

ITEM A-RS (04-2018) IS-OC CM 18/09/2019	ROADS AND STORMWATER DEPARTMENT: PROPOSED TRAFFIC CALMING POLICY
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RESOLVED

1. **That** the Infrastructure Services Oversight Committee report regarding the proposed Traffic Calming Policy for City of Ekurhuleni (CoE) **BE NOTED**.
2. **That** the previous Traffic Calming Guideline approved by Council under Item PT 80-2002 on the 1st of August 2002 **BE REVOKED**.
3. **That** the Traffic Calming Policy attached to the report **as Annexure A BE APPROVED**.
4. **That** the Policy **BE WORKSHOPPED** for **ALL COUNCILLORS** within **60 days** after tabling the report.



**TRAFFIC CALMING POLICY
ROADS AND STORMWATER DEPARTMENT**

CITY OF EKURHULENI TRAFFIC CALMING POLICY

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1 PURPOSE

The purpose of this policy is to create a metro-wide policy framework in terms of which traffic calming will be implemented and such applications assessed and approved for the whole of City of Ekurhuleni (CoE).

This traffic calming policy provides guidelines for the following activities:

- Requests for traffic calming consideration;
- Documentation of traffic calming requests;
- Identification and approval of traffic calming measures;
- Programming of traffic calming improvements;
- Design of traffic calming measures; and
- Evaluation of traffic calming applications in the area.

2 POLICY STATEMENT

It is the policy of the COE to discourage speeding, calm traffic on lower order roads, discourage rat-running and preserve mobility where practicable, on higher order road within the community for all modes of transportation, while achieving an appropriate balance among traffic circulation, traffic safety, public safety response, and quality of life, particularly within residential areas, through measures deployed to affect travel routes, traffic volumes, and speeds.

In the event of substantial conflict between public safety response and such measures, observed or projected, preserving public safety response shall be given priority.

3 POLICY OBJECTIVES

The objectives of this policy are to:

- Ensure that traffic calming is part of the overall transport strategy.
- Ensure that traffic calming is accommodated at the correct road hierarchy level.
- Improve the efficiency of the overall road network without detrimentally affecting the mobility.
- Protect residential areas and the residents from unwanted through traffic and associated dangers.
- Promote safety for modes such as pedestrians and bicycles where high speeds occur.
- Ensure that traffic calming must be managed in a uniform manner across the Municipality.

4 DESIGNATED OFFICIALS OF THE DEPARTMENT

- 4.1 The municipality will designate officials of the Roads and Stormwater Department for specific areas of the municipality.
- 4.2 All communication between the applicants and the municipality will be through the Roads and Stormwater Department Planning Division.
- 4.3 The Officials of the Department will be responsible for:
- (a) Creating a database for all traffic calming requests
 - (b) Assessing and investigating the problems
 - (c) Conducting traffic calming investigations and making recommendations for implementation.
 - (d) Approval as delegated by Council.

5 ROAD HIERARCHY

- 5.1 The road hierarchy classification shall determine whether traffic calming measures may be installed or not.
- 5.2 No traffic calming measures must be implemented on Class 1 and 2 roads.
- 5.3 No traffic calming measures may be implemented on Class 3 roads except where an engineering judgement and road safety shows otherwise.
- 5.4 Traffic calming measures may be provided along Class 4 (Local Distributors) and Class 5 (Residential Access) roads subject to the approval by the Department
- 5.5 **Table 5.1** shows the road classes on which traffic calming is applicable.

Table 5.1: Applicable Road Classes

Road Class	Traffic Calming
1	No traffic calming
2	No traffic calming
3	Traffic calming restricted must be limited to signage and road markings
4	- All types of traffic calming allowed - Focus on mini-circles and less on speed humps
5	- All types of traffic calming allowed - Focus more on speed humps

5.6 Traffic calming applications must be done at the local level

- 5.7 The final location of traffic calming installations (and whether they will be installed at all) shall be determined by the Planning Division in the region

6 POLICY PRINCIPLES

6.1 General

- (a) Traffic calming will be managed in a uniform and consistent manner across the Municipality.
- (b) No traffic calming measures shall be implemented at all signalised intersections.
- (c) In general traffic calming should not be considered at the stop or yield controlled intersection except in exceptional cases where engineering judgement will prevail.
- (d) Where Traffic calming measures were implemented at intersections in conjunction with stop and yield signs, prior to the adoption of this policy, will remain in place.
- (e) Provision for pedestrians and cyclists should be of a high quality in the implementation of all traffic calming measures.
- (f) All traffic calming designs shall be in accordance with the National Guideline for traffic calming – COD Report CR.-96/036. Annexure A provides a copy of the National Guideline for traffic calming on the design of traffic calming measures.
- (g) In the event of high speeds, speed calming must be introduced by means of law enforcement

6.2 Previously disadvantaged areas

- (a) Traffic calming measures may be installed when pedestrian; speed and/or traffic intrusion are deemed excessive i.e. high pedestrian interaction with vehicles and where motorists travel at higher speeds than the prescribed speed limit for a particular class of road, subject to the approval by the official of Department. The rationale of his decisions must be recorded.
- (b) Traffic calming measures may be installed on Class 3, 4 or 5 roads subject to the approval by the Regional Executive Manager or Chief Engineer: Roads and Stormwater. The rationale of his decisions must be recorded. However the installation of physical measures on Class 3 roads must be limited.

6.3 Traditionally well developed areas

- (a) No traffic calming measures are to be installed on Class 1, 2 or 3.
- (b) Traffic calming measures may be installed when speeds and/or traffic intrusion are deemed excessive i.e. high pedestrian interaction with vehicles and where motorists travel at higher speeds than the prescribed speed limit for a particular class of road, subject to the approval by the official of Department. The rationale of his decisions must be recorded.
- (c) No traffic Calming measures shall be installed in Enclosed Areas as there are no through traffic (only residents drive on roads in Enclosed Areas).

6.4 Central Business Districts – Commercial Developments

- (a) No physical traffic calming measures are allowed except raised pedestrian crossings.
- (b) Lower order roads and special cases may be considered if well motivated but will as a norm not be applied, subject to the approval by the Head of Department: Roads and stormwater,,the rationale of his decisions must be recorded.

6.5 Industrial areas

- (a) No physical traffic calming measures may be installed in industrial areas.
- (b) Where necessary traffic calming measures should be limited to informative and suggestive measures such as maximum speed limit signs, special paving construction or road surfacing.
- (c) Special cases may be considered if well motivated but will as a norm not be applied, subject to the approval by the Head of Department: Roads and stormwater,,the rationale of his decisions must be recorded.

6.6 Mixed use developments

- (a) The needs of the residents shall take precedence over those of the commercial sector. Mixed developments tend to encourage walking, bicycling etc.

6.7 New Developments

- (a) Traffic calming must be an **integral part** of the process when planning for new developments.
- (b) New township developments must be planned in such a way that they will not require the implementation of traffic calming in future.
- (c) All private and public development proposals will be reviewed for potential traffic calming issues.
- (d) An application for township developments may be **returned to the applicant of a review of the layout** on the grounds that the existing proposed layouts require an excessive number of traffic calming measures.
- (e) All traffic calming costs will be placed upon the developer to eliminate or minimise the negative impacts that are a result of the development. (new or as a result of rezoning)

6.8 Schools

- (a) School traffic safety must be given top priority when prioritising traffic calming requests.
- (b) All traffic calming measures shall not impact negatively on the movement of school buses and municipal buses.
- (c) New schools must not be allowed a direct access on class 2 and 3 roads.

6.9 Emergency Service and Public Transport Vehicles

- (a) All traffic calming devices shall be designed to accommodate all emergency vehicles and to minimize its impacts on emergency vehicle response times.
- (b) Traffic calming measures shall be limited on primary access response routes and major Public Transport routes.
- (c) The Fire Department, Public Transport Department and the Police Department where applicable will be consulted.

7 KEY ROLE PLAYERS

Understanding the roles of the stakeholders is most important to ensure effective implementation. The stakeholders include:

- Municipal Officials (Including emergency services and public transport operators);
- Councillors (for noting of implementation decision or facilitation of the public participation process in the case when a traffic calming master plan needs to be supported by the community); and
- Members of the public.

Table 7.1 presents the main responsibilities of each stakeholder in the traffic calming procedure.

Table 7.1: Responsibilities of each role player

Issues	Actions		
	COE Officials	Councillor	Public
Communication	<ol style="list-style-type: none"> 1. Communicate the outcome in writing 2. Share lessons learned, successes with other officials in the City. 	<ol style="list-style-type: none"> 1. Assist the public (residents) to formalise their requests. 2. Communicate the policy and assist them in understanding the issues and applicable route to follow. 3. Support the officials and technical experts in the application of the Policy. 4. Assist in communicating the outcome to the public. 5. Assist the officials in public meetings and consultations where necessary. 	<ol style="list-style-type: none"> 1. communicate their requests to Council in writing. 2. Assist the Council by sharing information with them and fellow residents. 3. Assist in monitoring and provide feedback on successes and failures. 4. Assist in Public Participation where necessary.
Technical Assessment and Implementation	<ol style="list-style-type: none"> 1. Use the guidelines as stipulated in the policy. 2. Use good engineering judgement. 3. Innovate and explore – stretch the boundaries. 		<ol style="list-style-type: none"> 1. Provide as much information to the City officials as possible to understand the issues and problems 2. Assist in information gathering when applicable. 3. Support the initiatives. 4. Adhere to the road rules.

Source: Adopted from the City of Cape Town Traffic Calming Policy, April 2003

8 PRINCIPLES FOR DETERMINING POTENTIAL TRAFFIC CALMING MEASURES

8.1 Speed humps

- (a) Speed humps may be installed on local streets. The street shall be a two lane residential local street where the primary function is to provide access to residential dwellings.
- (b) Speed humps may be considered on primary emergency response routes or on public transport routes.
- (c) Installation of speed humps shall be no closer than 60 metres from an intersection except in cases where engineering judgement prevails.
- (d) Speed humps must not be located on sharp horizontal and vertical curves due to visibility and motorcycle and bicycle stability problems except in cases where engineering judgement prevails and overall operating conditions.
- (e) The exact spacing between humps must be determined on an individual basis based on engineering judgment.

8.2 Traffic circles

- (a) Traffic circles can be used at intersections of two local streets. They can also be used at intersections between low volume distributor roads and local streets, provided that the volume on the low-volume distributor road is not more than approximately three times the volume on the local street, so as to avoid problems with traffic on the collector road not yielding to vehicles which have entered the circle from the local street.
- (b) Mini circles may only be installed on local streets under 8 metres wide.
- (c) The installation of traffic circles on primary emergency routes should be minimised.

8.3 Chicanes

- (a) Chicanes must be used on local streets less than 8 metres in width
- (b) Chicanes may be installed on two-lane, two way streets.
- (c) Chicanes shall be placed no less than 50 meters apart.
- (d) Chicanes need enough light to be seen well in advance by motor vehicle drivers during the hours of darkness. To increase visibility other measures such as cat eyes can be used.

8.4 Raised Pedestrian Crossings

- (a) Raised crossings may be used on local or Collector Street along defined pedestrian routes.
- (b) Raised crossings will only be used at marked, unsignalised pedestrian crossing.
- (c) Raised pedestrian crossings may be used in Central Business Districts (CBDs) where large volumes of pedestrians exist.

8.5 Chokers

- (a) Chokers shall only be used on streets wider than 8 metres with parking or wide kerb lanes.
- (b) Intersections where there is low truck volume and other large vehicles unless there are alternative routes for heavy vehicles,
- (c) Near schools or other areas of high pedestrian volumes.

8.6 Roundabouts

- (a) Roundabouts may only be used on streets over 8 metres wide.
- (b) Use of roundabouts (or variations thereof such as 'turbo' roundabouts) must be limited to arterial streets as an intersection control measure.
- (c) Roundabouts are appropriate on intersections with 3 to 8 legs and adequate right of way.

8.7 Road Closures

- (a) They must be dealt with in terms of the restriction of access for security and safety purposes act and the ordinance.

8.8 Speed Cushions

- (a) Speed cushions may be installed on primary emergency response routes, on public transport routes subject to approval by the Roads and Stormwater Department in consultation with the Traffic Working Group.

8.9 General

- (a) All traffic calming measures **will only be considered where:**
 - (i) There are inherent safety problems caused by conflict between motorised and non-motorised traffic, road layout, geometric constraints, sight distances etc.
 - (ii) They will contribute directly to safety at public places (schools, halls, parks etc.).
 - (iii) Where rat running is causing serious problems.
 - (iv) Traffic calming is NOT to curb speed as speed is a motorist behavioural matter and needs to be dealt with by law enforcement.

9 TRAFFIC CALMING REQUEST PROCEDURE AND APPROVAL PROCESS

All traffic calming requests regardless of its extent should follow the evaluation procedure as set out below. The requests will be assessed as they are received. This

procedure must be followed when assessing traffic calming requests. Depending on the particular issue(s), not all of the steps may be necessary. The proposed measures are based on the existing COE procedure and have been updated. **Figure 10.1:** illustrates the traffic calming procedure for assessing all traffic calming requests in the COE.

9.1 Request for traffic calming measures

- (a) The residents have a right to apply for traffic calming measures.
- (b) All traffic calming requests can be in the form of a formal application submitted on the “Request for Traffic Calming Study” form, obtainable from any Roads and Stormwater offices, customer care centres or on the COE website at www.ekurhuleni.gov.za. (A copy of the form is attached as **Annexure B**). Letters and e-mails containing the relative information as requested in the official form will be accepted as well.
- (c) Completed applications must be submitted to the Roads and Stormwater Department
- (d) To the extent possible, each request must identify the street(s) or area of concern and describe the nature of the problem(s).
- (e) The request shall contain relevant signatures of the applicant and/or supporting residents in the block (s) where installation is required.
- (f) If the information is not sufficient the request may be rejected.
- (g) All traffic calming requests will be reviewed on a case-by-case basis as and when they are received.

9.2 Receiving application

- (a) On receipt of the application the Roads and Stormwater Department will record the application in the database.

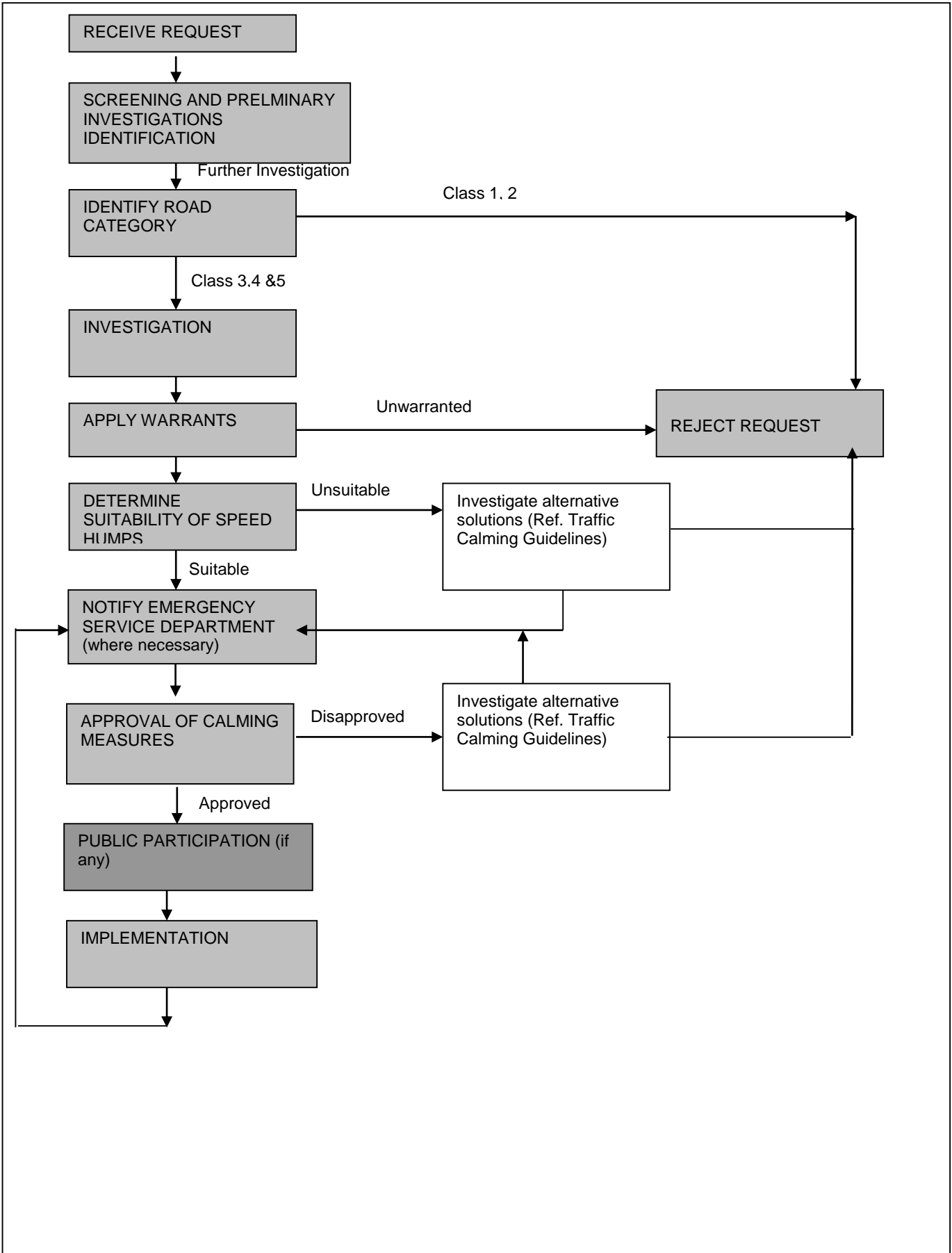


Figure 9.1: COE Traffic Calming Procedure

9.3 Screening and Preliminary Investigations

- (a) The Department shall review the request for consistency with this policy. In the event that the request is not consistent the applicant shall be so notified and no further action shall be taken.
- (b) Law enforcement shall take precedence over traffic calming.
- (c) If it is determined that enforcement is the most effective solution, the Department shall forward such application and recommendations to the enforcement department and there will be no further action required.
- (d) The Department shall determine whether the traffic problem is significant enough to warrant further study and prioritisation for traffic calming measures.
- (e) Requests determined to be consistent with this policy will be scheduled for further study and prioritisation.

9.4 Define Study Area

- (a) The area affected by the problem will be defined by Department according to the petition and later refined with the residents and his/her knowledge of where the traffic-related concerns occur.
- (b) The Department shall determine whether the traffic-related issues affect multiple streets or a single street.
- (c) The Department shall evaluate (if any) other traffic calming measures in the study area.

9.5 Identify Road Category

- (a) Determine the road Classification for which the traffic calming is suggested.
- (b) Physical features such as the surrounding road network, proximity of schools, road safety characteristics must be evaluated at this point.

9.6 Collect Traffic Data

- (a) The Department shall collect data to assist in the evaluation of the request. In cases where data does not exist the Department shall make realistic estimates or alternatively conduct small studies to limit costs.
- (b) The Department shall conduct a preliminary evaluation including a basic speed and volume study where necessary. Other data normally required include:
 - Current and future land use
 - Accidents statistics and potential accidents spots
 - Pedestrian and cyclists volumes and/or visual assessments
 - Geometric details
 - Public transport routes, current and future
 - Primary emergency vehicles routes

- (c) Once the data has been collected, analysed and interpreted for the affected neighbourhood, the Department must conclude if the impacted area encompass a single street or multiple streets.

9.7 Apply warrants

- (a) All traffic calming proposals, requests for traffic calming should be assessed objectively.
- (b) A rating system proposed in the National Guidelines for Traffic Calming will be utilised to compare competing (for funding) local traffic calming projects.
- (c) Investigations whether calming is warranted should be done according to the proposed points system as shown in **Table 10.3**.
- (d) Failure to satisfy these warrants would result in traffic calming not being recommended. Such streets may still be eligible for other mitigation measures and/or enforcement initiatives.

Table 10.3: Warrants for testing the feasibility of traffic calming

Guidelines for evaluating feasibility					
No	Warrants	Point Score			Weight
		0	1	2	
1	Traffic volumes	<50 vph	50-150 vph	>150 vph	3
2	Public service vehicles	<3 vph	3-5 vph	>5 vph	1
3	Pedestrian / risk	Low	Medium	High	2
4	Through traffic volume	<5 %	5-50 %	>50 %	3
5	Pedestrian volumes (Vol/4h over 150 m)	<50/4h	250-500/4h	>500/4h	3
6	Parking / loading movements	<100/h/km	100-200/h/km	>200/h/km	2
7	Schools / Sensitive Areas	Low	Medium	High	4
8	Footways / verges	Made	Rough	None	2
9	Frontage / accesses spacing	>75m	50-75 m	<50 m	2
10	Stopping sight distance	>130 m	50-130 m	<>50 m	1
11	Geometry	Good>5 %	medium3-5 %	poor< 3 %	2
12	Road type	1-3a4	3b-4	5	3

Where:

- Traffic volumes - Most appropriate peak traffic volumes between 04:00 and 20:00.
- Public service vehicles - Average peak hour volumes (buses, taxis (public transport) refuse removal, ambulances, emergency vehicles, etc).
- Pedestrian/risk - The potential risk that pedestrian and vulnerable road users are exposed to in the presence of traffic can be subjectively assessed. (e.g. brake lights, swerving etc).
- Through traffic volume - That proportion of traffic that has another origin or destination along the road, or within the area, under study.
- Pedestrian volumes - The volume of pedestrians crossing a road over a four-hour period, and measures over a 150 meters roadway length.
- Schools/playgrounds/sensitive areas - The presence of schools/crèches/playgroups, hospitals, old age homes, clinics etc and other facilities that may be sensitive to traffic, traffic noise, fumes, etc and within the study area.
- Footways/verges - The provision of pedestrian facilities (pavements etc) within the verges.
- Frontage access spacing - The average distance between accesses to properties within the studied area/road.
- Stopping sight distance - The minimum distance required for a driver to bring his vehicle to a standstill and based on speed, driver reaction time and skid resistance.
- Geometry- The vertical rise or fall of the roadway measured from the base to the apex and expressed as a percentage also stopping sight distances in horizontal curves to be considered

To calculate compliance with the warrants the following calculation must be applied to determine the weighted score:

$$TS = \sum_{I=1}^n P_i, W_i$$

Where:

TS = weighted total score

P_i = point of criteria I

W_i = weight of criteria I

N = number of criterion

The following weighted score adopted from the National Guidelines for traffic calming measures can be used to determine whether the proposed measure are warranted or not:

Condition 1: Score below 31 points = Not warranted for implementation or further investigation.

Condition 2: Score between 32 and 43 = Further Investigation.

Condition 3: Score above 43 = Warranted for implementation.

9.8 Identification of traffic calming strategies

- (a) The Roads and Stormwater Department shall determine which traffic calming measures will be appropriate based on the principles set out on **Chapter 8**.
- (b) The Applicant will be informed of the traffic calming proposals after the technical evaluation. .
- (c) The preferred strategy or combination of strategies would then be established by the Department..

9.9 Notify Sister Departments

Where necessary the Fire and Emergency Services, Transport and Provisioning as well as the EMPD may be notified.

9.10 Approval of traffic calming measures

- (a) The Department will consider the recommendations by the responsible official/s and then make its decision based on the report and their knowledge of the area.
- (b) If the Department does not approve that traffic-calming measures be installed, a decision will be made to either stop the process or go back and reconsider alternative traffic calming devices and redefine the proposed measures.
- (c) The decision to stop and reconsider other traffic calming devices shall rest upon the Department.

- (d) The Department will communicate the outcome of the application with the Applicant in writing.
- (e) The Department shall determine if the request is of an exceptional nature (See **Chapter 12**).

9.11 Rating, Ranking and Selection of Projects

- (a) Only traffic calming projects, which have been approved for implementation (and there is insufficient funds to deal with the implementation on a first come first serve basis), will be ranked.
- (b) The Department may use its discretion to:
 - (i) Balance projects among the different wards in the COE.
 - (ii) Prioritise projects, which need immediate responses according to the **Chapter 11** criterion.

9.12 Funding

- (a) Generally, traffic calming devices may be installed at the Municipality's expense subject to availability of funds.
- (b) In the event that the requests for traffic calming measures exceed the budget allocation, funding for approved traffic calming projects will be distributed in accordance with the ranking system discussed in **Section 10.6**.
- (c) Traffic calming devices may not be installed by the residents of a neighbourhood but may pay the monies at Council approved tariffs in order for the Department to have the calming devices installed (either Departmentally or with the assistance of duly appointed Contractors).
- (d) Traffic calming measures are not warranted in enclosed neighbourhoods.

9.13 Implementation

- (a) Installation of all traffic calming devices is subject to the availability of funding within the current approved fiscal year budget and work backlog of the department.
- (b) When a traffic calming measure is programmed into the capital budget, the COE shall schedule and proceed with the design and implementation.
- (c) The implementation of any traffic calming measures should have the support of at least 67% of the residents along the affected street.
- (d) It is the applicant's responsibility to obtain all the signatures of the supporting residents.

10 EXCEPTIONAL CIRCUMSTANCES

- 10.1 For the purposes of this policy, "Exceptional Circumstances" exist when one or more of the following are met:

- (a) Accidents rates should be considered significant when there are reported cases involving pedestrian, bicycle and cars along a residential street;
- (b) Located at Public Places (schools, hospitals, community halls, parks etc.);
- (c) There is excessive extraneous traffic and through traffic;
- (d) The 85th percentile speed is more than 10-20 km/h over the posted speed limit.

10.2 For all these critical circumstances the Department shall fast track the project for implementation subject to availability of funds.

11 PRIORITISATION

11.1 Warrants System

- (a) Applications will be dealt with as they are received
- (b) The implementation of the approved traffic calming measures will be dealt with as they are received depending on the availability of funds.
- (c) For those that cannot be implemented due to financial constraints they will be put on a priority list.
- (d) The ranking system will be applied to the traffic measures that are on the priority list.

11.2 Prioritisation of locations

The Department may prioritise requested locations according to the following ranking criteria:

- (a) Traffic volume
- (b) Traffic speeds
- (c) Speed-related vehicular accidents (reported)
- (d) Vehicle-pedestrian accidents (reported)
- (e) Bus and truck traffic
- (f) Land uses along the street
- (g) Proximity of schools
- (h) Evidence of support by affected property owners/residents

12 PREPARATION OF A TRAFFIC CALMING MASTER PLAN

The proposed procedure in the preparation of a Traffic Calming Master Plan is as follows:

(a) Information gathering

- Land-use maps (with existing and proposed land uses in the study area).
- Traffic counts.
- Pedestrian volumes to establish pedestrian risks and visual assessment.
- Road hierarchy plans.
- Accident statistics.
- Letters of complaints and requests.
- Current traffic calming priority list.
- Public transport routes.
- Existing traffic control and calming measures.
- Identify affected wards and obtain ward councillors contact details.

(b) Establishment of the road hierarchy

- Identify different road hierarchy with.

(c) Pedestrian & traffic analysis

- 12 hour counts analysis.
- Assess through traffic (rat running).

(d) Meeting with ward councillors

- Notify the relevant ward councillor before implementing traffic calming measures.

(e) Identification of problem areas

- Based on public complaints and requests.
- Identify potential traffic calming points.

(f) Evaluation of problem areas

- Assess the real problems versus the status quo.
- Based on a weighted point score.

(g) Proposed traffic calming measures

- Define traffic calming measures for each problem area.
- Identify additional traffic calming measures required.

(h) Draft master plan

- Draft master plan.

(i) Workshop with ward councillors and the community

- Present draft master plan to the entire community.

(j) Finalise master plan

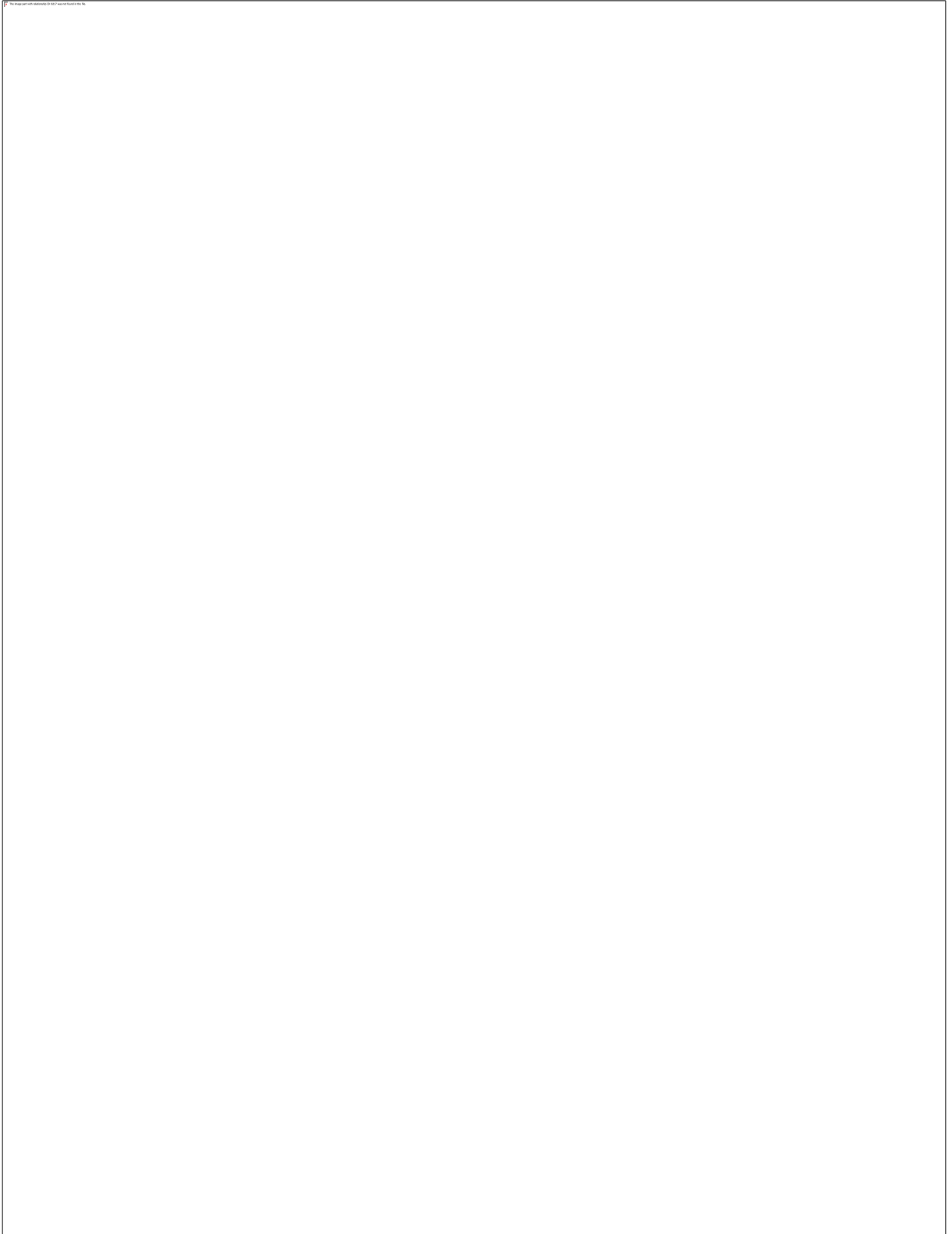
- Finalise master plan.

(k) Prepare a business plan

- Prioritisation, phasing and programming of projects.
- Budgets and identify sources of funds.

Figure 12.1 shows the procedure when preparing a Traffic Calming Master Plan

Figure 12.1



13 SPEED HUMPS

13.1 Introduction

Speed humps were originally developed in the early 1970's by the Transport and Road Research Laboratory (TRRL) in Great Britain. In the 1990's research in Australia developed an alternative design to the TRRL profile humps developed in Great Britain, referred to as the flat-topped speed hump.

The flat-topped speed hump is constructed of brick paving with asphalt or concrete ramps and has generally been found more aesthetically acceptable than non-brick treatments. This design tends to reduce the deformation problems experienced with asphalt humps but might increase vehicle noise and maintenance requirements. **Annexure D** shows some guidelines for the Design and Application of Speed Humps prepared by the Institute of Transportation Engineers (1993).

13.2 Basic principles

- (a) Traffic speeds are decreased at the humps and at locations between properly spaced successive humps.
- (b) A single hump will only act as a point speed control. To reduce speeds along an extended section of street a series of humps is usually needed.
- (c) Speed humps will often divert traffic to other streets, especially in those situations where a significant amount of traffic is using the street as a short cut, detour, or overflow from a congested collector or arterial roadway. Volume reductions also are affected by the number and spacing of humps and the availability of alternative routes.
- (d) Adequate signing and marking of each speed hump is essential to warn roadway users of the hump's presence and guide their subsequent action.
- (e) Speed humps have not been found to pose a traffic safety hazard when properly designed and installed at appropriate locations (ITE, 1993).

13.3 Location Factors

According to the Automobile Association of South Africa (1993) the following rules must be considered when deciding on the location of speed humps:

- (a) Speed humps are restricted then not more than 5 humps per series
- (b) The distance between speed humps shall not be less than 20 metres no greater than 400/500 metres.
- (c) The distance from pedestrian crossings shall not be less than 30 metres
- (d) The distance from an intersection shall not be greater than 40 metres.
- (e) The distance after a bend shall not be greater than 40 metres from a bend.

13.4 Design Guidelines

Generally, a speed hump should be:

- Of any height between 50 mm and 100 mm to suit particular cases
- Of a length (the dimension parallel to the road centreline) in the order of 3.5 to 4.0 m (South Africa Traffic Signs Manual Chapter 12 of Volume 2, 1999)

Annexure E presents typical dimensions for speed humps.

13.5 Road Signs and Markings

Volume 2 Chapter 12 of the South African Traffic Signs Manual (1999) provides information on, and/or examples of typical traffic calming signing layouts in respect of implementing speed humps.

- Advance traffic signs to warn of the presence of a speed hump is obligatory. In this regard road sign W332 (**See Annexure F**) should feature in advance of the speed hump.
- In addition to the provision of warning signs, information signs (e.g. indicating the distance to the first hump, the distance over which the humps extend etc.) should be considered.
- The actual position of each hump should be marked by placing DANGER PLATE signs W401 and W402 in the verges to each side of the hump on both approaches
- The speed hump shall always be painted with white retro-reflective stripes as shown in **Figure 15.1**. The stripes shall be laid in an alternate black and white pattern across the full width of the carriageway and positioned centrally between the two rows of studs as shown below.

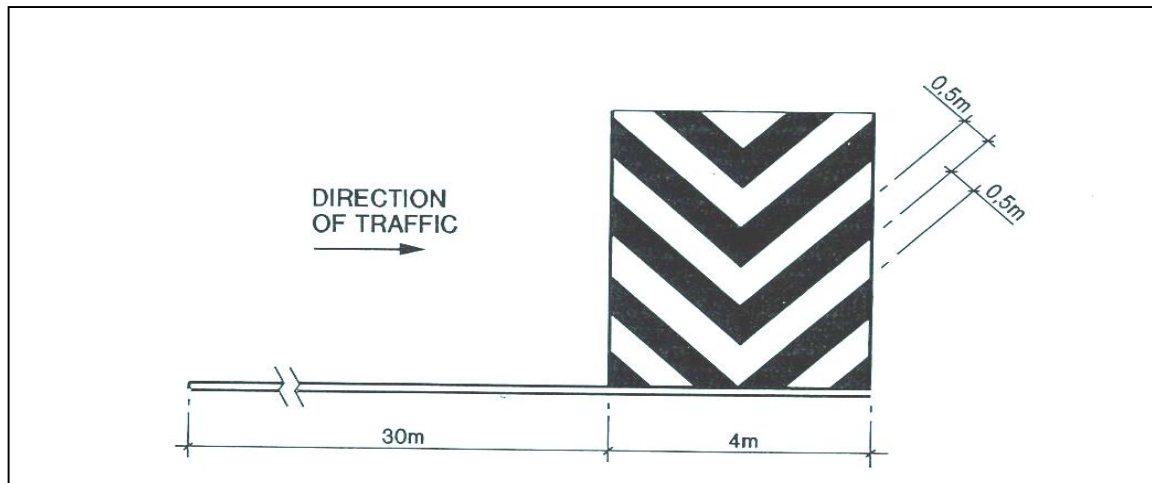


Figure 13.1: Retro-reflective stripes

- Annexure G** illustrates a typical traffic calming signing layout for a speed hump.

13.6 Recommendations

- (a) All road signs and marking will be signed according to the South African Traffic Signs Manual (1999) together with the requirements of the Road Traffic Act.
- (b) All road signs and marking will be designed according to the requirements of the National Guidelines on Traffic Calming (1994).

14 TRAFFIC CIRCLE

14.1 Introduction

Quite a number of traffic circles have been developed in most urban areas nationally. In essence their design standards are similar although minor variations occur. Basically the final layout of traffic circles are dependent on the physical characteristics of the site and therefore variations an also be expected.

Generally mini-circles should be applied to streets that are narrower than 8m in width. However if there is need to apply them on wider streets, deflection islands should always be introduced on the sides of the approaching streets to reduce the width of the streets. Raised Rumples strips of about 50mm high should be used on such islands to prevent vehicles from traversing the islands (Van As, 2005).

14.2 Basic principles

According to a study report by the Road Traffic Safety Foundation – Automobile Association of South Africa (1994) the main issues to be noted with respect to mini traffic circles are:

- (a) Raised central islands are a better option than painted islands for the latter are unsightly and may also not reduce the speed of motor vehicles sufficiently.
- (b) All mini circles should preferably have an outer radius not less than 10.5 metres to allow most vehicles to circumnavigate the centre island
- (c) The provision of flared entries and the deflection of through movements will increase the advantages of traffic circles
- (d) The continuous flow promoted by the efficiency of traffic circles can also cause problems for pedestrians and cyclist; hence the needs of these road users must not be overlooked.
- (e) Installing speed humps on the approaches to the mini traffic circles with the aim of reducing approach speeds is deemed beneficial.
- (f) At T-intersections, the intersection should preferably be widened to accommodate the circle. Otherwise, if the main road is of sufficient width, the circle can be offset towards the side of the minor leg and deflection islands provided aimed at reducing design speed.
- (g) Additional experience required to determine optimum height of island. Should be of sufficient height to prevent cars from travelling across the island but still allowing heavy vehicles (particularly buses) to turn at the circle.

14.3 Steps in setting out the circle

The circle is best set out on the site. According to Van As (2005) the following steps can be followed for setting out the circle:

- Determine the intersection point of the centrelines of the two intersecting streets. This point is the centre of the circle.
- Determine the radius of the circle island by measuring the distance from the centre point to each kerb radius and leaving a circulatory road width of between 5 m and 5.5 m.
- Set out approach lanes making sure that sufficient deflection is obtained to reduce vehicle speeds to about 30 km/h. Check the design using a test vehicle.
- The circle is then set out first using chalk and then pre-marked using paint.

14.4 Design Guidelines

Research by Van As (2005) came up with a mini-circle design layout that can be applied to streets narrower than 8 m in width, as illustrated in **Figure 15.1**. **Annexure H** illustrate a typical layout for the development of a mini-traffic circle at a three and four way intersection based on the Automobile Association of South Africa guidelines for mini traffic circles.

14.5 Road Signs And Markings

- (a) As with any traffic calming measures the provision of advanced signing should be viewed as being obligatory. In this regard road sign W201 shall feature prominently.
- (b) Yield at Traffic Circle sign R2.2 as required by the Road Traffic Regulations Act shall be placed at all traffic circles
- (c) A typical traffic layout showing signage and marking requirements is shown in **Annexure I**.

14.6 Recommendations

- (a) All traffic circles will be signed according to the South African Traffic Signs Manual (1999) together with the requirements of the Road Traffic Act.
- (b) All traffic circles will be designed according to the requirements of the National Guidelines on Traffic Calming (1994).

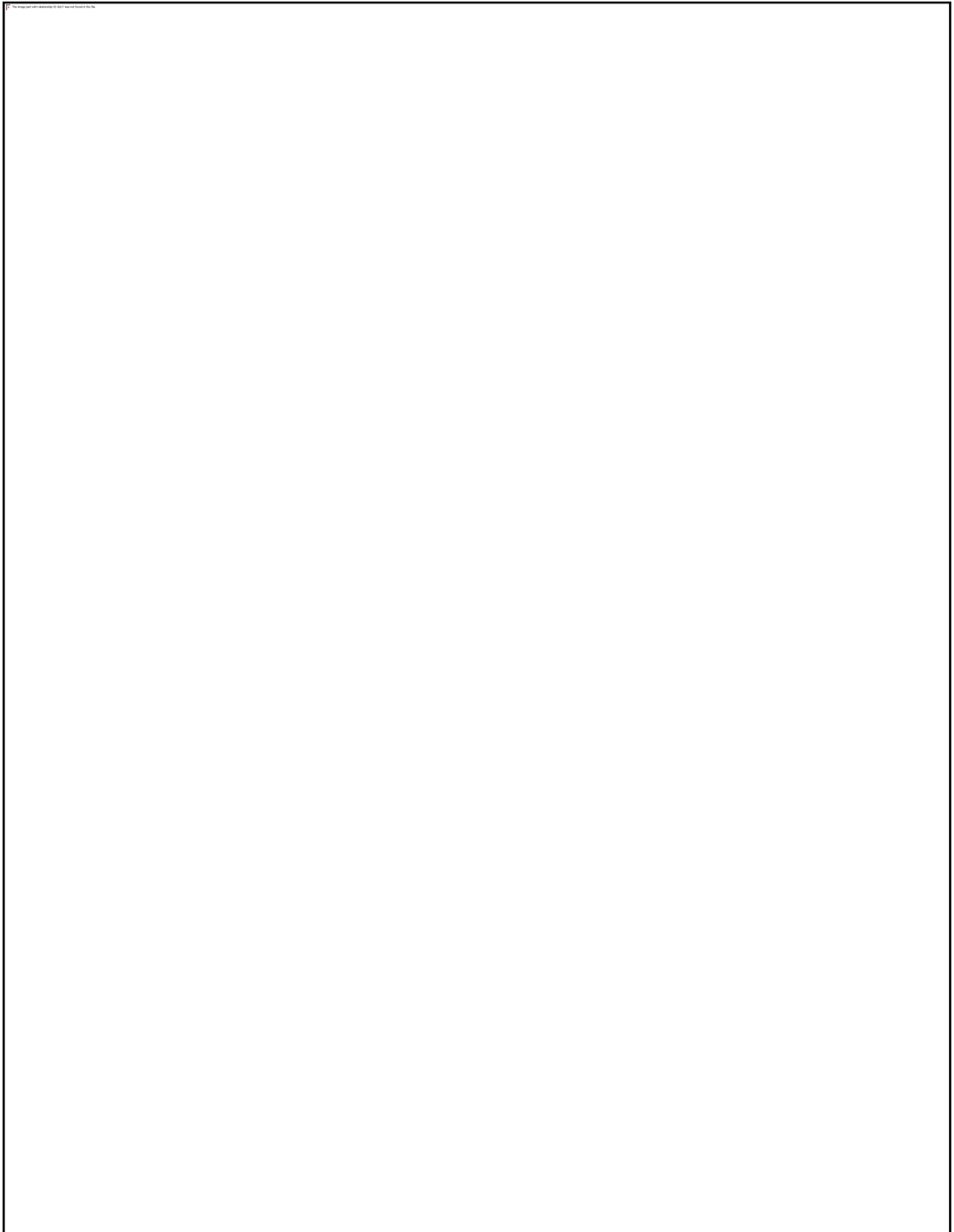


Figure 14.1: Mini-circle design for smaller intersections (Van As, 2005)

15 SPEED CUSHIONS

15.1 Introduction

Speed cushions have not been applied anywhere in South Africa. They are included in this document based on international standards. These can be applied on a trial basis in the COE.

On-road trials have shown that speed cushions are suitable for use as speed control features. They do not generally cause excessive discomfort to passengers of large buses, or excessive discomfort/delay to fire service vehicles. The discomfort or delay for passengers in mini and midi buses and double rear wheel ambulances is likely to be higher than for the larger buses, particularly at the wider cushions.

Careful consideration needs to be given to the most appropriate cushion design for a particular road, and for the vehicles likely to use that road. According to the UK Department of Transport (2004) the design parameters established from research trials are described below.

15.2 Design Guidelines

(a) Side ramps gradients

Not steeper than 1:4.

(b) On and Off gradients

It is recommended that on and off gradients should not be steeper than 1:8. The research suggested that where larger buses operate, the use of both of in-situ cushions with 1:6 gradients and a proprietary brand of cushion using a curved ramp with an average gradient of 1:5, did not cause any great discomfort or difficulty. However, in some circumstances with the 1:6 gradient cushions, grounding by other vehicles could occur. It is likely that these steeper gradients could be permitted in future, where they are appropriate to the type of vehicles likely to be using the route.

(c) Height

80mm should be considered as an absolute maximum. There have been reports of grounding occurring where cushions have in error been installed at heights greater than 80 mm. It is recommended that 75 mm should be specified as the maximum height for any cushions to be constructed in-situ. A lower height of 65 mm may be appropriate for narrow cushions.

(d) Length

Overall lengths varied between 1.7 m and 3.4 m, but were generally around 2 m to 2.5 m. Monitoring of the trials did not indicate any great difference in terms of discomfort. However, it has been suggested from off-road trials elsewhere that cushion lengths of 3.5 m, with a width of 1.6 m, height not greater than 65 mm, and on and off gradients not steeper than 1:8 may cause less discomfort to

passengers of mini and midi buses. On-road trials have not yet been carried out to substantiate this claim.

(e) Width

A wide cushion (about 1.9 m) will have a slightly higher speed reducing quality than a narrower (1.6 m) one. However, whilst the wider cushion would be generally appropriate for fire service vehicles, it may not be acceptable by bus operators because of the increased discomfort. Very narrow cushions (1.3 m or less) are best used in conjunction with a chicane or narrowing feature, when the effects tend to be more psychological than physical.

(f) Longitudinal spacing

This should generally accord with the requirements of the Highways (Road Humps) Regulations. Cushions cannot control speeds as much as standard road humps, and complete reliance on them in at least a 30 km/h zone may not achieve average speeds of less than 30 km/h.

For the narrower cushions (1.6m), spacing in the region of 60 m to 80 m would normally be required to ensure 85th percentile speeds of 40 km/h to 50 km/h. Closer spacing than this should produce 85th percentile speeds of less than 40 km/h along the road, offering greater encouragement to drivers to maintain a steady speed which then allows the cushions to be negotiated without discomfort or heavy braking, and with consequent environmental benefits.

(g) Transverse gaps

Minimum gaps of 750 mm between the base of a cushion and the kerb, as well as between adjacent cushions, are appropriate to accommodate cyclists and motorcyclists, though 1m is an ideal width. It was found that most cyclists and motorcyclists naturally tended to follow the nearside gap. It is important therefore to ensure that this is reasonably level, and the cushion is not located adjacent to a gully.

Where parking occurred cyclists could not take advantage of the nearside gap. In some instances parked vehicles straddled the cushion, reducing the gap available on both sides. As a result cyclists either rode over the cushions or rode to the other side of the carriageway to utilise the gap there. It is not unsafe for cyclists or motorcyclists to ride across cushions of designs agreeing with those specified above, though it is not particularly comfortable. Special care is required in design where three cushions transversely in line are used and regular parking occurs.

15.3 Typical Layout

Figure 16.1 shows a typical layout for a speed cushion.



Figure 15.1: Typical layout for a speed cushion (UK Department of Transport, 2004)

16 RAISED JUNCTIONS

16.1 Introduction

For raised junctions, the whole junction is raised to road hump level with ramps provided on all arms of the junction. The objective is to specifically slow vehicles down at potentially dangerous locations and to make crossing easier for pedestrians.

16.2 Design Guidelines

- (a) The plateau height shall be in the order of 100mm
- (b) The plateau shall be paved in block paving with a distinctive colour and a textured finish.
- (c) The adjacent pavement (side walk) shall preferably be 1 to 2 cm higher than the plateau in order to assist people with a visual handicap.
- (d) Ramps on the arms of the junction shall be a minimum length of 600 mm.
- (e) It should be ensured that the roadway lighting at the junction is extremely good (AASA, 1993)

16.3 Road Signs and Markings

As with any traffic calming measures the provision of advanced signing should be viewed as being obligatory.

16.4 Recommendations

- (a) All raised junctions will be signed according to the South African Traffic Signs Manual (1999) together with the requirements of the Road Traffic Act.
- (b) All raised junctions will be designed according to the requirements of the National Guidelines on Traffic Calming (1994)

17 CHICANES

17.1 Introduction

Chicanes reduce the carriageway width on opposite sides at a specific part of the road. It is also possible to have a single chicane on one side of the carriageway. A useful width restriction is to allow for carriageway width where two cars can pass each other slowly (carriageway width 4.2 to 4.4 metres) but one car and a bus or heavy vehicle would have difficulties in passing side on side. More commonly used are chicanes that only pass only one vehicle at a time (carriageway width 2.75 to 3.2 metres).

17.2 General Principles

In order to maintain low speeds over a longer stretch of road, chicanes for one way or two-way traffic must be placed no less than 50 metres.

17.3 Design Guidelines

The form and shapes of chicanes vary considerably. **Annexure K** shows a typical simplified version of a chicane.

17.4 Road Signs and Markings

- (a) Chicanes shall be well lit to be seen well in advance by motor vehicle drivers especially at night.
- (b) Chichanes signs in addition to road narrowing signs (W328, W329 or W330 (See **Annexure F**) shall be used well in advance.

Annexure K illustrates a typical traffic calming signing layout for a Chicane.

17.5 Recommendations

- (a) All chicanes will be signed according to the South African Traffic Signs Manual (1999) together with the requirements of the Road Traffic Act.
- (b) All chicanes will be designed according to the requirements of the National Guidelines on Traffic Calming (1994)

18 VISIBILITY

18.1 Introduction

Standard traffic control devices help drivers to assess an unfamiliar situation, thus uniform application and design of traffic control devices reduces the time a road user needs to recognise and understand the message, and to choose their course of action without hesitation. Ideally the meaning of the message or symbol should be apparent to the driver at a glance so that his attention will not be distracted from other observations, the driving task and from decision-making.

Uniformity of the road signs simplifies the task of the road user because it aids recognition and understanding, and ensures an essential contribution towards road safety requirements. Not only the users, but also traffic police and courts of law benefit by applying the same interpretation. Moreover, economies results for those involved with financing, manufacturing, installation, maintenance and administration of signs.

Specially, **uniformity** is becoming more important for the following reasons:

- Present-day driving involves higher speed on a complex street and road system with complex interchanges and intersections, which place higher demands on the abilities of drivers;
- Increased travel occurs away from the home area on unfamiliar streets and roads;
- Liability of government and local authorities for public safety is increasing;
- Ease and economy in the design and manufacturing of devices is achieved.

Uniformity should therefore be obtained in the design, message display, application, positioning and all other aspects of all traffic calming devices.

Traffic signs for traffic calming measures are currently prescribed in the Volume 2, Chapter 12 of the South African Road Traffic Signs Manual (1999). It provides information on the road signs and markings to be used when implementing traffic calming measures and providing examples of road signing and road marking layouts. The document is quite comprehensive and should be adhered to when designing road signs and markings for any traffic calming devices in the COE.

18.2 General Principles

- (a) Traffic Calming Signs and carriageway markings shall be used sparingly and in just sufficient volumes as to ensure that the intended warning, requirement or

prohibition can be readily understood. Due care shall be exercised at all times to ensure that signs and their attendant supports do not detract from their immediate surroundings or create an obstruction.

- (b) All traffic calming signs shall be erected at and in advance of all measures.
- (c) Not more than three signs of any type or size, including associated plates, will be permitted to be erected at any single common location, to minimise sign clutter.
- (d) Signs (including street lighting) are to be located where they can be clearly seen from a distance of a minimum of 20 metres, or as prescribed in the South African Traffic Signs Manual.

19 LEGAL RESPONSIBILITY AND REQUIREMENTS

The implementation of physical obstructions in the roadway can cause damage to vehicles and can result in accidents if implemented incorrectly. As this can result in claims against the Council, it is important that the legal implications of implementing any device be carefully considered.

The COE policy in terms of traffic calming measures to avoid any legal responsibilities is:

- (a) All traffic calming measures must be properly signed with road signs and road markings according to the Volume 2 Chapter 12 of the South African Road Traffic Signs Manual (1999).
- (b) All traffic calming measures must be properly visible especially at night where artificial lighting should be provided if necessary.
- (c) The EMM shall ensure that road users are provided with due advanced warning signs for all traffic calming measures.
- (d) The erection of all road signs and advanced warning signs will be according to Chapter 12 of Volume 2 of the South African Roads Traffic Signs Manual, (1999).

20 MAINTENANCE OF TRAFFIC CALMING MEASURES

The National Guidelines for Traffic Calming clearly states that it is a known fact that many traffic-calming measures are inconspicuous largely as a result of poor maintenance. It is therefore the function of the Maintenance Division to develop maintenance procedures and programs for the different devices.

Maintenance is a major component of effective traffic calming. The Maintenance Section of the area should thus inspect all measures at regular intervals in association with the authority responsible for maintenance to determine the nature and extent of repair work that needs to be done.

20.1 Policy Principles

- (a) All traffic calming devices shall be designed to minimise adverse impacts to street sweeping and other maintenance activities.

- (b) The development of traffic calming devices shall be coordinated with the Maintenance Division.
- (c) Maintenance staff shall prepare a routine maintenance plan for each measure implemented.
- (d) The Planning Division in association with the Maintenance Division must inspect all traffic calming devices.

20.2 Maintenance requirements

- (a) The Department shall prepare an inventory of all traffic calming measures implemented. The inventory shall include the date of commissioning, road signs used and specific road markings and point of specification, description of materials and a maintenance schedule.
- (b) A computerised database of all traffic calming devices implemented shall be maintained by the Department
- (c) The inventory should be kept on a computerised database and the type (nature) of maintenance done recorded together with the date.
- (d) The Department shall inspect all devices in quarterly intervals to determine the nature and extent of repair work that may be required.

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