand strong winds.

3 Only one trailer is permitted per site so designated and Sections 22.7.1 and 22.7.2(e) apply.

4 Where a municipality (or road authority) grants permission for an advertising trailer it must issue an identifying disc to the applicant with the written permission.

5 No advertising trailer may be towed on a provincial road for the primary purpose of advertising, and where such a trailer is towed on such a road the relevant advertisements must be covered so as not to be visible by anyone using the road.

6 Signs on advertising trailers may not exceed a vertical dimension of three metres and a horizontal dimension of six metres.

7 Advertising on trailers may not be animated and may not be illuminated except for retroreflective signs with the colours red to the back, yellow to the side and white to the front of the trailer

8 The name and telephone number of the owner of the trailer and the identifying disc referred to in sub-section (4) must be displayed on all advertising trailers in a place that is clearly visible.

22.8.21 Transitional provisions

1 Any outdoor advertising display that was erected or displayed on the date of publishing of this Chapter 22 contrary to the Sustainable Safety principles, outdoor advertising display restriction areas, conditions and specific requirements herein:

a) in the road reserve under the jurisdiction of municipality or provincial or national road authority or in any other area not determined as a DISPLAY ZONE as determined in Section 22.6.2(2), must be removed forthwith unless it was erected and displayed with the written permission of the responsible municipality, as duly authorised, or the executive authority of any road authority obtained before that date and such permission is still valid;

b) may remain if not in such a road reserve or DISPLAY ZONE if:

i. displayed in terms of an authorisation conferred before the date of coming into operation of this Chapter, provided that it is displayed in accordance with the requirements which are applicable to such authorisation on that date, or

ii. lawfully displayed at a place immediately before the road in question was proclaimed as a road reserve,

for remainder of any valid agreement, but not more than five years from the date that this Chapter come into operation after which it will be unlawful and must be removed forthwith, and if not so removed, evoke due procedure to have it removed and urgently so where it poses an immediate or urgent safety hazard.

22.9 TERMINOLOGY

22.9.1 General

The following terms are relevant to any discussion on Outdoor Advertising. They are included here to assist practitioners in using this Chapter:

Adequate visibility:

Adequate visibility of the intersection, of any traffic control devices on the approach and within the intersection, and of other vehicles approaching or standing at the intersection must be available to permit drivers to undertake reasonable actions to ensure safe progress through the intersection.

Advertisement:

Means any representation by a word, or abbreviation thereof, letter, logo, symbol, sign, figure, painting, and drawing or other pictorial representation, or light, displayed in or in view of any public place, provincial or national road within the jurisdiction of a city for the purpose of drawing the attention of the public to or promoting any product, service, business or commercial enterprise, trade, person, election or candidature in an election, voter registration, entertainment, function, meeting or other event, aspects relating to security and news headlines.

Advertising:

Means the act or process of displaying an advertisement and "advertise" has a corresponding meaning.

Advertising sign:

Any sign board which is not a road traffic sign and which indicates the availability of a service or product for sale by brand name, or which indicates the occurrence of an event the purpose of which is for gain.

Aerial advertisements:

An advertisement painted on, attached to or produced by an aircraft, including a captive balloon, kite, unmanned free balloon, moored airship, parasailing craft, hang glider, model or radio-controlled aircraft, an aircraft towed behind a vehicle or sailing vessel for the purpose of flight, and an aircraft towing banners or producing smoke signals.

Attention:

The cognitive process of selectively concentrating on one aspect of the environment such as the task of driving while ignoring other things. Orientation to sensory events; detection of objects or event for cognitive processing, and the maintenance of a vigilant state.

Attentiveness:

The trait of being observant and paying attention to a certain task, e.g. the task of driving.

Billboard:

A large outdoor advertising structure, typically found in high areas such as alongside busy roads: presents large advertisement to passing pedestrians and drivers

"Bits" of information:

In order to assess the ability of a driver to take in the information displayed on the face of a road traffic sign the information has been broken down into "bits"; the maximum recommended number of "bits" of information on a tourism sign face (including all stacks and/or panels) is 12 "bits"; typical values of signface components in terms of "bits" are:

words up to/including 8 letters = 1 bit

(ii) words more than 8 letters = 2 bits

(iii) arrow (stack-type) = 0,25 bit

(iv) route number = 0,5 bit

Cluster (of signs):

A sign cluster is a multi-part sign (maximum three panels or parts) mounted so that stacks applying to different directions are mounted on common supports with a vertical separation of 100 mm to 200mm.

Clear zone:

The area starting at the edge of the travelled way, available for safe use to display of road traffic signs in accordance with the National Road Traffic Regulations and by errant vehicles that leave the travelled way.

Balcony and under-awning advertisements:

- affixed flat onto or painted on a parapet wall, balustrade or railing'
- affixed flat onto or painted on a fascia;
- affixed flat or painted on the facia of a roof structure without walls;
- affixed to or painted on a pillar, column or post supporting a roof structure without walls;
- painted or printed on the fabric of a blind.

Construction site advertisements:

An advertisement describing the type of development being carried out on a construction site.

Decision sight distance:

Decision sight distance is the distance need for a driver to detect an unexpected or otherwise difficult to perceive information source or condition in a roadway environment that may be visually cluttered, recognise the condition or its potential threat, select an appropriate speed and path, and initiate and complete complex manoeuvres.

Development advertisements:

An advertisement describing the type of development being carried out on a construction site.

Digital and Projected Advertising Displays:

Any type of stationary advertising display that is located outside of a building, visible from the road, and capable of displaying dynamic content or automatically changing content.

Distraction:

A diversion of attention away from activities critical for safe driving toward a competing activity.

Driver distraction:

Occurs when the driver's attention is, voluntarily or involuntarily, diverted from the driving task by an event or object to the extent that the driver is no longer able to perform the driving task adequately or safely.

Driver behaviour:

The way a driver behaves while driving.

Estate agents' boards:

An advertisement that are temporarily displayed to advertise the fact that land, premises, development or other forms of fixed

property are for sale or to let.

Electronic billboards:

A billboard that displays digital (electronic) images that are changed by a computer every few seconds.

Expectancy:

Diver expectancies are formed by the experience and training of drivers.

Flags and banners:

A piece of cloth (or similar material) upon which an advertisement is displayed and which is attracted to a single rope, pole or flagstaff projecting vertically in such a way that its contents are normally not readable in windless conditions.

Floodlighting:

A floodlight is a broad-beamed, high-intensity artificial light.

Forecourt advertisements:

An advertisement on a forecourt of business premises, being an advertisement displayed in such forecourt to draw attention to commercial services, goods for sale or other services available at the premises but does not include a combination advertisement at a filling station or roadside service area.

Guidance sign:

Is a basic class of road traffic sign and includes location signs, route marker and trailblazer signs, direction and freeway direction signs, tourism signs and diagrammatic signs used to guide road users from the start to the end of their journeys.

Horizontal alignment:

The design speed of a road is an overall design control and is typically applied to achieve a balance among all design element often in terms of practical and economic consideration.

Information interpretation task:

Drivers use many of their senses to gather information.

Intersection performance:

The assessment of the state of the intersection safety performance (to be determine the gap to Safe System readiness).

Large billboards:

Billboards 18 to 40 square meters.

Manual:

Refers to the current editions of the Southern African Development Community-Road Traffic Signs Manual (SADC-RTSM) and the South African Road Traffic Signs Manual (SARTSM).

On-premises business advertisements:

An advertisement aimed at identifying and locating business enterprises and industries and excludes a residential or community advertisement.

Outdoor Advertising Display Restriction Area:

An area outside the road reserve of a road, based on a determined traffic conflict and/or turbulence zone on the roadway, for which it has been determined the installation of an outdoor advertising display will not be supported

Outdoor Advertising Display Restriction area:

An area outside the road reserve of a road, based on a determined traffic conflict and / or turbulence zone on the roadway, for which it has been determined the installation of an outdoor advertising display will not be supported.

Poster:

Any placard announcing or attracting public attention to any meeting, event, function, activity or undertaking or to the candidature of any person nominated for election to parliament, local government or nay similar body or to a referendum, or any placard advertising any product or service or announcing the sale of any goods, livestock or property.

Primacy:

Primacy indicates the relative importance to safety of competing information.

Product replicas and three-dimensional advertisements:

Is a replica or product used for advertising that may be free-standing or attached to a structure and includes an inflatable object that is not an aerial advertisement.

Project board:

An advertisement displaying the involvement of a contractor or consultant in a construction project.

Reaction time:

Information takes time to process.

Residential or community advertisements:

Includes a variety of small notices and advertisements displayed on premises used for residential-orientated purposes and for community services, and include advertisements un urban areas and also on places of residence in natural and rural areas.

Road Reserve:

The full width of a road including the roadside and the roadway within which the construction / installation of any ground mounted, cantilever, portal or any overhead fixtures to existing road structures to house an outdoor advertising display will not be supported.

Road Traffic Sign:

This includes all road signs, road signals, road markings or other devices prescribed in terms of the Road Traffic Act, Act 93 of 1996.

Service facility advertisements:

An advertisement at a filling station or roadside rest and service area.

Situational awareness:

Associated with the ability to perceive hazards in the road traffic environment.

Small billboards and tower structures:

Billboards less than 18 meters.

Stopping sight distance:

Sight distance in the length of the roadway ahead that is visible to the driver.

Sustainable safety zones:

- The road reserve including the roadway (an area of maximum control);
- Clear Zone
- Traffic conflict area
- Turbulence zone

- Outdoor advertising display restriction are

Super billboards:

Billboards larger than 40 up to 81 square meters

Tower or pylon advertisements:

A billboard affixed to or painted on a tower, bridge or pylon that is not used primarily for advertising purposes.

Tower structures:

A structure used for advertising in a parking area of a shopping centre and at an important mode such as an airport, railway station or bus or taxi station.

Traffic conflict zone:

An area on a roadway, indicated on diagrams/drawings, where vehicle paths may intersect or where other traffic conflicts, including with pedestrians, exist.

Trailer advertising:

A trailer (also known as a preview or coming attraction) is a commercial advertisement for a feature film that will be exhibited in the future at a cinema, the result of creative and technical work.

Turbulence zone:

An area indicated on the diagrams/drawings associated with an off-ramp, on-ramp or terminating lane (or lane drop) on a roadway.

Variable advertisements:

Advertisement that change over time. Either at pre-set intervals or can be adjusted off site.

Vertical alignment:

The topography of the land traversed has an influence on the alignment of roads and streets.

Visual billboard:

A light emitting screen or a light emitting screen composed out of various screens that displays videos or moving animations.

Visual clutter:

Visual searches are task-orientated which means that when performing a visual task, the searcher is looking for something specific.

Annexure D

REMOVAL OF ILLEGALLY ERECTED ADVERTISEMENTS VISIBLE FROM A ROAD

Removal of Illegally Erected Advertisements Visible from a Road

1 INTRODUCTION

There are several outdoor advertisements have been erected in transgression of the applicable legislation, and which pose a road safety hazard. This memorandum sets out the legal environment regarding the removal of those outdoor advertisements.

Distinction should be made with regards to outdoor advertising visible from local roads, provincial roads or national roads.

A further distinction is made between advertisements which were authorised by an authority contrary to the applicable legislation and advertisements which have been erected without authorisation from the relevant authority.

2 REMOVAL OF ADVERTISMENTS ERECTED ILLEGALLY

2.1 National Roads

The Regulations on Advertising on or Visible from National Roads, 2000- GN R1402 of 2000, (the National Regulations) are clear with respect to the technical requirements for advertising as well as the processes for application and approval of outdoor advertisements visible for national roads.

The country is covered “wall to wall” by municipalities and all national roads will transverse various municipal jurisdictions.

While the application of the National Regulations are excluded in urban areas within a municipality which have issued bylaws on the matter, the National Act does not contain such an exclusion and therefore section 50 of the National Act also applies to advertisements displayed in those areas. In this case, a constitutional interpretation is necessary. In Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC), the Constitutional Court determined that the national and provincial spheres of government may not by legislation, give themselves the power to exercise *executive* municipal powers or the right to *administer* municipal affairs. This is because, the Constitutional Court held further, the mandate of these two spheres is ordinarily limited to "regulating" the exercise of executive municipal powers and the administration of municipal affairs by municipalities and the authority to "regulate" does not include the power to exercise municipal competencies and perform municipal functions. Instead, it simply includes the power to by law establish a framework within which a municipality must exercise its executive and administrative powers. In other words, while the national government has the power, as is exercised through the National Act and Regulations to state how the provinces and the local authorities must exercise the function of approving the display of outdoor advertisements that are visible from national roads, it may not give the approval on behalf of the province or the local authority.

The National Act clearly state in section 50 that SANRAL is entitled to require the removal of illegally displayed advertisements, and if it is not removed, to remove the advertisement itself. Section 5(3) and (4) of the South African National Roads Agency Limited and National Roads Act, 7 of 1998, determine that an advertisement that is displayed or *permitted* to be displayed contrary to the Act,

may be required to remove that advertisement. If that person does not remove it, SANRAL may remove it.

Section 50 is straightforward in relation to an advertisement illegally displayed in the visual zone of a national road that does not fall within an urban area of a municipality which have promulgated by laws regulating outdoor advertising. A distinction must be made between advertisements displayed in an urban area contrary to the national legislation and with the consent of the relevant municipality and advertisements displayed in an urban area contrary to the national legislation without the consent of the relevant municipality.

The Interpretation Act 33 of 1957, defines person to include the following:

(a) any divisional council, municipal council, village management board, or like authority;
(b) any company incorporated or registered as such under any law;
(c) any body of persons corporate or unincorporated.

The Interpretation Act applies to the interpretation of all laws in force in the country. This means that section 50 of the National Act and Regulations must be interpreted to include a municipality.

2.1.1 Advertisements displayed contrary to national legislation with the consent of the relevant municipality

A municipality which permits the display of an advertisement contrary to the National Act and Regulations may be instructed by SANRAL to remove the advertisement, (as it allowed its display) falling which, SANRAL may remove the advertisement itself.

The municipality may incur civil liability in this case, as it allowed the illegal display of an advertisement, and would therefore not necessarily be willing to instruct the removal of the illegally displayed advertisements. The owner of the advertisement would likely want (and be entitled to) compensation.

2.1.2 Advertisements displayed contrary to national legislation without the consent of the relevant municipality

Advertisements displayed illegally within the visual zone of an national road for which the municipality has not given permission to be displayed should be rather straightforward and a request from SANRAL to the municipality concerned to instruct the person who is responsible for the illegal display to remove it, should suffice. In this case, the municipality in terms of its bylaws, has the power to remove the advertisement itself if the responsible person does not heed the instruction. Where a municipality has not promulgated bylaws regulating outdoor advertising, SANRAL should cooperate with the relevant provincial government in as far as the provincial government has promulgated legislation in this regard, as well as the municipality concerned, to remove the illegally displayed advertisements.

2.1.2.1 Recommendation

It is recommended that SANRAL make use of the powers afforded them in section 50 of the National Act to remove illegally displayed advertisements within the visual zone of national roads. It is appreciated that with regard to advertisements illegally displayed with the consent of a municipality, it is necessary in the spirit of cooperative governance to first embark on a cooperative programme to do so, failing which SANRAL has the legislative and executive power to remove such.

2.2 Provincial Roads

Of the Provinces, the Eastern Cape, Gauteng, KwaZulu – Natal, Limpopo and the Western Cape have promulgated roads legislation, all of which regulates advertising visible for provincial roads in a similar manner, which in essence follows the international and SANRAL model. The Free State, Mpumalanga

(until their Roads Act is promulgated), Northwest, and Northern Cape have not promulgated roads acts and are reliant on the Advertising on Roads and Ribbon Development Act, No. 21 of 1940. The latter Act and all of the provincial roads and infrastructure legislation allows for the removal of illegally displayed advertisements, following the same process as the national legislation. The Kwazulu-Natal Roads Act provides for the MEC to determine standards for advertising adjacent to provincial (main) roads and in the case where there is a safety hazard, also for district or local roads. The Gauteng Transport Infrastructure Act, 8 of 2001, is more restrictive in terms of the provincial government's powers, but still provides sufficient powers to remove illegally displayed advertisements.

With regards to the removal of illegally displayed advertisements within areas where a municipality has promulgated bylaws to regulate the display of outdoor advertising, the same interpretation of the word "person" as that for national government will apply, meaning that the relevant laws must be interpreted to include a municipality in the word "person".

2.2.1 Recommendation

It is recommended that provinces make use of the power afforded them in terms of their own road roads legislation, including the Advertising on Roads and Ribbon Development Act, 1940, to remove illegally displayed advertisements. A distinction must be made between an advertisement illegally displayed with the consent of the municipality concerned and those that are displayed without such consent. In the case where the municipality has given consent, the province may instruct the municipality to have it removed in accordance with the municipal bylaws, failing which, the province concerned may remove the advertisement itself. Where the municipality has not consented, a request to the Municipality making them aware of the illegal display and requesting action to be taken, should suffice.

2.3 Municipal roads

The sample of municipal by-laws studied provide for detailed processes of application for permission to display advertisements, as well as detailed requirements to be met before permission is granted for the display of advertisements visible form municipal roads or adjacent to municipal roads. Power to remove illegally displayed advertisements are also granted in terms of the relevant bylaws. Municipalities which have not promulgated any bylaws, should rely on the relevant provincial laws and assistance of the province to have illegally displayed advertisements removed.

2.3.1 Recommendation

It is recommended that municipalities in the example of the Johannesburg Roads Agency or the Limpopo Roads Agency, launch a programme to identify and remove illegally displayed advertisements.

2.4 Cross-government conclusions

As the constitutional dispensation with overlapping jurisdictions between the different spheres of government complicates the effective regulation of outdoor advertising that impact on road safety, only a joint effort will assist in the removal of illegally displayed advertisements. The United States' Highway Beautification Act, 1965, and its history of implementation provides a source of issues that need to be attended to in setting up a joint effort to address the issue of illegally displayed outdoor advertisements. The issues that have been repeatedly addressed in legislative amendments in the USA since the Beautification Act's initial promulgation include:

- Funding: Funding for compensation of removing legally displayed advertisements which after promulgation or issue of a new law or standard is borne by the states from its roads budget, but the federal government's contribution is 80%

- Illegal Signs: Owners of an illegal sign (unlawfully erected) must remove the sign 90 days after enactment of the bill, failing which the authority removes the advertisements and holds the owner of the advertisement responsible for the costs.
- Control Routes: The roads to which the Act apply, must be clearly stated.
- Compliance of different spheres of government- compliance have been assured in the USA through withholding funding.
- Scenic Byways: This aspect relates to the issues already addressed by SAMOAC.

The issues from the viewpoint of the advertising industry and the tourism industry in South Africa is the same as that of the USA. While the Beatification Act originates from an aesthetic point of view, [1]the issues with regards to removing illegally displayed advertisements are the same as with legislation authorising the removal of advertisements with the view to improve road safety. The latter, in fact provides a more compelling reason for removal than the aesthetics of the roadways.

It is possible for South Africa to implement a joint programme to eliminate illegally displayed advertisements, provided that-

- Funding is agreed on
- The owners of existing advertisements displayed illegally but with the consent of one of the three spheres of government, be equitable compensated for the removal of the advertisement;
- No compensation is awarded to owners of advertisements who is displaying and advertisement without the consent of any or the spheres of government;
- A timeframe for the removal of illegally displayed advertisements is agreed on and executed;
- No new advertisements are allowed to be displayed other than in accordance with the national standard to be incorporated into the Road Traffic Act;
- A method of compliance by all spheres of government be agreed on: compliance is most successfully ensured through the funding mechanism.

The programme could be initiated by a national government body but should include all role-players. A good start would be to establish a forum/committee comprising the National Department of Transport, SANRAL, the RTMC, representatives of provinces' relevant roads authorities (departments or Agencies), as well as the Metro's. The most important issue to be thrashed out by this forum/committee, is funding. Hardly any funds are available for maintenance of roads and funding for removal of advertisements and compensation should possible be found elsewhere than from the road maintenance budgets.

At the outset, illegally displayed advertisements should be identified. This step could be followed by a mapping of legally displayed advertisements, starting with the newly approved advertisements, and gradually adding existing legal displayed advertisements, until a proper cross-government database is achieved.

[1] Apparently, the Beautification Act was a result of a project undertaken by Lady Bird Johnson and signed into law by President Lyndon Johnson in October 1965.

3 APPLICATIONS FOR THE DISPLAY OF AN ADVERTISEMENT VISIBLE FROM A ROAD

3.1 Introduction

The application procedures and the requirements for display are similar for all spheres of government, with some differences in requirements and procedures. However, the relationships between national and provincial government with local government is constitutionally almost identical. Therefore, the national government relationship is dealt with in m ore detail than that of the provincial government.

3.2 National Roads

Any municipal bylaws must be read with the South African National Roads Agency Limited and National Roads Act, 7 of 1998 (the National Act) and the Regulations on Advertising on or Visible from National Roads, 2000 (the National Regulations).

While all of the by-laws reviewed contain a provision that the South African National Roads Agency's (SANRAL) input must be obtained in the case where an advertisement applied to be displayed within a local authority jurisdiction, but will be visible from a national road, the bylaws do not seem to require the *approval* of SANRAL. This may lead to a situation where a municipality grants authorisation to display an outdoor advertisement contrary to the requirements of the South African National Roads Agency Limited and National Roads Act, 7 of 1998, (the National Act) and the National Regulations

The Ekurhuleni Bylaws may be taken as an example: It determines in section 3(11) that "Applications for advertising signs in the national road reserve or within the visual zone of the national road reserve boundary of a freeway in an urban area shall be subjected to *recommendation* by South African National Road Agency Limited, after municipal principle-approval has been obtained. Such an advertising sign shall not be erected or displayed without the final written approval of Municipality."

The above means that an application is first approved in principle by the municipality, thereafter the *"recommendation*" of SANRAL is obtained, where after a final approval is granted before the advertisement may be erected. The Bylaws do <u>not</u> state that an approval will not be granted if SANRAL recommends that it be denied.

Section 3(12) differs from section 3(11) in relation to provincial roads, in that it requires *"positive comments"* from the province, in the case of an advertisement visible from a provincial road. The process is the same as for national roads.

There is an anomaly if the bylaws are compared to the National Act and Regulations: The Act prohibits the display or permission to display an advertisement visible from a national road, whether outside or within an urban area, if it is not displayed in accordance with the Regulations on Advertising on or Visible from National Roads, 2000, ("prescribed requirements as referred to in section 50 of the Act"). It also authorises SANRAL to require from the person who displayed or permitted such a display to remove the advertisements, failing which, SANRAL is authorised to remove the advertisement itself.

The National Regulations determine in regulation 5 that it does not apply to urban areas where a municipality has promulgated a bylaw dealing with the matters dealt with in the regulations and which is applicable to the national roads in the jurisdiction of the municipality concerned. It also do not apply in an area which the Minister declared it by notice in the Gazette not to apply. However, the regulation also determines that where the Regulations do not apply, the municipality must make approval of applications for the display of an outdoor advertisement visible from a national <u>*conditional*</u>

on the applicant also obtaining approval from SANRAL, which may only consider the road traffic, road traffic signs and road safety aspects of the application. Regulation 40(5), reciprocates, stating that SANRAL must make approval of an application for the display of an advertisement in an urban area conditional on the approval of the relevant municipality.

This means that, taking into account the constitutional structure and powers, bylaws may not contain a requirement for only a "recommendation" from SANRAL such as is contained in the Ekurhuleni bylaws, and approval should be made conditional on SANRAL approval in the case where the advertisement intended to be located in the visual zone of a national road.

The latter may lead to a chicken and egg situation, where simultaneous approval from SANRAL and the relevant municipality is required. The Ekurhuleni Bylaws make provision for such a situation , providing for a three-step process, where an application is made to the municipality, accompanied by a recommendation by SANRAL with a final approval by the municipality after receiving SANRAL's recommendation. The Bylaws however do not go far enough. It is still possible for the municipality to approve the erection of an advertisement in the visual zone of a national road despite a "negative recommendation" from SANRAL.

3.3 Provincial roads

The metro municipalities have extensive bylaws and policies regarding outdoor advertising. In the case of the provincial roads, the example of Ekurhuleni and the Gauteng province provide an example of the interaction between the laws in relation to the application procedures. Regulation 5 of the Gauteng Regulations on Advertising Visible from Provincial Roads, requires that in respect of any application for permission to display an advertisement in the visual zone of a provincial road, should firstly be approved by the municipality concerned. However, the municipality must on receipt of the application, refer it to the MEC for comment. For applications for the display of advertisements in a visual zone, outside the road reserve of a provincial road and withing a building restriction area, the person intending to erect that advertisement must obtain the written permission from the MEC, applying to the MEC at the same time when the application is made to the municipality. (applications in respect of advertisements displayed on a building or on a vehicle, machine or implement need not be referred to the MEC for comment). Regulation 5(7) requires the relevant municipality to take account of the MEC's comments and to apply the Gauteng Regulations, despite any bylaw to the contrary. This is an example of exercising the province's constitutional power exactly as explained in Johannesburg Metropolitan Municipality v Gauteng Development Tribunal 2010 6 SA 182 (CC), where the province regulates how a municipality may exercise its functions but does not exercise those functions on behalf of the municipality.

There are thus three variations of the application procedure in the case where an advertisement is intended to be displayed within the visual zone of a provincial road:

- Applications which have to be referred to the MEC for comment;
- Applications which requires the approval of the MEC; and
- Applications which do not have to referred to the MEC for approval or comment.

Section 3(12) of the Ekurhuleni Billboards and Display of Advertising Bylaws, 2017, determines that applications for the display of an advertisement visible within 20m from a provincial road reserve boundary is subject to the "positive comment" by the Provincial Authority, after in- principle approval has been obtained from the municipality. As in the case of national roads, the final approval of the municipality is required before the advertisement may be erected.

3.4 Municipal jurisdictions

The regulation of the display of billboards and outdoor advertising is rightfully an essentially local authority competence. In the metropolitan areas, the issues is well regulated and substantially in compliance with SAMOAC. Application procedures are well set out in the bylaws, and Ekurhuleni for example, has a detailed policy document supporting its bylaws, while the Mangaung Bylaws are detailed in relation to where and how advertisements will be allowed to be displayed. The municipal function regarding the display of billboards and outdoor advertising stretches much further than only road traffic and road safety and encompasses municipal planning and the environment. It is common cause that exercising a municipal function is one of the most difficult governing procedures in the country as the laws and interests of both provincial and national government have to be taken into account. So is the drafting of bylaws. The Integrated Development Plan of a municipality assists in the exercise of its functions, but the detailed legal procedures still have to be worked out by the municipal officials.

In addition to the locality of advertisements affection provinces and SANRAL, some advertisements also would affect neighbouring municipalities which necessitates consultation and cooperation amongst municipalities.

3.4.1 Conclusion

As shown in the examples of the application procedures for permission to display advertisements in the visual zones or provincial or national roads, it is difficult to give effect to the constitutional mandates of all three the spheres of government in different sets of legislation to which is in effect a single application procedure. A practical solution should be sought for the application procedure, giving effect to the constitutional mandates of all three spheres of government in an equitable manner and in the spirit of cooperation. While this document addresses only road traffic and road traffic safety, such a solution should include the environmental and planning elements, where necessary.

A solution as described above could be to establish a joint application website that provides a “one stop service” to applicants. This website should contain all the relevant information on requirements for a successful application and have a functionality for online documentation upload(in support of the application), in the example of the SARS website. The first step in such an electronic process would be the classification of the application in relation to geographic positioning, determining to which municipality the application should be referred. Based on the proposed geographic position of the intended advertisement, the system needs to be able to identify whether will be in the visual zone of a national or provincial road and automatically refer the application to the relevant municipality for approval, subject to approval of the relevant province or SANRAL (or both). The evaluations should be able to follow each other closely, or even run concurrently. The approval of the provinces or SANRAL should be restricted to road traffic and traffic safety matters.

A helpful functionality would be that the system could perform a preliminary identification of whether the intended location of the advertisement is allowed in terms of the standard to be provided in the Road Traffic Regulations, 2000. This, however, need not be added from the start.

An electronic “one stop service” for the application for the display of outdoor advertisements is a mammoth task and will have to be implemented in phases and will require the commitment and possible financial support of all three spheres of government.

Prerequisites for the successful implementation of such a system will be the implementation of a national standard for the display of advertisements in the visual zones of national, provincial and local roads, and the alignment of legislation.

In the interim the principles and procedures described in Annexure A should be followed as a measure of good cooperative governance.

3.4.2 Recommendation

1. It is recommended that the application procedures for permission to display an outdoor advertisement be automated to the extent possible to provide for applications for the display of advertisements to be displayed in:
    - The visual zone of a national road;
    - The visual zone of a provincial road;
    - An area which will affect a neighbouring municipality.
2. It is recommended that preceding the development of an ITC system to manage applications for outdoor advertising –
    - The Manual that is being developed should be issued as a minimum national standard in terms of section 44(2)(d) of the Constitution;
    - The relevant legislation of all three spheres of government must be reviewed to align with the minimum national standard;
    - The application and reference procedure should be agreed on.

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