



CITY OF JOHANNESBURG

Traffic Calming Policy

Revised – September 2002

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TRAFFIC CALMING POLICY CITY OF JOHANNESBURG

1. INTRODUCTION

1.1. Purpose of document

The purpose of this document is to set out the revised document on the policy for traffic calming for the City of Johannesburg.

The document firstly describes the evaluation procedure to be followed by the City of Johannesburg or the JRA should it receive complaints on any traffic problems, i.e. a procedure that commences with a preliminary evaluation and the steps that follow onto a detailed evaluation.

The remainder of the document focuses very specifically on traffic calming and deals with:

- the road hierarchy (from a traffic calming perspective);
- principles for evaluating traffic calming;
- traffic calming techniques;
- warrants.
- Evaluation and monitoring of measures

1.2. Definition

The objective with the introduction of traffic calming measures is to moderate traffic behavior, through physical and legislative measures, with the aim to reduce vehicle speeds, (and/or) traffic volumes (and/or) travel patterns, 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:

- i) to ensure that traffic calming is part of the overall transport strategy for the area;
- ii) to ensure that traffic is accommodated and applied at the correct road hierarchy level; (JRA – SD – R001)
- iii) to provide communication channels for the public to participate in the “calming” process;
- iv) to improve the efficiency and safety of the road network without compromising costs;
- v) to minimise the extent of pollution and damage caused by motorised vehicles;
- vi) to protect residential areas and the resident from unwanted through traffic and associated dangers;
- vii) to moderate extraneous traffic behavior;
- viii) to promote road safety and
- ix) to improve traffic flows.

2. EVALUATION PROCEDURE FOR TRAFFIC PROBLEMS AND COMPLAINTS (MACRO EVALUATION)

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

2.1. Receiving the complaint

If the matter is to be reported to the JRA, then it should preferably be via a petition, thus giving more credibility to the matter when reported to the JRA Committees.

A copy of the standard petition form is attached as Annexure A.

2.2. Preliminary evaluation

The preliminary evaluation has two elements namely:

1. The Nature of the Problem/Complaint & Formulation of Objectives and Goals

The petition or letter of complaint should describe the problem as clearly as possible with recommended objectives or goals. Further discussions with the Ward Councilor or Community Representative may be necessary to clarify the problem **as worded in the petition** or letter of complaint and to ensure that the recommended objective or goal is understood. An assessment will then be made as to whether an Engineering, Enforcement, Education or Combination course of action could be implemented.

2. 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 is to be implemented.

2.3. Courses of action (Design Solutions)

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 red 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 Chapters 3 of this document.
- Evaluation of the proposals as received from communities if they appointed a traffic engineer to evaluate the situation with proposals how to implement, finance, etc.

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. These actions would be undertaken by the Metropolitan Police at the request of the JRA
- Patrols such as scholar patrols, traffic wardens, etc. These actions would be undertaken by the appropriate authorities at the request of the City of Johannesburg or the JRA.

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 LDO campaign
- Announcements or notices to schools, sporting centers, etc.
- Limited public involvement with specific institutions such as schools, community development forums (CDF's) etc.
- Open public meetings with ratepayers associations, community, 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 and would be proposed accordingly.

3. DETERMINING THE FEASIBILITY OF TRAFFIC CALMING

3.1. 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. Data normally required:

- Current and future land use.
- Accident statistics
- Traffic volumes and speed.
- Pedestrian and cyclist volumes
- Geometric details
- Public Transport Routes, current & future

Step 2: Determine the road classification for which the traffic calming measures are suggested.

- Refer to Section 3.2 below.

Step 3: Test the proposed implementation of traffic calming against the first and second order principles given in Section 3.3 below, also taking into account the prerequisites 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 3.4). The collection of data as required and the testing of the proposal against the warrants are given in Section 3.5.

3.2. Road Hierarchy

Road class definitions, considering the Traffic Calming objectives set out above, are as set out below. Higher order roads supercede the criteria of lower order roads.

CLASS 1: Trunk Roads (National and Inter Regional Distributors)

- (a) Freeways, expressways, dual carriageways and dual single carriageway main roads.
- (b) Generally rural.
- (c) Facilitate regional mobility of traffic.
- (d) Characterized by regional route continuity.
- (e) Defined as Freeways, National or Provincial Roads
Examples: N1, N3, and Provincial Roads.

CLASS 2: Primary Distributors or Major Arterials

- (a) Form part of primary road network in urban areas.
- (b) Facilitate long distance traffic mobility within the city.
- (c) Characterized by high traffic volumes, limited access and fairly high speeds.
- (d) Characterized by urban route continuity.
- (e) Defined as Major Arterials and Metropolitan Routes
Examples: Rabie, Peter Place, Republic, Beyers Naudé, and Old Potch Road.

CLASS 3: District Distributors

- (a) Links primary roads with residential areas or development nodes.
- (b) Links residential areas with commercial and industrial work places.
- (c) Characterized by high traffic volumes, limited access, moderate speeds and mobility.
- (d) Public transport routes for buses and taxis.
- (e) Serve in excess of 400 equivalent dwelling units (EDU's).
- (f) Distribute traffic to and from Class 4 and 5 Roads.
- (g) Provide access to community facilities (sport fields, entertainment centers, etc.).
- (h) Characterized by local route continuity.
- (i) Defined as Minor Arterials or Major Collectors.
Examples: Silverpine, Tana/Hofmeyr, Modjadi, Marthinus Smuts, Rockcliff/West/8th.

CLASS 4: Local Distributors

- (a) Link Class 3 and Class 5 Roads.
- (b) Characterized by lower traffic volumes, low speeds and high accessibility.
- (c) Serve less than 400 equivalent dwelling units (EDU's)
- (d) Distribute traffic to and from Class 5 Roads.
- (e) Characterized by not having route continuity.
Examples: Susman, Senior, Mosaka.
- (f) Defined as Minor Collectors

CLASS 5: Residential Access Roads (Lightly Trafficked Roads)

- (a) Provide direct access to properties.
- (b) Provide for other non-vehicle-related uses (running, cycling, walking, etc).
- (c) Serve less than 200 equivalent dwelling units (EDU's).
- (d) Defined as local Streets

3.3. 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 or 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.
 - On public transport routes

Second order priorities:

3. Traffic calming measures **must not** cause traffic to deviate to other minor order roads.
4. Traffic calming measures **should only be considered where** :
 - there are inherent **safety problems** caused by road layout, geometric constraints, sight distances, etc.;
 - these will contribute **directly** to safety at schools, community centers, old age homes, hospitals, etc. when no other methods are possible;
 - where rat-running is causing serious **safety** problems.

Compliance's:

- Traffic calming proposals should be done with the participation of the Ward Councilor and 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 – COD Report CR.-96/036, design and implementation of speed humps COD Report CR 97/038 and Design Guidelines for Mini Roundabouts COD Report CR – 97/039 as issued by the Department of Transport.

3.4. Traffic Calming Techniques

There is a variety of traffic calming techniques, having different applications and serving different functions. Traffic calming could be a package of measures implemented in an area. The following measures are primarily for speed and capacity reduction and are rated A, B, or C according to their speed reduction effectiveness in Table 2.

i) Vertical Shifts in the Carriageway:

These vary according to the severity of the obstacle. i.e. humps, cushions, plateaus, raised intersections, pedestrian crossings and ramps. (Refer to JRA – SD – R020)

These measures are applicable where excessive speeds on local access streets need to be controlled.

ii) *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.
- One way systems
- Diagonal and road closures.

iii) *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 vehicles per hour.

- Chokers (one side or double sided)
- Medians
- Road Markings (painted)
- Chicanes

iv) *Roundabouts*

Conventional roundabouts are appropriate for major collectors and arterials where they can reduce accidents and assist traffic flow. (Refer to JRA – SD – T011 and JRA – SD – R019)

Mini roundabouts should only be used on distributors and minor collectors within residential areas – where they will increase the intersection capacity and promote safety.

v) *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.

vi) *Road Markings*

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

vii) *Priority Management*

This refers to the type of control at intersections.

viii) *Electronic Enforcement*

This refers to normal law enforcement.

ix) *Desynchronization*

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

x) *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 60 km/h.

xi) 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.

xii) 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.

xiii) Optical Width (Visual Narrowing)

This refers to such measures as tree planting.

xiv) Narrow Carriageways

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

xv) 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.

- Using planters

Table 2: Applications and suitability of Traffic Management Measures

Application			Suitability			
	Speed Reduction Rating	Visual enhancement of scene	Local and Access roads Class 5	Minor Collector Class 5	Major Collector Class 5	Class 4
Speed reduction measures						
Vertical Shifts in the Carriageway	A	-	Yes	No	-	-
Lateral Shifts in carriageway	B	-	Yes	Yes	No	-
Carriageway Constrictions	B	Yes	Yes	Yes	No	-
Mini-Roundabouts	B	No	Yes	No	-	-
Conventional Roundabouts	B	No	-	-	No	No
Small Corner Radii	B	-	Yes	Yes	No	-
Road Markings	C	No	-	-	No	Yes
Priority Management	B	No	No	No	-	-
Electronic Enforcement	C	No	-	No	No	Yes
Synchronization	B	-	-	-	Yes	Yes
Environmental and safety measures						
Optical width	C	?	Yes	Yes	Yes	No
Narrow Carriageways	C	?	Yes	Yes	No	-
Occasional Strips	C	?	-	No	Yes	-
Surface Changes	C	?	Yes	Yes	No	-
Central Islands	C	?	-	No	Yes	No
Shared Surfaces	C	?	Yes	-	-	-
Footway Extensions	C	?	Yes	Yes	Yes	No
Planting Greenery	C	?	Yes	Yes	Yes	Yes
Street Furniture and Lighting	C	?	Yes	Yes	Yes	Yes

KEY**Speed reduction rating**

- A - Guarantees 35 percentile traffic speeds below desired maximum
 B - Reduces speeds, but does not guarantee 85 percentile level
 C - Serves as reminder or encouragement to drive slowly and calmly

Visual enhancement

- Yes Positive
 - Neutral
 No Negative

Suitability

- Yes Suitable
 - Possible
 No Not recommended

Source:

3.5. Warrants

The Warrants for testing the feasibility for detail investigation are as shown in Table 3. To calculate compliance with the warrants the following calculations must be applied to determine the weighted score:

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

Where

TS	=	Weighted Total Score
P _i	=	Point for Warrant i
W _i	=	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 43 – Warranted for implementation further investigations may be initiated where doubt still exists.

Condition 3 : Score above 43 – Warranted for implementation.

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

Table 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	EAN (per 10 ⁶ veh-km)	<10	11-70	>70	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	3
6	Through traffic volume	<5 %	5-50 %	>50 %	3
7	Pedestrian volumes (Vol/4h over 150 m)	<50/4h	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	2
10	Footways / verges	Made	Rough	None	2
11	Frontage / accesses spacing	>75m	50-75 m	>50 m	2
12	Sensitive area	No	Slightly	Yes	1
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
16	Road type	4	-	5	3

Where:

- Traffic volumes - Average hourly off peak traffic volumes between 06:00 and 18:00
- EAN - Equivalent accident number (calculated as shown in Appendix C)
- 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.
- 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 etc, and other 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.

4. IMPLEMENTATION OF POLICY

The implementation of Traffic Calming proposals is two fold, namely the detailed investigation and design, and the construction of the proposal.

Detailed Investigation & Design

Should a request be evaluated and is progressing to detailed investigation and design, the project requires further experienced technical input.

This technical input can:

- either be undertaken in-house, in which case it would be placed on a priority program;
- done as part of precinct plans or LIDP's
- or by approved consulting engineers.

Construction of the Proposal

Once the investigation and the design has been completed the project will then be placed on a priority program for funding.

Funding

Given the municipal funding constraints, the project will:

- either be downgraded to suit municipal budgets;
- or be able to be financed, wholly or partially, by the community;
- or be placed on priority programs awaiting funding in future budgets.

ANNEXURE A

PETITION FORM FOR TRAFFIC PROBLEMS AND COMPLAINTS

ANNEXURE B

CALCULATION OF THE EQUIVALENT ACCIDENT RATE PER ONE MILLION VEHICLE KILOMETERS TRAVELED

DETERMINING THE EQUIVALENT ACCIDENT RATE PER ONE MILLION VEHICLE KILOMETERS TRAVELED

The equivalent accident rate takes into account accident severity when investigating a change to the speed limit along a road section with a poor accident record.

- 1 Determine the vehicle kilometers traveled on the relevant road section. (A sample of at least 5 million vehicle kilometers traveled is required).

Example

Average daily traffic volume x length of road section x number of days over which accident data apply.

e.g. 21 600 vehicles x 1.7 km x 356 days
= 13,4 million vehicle kilometers

- 2 Determine the number of accidents by severity on the road section for the corresponding period, multiply each severity type with the recommended weighted factor and sum.

Example

<u>Severity</u>	<u>No of Accidents</u>		<u>Weighting*</u>	<u>Equivalent No of accidents</u>
Fatal	7	x	12	= 84
Injury	35	x	3	= 105
Damage only	179	x	1	= <u>179</u>
			Total	368

*Weighting recommended in Manual K21"

- 3 Calculate the equivalent accident rate per million vehicle kilometers traveled:

Example

$$\begin{aligned} \text{Equivalent accidents per} & & = & \frac{\text{Total equivalent no. of accidents}}{\text{Millions of vehicle km traveled}} \\ \text{Million-vehicle km} & & = & \frac{368}{13,4} \\ & & = & 27,6 \text{ equivalent no. of accidents} \\ & & & \text{/million vehicle kilometers} \end{aligned}$$