

STELLENBOSCH

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Traffic Calming Policy



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TRAFFIC CALMING POLICY

STELLENBOSCH MUNICIPALITY

1. INTRODUCTION

1.1. Purpose of document

The purpose of this document is to set out the policy for traffic calming for Stellenbosch Municipality, and:

- To ensure that investigations to traffic calming are carried out in a uniform way.
- To clearly define where on the road network traffic calming is allowed.
- To describe traffic calming techniques which will be allowed in an area.
- To define when traffic calming will be warranted.
- To outline the process that be followed in evaluating and approving traffic calming facilities.
- To ensure that evaluations are carried out in a uniform way.
- To complement and not replace traffic regulation and enforcement.

The document firstly describes the preliminary investigation and evaluation procedures to be followed by the Municipality, when requests are received, and the progressive evaluations steps that follow.

The document then focuses very specifically on traffic calming and deals with:

- The road hierarchy (from a traffic calming perspective).
- Road classes where traffic calming will be allowed.
- Routes where traffic calming is not allowed (emergency and bus routes, crescents)
- Minimum speeds and traffic volumes before traffic calming is contemplated.
- Principles for evaluating traffic calming.
- Traffic calming techniques
- Warrants
- Implementation procedure

1.2. Definition

Traffic calming definition:

To moderate traffic behaviour, through physical and legislative measures, with the aim to reduce the vehicle speeds and/or traffic volumes, thereby improving traffic safety, and quality of life in the urban environment, but with due regard to mobility and accessibility.

1.3. Objectives

The objectives of this policy document are as follows:

1. To ensure that traffic calming is part of the overall transport strategy for the area.
2. To ensure that traffic is accommodated and applied at the correct road hierarchy level.
3. To provide communication channels for the public to participate in the “calming” process.
4. To improve the efficiency and safety of the road network without compromising costs.
5. To minimise the extent of pollution and damage caused by motorised vehicles.
6. To protect residential areas and the residents from unwanted through traffic and associated dangers.
7. To moderate extraneous traffic behaviour.
8. To promote road safety.
9. To improve traffic flows.
10. To ensure that other low order roads are not negatively impacted through the implementation of specific traffic calming measures.

2. MACRO EVALUATION

Any traffic issue stemming from a request or complaint, regardless of its extent and possible course of action, should firstly follow the preliminary or macro evaluation procedure as set out below.

2.1. Receiving the complaint

All traffic safety complaints must be reported to the Infrastructure Services Directorate in writing. The Infrastructure Services Department will forward the complaint to the Ward Councillor for notification. All traffic safety complaints must be in writing and take the form of a letter, an email or a facsimile message. No verbal, facebook or whatsapp requests will be investigated.

2.2. Preliminary evaluation

The preliminary evaluation will follow a four step process:

Step 1: The Nature of the request or complaint

The complaint should describe the problem as clearly as possible.

Step 2: Planning Assessment

Each complaint/request will be compared to the approved traffic plan for an area, should there be one. If no traffic plan is in place, only those measures that are reasonably considered safe and are technically feasible and affordable may be considered for further evaluation.

Step 3: Qualitative Assessment

If the road is classified as either a R1, R2, R2, U1, U2 or U3 route in terms of Section 4.2 then traffic calming is not permitted. **Table 1** below must be completed to determine if a more detailed assessment is justified.

Table 1: Qualitative assessment table

	Aspect	Yes	No
GENERAL			
1	No emergency vehicle route present		
2	Falls within an Area Traffic Calming Plan		
3	Are there bus routes along the route		
4	Did accidents recently occur at the specific location		
SPEED / SAFETY			
5	Cycle/pedestrian paths within roadway		

6	Sharp horizontal curves present		
7	Method of control at intersections not applicable (e.g. yield should be stop)		
8	Spacing of accesses close together		
9	Straight sections on road >180m		
10	Road signs and markings absent or in poor condition		
11	Schools/crèches/old age homes / recreational facilities in proximity		
12	Sub-standard road layout, geometrics and sight distances		
13	Steep grade that encourages speeding		
VOLUMES			
14	Is through traffic possible		
15	Road network – higher order roads with capacity problems result in rat running		
TOTAL NUMBER YES/NO			
QUALITATIVE ASSESSMENT (YES / POSSIBLE YES / NO)			

Step 4: Geographical Assessment

The road hierarchy of the problem area will be evaluated and the “traffic calming” class of road established. Physical features such as the surrounding road network, proximity of schools, road safety characteristics will also be evaluated at this point. An assessment will then also be made to whether an Engineering, Enforcement, Education or Combination course of action (see 2.3 below) is to be implemented.

2.3. Courses of action

The following possible alternative courses of action may be taken once the preliminary evaluation has been completed.

Engineering (E1)

This could be one of the following:

- Major engineering in which the problem requires substantive planning, design and construction. It would be proposed for inclusion in future budget programs.

- Traffic Systems Management in which the problem requires improvements to traffic management such as elimination of accident black spots, intersection improvements, traffic lights, etc. It would likewise be proposed for inclusion in future budget programs.
- Traffic calming in which the problem requires calming techniques for specific safety problems, etc. It would be proposed for inclusion on a priority program for detailed evaluation on Traffic Calming Techniques, Principles and Warrants as set out in Chapter 3 of this document.

Enforcement (E2)

This could be one or a combination of the following:

- Technical traffic actions such as improvements to road signs and markings, parking prohibitions, etc.
- Traffic enforcement actions such as speed checks and moving violations.
- Patrols such as scholar patrols, traffic wardens, etc.

Any traffic enforcement measures or arrangements, which would solve or reduce the problem, will be proposed.

Education (E3)

This could be one or a combination of the following:

- Liaison with the local and NGO organisations
- Announcements or notices to schools, sporting centres, etc.
- Limited public involvement with specific institutions such as schools, community development forums (CDF's) etc.
- Open public meetings with ratepayers associations, community based organisations, ward meetings, etc.
- Involvement with organizations such as "DRIVE ALIVE" and "ARRIVE ALIVE"

Any education measures or arrangements, which would solve or reduce problems, will be proposed.

Combination of E1, E2 and E3

This could be a combination of the above three mechanisms.

3. ESTABLISHMENT OF AREA TRAFFIC CALMING PLANS

3.1. Introduction

The need for traffic calming comes due to a number of reasons:

Inappropriate driver behaviour

This inappropriate behaviour prevails in the form of driving at speeds too high for the adjacent environment, drivers using residential roads as shortcuts or to avoid congestion on the major road network and increased potential for pedestrian/vehicle conflicts.

Presence of vulnerable road users

Vulnerable road users are young children, scholars, the elderly and the infirm.

The behaviour of these road users can be unpredictable and/or their movement is constrained leading to increased potential for pedestrian/vehicular conflict.

3.2. Developing area traffic calming plans (ATCP)

The process to develop an ATCP set out below:

1. Define the boundaries of the area, as far as practically possible ward boundaries would be utilized.
2. Prepare plans showing road classification, land use and identify locations where there are high concentrations of vulnerable road users (schools, hospitals, old age homes/retirement villages, parks, etc.)
3. Consultation with emergency service providers to identify emergency routes into the area. Routes identified as emergency routes are not disqualified from traffic calming measures, but the severity of the measures implemented on the road, if warranted in terms of this policy, should be reduced.
4. Consultation with the affected community together and Ward Committee.
5. Moderation of comments received and development of draft ATCP. It is important to note the municipal officials have responsibilities to both

the larger road user group and the local community, and the ATCP must reflect the required balance.

6. Submission of draft ATCP to all parties who have contributed to the development of the draft ATCP for acceptance.
7. Traffic calming measure must be prioritized for implementation based on budgeting constraints. The score achieved through the evaluation process described in Section 5.5 dealing with the warrants will be used as the first level for prioritisation.

3.3. Advantages of ATCP's

The development of ATCP's allows for a structured approach to implementing traffic calming measures. Not all measures requested/investigated need to be incorporated into an ATCP particularly in isolated areas. The advantages of an ATCP are:

1. Assessment of traffic calming requests simplified
2. Emergency routes are identified, typically Class 4 roads (see attached
3. Community participation defines the principles guiding the implementation of traffic calming in their area
4. Keeping plan updated and relevant will provide positive control for municipal officials responsible for the evaluation and implementation of traffic calming measures.

4. FEASIBILITY OF TRAFFIC CALMING

4.1. Introduction

Should the macro evaluation described in Chapter 2 indicate that the identified traffic problem or complaint could possibly best be addressed by traffic calming measures; the feasibility of such measures should then be further tested and investigated using the following procedure:

- Step 1: Reconsider information collected as part of "geographical assessment" (Section 2.2) and obtain additional data if necessary.

- Step 2: Determine the road classification for which the traffic calming measures are suggested, refer to Section 4.2 below.
- Step 3: Test the proposed implementation of traffic calming against the first and second order principles given in Section 4.3, also taking into account the pre-requisites for attending to traffic calming aspects as given in this section.
- Step 4: In the event of a proposal complying with the principles (i.e. step 3 above), carry out a detailed evaluation, through selection of an appropriate traffic calming technique (refer to Section 4.4). The collection of data as required and the testing of the proposal against the warrants are given in Section 4.5.

4.2. Road Hierarchy

The road hierarchy set out in this section is based on TRH26: South African Road Classification and Access Management Manual and this document should be referred to if further detail is required.

Road classes 1, 2 and 3 do **not** qualify for traffic calming measures. If it is deemed that action is required to calm traffic for whatever reason (for example to reduce vehicle / pedestrian conflict), alternative measures may be investigated. These alternative measures may include pedestrian overpasses, signalised pedestrian crossings, signage, and provision of sidewalks/cycle facilities, edge treatment or other Transportation Systems Management applications. The alternative measure may be presented in the form of a traffic management plan which could include all or some of the above. Engineering judgement will have to be applied.

Road classes 4 and 5 **potentially** qualify for traffic calming measures, provided that the total score obtained when applying the warrants is above the minimum value. In the event that these roads serve as emergency or bus routes, at the discretion of the Municipality's Infrastructure Services Directorate, these may be deemed not to qualify for traffic calming measures and alternative measures may be investigated.

The tables below set out the functional road classification and the road access management and features for both rural and urban roads.

RURAL ROAD CLASSIFICATION

Table 2: Rural Functional Road Classification

Basic Function	Function		Description	Mobility					
	Alternate functional descriptions	Determining function		Origin / destination	Through traffic component	Reach of connectivity	% of built km		
Mobility	Vehicle priority, vehicle only, long distance, through, high order, high speed, numbered, commercial, economic, strategic; route, arterial road or highway.	Movement is dominant, through traffic is dominant, the majority of traffic does not originate or terminate in the immediate vicinity, the function of the road is to carry high volumes of traffic between urban areas	Class No (R _c) 1	Principal arterial*	Metro areas, large cities, large border posts, join national routes	Exclusively	> 50 km	2 - 4% Classes 1 and 2	1000 – 100 000+
			2	Major arterial*	Cities and large towns, transport nodes (harbours and international airports), smaller border posts, join major routes	Exclusively	>25 km		500 – 25 000+
			3	Minor arterial*	Towns, villages and rural settlements, tourist destinations, transport nodes (railway sidings, seaports, landing strips), small border posts, other routes	Predominant	> 10 km	6 - 12% Classes 1, 2 and 3	100 – 2 000+
			4	Collector road	Connect farming districts, rural settlements, tourist areas, national and private parks and mines to mobility routes	Minimal	< 10 km	20 - 25%	< 1 000
			5	Local road	Farm or property access, connection to other routes	Nil Discontinuous	< 5 km	65 - 75%	< 500
			6	Walkway (path or track)	Settlements, farms, transport nodes, water points	n/a			

* In rural areas, the term distributor may be preferred to arterial

Table 3: Rural Access Management Requirements and Features

Basic Function	Description		REQUIREMENTS			TYPICAL FEATURES (use appropriate context sensitive standards for design)									
	Class No (R ₁)	Class name	Design typology	Route no.	Access to property	Parking	Speed km/h	Inter-section control	Typical cross section	Roadway / lane width	Road reserve width	Public transport stops and ped. xing.	Pedestrian footways (constructed)	Cycle lanes	Animal drawn vehicles
Mobility	1	Principal arterial	Expressway	Yes (N)	Not allowed*	No (off road rest stops allowed)	120	Grade separate or priority to through	2 / 3 / 4 lane, surfaced shoulders, climbing lanes	3.5 - 3.7 m	60 - 80 m (62 m)	No	No	No	No
	2	Major arterial	Highway	Yes (R: 2 or 3-digit; or N)	Not allowed ^{***}	No (off road rest stops allowed)	120	Priority or grade separate	2 / 3 lane, surfaced shoulders, climbing lanes	3.5 - 3.7 m	40 - 70 m (48 m)	As required	Isolated	Recreational on shoulder	No
	3	Minor arterial	Main road	Yes (R: 3 or 2-digit)	Not allowed ^{***}	No (off road rest stops allowed)	100-120	Priority, roundabout	2 lane surfaced, gravel shoulders	4.0 m	30 - 50 m (30 m)	As required	Isolated	Recreational widen roadway both sides	Widen shoulder
Access / Activity	4	Collector road	Collector	Allowed, T (tourist) or D (district)	Yes	No (off road edge or in lay-byes / viewpoints)	80 - 100	Priority	2 lane surfaced or gravel, gravel shoulders	3.5 m	25 m	As required	Rare, isolated	Widen roadway	Widen shoulder
	5	Local road	Farm road	Allowed, T (tourist) or L (local)	Yes	No (on verge or shoulder)	60 - 80	Priority	1 / 2 lane gravel, 600 mm concrete strips in environmental areas		20 m	As required	Rare	Use roadway	Use roadway
	6	Walkway	Track or pathway	No	Yes	n/a							Not constructed, formed by use		

* Access to properties sufficiently large to warrant a private intersection / interchange can be considered if access spacing requirement met and there is no future need for a public road.
 ** Low volume farm gate and tourist access (less than 10 vehicles per day) can be considered if no alternative exists.

Table 5: Urban Access Management Requirements and Features

Basic Function	Description		REQUIREMENTS					TYPICAL FEATURES (use appropriate context sensitive standards for design)									
	Class No (U _j)	Class name	Design typology	Route no. (M/R/N)	Intersection spacing	Access to property	Parking	Speed km/h	Inter-section control	Typical cross section	Roadway / lane width	Road reserve width	Public transport stops and ped. xing.	Pedestrian footways (constructed)	Cycle lanes	Traffic Calming	
Mobility	1	Principal arterial	Freeway	Yes (M/R/N)	2.4 km (1.6 km - 3.6 km)	not allowed	No	100-120	Interchange	4 / 6 lane freeway	3.3 - 3.7 m lanes	60 - 120 m (60 m)	No	No	No	No	
	2	Major arterial	Highway	Yes (M/R)	800 m (± 15%)	Not allowed ^{**}	No	80	Co-ordinated traffic signal, Interchange	4 / 6 lane divided, kerbed	3.3 - 3.6 m lanes	38 - 62 m (40 m)	Yes at inter-sections	Off road	Yes - widen roadway	No	
	3	Minor arterial	Main road	Yes (M)	600 m (± 20%)	Not allowed ^{**}	No	70	Co-ordinated traffic signal, roundabout	4 lane divided or undivided, kerbed	3.3 - 3.5 m lanes	25 - 40 m (30 m)	Yes at inter-sections	Yes	Yes - widen roadway	No	
Access / Activity	4a	Collector street, commercial	Commercial major collector	No (A for temp. routing)	> 150 m	Yes (larger properties)	Yes if conditions allow	60	Traffic signal, roundabout or priority	4 lane, median at ped. xing., boulevard, CBD one-way		20 - 40 m (25 m)	Yes at inter-sections or mid block	Yes	Yes, widen road or on verge	Median for peds, curved roadway	
	4b	Collector street, residential	Residential minor collector	No	> 150 m	Yes	Yes if appropriate	50	Roundabout, mini-circle or priority	2 / 3 lane undivided	6 - 9 m roadway, < 3.3 m lanes	16 - 30 m (20 m)	Yes anywhere	Yes	Yes, on road or verge	Raised ped, median, narrow lanes	
	5a	Local street, commercial	Commercial access street	No		Yes	Yes if conditions allow	40	Priority	2 lane plus parking		15 - 25 m (22 m)	If applicable, anywhere	Normally yes	Use roadway	Raised ped, crossing	
	5b	Local street, residential	Local residential street	No		Yes	Yes on verge	40	Mini-circle, priority or none	1 / 2 lane mountable kerbs	3.0 - 5.5 m roadway (two way)	10 - 16 m (14 m)	If applicable, anywhere	Not normally, pedestrians can use roadway	Use roadway	Yes, but should not be necessary	
	6a	Walkway, non-motorized priority	Pedestrian priority	No	500 m maximum	Yes	Yes if parking lot or wooneerf	15	None, pedestrians have right of way	Surfaced				If applicable, anywhere	Yes or use roadway	Rare	Yes
	6b	Walkway, non-motorized only	Pedestrian only	No	500 m maximum	Yes	No vehicles	peds. 80 m / minute	None, pedestrian signal	Block paving		6 m		Yes	Yes	Yes	

* Access to properties sufficiently large to warrant a private intersection / interchange can be considered if access spacing requirement met and there is no future need for a public road.
 ** Partial and marginal access at reduced spacing allowed to relieve congestion, reduce excessive travel distances or remove the need for a full intersection

4.3. Principles of Evaluating Potential Traffic Calming

The principle philosophy in evaluating potential traffic calming is to eliminate hazards on minor roads and not later alter traffic characteristics on main roads.

Potential traffic calming should be evaluated and prioritized using the following principles:

First order priorities:

1. No traffic calming measures are to be imposed on roads classified as Classes 1, 2 and 3.
2. Traffic calming measures should not be considered :
 - on an ad hoc basis;
 - in addressing other social problems ;
 - where it will be detrimental to road safety; or
 - where other traffic engineering or alternative procedures could address the problem; and
 - on public transport routes;
 - on emergency vehicle routes

Second order priorities:

3. The implementation of appropriate road signs and road markings should be considered before other traffic calming techniques are proposed.
4. Traffic calming measures must not cause traffic to deviate to other minor order roads.
5. Traffic calming measures should only be considered where :
 - there are inherent safety problems caused by road layout, geometrics, sight distances, etc.;
 - these will contribute directly to safety at schools, community centres, etc. when no other methods are possible;
 - where rat-running (use of minor roads to avoid congestion on main roads) is causing serious safety problems.

Compliance's:

- Traffic calming proposals should be considered with the participation of the Ward Councillor in liaison with the Ward Committee and other residents.
- Where possible upgrading of the existing major road network is to be undertaken in the short or medium term.
- Traffic calming should:
 - comply with the Warrants stated in this Policy Document,
 - be in accordance with the National Guideline for Traffic Calming

4.4 Traffic Calming Measures and Techniques

Traffic calming measures may be divided into three categories, namely, hard, soft and special measures.

Hard measures are found at intersections, between intersections and in an area-wide application.

- (a) Measures at intersections are aimed at reducing vehicle speed, maintaining or limiting to various degrees the ruling speed limit, access movements, and include mini-circles, raised intersections, intersection diverters, street closures and intersection narrowing.
- (b) Measures between intersections are aimed at reducing vehicle speed, maintaining the ruling speed limit and include speed humps, chicanes, pinch points or chokers, rumble strips, roadway narrowing (including islands), pedestrian crossing tables and semi-spheres (hobbles).
- (c) Area-wide measures include one-way systems.

Soft measures are more cost-effective and should be considered before hard measures. They include road marking and signage (e.g. pedestrian warning signs, speed reduction signs, information signs), enforcement, education and temporary road closure. It is also the only option for higher classes of roads.

Special measures include the “woon-erf” concept that would be implemented in residential priority areas. It is a specific concept with specific requirements. These requirements include, amongst others, that the area should be included in a traffic management plan, streets must have limited through traffic, and the environment has to be appropriately designed (including parking areas and play areas without division between traffic lanes and walkways). The urban street design should also support community activities.

There are a variety of **traffic calming techniques**, having different applications and serving different functions. The following measures are primarily for speed and capacity reduction

i) Planting/Greening

Tree planting should be an essential part of all traffic calming schemes and its use is applicable on all road types. This contributes to visual side friction.

ii) Narrow Carriageways

The narrowing of any carriageway tends to reduce speeds. This also applies to median islands.

iii) Optical Width (Visual Narrowing)

This refers to such measures as tree planting.

iv) Footway Extensions

Footway extensions can be built on all roads of a lower classification than arterial standards wherever there is a surplus carriageway space, at junctions, pedestrian crossings places and bus stops.

v) Shared Surfaces

Shared surfaces (i.e. between vehicles and pedestrians) are suitable to local streets with no through traffic and where traffic flow is below 300 vehicles per hour.

vi) Surface Texture/Type/Colour/Location

Textured surfaces are useful where visual or sensory reinforcement of a situation is required. These measures should not be used on roads where speed limits are higher than 50 km/h.

vii) Synchronization

The synchronization of traffic signals can be used to control speed along such a road but could prove to be detrimental to traffic flow.

viii) Electronic Enforcement

This refers to normal law enforcement.

ix) Priority Management

This refers to the type of control at intersections.

x) Road Markings and Signs

These measures can be used to change lane width thus slowing traffic.

Alternatively signs and markings can be used to highlight potentially unsafe conditions for the driver,

xi) Small Corner Radii

The small corner radii are useful at all junctions within residential areas where the speeds of turning movements need to be reduced. Radius design should be appropriate to the classification of roads involved.

xii) Roundabouts

Conventional roundabouts are appropriate for major collectors and arterials where they can reduce accidents and assist traffic flow. Mini roundabouts should only be used on distributors and minor collectors within residential areas – where they will increase the intersection capacity.

xiii) Carriageway Constrictions

Constrictions are localized measures to reduce the capacity on a road.

Constrictions are appropriate for both access streets and mixed priority roads where volumes are less than 500 vph.

xiv) Lateral Shifts in the Carriageway:

- Alternative footway extensions
- Islands and medians in the carriageway
- Alternate angled parking (with permanent features, e.g. planters)

Lateral shifts, which force change in direction and limits the driver's view of the road ahead. These are not suitable for bus routes.

xv) Vertical Shifts in the Carriageway:

These vary according to the severity of the obstacle. i.e. humps, cushions, plateaux (tables) and ramps. These measures are applicable where excessive speeds on local access streets need to be controlled.

When considering the techniques that can be used it is recommended that the use of Road signs and Markings be investigated prior to implementing other traffic calming techniques.

For routes that have been identified as emergency routes, traffic calming measures will not be permitted if the measure will negatively impact on emergency response times. It is therefore suggested that traffic calming measures that will not result in vertical deviation (example; speed hump), be considered.

Where traffic calming measures have already been implemented on emergency routes and these measures result in vertical deviation then the measures should be re-evaluated and where justified replaced with an alternative technique.

4.5 Warrants

The warrants for determining the need for the implementation of traffic calming techniques are as shown in **Table 6**. To calculate compliance with the warrants the following calculations must be applied to determine the weighted score:

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

i = Warrant number

Where

TS = Weighted Total Score

P_1 = Point for Warrant i

W_1 = Weight for Warrant i

N = Number of Warrants

The following weighted score must be used to determine whether the proposed measures are warranted.

Condition 1 : Score below 31 points – Not warranted for implementation.

Condition 2 : Score between 32 and 37. Warranted for implementation only if there are vulnerable road users/sensitive areas.

Condition 3 : Score above 37– Warranted for implementation.

Note: In Table 6 where data does not exist, realistic estimates or a minor investigation may be initiated.

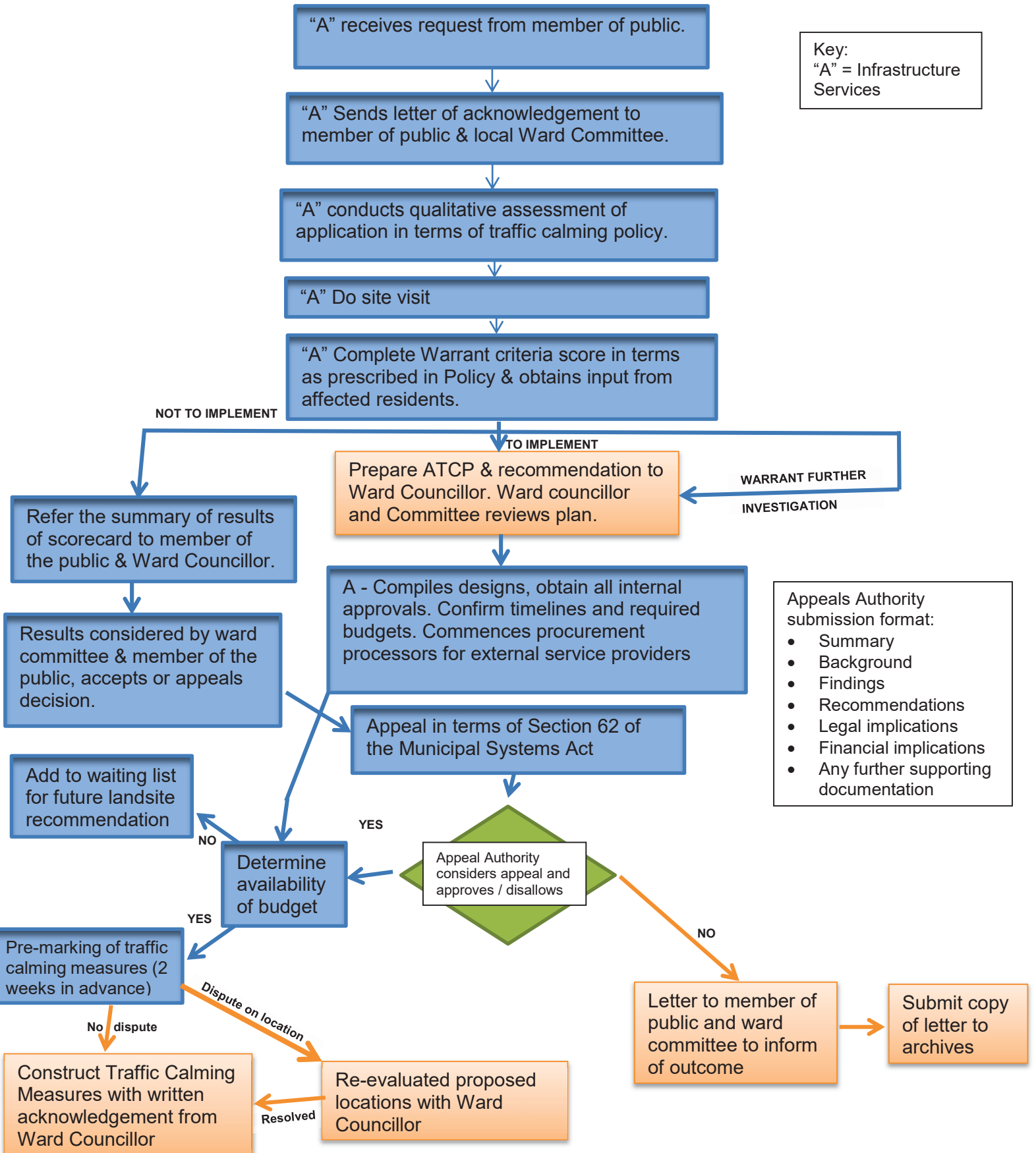
Table 6: Warrants for determining the need for traffic calming techniques

Warrants for evaluating feasibility					
No	Warrants	Point Score			Weight
		0	1	2	
1	Traffic volumes	<50 vph	50-150 vph	>150 vph	3
2	Accidents per year	<1 per year	2 – 4 per year	> 5 per year	3
3	Public service vehicles	>5 vph	3-5 vph	<3 vph	-1
4	Pedestrian / risk	Low	Medium	High	2
5	85 th percentile speed	<40	40-60	>60	2
6	Through traffic volume	<5 %	5-50 %	>50 %	2
7	Pedestrian volumes (Vol/4h over 150 m)	<250/4h	250-500/4h	>500/4h	3
8	Parking / loading movements	<100/h/km	100-200/h/km	>200/h/km	1
9	Schools / playgrounds	No	-	Yes	3
10	Footways / verges	Made	Rough	None	2
11	Frontage / accesses spacing	>75m	50-75 m	<50 m	1
12	Sensitive area	No	Slightly	Yes	2
13	One or two way	One		Two	1
14	Stopping sight distance	>130 m	50-130 m	<50 m	1
15	Gradient (Longitudinal)	>5 %	3-5 %	< 3 %	1

Where:

Traffic volumes	Average hourly off peak traffic volumes between 06:00 and 18:00
Accidents per year	Number of accidents per year
Public service vehicles	Average peak hour volumes (buses, refuse removal 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.)
85th Percentile speed	The speed at or below which 85 percent of the vehicles travel.
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.
Parking / loading movements	The number of parking/loading manoeuvres per hour over a kilometre section of road
Schools / playgrounds	The presence of schools/crèches/playgroups etc. 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
Sensitive area	The presence of hospitals, old age homes, clinics and recreation facilities that may be sensitive to traffic, traffic noise, fumes, etc.
One or two way	Whether roads accommodate two or one-way traffic flow.
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.
Gradient	The vertical rise or fall of the roadway measured from the base to the apex and expressed as a percentage.

Figure 1: Flow chart of warrant investigation process



5. IMPLEMENTATION

The implementation of Traffic Calming proposals comprises of the following:

- Detailed investigation
- Update Area Traffic Calming Plan (ATCP)
- Appeals
- Urgent Traffic Calming Interventions
- Construction of the Proposal

Detailed Investigation

Should a request be investigated and evaluated, and the requirements for progression to the detailed investigation and design stage, be met - the project will require further technical input.

This technical input will involve the following:

- A detailed analysis of the traffic patterns, traffic volumes, intersection geometry, intersection levels of service, alternative routes, unintended implementation consequences (e.g. rat runs) pedestrian and cyclist patterns and environmental aspects of the route.
- A detailed design of the recommended appropriate calming solution, entailing exact location, geometric design, road markings and signage.
- Obtaining inputs from affected residents.

An application for traffic calming may request a specific measure, for example a speed hump. Where the analysis indicates that traffic calming is warranted, the Municipality's Infrastructures Services Directorate will select the most appropriate measure, notwithstanding the request in the application.

Submitting updated ATCP to Ward Councillor

On the receipt of written request, the Traffic Calming scorecards will be completed as prescribed by the policy.

On conclusion of the evaluations, outcomes will be forwarded to the Ward Councillor, who would table the ATCP at committee meetings.

On determination that the request is warranted, the proposals will be included in an updated ATCP. The updated ATCP together with inputs obtained from affected residents will be distributed to the Ward Councillor for notification and confirmation of support.

Appeals

The public may appeal the decision by Municipality's Infrastructures Services Directorate and the matter would then be referred to the relevant appeals committee in terms of Section 62 of the Local Government Municipal Systems Act (32 of 2000).

Completed scorecards and other supporting information, as listed hereunder, must be submitted to the Appeals Authority.

The submission must include:

- Summary
- Background
- Findings
- Recommendation
- Legal implication
- Financial implication
- Documentation from Ward Committee if applicable

Supporting documentation will comprise of all information relating to the initial request as well as signed petition from affected residents confirming their support (or non-support) of the proposal. As well as a letter of support or non-support from the relevant Ward Councillor.

Review by Appeals Authority

On review of submitted information, the Appeals Authority may approve or reject the decision to by the Directorate:

If Traffic Calming measures are approved:

- Where budget is available - arrange for the construction of calming measures to form part of the yearly construction programme.
- Where no budget is available - add the approval to the waiting list for future budget recommendation.

If not approved:

- Issue a letter in all instances to applicant to inform applicant and ward committee of the outcome and send a copy to archives for filing

Urgent Traffic Calming Interventions

The Municipality's Infrastructure Services Directorate reserves the right to designate any traffic calming intervention as urgent. Urgent traffic calming interventions will immediately be implemented, without the requirement of formal submission to Ward Councillor, the Ward councillor will however be informed.

The following conditions will apply to urgent traffic calming interventions

In addition to meeting the requirements of the Preliminary Evaluation (Section 2) and obtaining a scoring of 37 and above, as described in in Warrants (Section 4), a risk analysis must be carried out on the following:

	Aspect	Yes	No
1	Potential for vehicular accidents – Very High		
2	Potential for personal injury – Very High		

Where any of these additional conditions are met the Municipality will proceed immediately with implementation of a traffic calming measure. The ward committee and portfolio committee will be notified and the ACTP updated.

Construction of the Proposal

Before the implementation of the approved and funded traffic calming measures; temporary pre-marking on the road surface will be done, to indicate the proposed positions of the traffic calming measures. These pre-marking will be displayed for 2 weeks, so that the local Ward Councillor, the Ward Committee and the daily road user can familiarise themselves with the proposed locations. If there is a dispute regarding the proposed position – the locations; in corporation with the associated ward councillor will be re-evaluated. If no response is received during this 2 weeks period and with written confirmation of the associated ward councillor - construction will commence. The pre- process is not applicable to urgent traffic calming interventions.

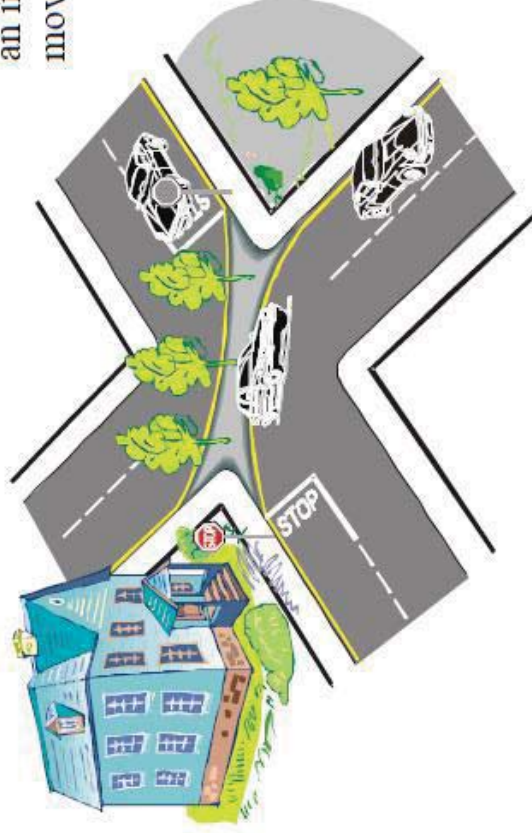
Cost analysis of Traffic Calming Techniques

NR	TYPE OF FACILITY	DESCRIPTION	APPLICATION	ESTIMATED COST (R)	ADVANTAGES	DISADVANTAGES
1	All-way stops	All approaches are stops controlled to force vehicles to reduce speed before stopping at the intersection	Intersection of 2 roads where traffic signals are not warranted. All-way STOPS should not be implemented to reduce speed where it is not warranted.	Typically R20 000 to R60 000	Low cost, law enforcement can be effectively carried out	If implemented to reduce speed, can result in motorists ignoring stop street
2	Mini-circles	A circle is built in the existing roadway without road widening.	To reduce speed of through vehicles, improve capacity of side roads, reduce severity of accidents	Typically R120 000 to R300 000	Reduced delay, especially on side streets, circles effectively reduce severity of accidents	Relative expensive, geometry can be tight, especially for emergency vehicles, driver
3	Speed humps	Raise road surface over 3.5 to 4.0m with 75mm to 100-120mm, typically	Reduce speed on long straight road sections.	Typically R25 000 to R60 000	Effective in reducing speed on long, straight road	Visibility poor at night if road markings are not visible
4	Raised Pedestrian Crossings	Raise road surface with 120mm at pedestrian crossings (length 5m)	Reduce speed at pedestrian crossings	Typically R35 000 to R60 000	Increase safety of pedestrians effectively	Relative high cost, visibility poor at night if road markings are not maintain regularly

5	Raised Intersections	The road surface within the intersection is raised with 75 to 200mm. The control of the intersection can be 4-way or 2-way stop controlled.	The speed of motorists through the intersection is reduced	Typically R120 000 to R350 000	Reduce speed through intersections, reduce severity of accidents	Relative high cost, driver discomfort
6	Raised Mini-circles	The road surface within the intersection is raised with 75mm to 200mm. A mini-circle with small diameter is provided on top of this	Normal mini-circles have limited applications where cycle paths cross at intersections as vehicles are deflected into the cycle path.	Typically R250 000 to R450 000	Reduce speed through intersections, accommodate cyclists and pedestrians with traffic circle control	Relative high cost, driver discomfort
7	Access limitations	Access is restricted with one-ways, no access signs	To reduce through traffic	Typically R150 000 to R400 000	Low cost	Access limitations can result in problems with waste collection, emergency vehicles
8	Reduction in road width (chokers)	Road is narrowed with kerbs	Reduce speed, discourage through traffic, especially heavy	Typically R80 000 to R300 000	Can exclude heavy vehicles from road	Cost, driver discomfort

9	Rumble strips	Strips across the road, consisting of bitumen and 13 to 19mm stone	Rumble strips are implemented close to intersections, before sharp horizontal curves to caution motorists of the dangerous situation	Typically R10 000 to R50 000 per set	Effective in increasing awareness of drivers	Noise
10	Semi street closures	The road is closed for one direction of traffic by installing kerbs or by planting bollards	Reduce through traffic and to reduce speed	Typically R75 000 to R450 000		Increase conflict as one direction of traffic has to yield for the other direction, driver discomfort.
11	Cycle/Pedestrian paths	Provide separate road surfaces	Conflict between pedestrians, cyclists and motorists is reduced	Typically R600 to R950 per m ²		Cost
12	Change in road surface	Asphalt road surface is changed to paving blocks	Increase driver alertness and reduced speed	Typically R100 000 to R500 000 per site	Can be aesthetically more acceptable than other forms of traffic calming	Cost, limited speed reduction
13	Semi-spheres (hobbels)		Increase driver alertness and reduced speed	Typically R20 000 to R200 000 per site	Private road/Class 5. Similar applications to a speedhump, but harsher.	Not favoured on public streets, but can be considered in extreme situations.
14	Lane divider (for example "Armadillo" and "Vuka studs")	The cat-sized lumps can be utilised along NMT cycling lanes.	Increase driver alertness and reduced speed	Typically R20 000 to R200 000 per site	Effective in divide bike lanes from motorised traffic	Cost

Traffic Calming

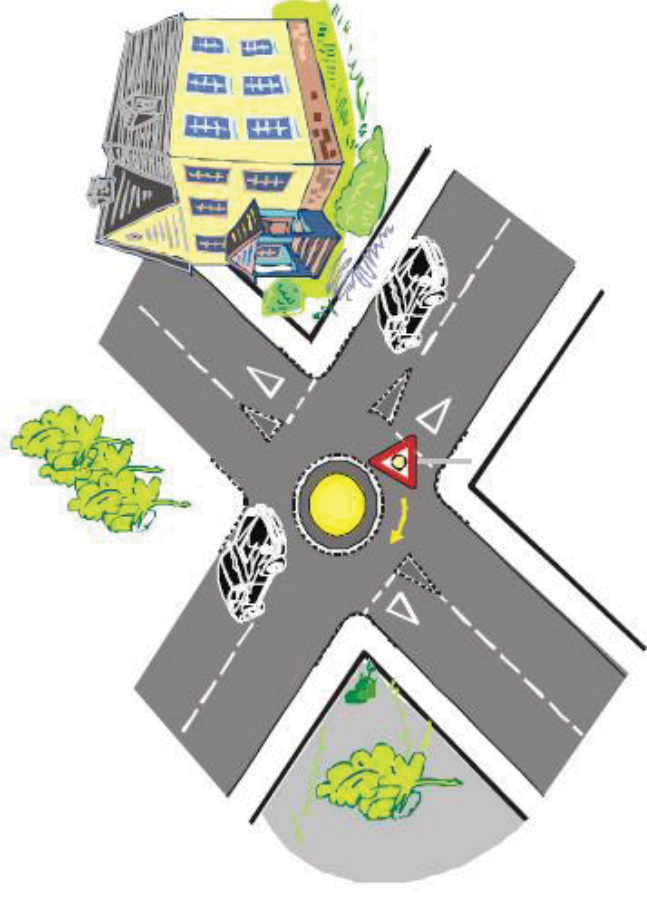


“Barriers placed diagonally across an intersection to prevent through movement.”



Diagonal Diverters

Traffic Calming

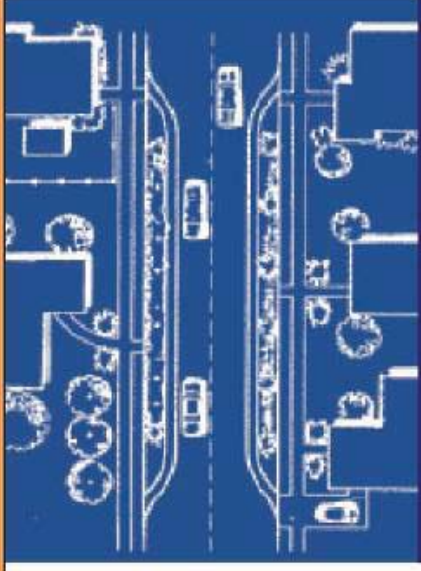


Mini Traffic Circle

Traffic Calming

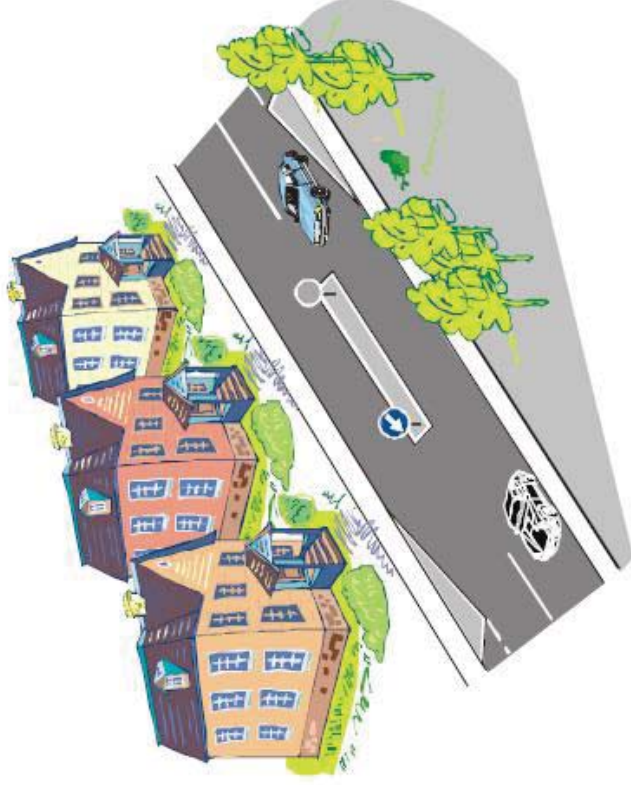


“Kerb extensions or islands on one or both sides of the street that narrow the street at that location.”



Chokers

Traffic Calming

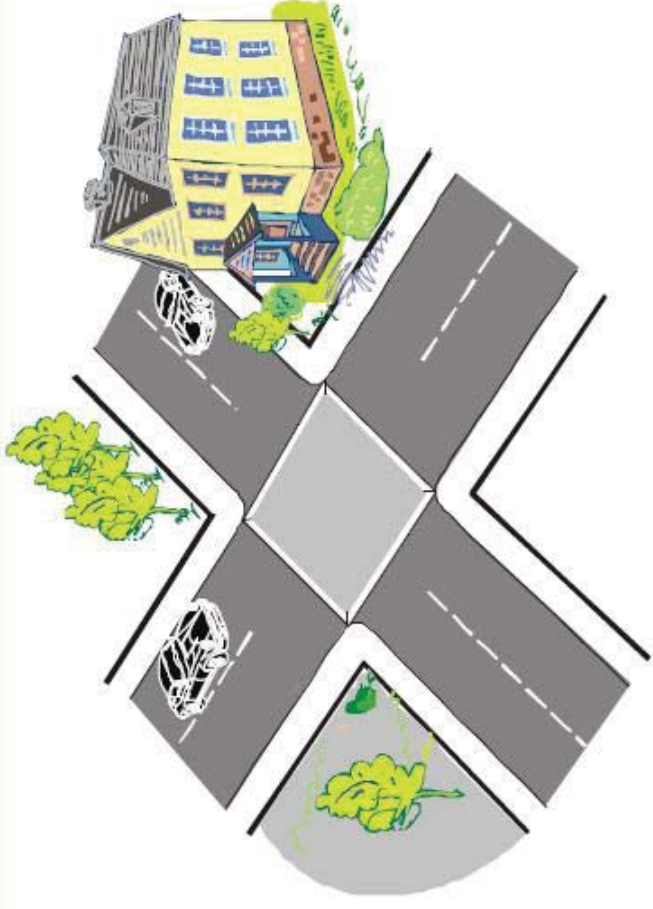


“Median centrally placed on roadway ensure conspicuity with vertical elements, marking and lighting.”



Median with one sided parking

Traffic Calming



Raised Intersection

Traffic Calming



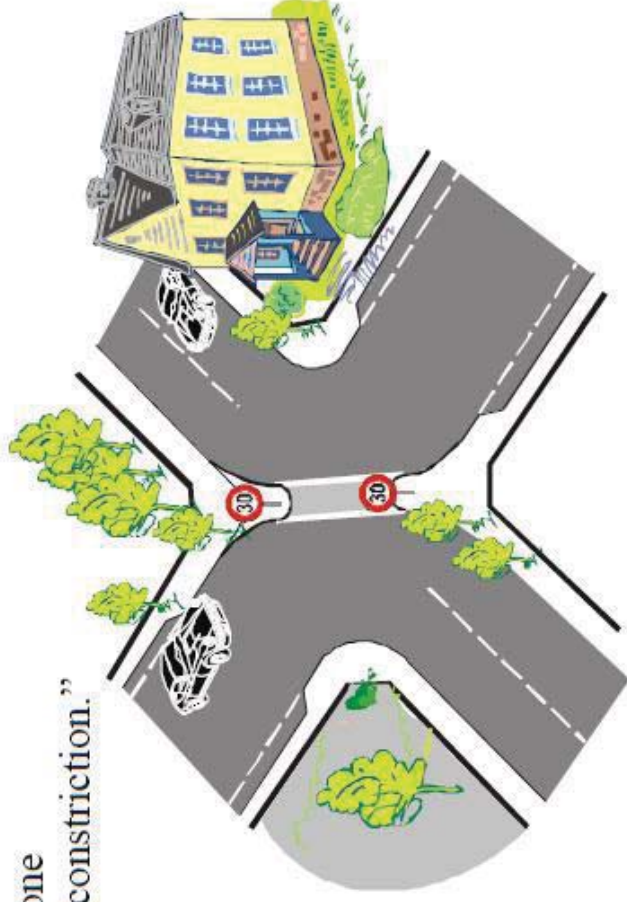
“Entrance to speed reduced zone on T-junction with exit construction through road.”



Construction Through Road

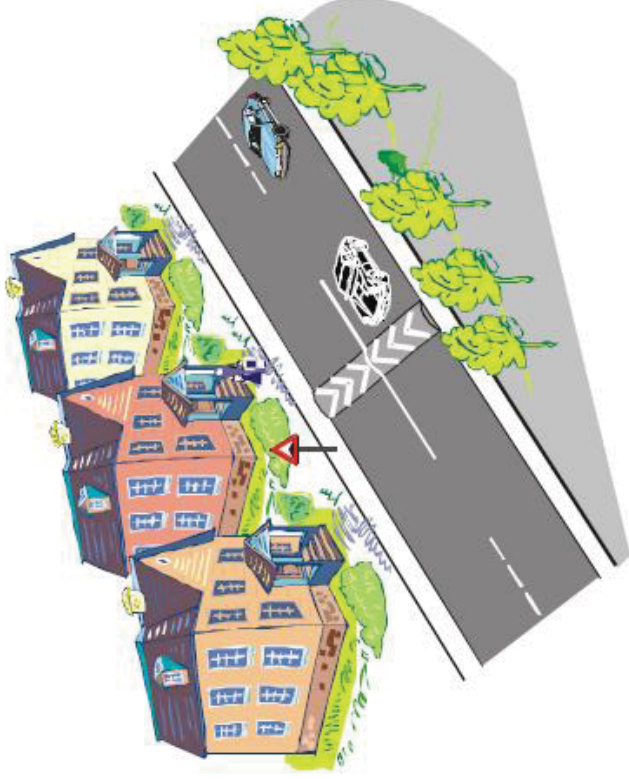
Traffic Calming

“Entrance to speed reduced zone on intersection with diagonal constriction.”



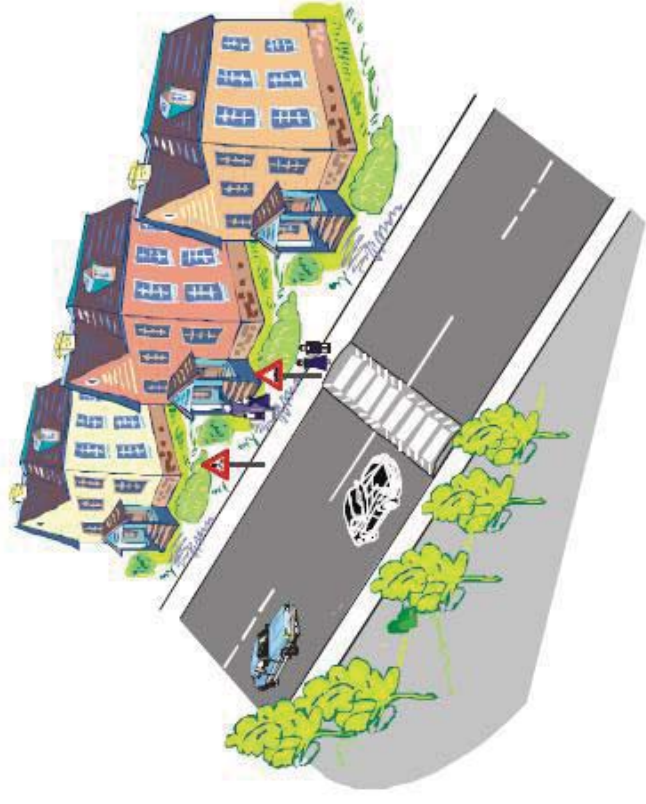
Diagonal Constriction

Traffic Calming



Speed Restriction

Traffic Calming



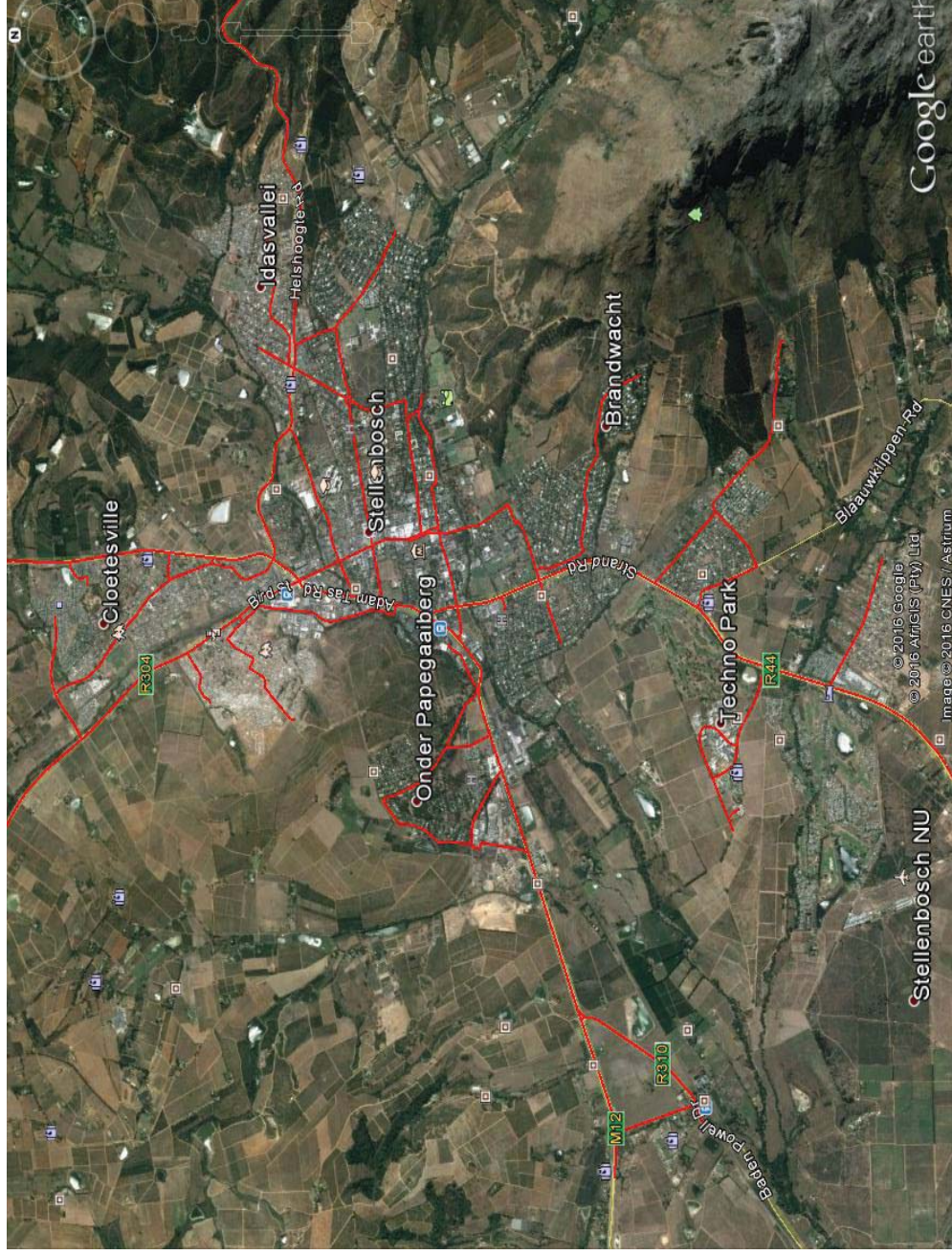
Raised Pedestrian Crossing



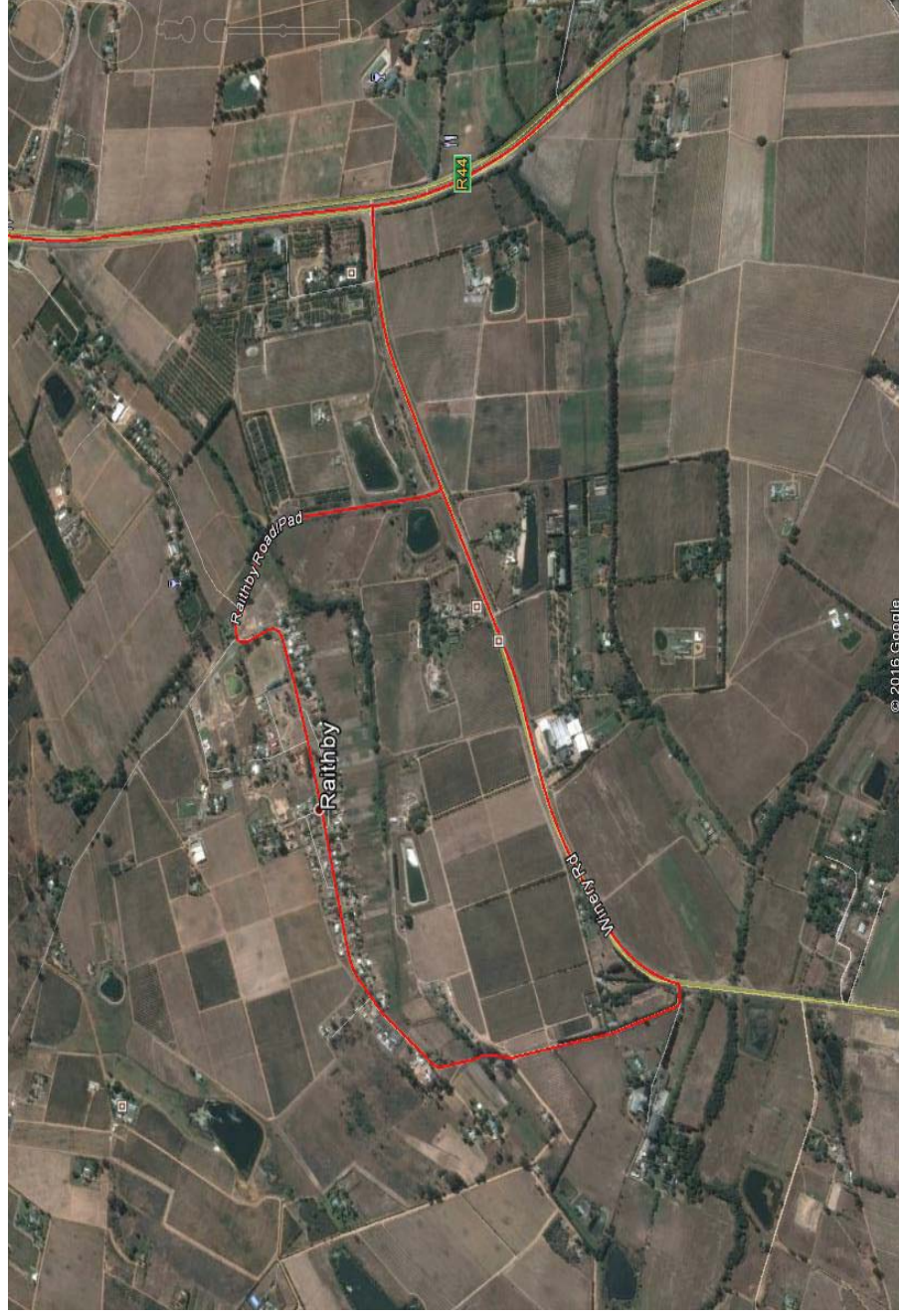
Emergency Routes – WC024



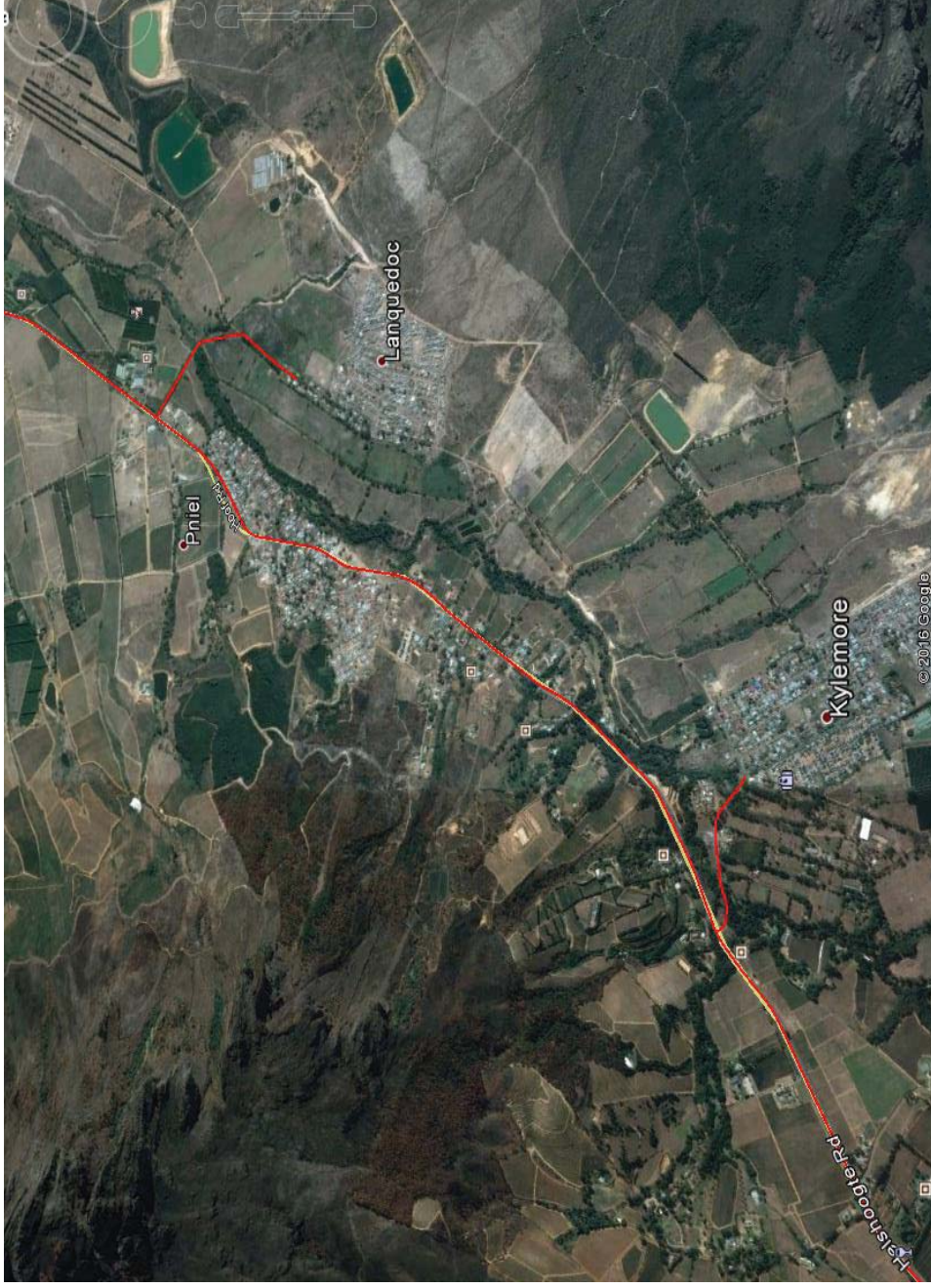
Emergency Routes – Stellenbosch



Emergency Routes – Raithby



Emergency Routes – Kylemore, Pniel and Lanquedoc



emergency Routes – Wemmershoek



Emergency Routes – La Motte and Groendal (Franschhoek)



Emergency Routes – Franschoek



