Design Consistency: Case Study of the KwaZulu-Natal Department of Transport's Implementation of the National Road Classification and Access Management System

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***Abstract* — The key to the achievement of a safe traffic system lies in the systematic and consistent application of safety and design principles. National standards regarding the Road Classification and Access Management have been formulated by the National Department of Transport for the South African road network. Many road authorities have aligned their own road network classification by adopting this system in order to protect the integrity of their road infrastructure and effectively promote safety and efficiency for the road user.**

Consistent design and access management can assist the road user to recognise what traffic behaviour is expected of them, and what to expect from other road users with regard to the type of road class, increasing the perception factor for a particular road class.

This paper aims to present the development of the road classification and access management system for the KwaZulu-Natal Department of Transport highlighting the challenges to ensure the system is adopted and maintained by developing appropriate standards and guideline policies.

Keywords — roads safety; consistent; road classification; Road Authority; fatality; design; functionality; homogeinity; predicability; KwaZulu-Natal Department of Transport; infrastructure; standards; policies; road networks.

I. INTRODUCTION

Improving road safety has emerged as the top development priority for Africa, which has seen the highest rate of road traffic fatalities in the world, despite comparatively low levels of motorisation. According to the World Health Organization (WHO) [1], road traffic crashes are one of the world's leading causes of death, with 3500 lives per day. Low and middle-income countries are most affected by this public health crisis, accounting for 90% of global road traffic fatalities. South Africa has an estimated road network of almost 750 000 kilometres, with 75% consisting of unsurfaced (gravel) roads. Almost 135 000 people have died in road crashes in South Africa over the past decade, and according to the statistics[2] by the Road Traffic Management Corporation (RTMC), 14 050 people died in road crashes in South Africa in 2017. The death toll was marginally lower than the 14 071 people who died in road crashes in 2016 but still higher than any year from 2008 to 2015. Figures also show that almost 40% of the road deaths are pedestrians. Against this backdrop of the fatality statistics of the past 10 years (from 2008) the numbers prove that current road safety initiatives are simply not working.

Road safety is a major concern to all responsible for transport policy. Road design standards, guidelines and policies can reduce the accident toll on our roads. By understanding the root causes of traffic injuries and fatalities, policy makers can better evaluate the preventative measures available and make investment in road safety more effective. We need to quantify the relationship between road design standards, traffic crashes and road user behaviour. To reduce the traffic crash figures we need to improve the quality of our road transport system: better roads, better vehicles and more experienced road users. Low safety design resources, poor institutional co-ordination and limited budgets can present substantial challenges to the adoption of a holistic approach to road safety for many road authorities. The challenge is to enforce the necessary standards and policies – by first getting the authority to understand the critical aspects, then being able to administer and control the designs of the road upgrades and maintenance within the Road Network System Master Plan.

National Standards have been agreed for the functional classification of roads in South Africa. Several road authorities in various provinces have accepted this standard, including the KwaZulu-Natal Department of Transport. This paper will attempt to highlight the processes and procedures that have been put in place to facilitate the adoption, implementation and maintenance of this system for the KwaZulu-Natal Department of Transport, including the necessary standards and policies essential for consistent designs, and effectively promoting road safety.

II. Initial Considerations

A. *Road Classification*

The function of a road can either be to provide long distance travel, or play a role of distributor in areas of scattered destination, or just direct access to properties. The problem is that many existing roads are often multi-functional and problems arise due to the three elements of traffic function contradicting design requirements. The cross section of the road is related to its function with distinct features.

B. *Design Criteria and Standards*

Geometric design standards are being reviewed and updated for the KwaZulu-Natal Department of Transport. This ensures uniformity which makes traffic situations and road users' behaviour more predictable – improving safety. Safety is one of the criteria assessed throughout the design process.

The KwaZulu-Natal Department of Transport has initiated a road safety appraisal initiative on existing roads within the provincial road network, but this could be extended to formalised independent safety audit reviews on new road designs to ensure that the highest possible level of safety has been achieved. This would include the considerations of the road environment. Proper attention to roadside design can reduce the number and severity of such crashes. Innovation development could be difficult if compelling standards have been set. In addition, a road might be assessed as a certain road classification, however a more practical and realistic design criteria would be more effective both from a safety and economic perspective.

The experience and knowledge of the road authority then becomes critical to ensure the correct decisions are made and standards are maintained.

C. *Safety Effects of Road Design Standards*

A concept for safe road traffic, called a sustainable-safe traffic system has been introduced by the Dutch, but can be adopted for specific situations. Traffic engineers have and still do improve the safety of a road traffic system primarily by considering the contributions of the separate components of the man – vehicle – road system. Influencing human behaviour, fitting safety features to the vehicle and well thought out design have, without doubt, made a positive influence on the development of road safety. To realise a sustainable-safe road traffic system, a road infrastructure is advocated in which safety is fundamentally incorporated, taking into account the interplay with the other two components, man and vehicle. With sustainable road design the approach to road safety is pro-active, and a pro-active attitude by a road authority is essential to avoid situations that can result in crashes.

The principles of sustainable safety are:

- adjustments for the requirements of town and environmental planning
- adjustments for the requirements of safe design
- adjustments for the requirements of mobility
- improved education and enforcement of road safety laws

Each road category requires a design compatible with its function, while at the same time ensuring optimum safety. To achieve this, all road categories should comply with the following three safety principles:

- **Functionality:** preventing unintended use of the infrastructure: the traffic will be distributed over the road network as was intended and the various roads are used by the types of traffic for which they were designed.
- **Homogeneity:** avoiding significant differences in speed, driving direction and mass of vehicles. Differences in speed and mass between transport modes using the same link or junction at the same time is reduced to a minimum.
- **Predictability:** avoiding uncertainty among road users; as far as possible predictable traffic situations; road users anticipate the layout of the road correctly.

III. THE KZN DEAPARTMENT OF TRANSPORT AS A CASE STUDY

A. *Introduction*

The key to the achievement of a safe traffic system lies in the systematic and consistent application of safety and design principles. National standards regarding the Road Classification and Access Management have been formulated by the National Department of Transport for the South African road network. Many road authorities have aligned their own road network classification by adopting this system in order to protect the integrity of their road infrastructure and effectively promote safety and efficiency for the road user. There are just over 190 000 kilometres of provincial roads in South Africa, where the KwaZulu-Natal Department of Transport are responsible for approximately 30 000 kilometres with about 7500 kilometres of surfaced roads.

Consistent design and access management can assist the road user to recognise what traffic behaviour is expected of them, and what to expect from other road users with regard to the type of road class, increasing the perception factor for a particular road class

The KwaZulu-Natal Department of Transport is one such road authority who are aligning their road network to this national standard. The KwaZulu-Natal Department of Transport also have the obligation to provide a reliable, effective, efficient and integrated transport system that supports the sustainable economic and social development of the country.

The Technical Recommendations for Highways (TRH26) – South African Road Classification and Access Management Manual[3] has provided guidance on the functional classification of roads for the KZN Department of Transport to establish the uniform national standard within the province.

B. *Current Standards and Policies*

The KwaZulu-Natal Department of Transport have various engineering policy and procedure manuals to provide guidance to the technical personnel involved with the planning, design, construction and operation of their transport infrastructure. The Department operates in a complex and changing environment where its activities are under constant scrutiny from various authorities and public bodies. When performing their activities, in respect of transport infrastructure, personnel are required to comply with all current legislation, specified norms and standards, as well as national and provincial guidelines and requirements. There are legal requirements for the Department to plan and programme its activities and then report on the progress of these activities in the specified formats. Standard Operating Procedures are required by the Auditor-General in respect of the Department’s activities and standards, which must be set and adhered to.

The following diagram shows the relationship between the manuals and operating procedures that are being revised and adopted:

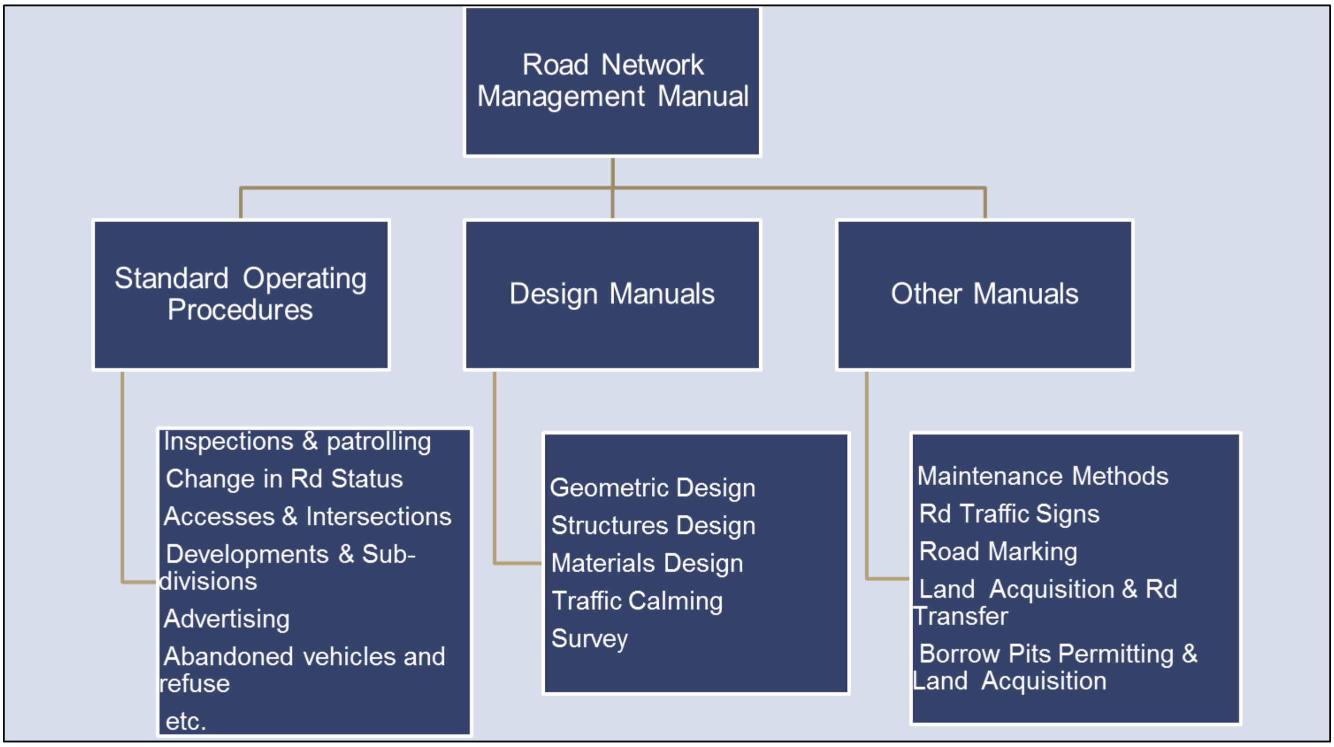

Fig. 1. Standards and Procedure Manuals Structure for the KZN Department of Transport

While the revision and drafting of the manuals is being compiled with the assistance of consultants, within time the Department will become more involved in preparing and updating these manuals and implementing the standards and procedures contained within them. In this regard, it is important that relevant workshops and interaction sessions are held with the Departments technical personnel to inform and highlight the standards and policies available. This will allow for the necessary input and ownership on the contents and procedures. With the changing operational environment, the manuals must be living documents that are updated and amended as changes take place. Departmental custodians must be identified for each manual to monitor and organise the ongoing revisions.

C. *Revised Road Cross-Sectional Standards*

The classification system is based on the six functional classes of TRH 26 - South African Road Classification and Access Management Manual [3] (RCAM, 2012) which builds and expands on the classification system of the Road Infrastructure Strategic Framework for South Africa (RISFSA) of the South African Department of Transport (DOT, 2006) and supersedes both the draft National Guidelines for Road Access Management in South Africa (COTO, 2005) and the Manual for the Redefinition of the South African Road Network (DOT, 2008). This system acknowledges that individual roads and streets cannot serve all travel functions, but that travelling is characterised by movement through networks with varying functions along the route. Once roads have been classified, it is then critical that they are managed to ensure that they perform their required function. The six class, rural and urban road classification system adopted by the KwaZulu-Natal

Department of Transport is illustrated in the table below. The first three classes of roads in the system has a primary function of mobility, while the second three classes of roads or streets has a primary function of access / activity.

TABLE I. ROAD CLASSES GROUPED BY THEIR FUNCTION

Number	***Function***	***Description***
Class 1	Mobility	Principal Arterial
Class 2		Major Arterial
Class 3		Minor Arterial
Class 4	Access / Activity	Collector Street
Class 5		Local Street
Class 6		Walkway

The functional classification for the KwaZulu-Natal region has been a joint exercise involving the urban planners and transportation engineers – both very familiar with the areas and the roads to be assessed. Long term planning needs to also be considered in the road classification, as it can be difficult to change the particular access management at a later stage.

In general, pedestrian and cycle facilities should be provided in locations where there is a reasonable expectation that such facilities will be used by pedestrians and cyclists, even if the numbers of pedestrians and cyclists are relatively low. Pedestrian walkways should be standard on urban Class 4 and Class 5a – Commercial local streets. (urban Class 5b Residential local streets pedestrians use the roadway). Pedestrian facilities on mobility roads are ideally not recommended, but when necessary, should be physically separated to avoid mixing slow moving vulnerable pedestrians with high speed traffic.

D. Cross-Sectional Elements

In the evaluation of cross-section dimensions for the KwaZulu-Natal Department of Transport roads, both national and international standards were assessed and compared. The factors that determine the cross-section widths are:

- Road network factors – road function and design speed
- Traffic factors – traffic volumes and vehicle type using the road
- Road factors – alignment, drainage and number and function of traffic lanes
- Safety considerations – accident rates and severity
- Cost / Benefit analysis – construction and maintenance costs

Research [4] results indicate, which doubt the validity that, “the wider the road, the safer”. There seems to be an optimum for lane width and pavement width for different types of roads. The analysis of the total economic consequences of the choice of the road cross section type and its optimal dimension also needs consideration.

Studies [5] have shown that driver behaviour is dependent primarily on road characteristics, i.e. the presence of a surfaced shoulder, the width of traffic lanes, the speeds and the volume of traffic on the lanes. Road characteristics tend to be associated with traffic characteristics; they convey a certain expectation from driver behaviour. – road user predictability.

A fundamental feature of roadway cross section is the width of a travel lane, which must be sufficient to accommodate the design vehicle, allow for imprecise steering manoeuvres and provide clearance for opposing flow in adjacent lanes. For the KwaZulu-Natal Department of Transport the cross-section dimensions have been standardised for the various road classes (rural or urban), with the design speeds also being a determining factor. Traffic lane widths are either 3,25 m, 3,5 m, or 3,7 m, with only residential collector and local streets with a reduced 3,0 m lane.

Shoulders are used for emergency stopping, for accommodating stopped vehicles, and for lateral support of the subbase, base and surface courses of the travel lanes. On some roadways, shoulders may be used for pedestrian and bicycle traffic where no separate paths are provided for those functions. On divided highways, shoulders are generally provided on both the median and the outside of the roadway. Shoulders should be wide enough to adequately fulfil their purpose, but excessive width encourages drivers to use them as an additional travel lane. For the KwaZulu-Natal Department of Transport, the outer paved shoulder widths vary considerably from no shoulder to 2,5 m, depending on the road class, whether rural or urban and the number of lanes.

Medians separate opposing streams of traffic; they provide a recovery area for out of control vehicles, an emergency stopping area, and space for storage and speed changing by right turning vehicles. They are also used to preserve space for future increase in the number of lanes on the facility. Shrubbery or anti-dazzle fences in the median can help minimize headlight glare from oncoming vehicles. If insufficient space is available for an adequate median, barriers can be installed between opposed traffic streams. The KZN Department of Transport’s cross sectional standards, have a minimum median width of 8,8 m on Principle and Major Arterial Freeways; recognising the reality of cost constraints, however, medians as narrow as 1,8 m are allowed when carriageways are separated by a concrete median barrier. Due to their relatively poor safety record, undivided four-lane highways are not recommended. For Principle and Major Arterial expressways in urban situations, the median width, in the form of a raised kerb island, can vary between 6,5 m to 2,0 m depending on the future additional lane requirements to be allowed within the median.

Kerbs are used on roadways for a variety of purposes, such as facilitating drainage, channelising islands, and separating sidewalks from vehicle lanes. For the KwaZulu-Natal Department of Transport, two types of barrier kerbs are used to separate walkways from the vehicle lanes. For low speed roads (i.e. < 60 km/h), a higher exposed kerb-face of 170 mm is utilised to improve the safety of the pedestrian, while for higher speeds (i.e. > 80 km/h), the lower exposed kerb-face of 100 mm is preferred in combination with a guardrail, from a safety perspective.

Walkways are provided mainly in urban areas. The standard width of 1,5 m is generally accepted by the KZN Department of Transport, but this can be increased as may be required depending of the pedestrian volumes. When sidewalks are constructed along rural roads, ideally, they should be well removed from the traffic lanes. Unfortunately, due to the mountainous terrain often experienced within the KZN Province, it is sometimes unavoidable that the sidewalks are constructed along rural roads. This however should be kept to a minimum. Pedestrians and cyclists may share the paved shoulder of a roadway for under specific conditions; if volumes are sufficient, however, both sidewalks and cycle lanes should be built away from the roadway.

A quick reference matrix has been developed for the KwaZulu-Natal Department of Transport in relation to the various standard cross sectional drawings as a reference document.

TABLE II. KZN DEPARTMENT OF TRANSPORT ROAD REQUIREMENT MATRIX

PAVED ROADS CROSS-SECTIONS

Class	Functional Description	Cross Section Type	Design Speed	Road Reserve Width	Continuous Lanes	Crawler Lanes	Outer Shoulder	Inner Shoulder	Turning Lane	Median	Footwalk Type	Cycle Lane	Drawing No.
R1	Rural Principal Arterial	2/3/4 lanes, shoulders & crawler lanes: Dual C/W freeway	120	60 to 80	3,70	3,50	2,50	1,50	-	9,2m[5]	Nil	No	SD 2201
			100	60 to 80	3,50	3,25[2]	2,50	1,00	-	8,8m[5]	Nil	No	SD 2202
			80[3]	60 to 80	3,50	3,25	2,50	1,00	-	8,8m[5]	F1	No	
		2/3/4 lanes, shoulders & crawler lanes: Single C/W expressway	120	40 to 60	3,70	3,50	2,50	-	3,00	0,5m[6]	Nil	No	SD 2204
			100	40 to 60	3,50	3,25[2]	2,50	-	3,00	0,5m[6]	F1	No	SD 2205
			80[3]	40 to 60	3,50	3,25	2,00[1]	-	3,00	0,5m[6]	F1	No	
R2	Rural Major Arterial	2/3/4 lane, shoulders & crawler lanes; Dual C/W freeway	100	60 to 80	3,50	3,25[2]	2,50	1,0	-	8,8m[5]	Nil	No	SD 2202
			80	60 to 80	3,50	3,25	2,00	1,00	-	8,8m[5]	F1	No	SD 2203
		2/3 lane, shoulders & crawler lanes; Single C/W expressway	100	30 to 40	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2206
			80	30 to 40	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2206
			60[3]	30 to 40	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	
R3	Rural Minor Arterial	2/3/4 lane Single C/W expressway	100	30	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2206
			80	30	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2206
			60	30	3,25	3,25	1,00	-	3,00	-	F2	Wider shoulder [7]	SD 2207
R4	Rural Collector	2 lanes	80	20	3,25	3,25	0,25	-	3,00	-	F1	Wider shoulder [7]	SD 2208
			60	20	3,25	3,25	0,25	-	3,00	-	F2	Wider shoulder [7]	SD 2208
R5	Access Road	2 lanes	40 to 60	20	3,00	3,25	0,00	-	3,00	-	F2	cycle lane 2m (min)	SD 2220
U1	Urban Principal Arterial	4/6/8 lane Dual C/W freeway	100	60 to 80	3,50	3,25[2]	2,00	1,00	-	8,8m[5]	F1	No	SD 2209
			80	60 to 80	3,50	3,25	2,00	1,00	-	8,8m[5]	F1	No	SD 2209
		4/6/8 lane Dual C/W expressway	80	60 to 80	3,50	3,25	2,00	1,00	3,00	2,0m (min)	F1	On shoulder [7]	SD 2210
			60[3]	60 to 80	3,50	3,25	2,00	1,00	3,00	2,0m (min)	F2	On shoulder [7]	
		2/3/4 lane Single C/W expressway	80	30 to 40	3,50	3,25	2,00[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2214
			60[3]	30 to 40	3,50	3,25	2,00[1]	-	3,00	0,5m[6]	F2	On shoulder [7]	
U2	Urban Major Arterial	4/6/8 lane Dual C/W freeway	100	60 to 80	3,50	3,25[2]	2,00[1]	1,00	-	8,8m[5]	F1	No	SD 2209
			80	60 to 80	3,25	3,25	2,00[1]	1,00	-	8,8m[5]	F1	No	SD 2211
		4/6/8 lane Dual C/W expressway	80	60 to 80	3,25	3,25	2,00[1]	1,00	3,00	2,0m (min)	F1	On shoulder [7]	SD 2211
			60	60 to 80	3,25	3,25	2,00[1]	1,00	3,00	2,0m (min)	F2	On shoulder [7]	SD 2212
		2/3/4 lane Single C/W expressway	80	30 to 40	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F1	On shoulder [7]	SD 2215
			60	30 to 40	3,50	3,25	1,50[1]	-	3,00	0,5m[6]	F2	On shoulder [7]	SD 2216
U3	Urban Minor Arterial	2/4 lane dual C/W, kerbed	80	30 to 40	3,25	3,25	1,00	0,50	3,00	2,0m (min)	F1	Wider shoulder [7]	SD 2213
			60	30 to 40	3,25	3,25	1,00	0,50	3,00	2,0m (min)	F1	Wider shoulder [7]	SD 2213
		2/4 lane Single C/W, kerbed	80	30 to 40	3,25	3,25	1,00[1]	-	3,00	-	F1	Wider shoulder [7]	SD 2217
			60	30 to 40	3,25	3,25	1,00[1]	-	3,00	-	F2	Wider shoulder [7]	SD 2218
U4a	Commercial Collector Street	2/4 lane, median at ped, crossing, boulevard	≤ 60	20 to 40	3,25	3,25	0,25	-	3,00	-	F2	cycle lane 2m (min)	SD 2219
U4b	Residential Collector Street	2/3 lane undivided	≤ 60	20 to 30	3,00	3,25	0,25	-	3,00	-	F2	cycle lane 2m (min)	SD 2220
U5a	Commercial Local Street	2 lanes plus parking	≤ 60	20[4]	3,25	3,25	0,25	-	3,00	-	F2	cycle lane 2m (min)	SD 2219
U5b	Residential Local Street	1/2 lane mountable kerbs	≤ 60	20[4]	3,00	3,25	0,00	-	3,00	-	F2	cycle lane 2m (min)	SD 2220

Superscript[1]

1. Reduce shoulder for auxiliary lane 0,8m (min) or 1,0m (preferred).
2. Crawler Lane width to increase to 3,5m for high vehicles volumes to reduce rutting.
3. Speed Option only to be considered only in special / exceptional circumstances.
4. Desired Road Reserve width is 20m(minimum)unless existing.
5. Median Concrete Barrier is an option : R1 & R2 - 8 Lanes : U1 & U2 Freeway - 6 Lanes.
6. 0,5m painted island for 4-lane undivided expressways.
7. Acceptable for Cyclists to use the shoulder (1,5m minimum), provided combined volumes of pedestrians and cyclists is low (< 400 per day)
   - Footway Details refer to SD 2208 and SD 2210

PAVED ROAD NOTES:

1. Applicable legislation makes the Department responsible for both Provincial and Municipal road standards, The standards therefore include municipal type roads.
2. The RCAM Functional Class is used as a primary factor to determine widths of cross-sectional elements.
3. Class R1 roads consist of the long distance mobility roads linking centres of national importance.
4. Commercial streets should cater for large goods delivery vehicles, (Class U4a & U5a).
5. Projected traffic volumes have been excluded as a factor, as these should only increase the number of required lanes and should not increase lane or shoulder widths.
6. Footwalk and Cycle Lane requirements are to be determined from pedestrian /cyclist counts or projections, These may be nil, one side only, or both sides.
7. Type F1 Footwalk: Minimum 1,5m useable width, separated from carriageway by guardrail, concrete barrier, or a 3,0 m clear gap.
8. Type F2 Footwalk: Minimum 1,5 m useable width, separated from carriagway by kerb and channel,
9. where a road segment contains short sections of roads with lower design speeds, then the cross-sectional elements for the higher design speed should be applied to the whole road segment.
10. Median width makes provision for future additional lanes. Concrete median barrier will be used when additional lanes are added.
11. On main roads and district roads there is a15m wide building restriction area measured from the road reserve boundary. Written permission from the Department is required for relaxation of any structure within the building restricted area.

E. *Challenges Experienced in the Implementation the Standards and Policies*

Over the years, the Provincial road network has grown with the addition and amalgamation of various government road authorities namely the Natal Roads Branch, the KwaZulu Department of Works and Roads, the Development Services Board and Department of Agricultural Roads. These amalgamated authorities became the KwaZulu-Natal Department of Transport. The classification of roads under the various authorities varied with some not having a formal road classification system. The new roads were incorporated into the provincial road network as either Main or District roads, which had specific criteria attached to each of the road categories.

The classification criteria for main roads was largely based on the links and connectivity between towns and established areas with district roads connecting farms and rural communities to the main roads. Local roads were later introduced to extend the road network further into the rural communities. However, the roads that serve the rural areas with settlements of high population densities were not the roads with high traffic volumes. These roads are characterised by numerous and adhoc direct accesses onto the roads.

Many of the roads have developed from often used footpaths into gravel roads with no geometric design criteria. Once dead end roads have been extended to link to other provincial roads, thus changing its function and use.

The current challenge is the retro-fitting of road classification by function and access standards, onto the existing unplanned roads as previously mentioned. The challenge is further exacerbated due to budget constraints, where the implementation of the correct classification standard will be a higher cost as opposed to a standard similar to the existing roadway. The retro-fitting of the road standards onto the existing road network has resulted in locations where pedestrians and cyclists have become more vulnerable.

At such locations, traffic calming measures have become an essential requirement to ensure the safety of the vulnerable road users. The calming measures have consisted of combinations of road traffic signs, road markings and physical calming devices, which range from minor impact rumble strips to severe impact speed humps. All the calming measure elements work together to protect the vulnerable road users.

Studies [6] [7] have shown, that at both extremes of the scale for road function (the freeway on the one hand and the 40 km/h residential roads on the other), good results are gained in reducing risk to road users. However, particularly in the case with the KwaZulu-Natal Department of Transport, most of the roads in the network fall within the intermediate zone that serves the mobility function, but also provide access to properties. It is in these categories (i.e. the non-freeway outside built-up areas, and the non-residential streets inside built-up areas), that sustainable-safe system approach should offer a solution. The intention would be to make the road traffic system fundamentally safe through preventative measures.

The challenge is then, for the road authority to be able to decide on the most appropriate means to deal with the intermediate zone type issues effectively, to ensure the best solutions are applied. Unfortunately, there is limited internal technical resource capacity within the KZN Department of Transport and reliance is made on the support of Consultants. The KZN Department of Transport is committed to the Radical Economic Transformation Policy of Government, which promotes the empowerment of emerging consultants. The programme has been very successful, and the industry is benefiting as smaller developing companies are being mentored by the more established and experienced companies. The challenge for the Department, is that quality of standards aren’t compromised, which inevitably affects the road safety.

Pedestrians are vulnerable participants in traffic and usually act subordinately to the other road users in view of the massive difference in mass, speed and vulnerability. Pedestrians therefore deserve the extra protection; however, the challenge is that they are often reluctant to use segregated facilities that result in extra distance, extra effort or perceived extra risk. Facilities such as walkways, overhead bridges, pedestrian crossings, traffic calming and speed humps which are provided are not always utilised.

IV. Conclusion

The three main components relating to traffic are the road users, the road and the transport modes. All three need to adhere to certain procedures, rules and standards to achieve the highest possible level of road safety. The sustainable safety strategy is characterised by a proactive and preventative attitude rather than being reactive. In a sustainable safe traffic system, the human takes the central role. Humans can be unpredictable by nature, and influencing their behaviour is a challenge, especially to do so in the long-term. Elements influencing the road user behaviour are:

- Engineering - vehicles equipped with technology to assist the driver.
  - and an inherent safe road environment with the infrastructure adapted to the limitations of the road user and preferably predictive (road cross section and features to make obvious what behaviour is expected).
- Education - road users that are well informed, adequately educated and show evidence of the expected behaviour, including education for pedestrians.
- Enforcement - developing and enforcing laws, rules and regulations.

The majority of the world’s safest countries have long term road safety initiatives in place. The efforts of the KwaZulu-Natal Department of Transport to develop and implement effective standards and policies will result not only in considerably safer road travel, but will also result in saving lives and associated societal costs.

Acknowledgement

The authors of the paper would like to firstly acknowledge the KwaZulu-Natal Department of Transport for the opportunity to review and work with them in the development of their standards and policies and be able to highlight the successes and challenges experienced, to ensure the KZN Network Asset is maintained with road safety as the core focus.

Secondly, a special acknowledgement and appreciation must be given to Mr. Robert Tarboton, who has played an integral part in advising and assisting the KZN Department of Transport, especially in his dedication to the importance of the standards and policies that govern the integrity and future of the network system. Robert Tarboton has enormous knowledge and understanding of the Department, as he worked 36 years with the KZN Department of Transport, before retiring in 2007 and then working with Royal HaskoningDHV, where he has continued his dedication to the success of the KwaZulu-Natal Department of Transport.

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