ETHEKWINI ROAD SAFETY PLAN

2012 - 2016
## TABLE OF CONTENTS

1 INTRODUCTION .................................................................................................................................................. 1

1.1 International and national traffic safety strategies ................................................................................................. 1

1.1.1 Ministerial Conference in Moscow, November 2009 ......................................................................................... 1

1.1.2 United Nations Decade of Action for Road Safety .............................................................................................. 2

1.1.3 South African National Road Safety Strategy 2011 – 2020 .................................................................................. 3

1.2 ETHEKWINI MUNICIPALITY ................................................................................................................................... 4

1.3 ETHEKWINI TRAFFIC SAFETY .................................................................................................................................. 4

1.3.1 Vision .................................................................................................................................................................... 4

1.3.2 Mission ................................................................................................................................................................ 4

1.3.3 Aims of the eThekwini road safety plan ............................................................................................................. 4

1.4 Partnership approach to management ..................................................................................................................... 5

1.5 Current road safety management ........................................................................................................................... 7

1.5.1 Key achievements ................................................................................................................................................ 7

1.5.2 Key challenges still existing .................................................................................................................................. 7

2 ETHEKWINI DEMOGRAPHIC INFORMATION ...................................................................................................... 8

2.1 Vehicle volumes ...................................................................................................................................................... 8

2.2 Population ................................................................................................................................................................ 8

2.3 Vehicle population ..................................................................................................................................................... 9

3 ACCIDENT AND INJURY TRENDS ........................................................................................................................... 11

3.1 Number of Accidents and Casualties ....................................................................................................................... 11

3.1.1 Basic trends .......................................................................................................................................................... 11

3.1.2 Accident and casualty rates ................................................................................................................................... 13

3.1.3 Accident types ...................................................................................................................................................... 17

3.1.4 Pedestrians ............................................................................................................................................................ 20

3.1.5 Accidents by Road Type ....................................................................................................................................... 22

3.1.6 Involvement by vehicle type .................................................................................................................................. 25

3.1.7 Target group ........................................................................................................................................................ 28

3.2 Location of Accidents ................................................................................................................................................ 28

3.2.1 General location of accidents and related data ................................................................................................... 28

3.3 Summary of the results of accident analysis – statistics and location ......................................................................... 29

4 MANAGEMENT APPROACH AND STRUCTURE .................................................................................................. 31
4.1 Integrated Road Safety Management ................................................................. 31
4.2 Institutional Arrangements ............................................................................... 32
  4.2.1 The Proactive Partnership Team ................................................................. 32
  4.2.2 The Road Safety Technical Committee / (Road Safety Coordinating Committee) ......................................................................................................................... 33
  4.2.3 The Data Management Team ..................................................................... 33
  4.2.4 The Traffic law Enforcement Working Group .......................................... 34
  4.2.5 The Road Safety Education and Awareness Working Group .............. 34
  4.2.6 The Road Safety Engineering Working Group ......................................... 35
  4.2.7 The Post-Accident Response Working Group ........................................... 35
5 CURRENT STATUS OF ROAD SAFETY MANAGEMENT ......................................... 36
  5.1 Road Safety Management ............................................................................ 36
  5.2 Information Systems ..................................................................................... 37
    5.2.1 Accident data .......................................................................................... 37
    5.2.2 Other information ................................................................................... 37
  5.3 Safer Road Users ......................................................................................... 38
    5.3.1 Intensive schools campaign ................................................................. 38
    5.3.2 Area-wide School Campaign ............................................................... 38
    5.3.3 Adult pedestrian campaign .................................................................. 39
    5.3.4 Metro Police Functions ........................................................................ 39
    5.3.5 Crossing assistance for learners ........................................................... 40
    5.3.6 Communication programmes ............................................................... 40
    5.3.7 Public Transport ................................................................................... 40
    5.3.8 Liaison ................................................................................................... 40
  5.4 Safer Roads .................................................................................................... 41
    5.4.1 Integration of road safety within the Integrated Development Plan (IDP) and other planning instruments .......................................................... 41
    5.4.2 Elimination of hazardous locations ....................................................... 41
    5.4.3 Road Safety Assessments ..................................................................... 41
    5.4.4 Provision of safe infrastructure around schools .................................... 41
    5.4.5 Road classification system .................................................................... 42
    5.4.6 Evaluation of interventions ................................................................... 42
    5.4.7 Integration of engineering measures with law enforcement, communication and education ............................................................... 42
5.4.8 Liaison ................................................................. 42
5.4.9 Safer Vehicles .......................................................... 42
5.5 Evaluation and Research ................................................ 43
6 ROAD SAFETY MANAGEMENT TOOLS .................................. 44
6.1 General .................................................................. 44
6.2 Community input ....................................................... 44
6.3 Identification of hazardous locations using accident data ........... 44
6.4 Economic Appraisal, warrants and Prioritisation ...................... 45
  6.4.1 Introduction ........................................................... 45
  6.4.2 Safety risk and extent of safety treatments ....................... 45
  6.4.3 Qualitative assessment of proposed safety treatments .......... 46
  6.4.4 Economic appraisal .................................................... 47
6.5 Project selection .......................................................... 48
6.6 Project prioritisation ..................................................... 49
6.7 Accident reduction ....................................................... 49
6.8 Economic analysis parameters .......................................... 50
6.9 Non-monetary benefits ................................................ 50
6.10 Proposed simplified methodology to prioritise road safety actions .... 50
7 DEVELOPMENT OF A ROAD SAFETY IMPLEMENTATION PLAN ............ 53
7.1 General approach, KPIs and summary of the implementation plan .... 53
7.2 Programme 1 – Establish partnerships and working groups ........... 56
7.3 Project 2 – Service provider for awareness and marketing ............... 56
7.4 Programme 3 - Pedestrians in the CBD area ............................ 56
  7.4.1 Description of the problem ............................................ 56
  7.4.2 Location of the proposed intervention ............................... 57
  7.4.3 Proposed Intervention .................................................. 57
  7.4.4 Before and after studies ................................................ 58
  7.4.5 Partnerships ............................................................... 58
  7.4.6 Cost Estimate ............................................................. 58
7.5 Programme 4 - Minibus Taxi Road Safety Project ......................... 59
  7.5.1 Description of the problem ............................................. 59
  7.5.2 Proposed Intervention .................................................. 59
  7.5.3 Education and Awareness .............................................. 60
7.5.4 Cost Estimate ........................................................................................................60

7.6 Programme 5 - Arterial routes and distributor roads – Speed management ..........61
    7.6.1 Description of the problem ...........................................................................61
    7.6.2 Location .......................................................................................................61
    7.6.3 Proposed Engineering measures ...................................................................63
    7.6.4 Awareness campaign ....................................................................................63
    7.6.5 Law Enforcement ..........................................................................................63
    7.6.6 Cost Estimate ...............................................................................................63

7.7 Programme 6 - Freight Route with focus on the M7 ........................................63
    7.7.1 Description of the problem ...........................................................................63
    7.7.2 Location of freight routes ............................................................................64
    7.7.3 Proposed Engineering Measures ...................................................................64
    7.7.4 Law Enforcement ..........................................................................................64
    7.7.5 Cost Estimate ...............................................................................................64

7.8 Programme 7 – Safety around schools ...............................................................64

7.9 Programme 8 – Safety on Residential Routes ......................................................65

7.10 Programme 9: Pedestrian Safety on Freeways ...................................................65

7.11 Programme 10 - Opinion surveys on road safety awareness .............................65

8 TOTAL COST AND PROPOSED ROLL OUT PROGRAMME .................................66

9 FUNDING ..................................................................................................................68

10 MONITORING AND EVALUATION ....................................................................68
FIGURES

Figure A1- Location of schools, hospitals and police stations
Figure A2- Location of All accidents (Jan 2010 To Sept 2011)
Figure A3- Accidents per square kilometres
Figure A4- Accidents per suburb
Figure A5- Accidents per ward per 1000 people

Figure B1- Preliminary road hierarchy plan
Figure B2- No of accidents per road (2008)
Figure B3- No of accidents per road (2009)

Figure C1- Pedestrian Accidents per ward per 1000 people
Figure C2- Location of pedestrian accidents 2010
Figure C3- Location of pedestrian accidents 2011
Figure C4- Pedestrian accidents per square kilometres
Figure C5- Fatalities per road & location of pedestrian accidents

Figure D1- CBD -Area identified as zone for pedestrianization implementation
Figure D2- CBD- Location of existing intersections and pedestrian crossings
Figure E1- Location of pedestrian accidents on arterial routes
Figure E2- Location of accidents on arterial routes
Figure E3- Number of accidents per road and location of accidents
Figure E4- Number of fatalities per road and location of pedestrian accidents
Figure F1- Location and type of accidents along critical freight routes
Figure G1- Schools per square kilometre
Figure G2- Location of pedestrian accidents in relation to combined & primary schools
Figure G3- Location of pedestrian accidents in relation to secondary schools
Figure G4- Location of schools within 1km from major roads
Figure G5- Number of schools versus number of pedestrian accidents
Figure C6- Location of schools and status of road safety programmes (2006-2012)
DEFINITIONS

**Fatal accident:** Any road traffic accident resulting in a person killed immediately or dying within 30 days as a result of the accident.

**Injury:** Physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. It can be a bodily lesion resulting from acute exposure to excessive energy or impairment of function.

**Injury accident:** Any road traffic accident resulting in at least one injured or killed person.

**Road traffic:** Any movement of a road vehicle on a given road network.

**Road transport:** Any movements of goods and/or passengers using a road vehicle on a given road network.

**Road traffic accident:** A collision or incident involving at least one road vehicle in motion, on a public road or private road to which the public has right of access.

*Included are: collisions between road vehicles; between road vehicles and pedestrians; between road vehicles and animals or fixed obstacles and with one road vehicle alone. Included are collisions between road and rail vehicles. Multi-vehicle collisions are counted as only one accident provided that any successive collisions happen within a very short time.*

**Road traffic injury (or casualty):** A person who has sustained physical damage (i.e. injury) as a result of a road traffic accident.

**Road user:** a person using any part of the road system as a non-motorized or motorized transport user.

**Road traffic fatality:** Any person killed immediately or dying within 30 days as a result of an injury accident, excluding suicides.
1 INTRODUCTION

1.1 International and national traffic safety strategies

1.1.1 Ministerial Conference in Moscow, November 2009

Ministers and heads of delegations as well as representatives of international governmental and nongovernmental organizations and private bodies gathered in Moscow from 19–20 November 2009 for the First Global Ministerial Conference on Road Safety.

The delegates acknowledged the 2004 World Health Organization/World Bank World report on road traffic injury prevention and subsequent publications stating that road traffic injuries are a major public health problem and leading cause of death and injury around the world and that road accidents kill more than 1.2 million people and injure or disable as many as 50 million a year, placing road traffic accidents as the leading cause of death for children and young people aged 5–29 years.

The meeting underlined the reasons for road traffic deaths and injuries as identified by the World Health Organisation and which include the following:

- inappropriate and excessive speeding;
- drinking and driving;
- failure to appropriately use seat-belts and child restraints;
- failure to wear helmets and other safety equipment;
- the use of vehicles that are old, poorly maintained or lacking safety features;
- poorly designed or insufficiently maintained road infrastructure, in particular infrastructure which fails to protect pedestrians;
- poor or unsafe public transportation systems;
- lack of or insufficient enforcement of traffic legislation;
- lack of political awareness; and
- lack of adequate trauma care and rehabilitation.

It was also agreed that the solution to the global road safety crisis can only be implemented through multi-sector collaboration and partnerships among all concerned in both public and private sectors, with the involvement of civil society.

Some of the resolutions that are of importance for the refining of strategies in South Africa are the following:

- Encourage the implementation of the recommendations of the World report on road traffic injury prevention
- Set ambitious yet feasible road traffic casualty reduction targets that are clearly linked to planned investments and policy initiatives
- Make efforts to develop and implement policies and infrastructure solutions to protect most vulnerable road users such as pedestrians, cyclists, motorcyclists and users of unsafe public transport, as well as children, the elderly and people living with disabilities
- Implement safer and more sustainable transportation, including through land-use planning initiatives and by encouraging alternative forms of transportation
- Promote harmonization of road safety and vehicle safety regulations and good practices
- Strengthen or maintain enforcement and awareness of existing legislation
- Encourage organizations to contribute actively to improving work-related road safety through adopting the use of best practices in fleet management
- Encourage collaborative action by fostering cooperation between relevant entities of public administrations, private and public sectors, and with civil society
- Improve data collection
- Strengthen the provision of pre-hospital and hospital trauma care, rehabilitation services and social reintegration

1.1.2 United Nations Decade of Action for Road Safety
During the Moscow Ministerial Conference of 2009 the Ministers present adopted the Moscow Declaration for a Decade of Action in Road Safety. On 2 March 2010 the United Nations Resolution, 64/255, proclaiming 2011 – 2020 as a Decade of Action for Road Safety was adopted unanimously by more than 100 states. The main goal of the Resolution is to stabilise and then reduce the forecasted level of road traffic fatalities around the world by increasing activities conducted at national, regional and global levels. The Resolution calls upon Member States to implement road safety activities, particularly in the areas of road safety management, road infrastructure and mobility, vehicle safety, road user behaviour, and post-accident response.

The guiding principles underlying the plan for the Decade of Action hinge on the “safe system” approach. The approach aims at the developing a road transport system that is better able to accommodate human error and take into consideration the vulnerability of the human body. The goal of the “safe system” is to ensure that accidents do not result in serious human injury.

The “safe systems’ approach means shifting a major share of the responsibility from road users to planners, engineers, road managers, the automotive industry, the police, politicians, legislators, health service providers, educationists and schools, the judiciary and non-governmental organisations. Road users should have the responsibility of abiding by the laws and regulations.

The plan is based on three major domains, namely Pre-Accident, Accident and Post-Accident Interventions. For the effective implementation of the plan, the interventions will cover five pillars namely:

- Road Safety Management
- Safer Roads and Mobility
- Safer Vehicles
- Safer Road Users
- Post-Accident Response
The Decade of Action plan recognizes the importance of ownership at all levels and encourages the involvement of various relevant government sectors as well as Non-Governmental Organisations, Civil Society and the Private Sector.

1.1.3 South African National Road Safety Strategy 2011 – 2020
The Department of Transport designed a road safety strategy for implementation over a 10 year period because South Africa joined the international community in the Decade of Action for Road Safety from 2010 to 2020. In addition the South African strategy supports the Millennium Development Goals and the ACCRA agreement of 2007 by the African Ministers of Transport to halve fatalities in sub-Saharan Africa by 2015.

The Department of Transport’s Vision is as follows:

*To provide safe, reliable, effective, efficient and fully integrated transport systems and operations as well as infrastructure, which will best meet the needs of freight and passenger customers and commuters at improving levels of service and cost in a fashion which supports government strategies for economic and social development, whilst being environmentally and economically sustainable.*

The road safety aspect of the Department’s Vision is supported by the following:

- **Goal:** To reduce fatalities on the roads of South Africa by 50% by 2015, with further reductions by 2020.
- **Vision:** Safe and efficient road transport, contributing to economic growth and development, through improved cooperation and compliance from road users, the business and NGO community and public and private sector interventions.
- **Mission:** Using strong political will and commitment to reach all road users, utilizing a systems’ based approach of education, enforcement, engineering and evaluation to change attitude and behaviour and reduce fatalities.
The South African road safety strategy is based on the traditional approach of the 4 E’s, namely:

- enforcement;
- education;
- engineering; and
- evaluation.

1.2 ETHEKWINI MUNICIPALITY

eThekwini Municipality covers approximately 2 300km² and is home to 3,58 million people, just over one third of the population of KwaZulu-Natal. It is by far the larger of the two metropolitan councils in the province and accounts for 60% of economic activity within the province.

The eThekwini Municipal area extends from Tongaat in the north to Umkomaas in the south and from the coastline in the east to Cato Ridge in the west. It includes many diverse forms of land use ranging from the densely populated greater Durban metropolis to smaller towns such as Tongaat, Verulam and Kingsburgh to deeply rural hinterland areas such as Osindisweni, Inanda, Molweni and KwaNdengezi.

1.3 ETHEKWINI TRAFFIC SAFETY

The eThekwini Road Safety Plan is a comprehensive and fully integrated plan and is a key component of the eThekwini Integrated Transport Plan (ITP). It addresses all aspects of traffic engineering, enforcement and education on an integrated basis in an effort to reduce the social and economic costs of accidents.

1.3.1 Vision

To create a city with a road safety culture that will lead to a reduction of injuries and fatalities on the roads and improve the community’s quality of life.

1.3.2 Mission

The Mission is to reduce the fatalities in eThekwini by minimum 15% over the next 5 years.

1.3.3 Aims of the eThekwini road safety plan

A primary aim of the eThekwini road safety plan is to address the road safety problems within the municipality in such a way that sustainable partnerships between the municipality, the business sector and civil society are formed. These partnerships will be formed through dynamic and continuous improvement processes guided by the principles of the United Nations Decade of Action as well as the South African National Road safety Strategy 2011 – 2020 through the implementation of the Proactive Partnership Model.

The international good practice guidelines for the management of key road safety risk factors which are supported by the World Health Organisation will be adapted and implemented to address the prioritised local risk factors.
Further aims are to:

- use modern technologies as road safety management tools to improve efficiency and cost effectiveness;
- provide a focus on road safety and to ensure that road safety underpins all transportation policy measures in the Council;
- highlight the scale of the deaths and injuries that are occurring at present on the Council’s road network;
- Develop an action plan to improve road safety for all users in the city
- provide a safe infrastructure and operating environment for all modes of transport (including non-motorised transport) and all passengers;
- ensure adequate regulation and levels of enforcement on services moving goods and people;
- create professional road safety capacity.

1.4 Partnership approach to management

A major change in the eThekwini Municipality’s approach to road safety management is the formation of partnerships according to the directives of the international good practice model of The Proactive Partnership Strategy (PPS) that has been implemented successfully by the Global Road Safety Partnership in various cities globally. It is a strategy created specifically for use in municipalities and is based on sustainable partnerships between Government, Business and Civil Society in the municipality. The PPS is entirely related to a dynamic and continuous improvement process. The PPS model has been used effectively in many Brazilian towns and is successful in helping communities to make effective progress on what can be realistically achieved in injury prevention.

The Proactive Partnership Model for road safety management was chosen for the following reasons:

- It provides a structured framework for managing road safety and improving the safety culture in the community.
- The local investment in road safety is based on a reliable process that identifies the local road safety problem through related accident reclassification, subsequent analysis and targeted actions that are implemented immediately. The improvement in the road safety culture, quality of life of the citizens and human life itself, is quickly evident and a great motivator for further work.
- Local citizens own the road trauma problem and the solution and a true community partnership approach exists. Buoyed with visible and tangible success, and within a reasonable time frame, the partnership aims for continuous improvement.
The eThekwini Transport Authority (ETA) will spearhead a process to ensure that the following preconditions for the successful implementation of the Proactive Partnership Strategy are met:

- An environment where the Mayor, the City manager, and those key players in the fields of Transport, Health, and Education in the municipality as well as essential partners on data collection such as the Police, Health Emergency Services, Fire Brigade, and Hospitals see the connection between road safety and quality of life and are prepared to commit publicly to improving it.
- An acknowledgement by the city managers that the road safety problem can be most effectively addressed through partnerships between government sectors, business and civil society.
- A social context where the people are connected to the decision making process and are empowered to participate in a process to bring about change.

The PPS model consists of 6 steps which form a continuum of constant progressive development as is presented in the following diagram:

**DIAGRAM 2: PROACTIVE PARTNERSHIP APPROACH MODEL**

A formal pro-active approach often leads to signed agreements and Memorandums of Understanding with limited real value. To ensure that the Partnership works on a continuous basis, a public commitment is required, that is repeated on a regular basis. Proposals are made in this document, which albeit unorthodox, will place road safety in the public eye and will continuously ensure that the role players re-commit themselves to the plan.
1.5 Current road safety management

1.5.1 Key achievements
The Road Safety Branch of the eThekwini Transport Authority succeeded in making good progress with the reduction of fatal accidents and fatalities in spite of the pressure put on the transport system with a population growth in the city of approximately 450 000 over the past 10 years. During the period of the Previous Road Safety Plan there was a total vehicle population growth of 15% or 3% per year. The heavy vehicle population grew by 41%, the minibuses by 14%, buses by 17%, light delivery vehicles by 21% and motorcycles by 12%. Over the same period the fatal accidents went from 656 to 532 per year and fatalities from 719 to 578 per year.

The following are key achievements that highlight the success of the current road safety plan:

- The ETA succeeded in providing strategic accident information that was obtained from the law enforcement and engineering departments.
- Dedicated traffic policing special units were established.
- Road safety management activities encouraged community involvement.
- Road safety infrastructure improvement measures were implemented at most of the schools.
- Road safety education projects were successfully implemented in primary schools.
- Road traffic data was used in the identification of hazardous locations.

1.5.2 Key challenges still existing
The following key challenges still to be addressed emerged from the evaluation of the Road safety plan 2005 - 2010:

- The accuracy of data still remains an issue due to poor reporting by SAPS and not forwarding all accident forms
- The lack of systematic feedback and monitoring of intervention results with specific reference to engineering interventions.
- The absence of baseline information regarding risk factors such as seatbelt wearing, drinking and driving, etc.
- The effectiveness of the judicial process creates a problem with regard to the impact of fines for traffic offences.
- The impact of road safety education is limited due to limited resources in the form of manpower and educational materials.
- There still seems to be an uncertainty about the road safety roles and responsibilities of the Metro Police.
- Law enforcement activities are not acknowledged as key road safety interventions.
- The eThekwini road safety plan is perceived to be an ETA road safety plan and other relevant role players have failed to take joint ownership thereof.
- The road safety plan does not make provision for a sustained adult pedestrian awareness programme
- The participation of other relevant sectors such as the Health and Judicial sectors, remains a challenge
2 ETHEKWINI DEMOGRAPHIC INFORMATION

2.1 Vehicle volumes
The traffic volume figures were derived from two-way counts conducted over a 12 hour period of vehicles accessing the central area of the city. Vehicle volumes have increased from 414644 in 2001 to 489182 in 2010. The biggest increase was for taxis (49% increase) and heavy vehicles (46% increase), while traffic volumes for buses decreased by 30%.

GRAPH 1: VEHICLE VOLUMES: 2001 TO 2010

2.2 Population
In October 2001 the eThekwini population was 3 092 237 and is estimated to be 3 540 000 in 2011.

GRAPH 2: ETHEKWINI ESTIMATED POPULATION
2.3 Vehicle population

Vehicle population is based on registered vehicle population (self-propelled vehicles).

GRAPH 3: LIGHT MOTOR VEHICLE POPULATION

The light motor vehicle population increased from 413576 in 2006 to 468031 in 2010 (13% growth over the 5-year period).

The total growth in vehicle population was 15% or 3% per year average. The biggest growth was in heavy vehicles (41%). Minibuses increased with 14% while buses increased with 17%. Light delivery vehicles increased with 21%, while the motorcycle population increased with 12%. While the heavy goods vehicle population growth is reflected in the traffic volumes, the increase in registered buses is not reflected in the traffic volumes, which show a decline for buses.

GRAPH 4: PASSENGER VEHICLE POPULATION
GRAPH 5: LOADED VEHICLES

Loads vehicles 2006 to 2010

GRAPH 6: MOTORCYCLE POPULATION

Motorcycles 2006 to 2010
3 ACCIDENT AND INJURY TRENDS

3.1 Number of Accidents and Casualties

3.1.1 Basic trends

From a total number of accidents of 673,266 from 2001 to 2010, 1% or 6,474 were fatal. After a peak in 2004, the number of fatal accidents decreased until 2008, with a slight increase again up to 2010.

Between 2000 and 2010, all severity categories show a decrease, with the “damage only” category showing an increase of 23%. Even though accident statistics might not be 100% accurate, this might be an indication that the severity of accidents are decreasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatal</th>
<th>Serious</th>
<th>Slight</th>
<th>Damage</th>
<th>Total</th>
<th>Average Accidents per day</th>
<th>Damage only per 1000 accidents</th>
<th>Fatal Acc per 1000 accidents</th>
<th>Injury accidents per 1000 accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>496</td>
<td>2413</td>
<td>7751</td>
<td>42671</td>
<td>53331</td>
<td>146</td>
<td>800.12</td>
<td>9.30</td>
<td>190.58</td>
</tr>
<tr>
<td>2001</td>
<td>537</td>
<td>2620</td>
<td>10312</td>
<td>41038</td>
<td>54507</td>
<td>149</td>
<td>752.89</td>
<td>9.85</td>
<td>237.25</td>
</tr>
<tr>
<td>2002</td>
<td>635</td>
<td>2674</td>
<td>10309</td>
<td>41466</td>
<td>55084</td>
<td>151</td>
<td>752.78</td>
<td>11.53</td>
<td>235.69</td>
</tr>
<tr>
<td>2003</td>
<td>665</td>
<td>2824</td>
<td>9580</td>
<td>42971</td>
<td>56040</td>
<td>154</td>
<td>766.79</td>
<td>11.87</td>
<td>221.34</td>
</tr>
<tr>
<td>2004</td>
<td>720</td>
<td>2826</td>
<td>9467</td>
<td>43689</td>
<td>56702</td>
<td>155</td>
<td>770.50</td>
<td>12.70</td>
<td>216.80</td>
</tr>
<tr>
<td>2005</td>
<td>656</td>
<td>2497</td>
<td>9387</td>
<td>47165</td>
<td>59705</td>
<td>164</td>
<td>789.97</td>
<td>10.99</td>
<td>199.05</td>
</tr>
<tr>
<td>2006</td>
<td>613</td>
<td>3104</td>
<td>10521</td>
<td>50244</td>
<td>64482</td>
<td>177</td>
<td>779.19</td>
<td>9.51</td>
<td>211.30</td>
</tr>
<tr>
<td>2007</td>
<td>605</td>
<td>3659</td>
<td>13901</td>
<td>54107</td>
<td>72272</td>
<td>198</td>
<td>748.66</td>
<td>8.37</td>
<td>242.97</td>
</tr>
<tr>
<td>2008</td>
<td>492</td>
<td>3282</td>
<td>14873</td>
<td>51709</td>
<td>70356</td>
<td>193</td>
<td>734.96</td>
<td>6.99</td>
<td>258.04</td>
</tr>
<tr>
<td>2009</td>
<td>523</td>
<td>3051</td>
<td>11294</td>
<td>52809</td>
<td>67677</td>
<td>185</td>
<td>780.31</td>
<td>7.73</td>
<td>211.96</td>
</tr>
<tr>
<td>2010</td>
<td>532</td>
<td>2611</td>
<td>9467</td>
<td>50500</td>
<td>63110</td>
<td>173</td>
<td>800.19</td>
<td>8.43</td>
<td>191.38</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6474</td>
<td>31561</td>
<td>116862</td>
<td>518369</td>
<td>673266</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Average last 5 years 185</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Serious injury accidents peaked in 2007; while slight injury accidents peaked in 2008.¹ (Graph 7). The same trend is repeated for casualties.

**GRAPH 7: NUMBER OF ACCIDENTS BY SEVERITY**

![Graph showing the number of accidents by severity from 2000 to 2010](image)

**TABLE 2: NUMBER OF CASUALTIES: 2000 – 2010**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatal</th>
<th>Serious</th>
<th>Slight</th>
<th>Total</th>
<th>Average Casualties (Fatal + all injuries) per day</th>
<th>Average Fatalities per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>545</td>
<td>3188</td>
<td>11645</td>
<td>15378</td>
<td>42</td>
<td>1.49</td>
</tr>
<tr>
<td>2001</td>
<td>609</td>
<td>3715</td>
<td>17406</td>
<td>21730</td>
<td>60</td>
<td>1.67</td>
</tr>
<tr>
<td>2002</td>
<td>714</td>
<td>3860</td>
<td>16381</td>
<td>20955</td>
<td>57</td>
<td>1.96</td>
</tr>
<tr>
<td>2003</td>
<td>753</td>
<td>3917</td>
<td>14710</td>
<td>19380</td>
<td>53</td>
<td>2.06</td>
</tr>
<tr>
<td>2004</td>
<td>789</td>
<td>4048</td>
<td>14419</td>
<td>19256</td>
<td>53</td>
<td>2.16</td>
</tr>
<tr>
<td>2005</td>
<td>719</td>
<td>3260</td>
<td>13423</td>
<td>17402</td>
<td>48</td>
<td>1.97</td>
</tr>
<tr>
<td>2006</td>
<td>708</td>
<td>4064</td>
<td>15385</td>
<td>20157</td>
<td>55</td>
<td>1.94</td>
</tr>
<tr>
<td>2007</td>
<td>683</td>
<td>4790</td>
<td>20207</td>
<td>25680</td>
<td>70</td>
<td>1.87</td>
</tr>
<tr>
<td>2008</td>
<td>534</td>
<td>4330</td>
<td>22529</td>
<td>27393</td>
<td>75</td>
<td>1.46</td>
</tr>
<tr>
<td>2009</td>
<td>579</td>
<td>4078</td>
<td>15892</td>
<td>20549</td>
<td>56</td>
<td>1.59</td>
</tr>
<tr>
<td>2010</td>
<td>578</td>
<td>3564</td>
<td>13749</td>
<td>17891</td>
<td>49</td>
<td>1.58</td>
</tr>
<tr>
<td>Total</td>
<td>7211</td>
<td>42814</td>
<td>175746</td>
<td>225771</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average last 5 years: 61 / 1.69

¹ Note that fatal accidents and fatalities are shown on a secondary axis
3.1.2 Accident and casualty rates

Fatal accidents by 10 000 traffic volume decreased from 14.7 in 2001 to 11.8 in 2010. There was however a peak of 18.2 in 2004. Traffic volumes of cars, taxis, HGV's, buses are added together and the number of fatal accidents for a specific year are divided by the total traffic volume X 10 000. The accident indicators per estimated 100 000 population show the same trend.
Fatalities and fatal accidents per 10 000 live motorised vehicle population show a decrease from 2006 to 2010.
The severity rate (Number of fatal accidents for every 1000 accidents has decreased from 2001 (9.9) to 8.4 in 2010. The year with the lowest severity rate was 2008 and there is a slight increase between 2008 and 2010.

Accident rates by type of accident show the comparative severity rate of the different accident types for the 10 year average (2001 to 2010). Vehicle/pedestrian accidents show the highest severity rate (302.7 fatal and serious accidents per 1000 accidents). This is followed by side-swipe on ramps (250), Head-on accidents (228.2), alighting and boarding (217.4) and “single vehicle overturned”.

When one compares the number of fatal and serious casualties, head-on accidents show the highest number of fatal and serious injuries per 1000 injuries. It should be remembered that Head-on accidents always involve more than one vehicle and would have a tendency to involve more people. Head-on accidents are followed by side swipes on ramps (400), Vehicle/pedestrian (320.2), single vehicle overturned (307.5) and sideswipe: opposite direction (265.9).

These are indications of the severity of the accident type and not an indication of prevalence of those accident types.
GRAPH 13: FATAL AND SERIOUS ACCIDENTS PER 1000 ACCIDENTS BY ACCIDENT TYPE – TEN YEAR AVERAGE

- Vehicle/pedestrian: 302.7
- Side swipe ramp: 250.0
- Head on: 228.2
- Alighting/Boarding: 217.4
- Single vehicle - overturned: 195.5
- Multi-vehicle Rear end: 81.3
- Turn right opposing: 51.6
- Vehicle/fixed object: 43.0
- Right angle-straight: 41.3
- Sideswipe: Opp direction: 39.6
- Other: 36.3
- Right angle-turn: 28.6
- Vehicle/animal: 16.8
- Right turn (same): 16.1
- Parked sideswipe: 10.6
- Rear end: 10.0
- Sideswipe: Same direction: 9.6
- Right Angle stationary: 6.0
- Parked/Parking: 4.2
- Reversing: 3.0
- Left turn (same): 1.6
- Vehicle/train: 0.0
- Unsecured load: 0.0
- Projecting load: 0.0
3.1.3 Accident types

Rear-end accidents represented most accidents (175 750 accidents from 2001 to 2010), followed by side-swipe – same direction (86 819) and vehicle/pedestrian accidents (73572 accidents). Rear-end and side-swipe – same direction represent only 2.7 and 1.7 % of fatal accidents respectively.

Pedestrian accidents represent 11.9 % of total accidents, but more than 60% of fatal accidents. Pedestrian accidents are thus a concern both in terms of numbers and severity.

Other accident types with high severity rates are: single vehicle overturned (representing 1.7% of all accidents but 8.9% of fatal accidents). Head-on accidents also have a high severity rate, even though its proportion in terms of all accidents is small.
When taking the number of fatalities and serious injuries into consideration for the period 2001 to 2010, the following predominant accident types are identified:

- Pedestrians (4075 fatalities)
- Single vehicle overturned (678 fatalities)
- Vehicle against fixed object (581 fatalities)
- Head-on (322 fatalities)

It is clear that accidents in which only one vehicle is involved contribute to the most serious accidents (21% of all accidents, but 82% of fatal accidents). Of these, pedestrian accidents remain the biggest concern.

Analysis of single-vehicle overturned and vehicle against fixed object accidents indicates that while the latter category show a decrease in terms of total numbers, in line with the overall accident statistics, the single vehicle overturned category remains fairly constant.
<table>
<thead>
<tr>
<th>TYPE OF ACCIDENT</th>
<th>FATALITIES</th>
<th>SERIOUS INJURIES</th>
<th>TOTAL ACCIDENTS</th>
<th>FATAL ACCIDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Alighting/Boarding</td>
<td>16</td>
<td>0.2</td>
<td>303</td>
<td>1.0</td>
</tr>
<tr>
<td>Head on</td>
<td>322</td>
<td>4.7</td>
<td>481</td>
<td>1.6</td>
</tr>
<tr>
<td>Left turn (same)</td>
<td>3</td>
<td>0.0</td>
<td>43</td>
<td>0.1</td>
</tr>
<tr>
<td>Multi-vehicle Rear end</td>
<td>24</td>
<td>0.4</td>
<td>132</td>
<td>0.4</td>
</tr>
<tr>
<td>Other</td>
<td>69</td>
<td>1.0</td>
<td>397</td>
<td>1.3</td>
</tr>
<tr>
<td>Parked sideswipe</td>
<td>10</td>
<td>0.1</td>
<td>37</td>
<td>0.1</td>
</tr>
<tr>
<td>Parked/Parking</td>
<td>22</td>
<td>0.3</td>
<td>137</td>
<td>0.5</td>
</tr>
<tr>
<td>Projecting load</td>
<td>1</td>
<td>0.0</td>
<td>4</td>
<td>0.0</td>
</tr>
<tr>
<td>Rear end</td>
<td>199</td>
<td>2.9</td>
<td>1986</td>
<td>6.7</td>
</tr>
<tr>
<td>Reversing</td>
<td>3</td>
<td>0.0</td>
<td>90</td>
<td>0.3</td>
</tr>
<tr>
<td>Right Angle stationary</td>
<td>1</td>
<td>0.0</td>
<td>24</td>
<td>0.1</td>
</tr>
<tr>
<td>Right angle-straight</td>
<td>185</td>
<td>2.7</td>
<td>1125</td>
<td>3.8</td>
</tr>
<tr>
<td>Right angle-turn</td>
<td>99</td>
<td>1.5</td>
<td>720</td>
<td>2.4</td>
</tr>
<tr>
<td>Right turn (same)</td>
<td>27</td>
<td>0.4</td>
<td>294</td>
<td>1.0</td>
</tr>
<tr>
<td>Side swipe ramp</td>
<td>8</td>
<td>0.1</td>
<td>12</td>
<td>0.0</td>
</tr>
<tr>
<td>Sideswipe: Opp direction</td>
<td>174</td>
<td>2.6</td>
<td>667</td>
<td>2.3</td>
</tr>
<tr>
<td>Sideswipe: Same direction</td>
<td>159</td>
<td>2.3</td>
<td>900</td>
<td>3.0</td>
</tr>
<tr>
<td>Single vehicle - overturned</td>
<td>678</td>
<td>10.0</td>
<td>1525</td>
<td>5.2</td>
</tr>
<tr>
<td>Turn right opposing</td>
<td>141</td>
<td>2.1</td>
<td>1058</td>
<td>3.6</td>
</tr>
<tr>
<td>Unsecured opposing</td>
<td>1</td>
<td>0.0</td>
<td>5</td>
<td>0.0</td>
</tr>
<tr>
<td>Vehicle/animal</td>
<td>8</td>
<td>0.1</td>
<td>46</td>
<td>0.2</td>
</tr>
<tr>
<td>Vehicle/fixed object</td>
<td>581</td>
<td>8.5</td>
<td>1583</td>
<td>5.4</td>
</tr>
<tr>
<td>Vehicle/pedestrian</td>
<td>4075</td>
<td>59.8</td>
<td>17946</td>
<td>60.8</td>
</tr>
<tr>
<td>Vehicle/train</td>
<td>5</td>
<td>0.1</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6811.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>29515.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
3.1.4 Pedestrians
Pedestrian fatalities remain the biggest challenge in eThekwini and represent close to 60% of all deaths.

Pedestrian fatalities show a slow decline over the last 10 years. Serious injuries had a high peak in 2007, with a sharp decline towards 2010. In terms of proportion of all fatalities, the figure remains constantly close to 60%.
The proportion of drivers and passengers are fairly similar, with driver fatalities increasing slightly in proportion to passengers since 2008. This might be an indication of lower average vehicle occupancy rate.
### GRAPH 19: VEHICLE / PEDESTRIAN FATAL AND SERIOUS ACCIDENTS – 2001 TO 2010

![Graph showing vehicle/pedestrian fatal and serious accidents from 2001 to 2010.](image)

#### 3.1.5 Accidents by Road Type

### GRAPH 20: PERCENTAGE OF ALL ACCIDENTS BY ROAD TYPE – 2008 TO 2010

![Graph showing the percentage of all accidents by road type from 2008 to 2010.](image)
It is clear that most accidents occur on distributors and reflects the exposure on these types of roads. The percentage fatal accidents however have shown a decrease in the proportion occurring on distributors and an increase in the proportion occurring on freeways.
Fatal pedestrian accidents are clearly over-represented on freeways. On average 3% of all pedestrian accidents occurred on freeways while between 18 and 25% of fatal pedestrian accidents occurred on freeways. There seems to be a slight decrease in the proportion of pedestrian fatalities occurring freeways between 2008 and 2010, with some of the fatal pedestrian accidents moving towards collectors.
3.1.6 Involvement by vehicle type

**GRAPH 24: PERCENTAGES OF VEHICLES INVOLVED IN ACCIDENTS – 2001 TO 2010**

Motor cars are under-represented in fatal accidents (59.6% of vehicles involved in accidents are motor cars, while 47.9% of vehicles involved in fatal accidents are motor cars). Minibuses, LDVs, Heavy vehicles, buses and motor cycles are over-represented.

The number of Heavy Motor Vehicles and Articulated Motor Vehicles in accidents has increased, showing higher involvement since 2006 because of drastic increase in traffic volumes, while the involvement of buses has decreased since 2005.
GRAPH 25: NUMBER MOTOR VEHICLES INVOLVED IN ACCIDENTS – 2001 TO 2010

GRAPH 26: NUMBER OF HEAVY VEHICLES INVOLVED IN ACCIDENTS – 2001 TO 2010
The number of motor cycles involved in accidents has also increased since 2006, while the number of bicycles involved has shown a decline. Motor cycles, although a small proportion are involved in accidents (less than 1%) these vehicles are over-represented by more than 100% in fatal accidents (on average about 2% of vehicles involved in fatal accidents). Of concern is a fairly high proportion in 2010 (from 2% in 2009 to 2.6% in 2010). In many African countries, motor cycles as a form of transport has increased in the last decade and a sudden growth spurt in the popularity of these vehicles can have a drastic impact on accident statistics.

Minibus taxis are overrepresented in fatal and serious crashes (18%).
3.1.7 Target group
The 20 to 29 age group has the highest fatalities. The following target groups have the highest involvement in fatal accidents:

- Drivers between ages 20 and 39, with the highest peak between 25 and 29
- Passengers have a fairly high involvement for all age groups older than 15, but highest between 15 and 34.
- Pedestrian fatalities are high from 20 to 39 years of age, slightly decreasing after 39. There is a high peak for children between the ages of 5 and 9.
- 23% of fatalities involve women, while 77% of fatalities involve men.

When looking at the day of the week, most accidents occur on weekends (Fridays to Sundays).

3.2 Location of Accidents

3.2.1 General location of accidents and related data
The accident statistics of eThekwini for the years 2010 and 2011 was analysed in detail to determine the geographical location of accidents.

The following more general maps, maps in Appendix A show the location of the different accidents and related data:

A1 Locality of schools, hospitals and police stations. Included for a general overview as schools, hospitals and police stations are institutions directly related to road safety.

A2 All accidents January 2010 to December 2011. Show all the accidents for the 2 year period. When zoomed in, it provides an indication of where the most accidents occur.

A3 All accidents per square kilometre (for the 2 year period 2010 and 2011). Although not linked to a specific road, the map provide a clear indication of where the highest number of accidents occur, namely in the CBD area. This can be expected, as this is an area where there is high vehicle – pedestrian conflict.

A4 All accidents per suburb (for the 2 year period 2010 and 2011). The map was prepared to obtain a geographical overview of where the highest location of accidents are. The Durban area including the CBD stands out.

A5 All accidents per ward per 1000 people (for the 2 year period 2010 and 2011). This map again shows the highest concentration of accidents in the CBD area and surroundings.
The following maps show accidents related to roads, in Appendix B:

B1 Preliminary road hierarchy plan. The hierarchy was not finalized on completion of this project. It is however included as the class of certain roads has been finalized and it provides valuable input in terms of identifying arterial roads in eThekwini.

B2 Number of accidents per road in 2008

B3 Number of accidents per road in 2009. These two maps provide an indication of where accidents occurred in these 2 years in terms of arterial roads and other. The major roads leading into the CBD stand out.

A detail investigation on the geographical location of pedestrian accidents was also carried out. The following maps, showing pedestrian related accidents, are included in Appendix C:

C1 Pedestrian accidents per ward per 1000 people. This map indicate that the highest frequency of pedestrian accidents occur in the CBD area.

C2 Location of pedestrian accidents – 2010

C3 Location of pedestrian accidents – 2011. These two maps show the actual location of pedestrian accidents. The CBD as an area where pedestrian accidents occur, clearly stands out.

C4 Pedestrian accidents per square kilometre. The map indicates the location of schools as well as the density of accidents. Although the density of schools is not the highest in the CBD area, the density of pedestrian accidents are the highest in the CBD.

C5 Fatalities per road and location of pedestrian accidents. The map shows the total number of accidents per road within the eThekwini boundaries, i.e. not per link, but per total road. It gives an idea of which freeways / arterials have the highest number of accidents. Sipho Mkhize Drive, South Coast Road and KwaMashu Highway stand out as arterials with high frequencies of accidents.

3.3 Summary of the results of accident analysis – statistics and location

The following challenges are illustrated in the accident statistics:

1. Demographics for population and vehicle population and also traffic volumes show an increase and indicate that the accident problem might increase over time.

2. There is however a downward trend for fatalities and serious injuries (as well as fatal and serious injury accidents), although damage only accidents do not show the same downward trend. The reason for this is not clear. A concerted effort should be made to ensure that these figures are accurate.
3. Even though the total number of pedestrian fatalities has decreased, pedestrian fatalities remain the biggest concern in eThekwini, remaining close to 60% of fatalities. In 2010 about 18% of pedestrian fatalities occurred on the freeways (with only 3% of all pedestrian accidents occurring on freeways) confirming this road type as a high severity risk for pedestrians.

4. From the maps showing the location of accidents and fatalities, the CBD as an area where there is a high number of pedestrians, clearly stands out. 23% of all pedestrian fatalities occur in the CBD.

5. When one looks at the total number of deaths by accident type, the categories for single-vehicle overturned, and single vehicle against fixed object, showed the highest numbers (average 2001 to 2010), after pedestrian accidents. Single vehicle accidents (which include pedestrian accidents) are responsible for 21% of all accidents, but 82% of fatal accidents.

6. When taking the number of fatalities and serious injuries into consideration for the period 2001 to 2010, the following accident types are identified:
   - Pedestrians (4075 fatalities)
   - Single vehicle overturned (678 fatalities)
   - Vehicle against fixed object (581 fatalities)
   - Head-on (322 fatalities)

   Together, these categories make out about two-thirds of all fatalities in eThekwini.

7. Speed management should be considered as one of the main solutions to decrease the severity of these types of accidents. Alcohol often also plays a role in single vehicle accidents. Seatbelt wearing can have an impact on the casualty rate of all the categories, excluding pedestrian deaths.

8. Motor cars constitute about 30% of fatal accidents and this reflects under-involvement. Minibuses, heavy vehicles, articulated vehicles, LDVs and motor cycles are over-involved in fatal accidents.

   Those vehicles defined as public vehicles can be targeted for special traffic enforcement, education and communication projects. The severity rate of all light passenger vehicles and LDV's can be reduced through increased seat-belt wearing rates.

9. Although all age groups are involved in accidents, the economically active age groups (25 to 39) constitute a high proportion of fatalities.

10. A special effort should be made to ensure the safety of 5 to 9 year olds, including safe walking infrastructure and safe scholar transport.

11. Higher accident involvement over weekends for all vehicle types may be attributed to different travelling behaviour, including different travel destinations. Alcohol use might also increase. Lower traffic volumes also allow higher speeds.

12. A special enforcement strategy to decrease offences over weekends and to manage speeds during these periods should be implemented.
4 MANAGEMENT APPROACH AND STRUCTURE

4.1 Integrated Road Safety Management

The eThekwini Municipality recognises the importance of ownership at local level, and of involving multiple sectors and agencies. Activities towards achieving the road safety goals of the Municipality will be implemented at the most appropriate level and the involvement of a variety of sectors (transport, health, police, justice, urban planning etc.) will be ensured through the implementation of the Proactive Partnership Model. This implies that non-governmental organisations, civil society, and the private sector will be included in the development and implementation of activities towards meeting the road safety goals.

The following diagram illustrates the approach that is proposed to be followed, to ensure that road safety will be managed through cooperation and coordination involving various partners. The diagram is referred to as an “architecture” of the proposed road safety plan, as it indicates the relationship between the different goals and objectives, as well as the role players, projects and the communication structure required.

The architecture is also in line with the UN decade of action goals and reflect the same approach.

**GRAPH 29: DECADE OF ACTION APPROACH**

Reliable data will be collected and analysed in order to obtain information regarding the local risk factors. This information will be used to develop programmes and projects involving the traditional disciplines of traffic law enforcement, education, engineering and emergency services to promote the Decade of Action principles of safer roads and mobility, safer vehicles, safer road users and improved post-accident response.
4.2 Institutional Arrangements
The road safety activities described in the road safety management plan will be dealt with on various levels and in working groups of persons selected for their specific knowledge, skills and institutional responsibilities.

The following diagram illustrates the structure of road safety management in the Municipality.

**GRAPH 30: DECADE OF ACTION APPROACH**

4.2.1 The Proactive Partnership Team
The Proactive Partnership Model requires the establishment of a Partnership Team comprising of senior decision makers from the various relevant departments of the Municipality. This team will typically include the following representatives:

- Mayor of eThekwini
- City Manager
- Councillor: Health and Social Services
- Councillor: Safety and Security
- Councillor: Procurement and Infrastructure
- Head: Metropolitan Police Service
- Head: eThekwini Transport Authority
- Head: eThekwini Emergency Services
- Head: eThekwini Department of Health
- Head: eThekwini Communication Department
- Head: Provincial Ambulance Services
- KZN Department of Transport: Road Safety Department
- Commissioner: SAPS
• KZN Department of Justice
• SANRAL (Community Development)
• Taxi Associations
• Relevant NGOs
• Participating Private Sector

By signing a pledge the Partnership Team formally agrees to the support of each section or sector. According to this high level agreement the signatories are committed to ensure that the persons working or functioning in their sectors are committed to effectively implement the eThekwini Road Safety Plan.

Although located on top of the diagram above, the role of the partnership group is not to have an active management role, but merely indicate the high level agreement that is required between the different role players in eThekwini.

4.2.2 The Road Safety Technical Committee / (Road Safety Coordinating Committee)

The Road Safety Technical Committee fulfils a management and co-ordination function for the eThekwini road safety activities. It can also be called the co-ordinating committee, as its more descriptive role is to initiate and co-ordinate all road safety related activities and programs within eThekwini.

The functions are mainly to:

• Ensure coordination across all stakeholders
• Provide guidance to working groups and teams.

The Technical Committee is made up of representatives from:

• eThekwini Transport Authority (Chair)
• Metro Police Services
• KZN Department of Transport (road safety and engineering)

4.2.3 The Data Management Team

The need to establish, manage, analyse and use reliable data is crucial for the effective reductions in the number of fatal and serious accidents. Reliable data is the basis of an evidence-based approach to road safety.

A Data Management Team will take responsibility for data collection and analysis. The Data Management Team is of paramount importance for making decisions regarding the strengthening of road safety data systems.

This team comprises of agencies and individuals who have been identified as collaborating partners and includes representatives from:

• eThekwini Transport Authority (Chair)
• SAPS
• DMPS
Working group members have technical and practical responsibility for implementing changes to road safety data collection systems.

The key tasks of the Data Management Team are to:

- Coordinate collaboration between organisations to arrive at shared definitions and processes for recording and sharing the data;
- Be responsible for capturing/receiving and storing fatal and serious injury accident data from multiple sources on a monthly basis. The sources for this data are the SAPS, Metro Police, hospitals, and mortuaries;
- Identify local risk factors and classify as major, main and key risk factors;
- Provide related tables, graphs, maps and reports in order to plan relevant programmes and projects;

4.2.4 The Traffic law Enforcement Working Group

The role of the Traffic law Enforcement Working Group is to provide coordination, direction and management of road safety-based traffic law enforcement within the Municipality. The Working Group is made up of representatives from:

- Durban Metropolitan Police Services (DMPS) (Chair)
- KZN Road Traffic Inspectorate
- SAPS
- eThekwini Transport Authority

The DMPS Regional Commanders are expected to form Regional Joint Operational Committees involving, but not limited to:

- Durban Metropolitan Police Services
- SAPS
- KZN Road Traffic Inspectorate

The Working Group ensures that the DMPS regions operate according to detailed plans with specific and measurable outcomes. The national Traffic Law Enforcement Roll-out Plan will serve as the directive for the road safety based law enforcement activities.

4.2.5 The Road Safety Education and Awareness Working Group

The Road Safety Education and Awareness Working Group is made up of representatives from:

- eThekwini Transport Authority (Chair)
- Durban Metropolitan Police Services
- eThekwini Communications Department
• KZN Department of Transport (Road Safety)
• SANRAL (Community Development/ Road Safety)
• NGOs
• Private sector

The Road safety Education and Awareness Working Group will:

• Facilitate communication between all the role players;
• Operate according to detailed operational plans for education and awareness creation,
• Support other functions such as law enforcement and engineering.

With reference to the specific programs provided later in this report, it became clear that eThekwini needs to appoint a dedicated person or service provider that will manage the marketing and awareness campaign of the road safety plan.

4.2.6 The Road Safety Engineering Working Group
The role of the Road Safety Engineering Working Group is to raise the inherent safety and protective quality of road networks for the benefit of all road users, especially the most vulnerable (e.g. pedestrians, bicyclists and motorcyclists).

The Working Group is made up of representatives from:

• eThekwini Transport Authority (Chair)
• KZN Department of Transport
• SANRAL

This Working Group will:

• Assess the prioritised hazardous locations as identified by the Data management Team;
• Promote the safe system approach and the role of self-explaining and forgiving road infrastructure;
• Plan land use to respond to the safe mobility needs of all, including travel demand management, access needs, market requirements and geographic and demographic conditions;
• Include safety impact assessments as part of all planning and development decisions;
• Put effective access and development control procedures in place to prevent unsafe developments;
• Identify projects to be funded in each financial year.

4.2.7 The Post-Accident Response Working Group
The role of the Post-Accident Response Working Group is to increase responsiveness to post-accident emergencies and to encourage the improvement of the ability of health and other systems to provide appropriate emergency treatment and longer term rehabilitation for accident victims.
The Working Group will be made up of representatives from:

- The Durban Metro Police Services (Chair)
- The SAPS
- The Provincial Ambulance Services
- Private Ambulance Services
- The eThekwini Fire Brigade
- SANRAL (Incident Management)
- The tow-truck operators
- eThekwini Transport Authority

There is at present a good operational Incident Management team in the eThekwini area and it was decided in the working sessions that this working group will not be a priority for the next 5 years. Co-ordination with the emergency response teams and incident management teams will however be established on an on-going basis.

5  CURRENT STATUS OF ROAD SAFETY MANAGEMENT

5.1 Road Safety Management

Currently the eThekwini Road Safety Plan is managed by the eThekwini Transport Authority (ETA). This dedicated management of road safety has been beneficial to the achievement of various objectives and eThekwini is one of the few cities in South Africa with such a dedicated function. This has especially had a positive effect on the administration of accident information from within the city, both in terms of quality control of the data and the generation of reports to assist the strategic activities of engineering and enforcement.

The management of road safety cuts across many different functional areas and one of the problematic areas has been that of the coordination of essential areas outside the line function of the ETA. This includes mainly the areas of traffic enforcement and trauma response.

The level, from which the road safety plan is managed, is not high enough in the eThekwini City hierarchy to ensure the commitment of crucial functional areas.

City activities are managed strategically through the Integrated Develop Plan (IDP) and operationally through the Service Delivery and Budget Implementation Plan (SDBIP). It was noted that road safety does not feature at strategic level within the IDP.

Within the SDBIP, road safety activities fall mainly within Plan 4: SAFETY AND SECURITY. Although there are sufficient road safety KPIs (within Programme 5: Safe While Traveling: Road and Pedestrian Safety), these KPIs are not integrated with other areas such as spatial planning. The role of traffic enforcement to achieve the objectives in Programme 5 is absent, and the road safety role of traffic enforcement is reduced to one item under Programme 2: Enforce public improvement safety plan with key focus on non-roadworthy taxi’s and vehicles.

The city has other initiatives, such as Safer Cities, with which some alignment is possible to improve access to resources.
5.2 Information Systems

eThekwini manages accident data on a routine basis and implements special projects to collect traffic volumes and other travel data. Traffic citations are also collected. The accident data system can be represented on GIS, although the basic collection of data (through SAPS) is not based on coordinates, but makes use of a location coding system.

5.2.1 Accident data

As with the rest of the country, accident data are collected by the South African Police Services. Forms are sent to, or collected by eThekwini for capturing. eThekwini has a dedicated group of 12 capturers who do quality control of the data and follow-up some aspects with SAPS and with mortuaries. ETA visits police stations, but not all are cooperative. Police officers do not remain in the same posts and stations and training needs to be done routinely.

The following problems are encountered routinely:

- Incompleteness of data (not all fields are completed, especially the location)
- Severity of the accident not followed-up by SAPS and reported to eThekwini (the national directive is 30 days) however ETA does follow this up from the mortuary data.
- Many of the accident report forms are kept in dockets at the SAPS and not forwarded to the ETA.
- Under-reporting occurs mainly with damage only accidents, where members of the public are not insured and negotiate cost among themselves.

In comparison with most other cities in South Africa, eThekwini's dedicated accident information unit is commendable. There are some avenues which can still be followed to ensure greater accuracy and completeness of the data set. This includes comparison with other databases such as the MRC Mortuary data and other trauma information.

One of the strongest aspects of the eThekwini management of accident data is the reporting capability, which is flexible and done through in-house capability. It is possible to respond strategically to information needs from various internal and external role players to generate routine and ad hoc reports. Reports are being used to make decisions in regard to traffic calming, placing of traffic cameras and Metro Police targeted enforcement.

5.2.2 Other information

eThekwini collects traffic volume information and traffic citations routinely and can generate strategic reports using location information. It is possible to identify individual drivers / vehicles linked to high citation numbers.

There are still problems in the citations data base to link these to exact locations. eThekwini has also collected special travel information.
5.3 Safer Road Users

5.3.1 Intensive schools campaign

The Municipality's Road Safety Branch has identified 27 schools\(^2\) in the vicinity of high child pedestrian accident locations for special road safety focus since 2008. These are mostly in the road safety management areas selected through the current road safety plan, but not all schools fall within those areas.

Activities included drama and printed media. eThekwini road safety redesigned the Child in Traffic\(^3\) programme to improve the knowledge of Grade 1 learners.

Stakeholders include provincial road safety, ETA and the Metro Police and the intention is that each school is visited by one of the stakeholders at least once every 6 months. Three service contractors assist with the drama events, but are accompanied by ETA or the Metro Police.

The Intensive Schools Campaign also has an engineering component and the infrastructure around schools have been improved where necessary, including road works to improve safety, lay byes, road markings and road signs. Principals communicate directly with ETA if any infrastructure problems are experienced.

Some challenges identified were:

- Very little is being done for high schools in the city.
- The intensive campaign project was started as a pilot, but needs to be broadened to include more schools.
- More ETA staff is required to cover more schools.
- The majority of the learners at most of these schools are transported by public transport vehicles which presents its own challenges

5.3.2 Area-wide School Campaign

Analysis reveals that 21 percent of the pedestrians involved in accidents were children thereby making them a high-risk category. To reduce the high occurrences of pedestrian accidents and to increase road safety awareness, the ETA has implemented the Area Wide Road Safety School Awareness campaign at various primary schools within the eThekwini Municipal Area. The programme commenced in 2005 and is on-going. The School's Road Safety Campaign aims to educate school children in order to reduce the number of pedestrian accidents occurring in residential areas. This is done via a road safety drama presentation. The Road Safety Drama presentation teaches the correct procedure to follow when crossing the road and when travelling in or alighting from and boarding buses and taxis. This programme is presented in a fun filled manner that is both stimulating and interactive for the learners. Approximately 720 000 learners have been exposed to the road safety drama presentation thus far with a majority of the schools having been completed. Road Safety assessments have been completed at approximately 150 schools thus far. The average number of learners reached in the last 3 years is approximately 145 000 learners per year.

\(^2\) There are 600 primary schools in the city

\(^3\) This programme has been discontinued by the Province
### TABLE 4: LEARNERS EDUCATED

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NUMBER OF LEARNERS EDUCATED</th>
<th>NUMBER OF SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>10000</td>
<td>12</td>
</tr>
<tr>
<td>2006</td>
<td>48907</td>
<td>74</td>
</tr>
<tr>
<td>2007</td>
<td>209152</td>
<td>346</td>
</tr>
<tr>
<td>2008</td>
<td>14577</td>
<td>25</td>
</tr>
<tr>
<td>2009</td>
<td>157863</td>
<td>276</td>
</tr>
<tr>
<td>2010</td>
<td>118915</td>
<td>191</td>
</tr>
<tr>
<td>2011</td>
<td>159230</td>
<td>291</td>
</tr>
<tr>
<td></td>
<td><strong>718644</strong></td>
<td><strong>1215</strong></td>
</tr>
</tbody>
</table>

#### 5.3.3 Adult pedestrian campaign
During 2008 a project focusing on the worst pedestrian areas was implemented.

This proved to be very difficult due to the complex environment and people rushing during peak time, not paying attention to crossing guidance.

Since 2008 pedestrian awareness campaigns have been held at public transport ranks and community fairs on an on-going basis.

#### 5.3.4 Metro Police Functions
The Metro Police functions vary and not all functions relate directly to accident prevention. Three specialised traffic enforcement units have been created: Alcohol, Speed, and Public Transport. The Metro Police is divided into 5 regions.

Strategically eThekwini traffic enforcement activities are linked to the National Rolling Enforcement plan and the Metro Police work in partnership with the Road Traffic Inspectorate of the province. The Road Safety Branch also generates reports to assist with the planning of enforcement activities on identified locations. Information in regard to citations is available per location, although this system still needs more development. Five target locations in each of the regions have been identified for targeted traffic enforcement which is monitored on a continuous basis each month.

An alcohol centre has been established, with only one “booze bus” still in operation. Alcohol enforcement is not pursued actively, since there are bottlenecks in the court system.

Some of the road safety issues identified by the Metro Police are:

- Heavy vehicles travelling through the city
- Animals on freeways and on busy suburb roads with few suitable solutions
- Development of informal housing along the freeways, generating more pedestrian traffic along freeways
- Vandalism and theft of road signs
- Infrastructure provision for non-motorised transport

---

4 From Metro Police Strategy Document 2010
• Speeding is seen as one of the biggest causes of accidents. Following-too-closely escalates the problem.
• It is very difficult to find suitable solutions for enforcement of pedestrian behaviour
• Walking space at some intersections is under capacity and the volume of pedestrians is too high to control
• The court system is overburdened and cases are taken off the roll without good reason. There is no systematic feedback in regard to the success rate of citations
• Corruption is not addressed systematically

Traditionally traffic officials are seen to have an accident prevention role, including public relations activities such as presentations to public. This role also includes involvement in school education, overseeing the function of scholar patrols, adult crossing guards and point duty at schools. The Metro Police are involved in all these functions, but their mandate is not clearly defined.

5.3.5 Crossing assistance for learners
Adult crossing guards (or "lollipops") have been trained to assist children crossing busy roads. This project has been initiated by the province and the crossing guards are mostly linked to the Road Safety Councils. They are usually paid by the Province, but some schools also pay them.

There are some issues in regard to the adult crossing guards, e.g. whose responsibility it should be to manage this function. The general consensus is that a uniformed traffic officer has the best skills to manage and oversee the operational issues and safety around these guards.

The province manages 40 scholar patrol units

The Metro Police do point duty at some identified points too complex or busy to be controlled by scholar patrols or crossing guards.

5.3.6 Communication programmes
Some public communication programmes through radio has been done. This has not been pursued actively.

5.3.7 Public Transport
Safety aspects are addressed at Bus and Taxi Liaison Forums hosted by the ETA. The taxi industry does take part in the current national road safety programme

5.3.8 Liaison
In terms of Education and Communication projects eThekwini is involved with provincial road safety.

There is a Road Safety Education Working Group which comprises ETA, Provincial Road Safety, Metro Police and SAPS. This working group meets on a quarterly basis.
The intention is to start working closer with NGOs in the city, such as SADD, and cycling groups.

The Enforcement Working Group comprises RTI, Metro Police, SAPS Provincial office, SAPS Collision Unit and ETA.

5.4 Safer Roads
Historically, road safety interventions have focused on changing behaviour through traffic enforcement, education and communication. The international trend now indicates that the role of engineering to change behaviour has been underestimated.

This includes innovative speed reduction techniques, separation of non-motorised from motorised traffic, area-wide design and the provision of an effective, affordable and safe public transport system.

5.4.1 Integration of road safety within the Integrated Development Plan (IDP) and other planning instruments
The IDP gives strategic directives in regard to infrastructure development and transport planning. The road safety aspects of these planning initiatives is not currently acknowledged or defined clearly.

5.4.2 Elimination of hazardous locations
Hazardous locations are identified according to marked increases in the accident rate or where fatal accidents have occurred. These hazardous sections have been addressed systematically, but many problems remain and some hazardous areas persist on the top 10 list, even after various remedial actions.

In some cases, traffic enforcement activities do not adequately follow-up on engineering interventions, to ensure safe speeds, control moving violations and enforce correct usage of infrastructure and control systems.

The current prioritisation system does not adequately address the needs for infrastructure interventions at hazardous locations.

5.4.3 Road Safety Assessments
Road Safety Assessments are being conducted by the Road Safety Branch, based on identified high accident locations. Most of the assessments have been done around schools.

5.4.4 Provision of safe infrastructure around schools
Improvement of the road infrastructure is integrated with the School’s Campaign and road infrastructure at these schools is being addressed within the project. So far infrastructure interventions have been implemented at most of the schools. Interventions include signing and traffic calming.
5.4.5 Road classification system
The current road classification system is not accurate and is being updated by the ETA. This links to the systematic implementation of solutions for different road classes.

5.4.6 Evaluation of interventions
Many interventions have been implemented. Accident statistics are available, but there are no proper before-and after studies conducted, including the collection of other types of data, e.g. speeds, traffic volumes and specific behaviour, to enable proper evaluation of interventions. Such studies will create a body of knowledge of what has worked and what has been less effective. There is lack of a basic feedback, e.g. the date interventions are being implemented, duration of construction time and completion of the intervention. Such a feedback system is being implemented.

5.4.7 Integration of engineering measures with law enforcement, communication and education
Although the engineering and road safety sections work closely together in terms of the identification of hazardous locations, specific interventions are not communicated systematically to the public. The data provides direction in terms of problem locations to both engineering and enforcement activities, but the interventions are not always integrated. The Intensive Schools Project seems to successfully integrate the efforts from engineering, education and enforcement.

5.4.8 Liaison
A Road Safety Engineering Working Group consisting of the ETA’s different engineering sections, the KZN Department of Transport, the Call Centre and SANRAL meets on a quarterly basis. Discussion revolves around provision of safe infrastructure and public requests.

There used to be a Technical Liaison Meeting, which included the ETA, RTMC, Head of the RTI and the Metro Police, but this meeting has not taken place for a while.

5.4.9 Safer Vehicles
Vehicle designs are being improved on an on-going basis in terms of accident avoiding equipment such as braking and steering as well as in terms of the roadworthiness of the vehicle designs. These improvements have increased the level of protection for occupants when vehicles are involved in accidents.

Vehicle standards are controlled at national level but the city ensures that vehicles are roadworthy. This is done through inspection of vehicles for roadworthiness at testing stations (provincial and local) and routine road worthy checks at the roadside.

The roadworthiness of public vehicles is captured as a KPI within the Metro Police programmes in the SDBIP and there is a special unit for traffic enforcement in regard to public transport vehicles.
The city does not have its own weighbridge or portable weighbridge but makes use of the provincial one, which is quite far off. One of the biggest concerns in the city is the fact that heavy vehicle volumes are on the increase on routes through the city. A special road to take these vehicles through the city is being planned, but in the meantime these vehicles, especially if overloaded, cause damage to the road and constitute a danger on the road.

The city also does not have equipment to test the brakes.

There is no focus on inspecting the standards and correct usage of vehicle occupant protection systems, such as airbags and seatbelts.

Vehicles are not always used as intended, e.g. passengers are transported on LDVs and heavy vehicles without the proper protection.

5.5 Evaluation and Research

eThekwini Road Safety Branch has conducted some research projects and plan more research projects during 2012.

Some of the studies envisaged include: Comparative study on coloured and non-coloured surface in the CBD. The intention is to study the behaviour of motorists. Other subject areas include:

- How technology can be used to decrease the accident rate
- Seat-belt usage
- Children’s crossing behaviour outside schools
- Heavy vehicle safety

The availability of accident data and other linked data provides a rich resource for further analysis of accident trends.

There is limited evaluation of the success of interventions at hazardous locations, which would have to include pre- and post-studies of the specific intervention.

The city does have the necessary programming and analysis capabilities as well as access to databases. There is limited capability to:

- Systematically monitor and evaluate the implementation of the road safety plan
- Evaluate the success of specific interventions, or intervention types
6 ROAD SAFETY MANAGEMENT TOOLS

6.1 General
Safety projects should preferably be identified and prioritised with the aid of accident data where such data are available. The use of accident data for such purposes requires specialised and sophisticated statistical techniques to ensure that priority is given to the most hazardous locations. A short overview of these techniques is provided later in this chapter.

However, when adequate accident data are not available to make it possible to identify hazardous locations on a purely scientific basis, an alternative approach is required for the identification of such locations. Whatever data are available must be used, supported by a high degree of judgement in selecting the locations that require the most urgent attention. Community input is an important source of information that can make a significant contribution to the identification of hazardous locations as well as road safety projects.

6.2 Community input
Community members have first-hand experience of the road safety situation in their community. It makes sense to draw on the practical experience of ward councillors, ward committees and schools to supplement the knowledge and experience of professionals such as traffic engineers and traffic police to identify hazardous locations or potentially dangerous areas.

Various participative techniques can be used by facilitators to extract accurate and useful information. Some examples are mapping and modelling, in which participants map out road safety problems in their area. Active participation and involvement of councillors and their ward committees in such processes can contribute to the understanding, acceptance and correct use of the safety measures implemented by the municipality.

6.3 Identification of hazardous locations using accident data
Where accident data are available, the identification of hazardous locations should be based on the average or expected number of accidents at a particular location rather than the accident count obtained over a certain period (e.g. a year). Expected accidents are an estimate of the long-range average number of accidents for a particular type of roadway or intersection.

Network screening using accident data

Where accident data are available, network screening techniques are used to identify and rank sites that are likely to benefit most from safety improvements on the basis of accident data and at which further investigation is required to determine whether such improvements would be cost effective.

A range of screening methods are available, including the following:

a) Accident frequency (count) method, according to which sites are ranked based on the number of accidents. As an alternative to accidents, the Accident Equivalent Number can be
used according to which a greater weight is given to fatal and severe accidents compared to damage-only accidents.

b) Accident rate method, in which the accident frequency is normalised with traffic volumes. Sites are ranked from the highest to the lowest accident rate.

c) Critical rate method in which the accident rate is compared to a critical rate for a particular type of site. The critical rate is the average accident rate for sites with similar characteristics.

6.4 Economic Appraisal, warrants and Prioritisation

6.4.1 Introduction
The economic appraisal of safety improvements is undertaken to determine whether the proposed improvements are justified and to prioritise expenditure. The basic principle is to ensure that the benefits of a project exceed the cost and to ensure that the greatest possible benefits are achieved in relation to the cost of the safety improvements.

Economic appraisal is undertaken after a safety issue has been identified and safety improvements proposed. The appraisal requires the assessment of the monetary value of the reduction in accidents and the cost of implementing the improvement. Safety benefits require a quantification of the reduction in the number and/or severity of accidents that will result from implementing the improvement. These benefits are expressed in monetary terms and compared with the cost of the proposed improvement.

Safety improvements can result in other benefits such as improved travelling time or reduced fuel consumption. Such benefits should also be included in the benefit-cost evaluation.

A detailed economic appraisal is however not the only way to determine if safety measures are warranted. More often accident data is not available, and a more qualitative assessment needs to be carried out. Both methods are briefly described in this chapter.

6.4.2 Safety risk and extent of safety treatments
The potential positive impact of safety treatments should be weighed against the disbenefits. This is often difficult to explain to communities, as they often have a subjective view of what is required. Residents in a street will insist on speed humps every 30 metres, whereas the drivers of vehicles travelling through the area will not support any speed humps. A balance has to be found between the two viewpoints.

This is illustrated in the figure below, which can help to show residents (or ward councillors), that road safety devices such as speed humps or traffic signals, also have a negative impact, be it on implementation cost, additional delay or road user cost, and, that the safety benefit of a device need to be weighed against the costs and negative impacts.

The figure below can be used qualitatively to explain the concept of benefit /cost or to assist in facilitating discussions where the extent of, for example, speed calming measures, are discussed with the community. The figure indicates that every road has a risk of an accident happening, and that no safety measures can guarantee an accident free environment. It also
illustrates that implementing measures, result in higher capital and maintenance cost, increased fuel consumption and driver discomfort. A level of acceptable safety has to be reached given a certain set of safety treatments.

**GRAPH 31: COMPARISON BETWEEN BENEFIT AND COST**

### 6.4.3 Qualitative assessment of proposed safety treatments

**a. Minimum standards criteria**

If an assessment of an area is carried out, all the road elements that do not comply with minimum standards should be identified separately. This will include certain policies of ETA that are applied on all their roads. The following are examples:

- Sidewalks next to all class 4 roads.
- All pedestrian crossings adjacent to schools should be raised
- Pedestrian ramps at all intersections
- Pedestrian signal heads at traffic signals with certain volumes of pedestrians
- Etc.

These minimum standards or policy elements need not be debated with a community, they are implemented as they form part of the minimum standards or as prescribed in the policy of the road authority.
b. **Benefits / Disbenefits**

To do a qualitative assessment, the potential benefits should be weighed against the potential negative impacts of road safety measures.

**Typical benefits:**
- Speed reduction
- Volume reduction
- Separation of vehicles from each other or separation of pedestrians from vehicles
- Decrease in number of accidents

**Typical disbenefits:**
- Capital cost
- Maintenance cost (measures such as speed humps and mini circles have high maintenance due to the extent of road marks and road signs)
- User costs – increased fuel, travel time
- Increased noise and air pollution

### 6.4.4 Economic appraisal

In order to evaluate and compare different alternatives or different projects in economic terms, it is necessary to measure benefits and costs, using a common time basis since money has a time value. This time value means that future benefits and costs become increasingly smaller as the evaluation process incorporates values that lie further and further in the future.

The time value is taken into account by calculating the present worth of a benefit or cost with the aid of the following formula:

\[
P(W) (1+i)^n = FV
\]

In which:
- \(PW\) = Present worth
- \(FV\) = Future value
- \(i\) = Annual discount rate as a factor (percentage divided by 100)
- \(n\) = Discount period in years

The net present value (NPV) and cost/benefit ratios of a particular project are defined as follows:

\[
NPV = \sum PWb - \sum PWc
\]

\[
B/C = \frac{\sum PWb}{\sum PWc}
\]
A project is economically feasible if the net present value is positive or the benefit/cost ratio is greater than one (1).

Economic feasibility in itself does not, however, indicate the optimum time for implementing a project. To determine the best time to implement a project, a range of times should be analysed. When benefits are expected to grow in future (or at least remain the same), then the first-year rate of return (FYRR) criterion must be used to determine whether the project should be implemented immediately or whether it should be delayed by another year, even if it is economically feasible. This criterion is met when:

\[ \sum PW_{bf} > I \times \sum PW_{c} \]

In which:
- \( PW_{bf} \) = Present worth of benefits \( b \) in the first year
- \( PW_{c} \) = Present worth of cost \( c \) assuming that all costs are incurred in the first year
- \( i \) = Annual discount rate as a factor (percentage divided by 100)

In situations where the flow of benefits will at least remain constant or increase over time and where these benefits will be accrued over a very long period of time, the first-year rate of return is a sufficient test to determine whether a project is feasible and whether it should be implemented. In all other cases, it is necessary to test for both the net present value (alternatively the B/C ratio) and the first-year rate of return.

### 6.5 Project selection

The economic appraisal method can firstly be used to select the most cost-effective safety improvement measure at a particular site and then to prioritise or rank safety improvements at different sites on the basis of monetary considerations. Where safety improvement measures at a particular site are not mutually exclusive, meaning that all these measures could be implemented, then these should be treated as different projects and prioritised or ranked accordingly.

In situations where safety measures are mutually exclusive, then the most cost-effective of these safety measures should be selected. The appropriate method of selecting such measures is the net present value (NPV) method. The improvement measure with the highest net present value is considered to be the one which is most cost-effective.
6.6 Project prioritisation

Proposed safety improvement projects may be prioritised or ranked using economic appraisal principles to determine the most cost-effective projects, which should be implemented first. Generally, it is unlikely that available funds will make it possible to implement all safety improvements immediately and it is necessary to select those that have the greatest benefit.

The prioritisation or ranking of safety projects requires the selection of the optimum mix of projects that represents the most cost-effective approach to safety improvement. This typically requires the use of very complex systematic ranking methods based on linear or dynamic programming techniques. These methods can only be applied on a large scale by means of computer software. One reason for the complexity involved is that the benefits and costs of a project may change when it is not implemented immediately and this effect should be taken into account when selecting projects.

A relatively simple approach is to base the prioritisation on the following net first-year value (NFV) for a project:

In which:

$$\text{NFV} = \text{Net first-year value}$$

$$\text{PWbf} = \text{Present worth of benefits b in the first year}$$

$$\text{PWc} = \text{Present worth of cost c assuming that all costs are incurred in the first year}$$

$$i = \text{Annual discount rate as a factor (percentage divided by 100)}$$

6.7 Accident reduction

The estimation of accident reduction as a result of a safety improvement requires an estimate of the following information:

- Existing number of accidents, including the severity distribution of accidents.
- Accident reduction factors that depend on the type of safety improvement.

The existing number of accidents should preferably be based on actual existing accident data, adjusted according to the Empirical Bayes (EB) method to account for random fluctuations. This adjustment is undertaken with the aid of safety performance functions and dispersion parameters. Such functions and dispersion parameters require a detailed accident information system, however, and this is currently not readily available in South Africa. The new version of the American Highway Safety Manual has extensive accident reduction functions that can be used.

The reduction in accidents can be estimated by means of accident reduction factors that are available for different treatment types. The factors can be used to estimate the accident rate after the implementation of the improvement by multiplying the existing number of accidents by the factors. Where multiple improvements are introduced, and these improvements do not reinforce or negate each other, the factors are multiplied together.

The lack of information on accidents is one of the biggest stumbling blocks in the application of the economic analysis method. The method can be applied where such information is
available, but in many cases an estimate must be made of the required information. In many situations, a considerable degree of judgement must be exercised to establish the required parameters.

### 6.8 Economic analysis parameters

Some parameters for the economic analysis of safety improvement projects are given in Appendix B. The following parameters are provided:

- **Discount rate for economic analysis**
- **Monetary value of accidents**
- **Typical accident type and severity level distributions for roads in urban areas**
- **Accident reduction factors**

Where required, formulae are given in the Appendix for estimating the parameters or data required for the economic appraisal.

### 6.9 Non-monetary benefits

Road safety improvements often result in benefits that cannot be expressed in equivalent monetary values, but that are nevertheless real. Examples of such non-monetary benefits include the following:

- General perception of road safety. There is an important need for communities to live in an environment which is perceived to be safe. The general perception of road safety is therefore an important consideration, even if there may not be a corresponding actual improvement in accident numbers.
- Developmental considerations. Certain road and safety improvements could result in improved opportunities for development and this could be an important spin-off from a safety intervention.

### 6.10 Proposed simplified methodology to prioritise road safety actions

The sections contained in chapter 6 above, provide an outline of the criteria normally used to prioritise road safety interventions, be it construction of an engineering solution, an extensive law enforcement campaign or an education programme for a specific area. The extent of data required and the man hours needed to calculate equivalent accident numbers or the cost of doing extensive traffic counts, more often than not prohibits the use of these detailed methods.

A simplistic method, based on the same rational, is proposed for eThekweni where the data collection required for the prioritisation is reduced to the following:

- A desk top study collating all available information. This will include traffic volumes, accident data, road classification, complaints from the public, previous studies at the location, etc. Where data is not readily available, sound engineering judgement should be used – for example traffic volumes can be approximated if the class of the
road is known or say an intersection can be compared to a similar one where data is available.

- A site visit to visually assess the problem during peak traffic periods, or at the time when the safety problem occurs – this may be at night or when a school comes out at midday.

- Obtaining input from the community – be it through a discussion with the ward councillor, the local school or in more complex areas, having a more detailed community involvement.

The proposed ranking is calculated based on the following formula:

\[
\text{Ranking score} = \frac{(A + B)}{C}
\]

A = Community rating
B = Relative Accident rate
C = Cost of upgrade

The different parameters are determined as follows:

1. Relative community rating or outcry. The extent of a community "outcry" can assist in prioritising safety problem areas. Although sometimes emotional and not objective, it is a valid input that can assist in addressing community needs. The extent of the outcry is rated on a scale of 1 to 10 – if there is no comment from the public, it is rated 1, and if there are several people complaining about a specific problem it will be rated 10.

2. An accident rate for a specific location or road section is calculated by taking the number of accidents and normalising it with the traffic volumes, typically an accident rate of number of accidents per million vehicle kilometres is calculated. If detail data is not available, including accidents or the traffic volume, it is not possible to calculate such an accident rate, which is a useful tool in prioritising locations where safety upgrades are required.

What is proposed is a simplified method whereby the real accident number is replaced and approximated with a relative accident rate. The graph below is used for this purpose. The estimated volume is plotted on the X axis, and some scale will be developed, say less than 500 veh / day is low, and more than 15 000 vehicles per day is high.

The estimated number of accidents at the location is plotted on the Y axis. A scale for this can be developed with less than 2 accidents per year low, and more than 8 accidents at the location regarded as high.

By plotting these numbers, the corresponding relative accident rate can be read from the graph. High accidents with low volumes will be regarded as a high accident rate, and high traffic volumes with a low number of accidents regarded as a low accident rate.
3. The cost of the proposed upgrade or solution required to address the safety issue is estimated and also translated to a relative number. The rating should however be reversed, with a high cost scoring a low rating and a low cost scoring high. Typically solutions of less than R20 000 will score 1 and a solution of more than R1 million will score 10.

The ranking score is then calculated and different locations or projects can be relative quickly compared with each other. The following table illustrates 3 very simple examples of how the ranking can be done, with the location with the highest score, providing the largest benefit and thus scoring the most.
The proposed method need to be tested with real data, and will provide at most a screening tool whereby several hazardous locations can be compared relative quickly with each other, to maybe warrant further investigation or to prioritise a law enforcement programme.

7 DEVELOPMENT OF A ROAD SAFETY IMPLEMENTATION PLAN

7.1 General approach, KPIs and summary of the implementation plan
The proposed implementation plan for road safety programs for the next 5 years was determined by the following:

- Ensuring the high level objectives and structure of road safety management in eThekwini is in line with the United Nations Decade of action goals. Although not envisaged now, the possibility still exists for some global co-operation, which will be easier if eThekwini is aligned with the global approach.

- A management structure for eThekwini through which road safety could be effectively implemented and where performance monitoring can take place. This was described in detail in section 4.

- The different programs are based on the identified problems and focus areas, based on accident statistics as far as available. Refer to Section 3.3 where a summary of the accident statistics and the geographical analysis of the location of accidents are provided.

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Examples</th>
<th>Examples</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Description of problem</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>An intersection close to a school where there are many parents complaining. There are however very few accidents and the traffic volumes are 3000 veh per day. The proposed solution is a raised pedestrian crossing, costing R30 000.</td>
<td>An intersection has high right turn volumes (more than 5000 vpd) and require a right turn lane, which will cost R3 million to construct. There is one accident per month, mostly rear end collisions. Few people have however complained about it.</td>
<td>A median island, costing R500 000 is required to stop vehicles doing illegal u-turns on an arterial road. Approximately 3 accidents occur per year. Some members of the public have complained.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Relative community rating</td>
<td>10</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Accident rating</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Cost of proposed road safety improvement</td>
<td>2</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Ranking score</td>
<td>7</td>
<td>0.67</td>
<td>1.60</td>
</tr>
</tbody>
</table>

TABLE 5: EXAMPLE CALCULATIONS – PROJECT RANKING
Realistic target values whereby accidents and fatalities can be reduced per program were selected as Key Performance Indicators of the programs. The actual reduction in fatalities and the proposed percentage reduction are shown in Table 6. The target areas should result in a reduction in fatalities of 17% over 5 years, or 3.4% per annum. This excludes the possible impact of the overall awareness campaign on the reduction of other fatalities. The calculation does not make provision for the growth in traffic volumes and vehicle ownership, just absolute numbers are used.

**TABLE 6: POTENTIAL REDUCTION IN FATALITIES AND KPI VALUES**

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage of fatalities</th>
<th>Current no. of fatalities</th>
<th>Proposed % reduction over 5 years (KPI)</th>
<th>Reduction in fatalities after 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current annual fatalities (based on 2010 results)</td>
<td></td>
<td>578</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian fatalities</td>
<td>60.0%</td>
<td>347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian fatalities in the CBD</td>
<td>23.0%</td>
<td>80</td>
<td>20%</td>
<td>16</td>
</tr>
<tr>
<td>Pedestrian Fatalities on freeways</td>
<td>18.0%</td>
<td>62</td>
<td>15%</td>
<td>9</td>
</tr>
<tr>
<td>Minibus taxi fatalities</td>
<td>18.0%</td>
<td>104</td>
<td>5%</td>
<td>5</td>
</tr>
<tr>
<td>Single vehicle, vehicle against fixed object and head on collisions</td>
<td>22.0%</td>
<td>127</td>
<td>30%</td>
<td>38</td>
</tr>
<tr>
<td>Total potential reduction in 5 years</td>
<td></td>
<td></td>
<td></td>
<td>68</td>
</tr>
<tr>
<td>Total % potential reduction after 5 years</td>
<td></td>
<td></td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>Annual potential reduction in fatalities</td>
<td></td>
<td></td>
<td></td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Table 7 below provide a summary of the specific projects and programs selected for implementation over the next 5 years. The key features of the selected programs and projects are as follows:

- A high emphasis is placed on an intensive awareness and education campaign. It is recommended that a dedicated person or service provider be appointed for this role. A marketing strategy with extensive reach, access to global innovation and understanding the market of eThekwini would be ideal. An opinion survey on road safety awareness is proposed, where the awareness of road safety should be measured. For each of the other specific programs, this branding and awareness should be carefully designed to have a similar branding throughout.

- The use of technology is introduced in road safety programs. Social media should be used in marketing campaigns to address that portion of the community that use it often. The image that should be projected of road safety, through the use of technology, is modern, exciting and something one has to be part of.

- Law enforcement will be enhanced by the use of additional electronic enforcement technology.

- Engineering measures are proposed in 5 projects where the implementation of physical infrastructure is proposed. These include the CBD, arterial routes, the M7 freight route, freeways and national routes (in consultation with SANRAL), safety around schools, and improving the safety of residential roads.
## TABLE 7: SUMMARY OF PROJECTS AND PROGRAMS WITH KPIS

<table>
<thead>
<tr>
<th>No.</th>
<th>Project or Programme</th>
<th>Description</th>
<th>Timeframe</th>
<th>Potential impact and Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Partnerships and work groups</td>
<td>Establish the work groups and partnerships</td>
<td>Within 6 months</td>
<td>High in terms of future cooperation and integration</td>
</tr>
<tr>
<td>2</td>
<td>Dedicated road safety awareness, branding and marketing campaign</td>
<td>Drive marketing campaigns and research appropriate technological interventions to raise public awareness.</td>
<td>Year 2</td>
<td>Indirect measurement through opinion surveys</td>
</tr>
<tr>
<td>3</td>
<td>CBD Area Pedestrian safety</td>
<td>23% of pedestrian fatalities occur in the CBD. Address through engineering measures, technology, awareness, and partnerships.</td>
<td>Design and Planning year 1, Implementation in years 2, 3, 4</td>
<td>Reduction in pedestrian fatalities in the CBD area by 20%, after 5 years.</td>
</tr>
<tr>
<td>4</td>
<td>Minibus taxi accidents - proactive feedback to associations and the taxi industry</td>
<td>Enhance Public Transport Driver Development training</td>
<td>Planning year 1, Implementation in years 2, 3, 4</td>
<td>Reduce the involvement of minibus taxis in fatal accidents by 5% over 5 years.</td>
</tr>
<tr>
<td>5</td>
<td>Arterial and distributor routes and speed management</td>
<td>Address the major arterials and distributors with highest accidents and do scoping study to determine engineering interventions. 60% of all accidents occur on distributor roads. Combined engineering solutions with programme of speed cameras to address speeding along arterial routes and major distributor routes.</td>
<td>Identify routes- first year, procure cameras second 6 months, operate cameras years 2 to 5+. Engineering interventions, design year 1 with implementation in years 1, 1.5 to 4</td>
<td>Reduce single vehicle involvement in accidents, including head on accidents and fixed object accidents by 30% over 5 years.</td>
</tr>
<tr>
<td>6</td>
<td>Safety improvements on Freight Routes</td>
<td>The M7 as a freight route should be investigated in detail to determine engineering, law enforcement and awareness issues. These can include dummy or real speed cameras and engineering interventions.</td>
<td>Detailed investigation of possible measures required-year 1 &amp; 2. Implementation of measures in years 3, 4 &amp; 5.</td>
<td>Data available at present, not specific enough, should set target of 5% to 10% reduction.</td>
</tr>
<tr>
<td>7</td>
<td>Safety around schools</td>
<td>The current awareness campaigns around schools should continue, but emphasis should be placed on developing a holistic approach through what the Province, SAPS, Metro Police, Road Safety Branch and other institutions are doing. A geographical coordination of the actions should also be coordinated using Council GIS.</td>
<td>Revise awareness programme at schools-year 1 in collaboration with others, then implement from year 2 to reach target value in year 5.</td>
<td>Improve the penetration of awareness programmes to increase the number of children receiving some form of road safety awareness message, using multi-media, social media etc. Increase learners reached from 145,000 per year to 180,000 per year. (25% increase over the 5 years). Ensure the target can be sustained thereafter.</td>
</tr>
<tr>
<td>8</td>
<td>Safety on Residential Routes</td>
<td>20% of all accidents occur on local and collector routes in residential areas. Engineering improvements will be undertaken on roads with high accident numbers in accordance with council policy. The provision of sidewalks and traffic calming will be the focus of this programme.</td>
<td>Identification and prioritisation of local roads to be done annually with implementation</td>
<td>5% to 10% reduction over 5 years.</td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian Safety on Freeways</td>
<td>18% of all fatalities are pedestrians crossing the freeways. Not a specific programme for ETA, but important that liaison with SANRAL takes place to ensure action is being taken.</td>
<td>Identify 1 or 2 key projects that will allow target to be met in year 1, facilitate with SANRAL to implement over 5 years</td>
<td>Liaise with SANRAL. Aim to reduce the current fatalities on Freeways by 15% over 5 years.</td>
</tr>
<tr>
<td>10</td>
<td>Opinion surveys on road safety</td>
<td>As a measure of the public awareness of the ETA road safety program and its progress, a public opinion survey should be conducted. A sample size of say 2000 to 3000 should be obtained.</td>
<td>Do annually in October (transport month)</td>
<td>Aim to reach an increase in the &quot;positive aware&quot; respondents by 5% per year for the 5 years (total increase of 25%)</td>
</tr>
</tbody>
</table>

*Key Performance Indicators become effective only after full implementation of the programmes and this is dependent on funding.*
7.2 Programme 1 – Establish partnerships and working groups
This will comprise of obtaining high level buy in the project and the signing of the necessary agreements between departments and relevant role players. This should be coordinated by the Road Safety Branch.

The proactive partnership model requires the establishment of a Partnership Team comprising of senior decision makers from the Municipality (Council and departmental officials), heads of Provincial Departments, relevant NGO’s, Taxi Associations and the Private sector.

There will be no cost implication of this action.

7.3 Project 2 – Service provider for awareness and marketing
To be able to handle the increased load of developing an extensive marketing, awareness and branding campaign over the 5 years, it is proposed that a service provider or a dedicated in house person be investigated. This person / service provider should understand the industry and road safety environment, and should also understand the extent and nature of the proposed interventions over the next 5 years.

The cost of appointing such a person is estimated at R800 000 per year. To raise the public awareness and especially the awareness amongst politicians and high level officials, it is proposed that research is conducted to determine appropriate technological interventions e.g. VMS sign boards, to highlight the number of fatalities in eThekwini.

At present there are 185 accidents per day in eThekwini, in which there are 61 casualties and 2 deaths. By displaying the growing number of fatalities, awareness will be created that will result in political and public pressure to address road safety issues.

7.4 Programme 3 - Pedestrians in the CBD area
7.4.1 Description of the problem
According to the eThekwini accident statistics, 23% of pedestrian accidents occur in the CBD. High volumes of pedestrians, taxis and vehicles that do not adhere to the rules of pedestrian crossings, are the main concerns in the CBD. Pedestrians also jay walk randomly resulting in the high number of pedestrian fatalities in the CBD. Speeds of vehicles were not measured and are probably lower than the legal speed limit of 60 km/h, but higher than what can be regarded as safe in such a high conflict area.

There are also areas with hawkers located on the sidewalks, forcing pedestrians to walk in the road, creating additional conflict.
7.4.2 Location of the proposed intervention
The following roads where identified as roads with some of the highest accident occurrence in the CBD:

- Monty Naicker road
- Anton Lembede road
- Dr. Pixley Kaseme road

The proposed area to be included in the CBD safe pedestrian zone include the area indicated in Figure D1, Appendix D. The location of existing intersections and crossings in the CBD are shown in Figure D2.

7.4.3 Proposed Intervention
An area such as the CBD will require a holistic approach involving all the disciplines related to road safety. The interventions should include the following possible measures:

- Further investigation is required to determine if speed is the contributing factor to accidents in the CBD. Further analysis of accident occurrence and causing factors in the CBD need to be identified and appropriate engineering measures implemented.
- In designing physical engineering measures, the “complete street” approach should be followed, whereby all aspects of the road reserve is addressed to ensure an integrated approach.
- The aspects that should be considered in the design of an engineering solution, should also include the following:
  - Available sidewalk width compared with the volumes-impact of hawkers on the sidewalk, and evaluation of road signs
  - Assess on-street parking
  - Sight distance for motorists to pedestrian crossing areas
  - Understand the desire lines of Non-Motorised Transport (NMT) - where the pedestrians cross the roads the most often
  - Investigate rails behind kerbs, to channelize pedestrian movement and restrict "jaywalking"
  - Investigate current timings of pedestrian signals
  - Implement nibs at identified crossing areas, to prevent taxis parking on those areas
  - Restrict Left turns in CBD to protect pedestrians
  - Raised pedestrian crossings at key intersections
- Enforcement measures will be implemented in accordance with the findings of the accident analyses.
- An awareness campaign should be designed in conjunction with the physical measures. An approach different to “posters on poles” is proposed. A typical example is implementing a pilot project, were a designated crossing area is defined, but at present pedestrians are rather jaywalking midblock. Road safety measures to encourage safe crossing of pedestrians is to be investigated, e.g. the use of Blue Tooth Devices.
- The overall programme will improve community safety as the improved infrastructure will raise awareness and will be an overall improvement of the area.
7.4.4 Before and after studies
To measure the effectiveness of the project, it is essential that before and after studies are conducted. These can consist of the following types:

- Detailed accident statistics
- Number of jaywalker per street block
- Perception survey among pedestrians
- Number of vehicle traffic violations

A detailed plan must be prepared to define the location, extent and time periods of the before and after studies.

7.4.5 Partnerships
The success of this programme will require sustained partnerships.

7.4.6 Cost Estimate
A detail design should be carried out of the CBD area to determine exactly what measures should be implemented where, which will have an impact on the cost estimate. A high level estimate of the cost is therefore provided:

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detail design and investigation</td>
<td>R 1 500 000</td>
</tr>
<tr>
<td>Implement physical measures at intersections</td>
<td>R 9 000 000</td>
</tr>
<tr>
<td>Awareness Campaign over 4 years</td>
<td>R 1 000 000</td>
</tr>
<tr>
<td>Additional law enforcement equipment</td>
<td>R 1 000 000</td>
</tr>
<tr>
<td>Do before and after studies to measure effectiveness</td>
<td>R  500 000</td>
</tr>
<tr>
<td>Total</td>
<td>R13 000 000</td>
</tr>
</tbody>
</table>
7.5 Programme 4 - Minibus Taxi Road Safety Project

7.5.1 Description of the problem
Minibus taxis are involved in the following type of accidents in eThekwini:

The number of accidents indicated in the statistics is from January 2011 to September 2011 and is indicated in brackets.

- Rear end (2342)
- Sideswipes- same direction (1909)
- Pedestrian Accidents (960)
- 5% of the pedestrian accidents caused by minibus taxis were fatal and 29% of the pedestrians were injured seriously.

7.5.2 Proposed Intervention
The proposed intervention consists of enhancing Public Transport Development Training. The use of an sms number will be investigated for reporting taxi transgressions. The provision of an integrated database should be investigated further.

This will be stored in a database where frequent offenders can be contacted. People will be reluctant to appear as witnesses in court, so drivers cannot be prosecuted based on the sms, but it will create awareness.

Although no official statistics are available, it is logical that a well-controlled industry will improve driver behaviour and hence will improve road safety. The special project proposed for the taxi industry, in addition to the sms reporting system, comprise of an integrated and co-ordinated approach to regulate and manage the industry. It is proposed that a combined database be developed with the structure shown in the diagram on the next page:
This integrated database would allow all the relevant role players to monitor owners, vehicles, and drivers and to draw reports on frequent offenders.

A driver training programme can be linked to the integrated approach, where a record is kept of what type of training and when drivers received training, and over time a programme of compulsory, regular "re-training" can be implemented to improve driving skills and road safety knowledge.

7.5.3 Education and Awareness
The driver training should be developed to not only train drivers, but to also educate them on road safety matters. ETA should have an identification method or reward system, to those taxi association and their drivers that completed the training modules on a regular basis and do not have offences against them to have a "sticker" indicating that the taxi is "safe" and is endorsed by the ETA. An endorsed taxi should also have a notification on a window, to inform the passengers of their rights, and have a few important topics regarding road safety.

7.5.4 Cost Estimate
The following table shows the cost estimate.

**TABLE 9: MINIBUS TAXI ROAD SAFETY PROJECT COST ESTIMATE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate sms service/call centre</td>
<td>R160 000</td>
</tr>
<tr>
<td>Investigate Development &amp; Implementation of database</td>
<td>R1 000 000 *</td>
</tr>
<tr>
<td>Total</td>
<td>R1 160 000</td>
</tr>
</tbody>
</table>

*Will only be implemented if warranted*
7.6 Programme 5 - Arterial routes and distributor roads – Speed management

7.6.1 Description of the problem
The accident statistics show that 21% of fatalities include single vehicle overturned accidents, head on collisions and vehicle hitting fixed objects. This most likely relate to speeding on higher order roads. The accident statistics also show that 60% of accidents occur on distributor roads. It is therefore proposed that a program dedicated at the major arterials and the major distributor roads be implemented, consisting of speed law enforcement and engineering interventions.

7.6.2 Location
The locations of accidents related to arterials are shown in appendix E in the following figures:

Figure E1: Location of pedestrian accidents on arterial routes
Figure E2: Location of accidents on arterial roads
Figure E3: Number of accidents per roads and location of accidents
Figure E4: Number of fatalities per road
The arterial roads with the highest accident occurrence in 2011 are shown in the table below:

**TABLE 10: ARTERIAL ROADS ACCIDENTS**

<table>
<thead>
<tr>
<th>Road</th>
<th>Total Accidents</th>
<th>Fatal Accidents</th>
<th>Serious Accidents</th>
<th>Slight Accidents</th>
<th>No Injury Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMGENI ROAD</td>
<td>1410</td>
<td>6</td>
<td>49</td>
<td>170</td>
<td>1185</td>
</tr>
<tr>
<td>SOUTH COAST ROAD</td>
<td>1190</td>
<td>11</td>
<td>36</td>
<td>104</td>
<td>1039</td>
</tr>
<tr>
<td>MR2</td>
<td>956</td>
<td>11</td>
<td>30</td>
<td>168</td>
<td>747</td>
</tr>
<tr>
<td>SOLOMON MAHLANGU DRIVE</td>
<td>900</td>
<td>2</td>
<td>12</td>
<td>94</td>
<td>792</td>
</tr>
<tr>
<td>MANGOSUTHU HIGHWAY</td>
<td>874</td>
<td>10</td>
<td>43</td>
<td>135</td>
<td>686</td>
</tr>
<tr>
<td>NORTH COAST ROAD</td>
<td>764</td>
<td>3</td>
<td>23</td>
<td>92</td>
<td>646</td>
</tr>
<tr>
<td>OLD MAIN ROAD</td>
<td>702</td>
<td>2</td>
<td>14</td>
<td>70</td>
<td>616</td>
</tr>
<tr>
<td>HIGGINSON HIGHWAY</td>
<td>696</td>
<td>10</td>
<td>32</td>
<td>139</td>
<td>515</td>
</tr>
<tr>
<td>PHOENIX HIGHWAY</td>
<td>564</td>
<td>6</td>
<td>13</td>
<td>55</td>
<td>490</td>
</tr>
<tr>
<td>OLD SOUTH COAST ROAD</td>
<td>545</td>
<td>6</td>
<td>22</td>
<td>88</td>
<td>429</td>
</tr>
<tr>
<td>M7</td>
<td>493</td>
<td>8</td>
<td>7</td>
<td>66</td>
<td>412</td>
</tr>
<tr>
<td>INANDA ROAD (NEWLANDS)</td>
<td>450</td>
<td>2</td>
<td>9</td>
<td>59</td>
<td>380</td>
</tr>
<tr>
<td>UMHLANGA ROCKS DRIVE</td>
<td>415</td>
<td>0</td>
<td>4</td>
<td>48</td>
<td>363</td>
</tr>
<tr>
<td>MR93</td>
<td>372</td>
<td>7</td>
<td>13</td>
<td>78</td>
<td>274</td>
</tr>
<tr>
<td>KWAMAMUSHU HIGHWAY</td>
<td>351</td>
<td>11</td>
<td>21</td>
<td>42</td>
<td>277</td>
</tr>
<tr>
<td>SIPHO MKHIZE DRIVE</td>
<td>314</td>
<td>20</td>
<td>35</td>
<td>78</td>
<td>181</td>
</tr>
<tr>
<td>MR94</td>
<td>312</td>
<td>3</td>
<td>5</td>
<td>28</td>
<td>276</td>
</tr>
</tbody>
</table>
7.6.3 Proposed Engineering measures
Travel time / speed surveys should be done on all the arterials, to determine the speeds on these roads. Visual investigation to identify hazardous locations on the roads need to be conducted, in conjunction with detailed analysis of the accident statistics per road. ETA needs to analyse the accident statistics to identify the type of accidents and main causes of accidents that occur most frequently.

Typical engineering interventions include ensuring sufficient sight distance, setting the appropriate speed limits, mitigation measures such as guardrails on curves, ensuring maintenance is in place, etc.

7.6.4 Awareness campaign
An awareness campaign along arterials and major distributor roads should focus on the impact of speeding.

7.6.5 Law Enforcement
Speed Law enforcement along these roads need to be increased, and it is proposed that it be done by using speed cameras. For a relative low cost, say 20 cameras can be acquired that can be moved over the different routes. The design of the cameras should be such that they can be used as real cameras at any time – i.e. a box in which a camera is installed. This will also make motorists unsure if there is a camera or not, resulting in their reduced speeds.

7.6.6 Cost Estimate

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Management Infrastructure *</td>
<td>R4 000 000</td>
</tr>
<tr>
<td>Detail engineering surveys - speeds and travel times, visual assessments, design (over the 5 years)</td>
<td>R1 000 000</td>
</tr>
<tr>
<td>Implementation of engineering measures</td>
<td>R2 500 000</td>
</tr>
<tr>
<td>Total implementation cost</td>
<td>R7 500 000</td>
</tr>
</tbody>
</table>

*Dependent on funding availability

7.7 Programme 6 - Freight Route with focus on the M7

7.7.1 Description of the problem
The ETA has no overload strategy at present. Overloading is a problem, based on perceptions mostly, and heavy vehicles travelling uphill at slow speeds cause congestion and results in accidents. On the M7, which carries high volumes of trucks, frequent accidents occur involving heavy vehicles.
7.7.2 Location of freight routes
The following roads were identified as critical freight roads:

- M7 (Critical freight route)
- Solomon Mahlangu Drive
- South Coast Road

It is proposed that the freight programme should focus on the M7 initially over the next 5 years.

7.7.3 Proposed Engineering Measures
A detailed study of the M7 should be carried out to determine the engineering interventions that can be implemented to reduce heavy vehicle related accidents.

7.7.4 Law Enforcement
In other locations, where there are heavy vehicles travelling downhill on steep grades, such as Kaaimans pass, introduction of speed enforcement cameras with compulsory stops achieved very good results. Locations for speed enforcement cameras need to be identified as a possible law enforcement measure.

It is important that these cameras are permanent, as truck drivers communicate with each other via radio and know when law enforcement is active or not.

7.7.5 Cost Estimate
The cost for the freight program is shown below:

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed engineering study, design and implementation of measures</td>
<td>R7 000 000</td>
</tr>
<tr>
<td>Permanent speed law enforcement cameras *</td>
<td>R600 000</td>
</tr>
<tr>
<td>Total</td>
<td>R7 600 000</td>
</tr>
</tbody>
</table>

*Dependent on funding availability

7.8 Programme 7 – Safety around schools
The current safety program around schools should continue, including the awareness campaign. The programme of the province, Road Safety Branch of ETA and the Metro Police should be integrated, making better use of existing resources to reach a higher penetration among scholars.

The use of social media to reach a wider audience of scholars should be implemented by creating Facebook and Twitter accounts where road safety actions are promoted.

There is no additional cost foreseen in the continuation of the schools program.
7.9 Programme 8 – Safety on Residential Routes
21% of all accidents occur on local and collector routes in residential areas. This accounts for 18% of all fatal accidents and 31% of pedestrian accidents in eThekwini. Engineering improvements including traffic calming and the construction of sidewalks will be undertaken on residential roads with high accident numbers in accordance with council policy.

Currently R5 million rands per annum is spent on upgrading residential roads. It is envisaged that this programme will cost a minimum of R25 million rands over the next 5 years.

7.10 Programme 9: Pedestrian Safety on Freeways
Although not regarded as an ETA project, the improvement of pedestrian safety on Freeways should be taken up with SANRAL through regular liaison. Pedestrian fatalities on freeways make up 18% of pedestrian fatalities and it should be addressed, most likely through engineering and education.

There are locations where informal communities live close to the freeways, and tend to cross the freeways at grade. Measures need to be taken to reduce potential fatalities amongst these communities related to them crossing freeways.

7.11 Programme 10 - Opinion surveys on road safety awareness
It is proposed that an annual survey be conducted of 2000 to 3000 residents of eThekwini to determine the impact of increased road safety awareness. Specific programmes such as the impact of the CBD measures, increased law enforcement and the impact of the VMS can also be evaluated. This should be combined each year with Transport month to provide a regular update on the progress with road safety in eThekwini. Together with the release of accident statistics and result of other programmes, it can be an annual feature on the road safety calendar.

The cost estimate for the survey is shown in the table below.

**TABLE 13: OPINION SURVEY COST ESTIMATE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan and design surveys</td>
<td>R50 000</td>
</tr>
<tr>
<td>Cost of surveys, depending on method used be it</td>
<td>R300 000</td>
</tr>
<tr>
<td>manual forms, interactive websites or mobile</td>
<td></td>
</tr>
<tr>
<td>phones. Several media should be used.</td>
<td></td>
</tr>
<tr>
<td>Analysis of data and preparation of report,</td>
<td>R80 000</td>
</tr>
<tr>
<td>including from year 2 comparison with previous</td>
<td></td>
</tr>
<tr>
<td>years and other trends</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>R430 000</td>
</tr>
</tbody>
</table>
## 8 TOTAL COST AND PROPOSED ROLL OUT PROGRAMME

The total cost of the different programs is summarised in the table below.

### TABLE 14: TOTAL COST ESTIMATE

<table>
<thead>
<tr>
<th>No.</th>
<th>Project or Program</th>
<th>Implementation (capital) cost</th>
<th>Annual operational cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Establishments of partnerships</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Marketing service provider annual cost</td>
<td></td>
<td>R800 000</td>
</tr>
<tr>
<td>3</td>
<td>CBD Area Upgrade</td>
<td>R13 000 000</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Mini bus taxi program</td>
<td>R1 160 000</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Arterial and distributor routes</td>
<td>R7 500 000</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Freight Routes - along the M7</td>
<td>R7 600 000</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Safety around schools program</td>
<td></td>
<td>R500 000</td>
</tr>
<tr>
<td>8</td>
<td>Safety on Residential Roads</td>
<td>R25 000 000</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian safety on SANRAL freeways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Annual survey of road safety awareness</td>
<td></td>
<td>R430 000</td>
</tr>
<tr>
<td></td>
<td>Additional Metro Police resources to dedicate to road safety issues</td>
<td>R1 000 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional ETA resources to dedicate to road safety</td>
<td>R2 000 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>R54 260 000</td>
<td>R4 730 000</td>
</tr>
</tbody>
</table>

The proposed programme for the roll out of the different projects and programs are outlined in the programme below. (N.B. Implementation and roll out of these programmes/projects is dependent on funding availability).
The proposed programme for the roll out of the different projects and programs are outlined in the programme below.

**TABEL 15: PROPOSED PROGRAMME**

<table>
<thead>
<tr>
<th>No</th>
<th>Projects and Programmes</th>
<th>Year and Quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4</td>
</tr>
<tr>
<td>1</td>
<td>Partnerships and work groups</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dedicated road safety marketing campaign</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CBD Area pedestrian safety</td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>Design and Planning</td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>Implementation</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Minibus taxis</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Arterial Routes &amp; Speed Management</td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Identify Routes</td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>Enforcement intervention</td>
<td></td>
</tr>
<tr>
<td>5c</td>
<td>Design engineering interventions</td>
<td></td>
</tr>
<tr>
<td>5d</td>
<td>Implementation of engineering interventions</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Freight</td>
<td></td>
</tr>
<tr>
<td>6a</td>
<td>Investigation of measures</td>
<td></td>
</tr>
<tr>
<td>6b</td>
<td>Implementation</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Safety around schools</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Safety on Residential Routes</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian Safety on Freeways</td>
<td></td>
</tr>
<tr>
<td>9a</td>
<td>Identify freeway projects with SANRAL</td>
<td></td>
</tr>
<tr>
<td>9b</td>
<td>Implementation of projects by SANRAL</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Opinion Surveys on Road Safety</td>
<td></td>
</tr>
</tbody>
</table>
9 FUNDING
The funding provided by the different role players will be determined during the start-up and development phases (first 6 months) of the implementation of the road safety plan.

The following parties will be role players in providing funding:

- eThekwini Transport Authority (ETA)
- eThekwini Health & Social Services
- eThekwini Safety and Security
- SANRAL
- KZN Department of Transport
- Road Accident Fund
- Private Sector partnerships

10 MONITORING AND EVALUATION
eThekwini should set itself a target of 80% compliance with traffic laws and regulations on key risk factors of speeding, drinking and driving, seatbelt usage and hand-held phone use while driving.

The research activities should include baseline studies to determine the status quo regarding:

- Travel speeds
- Prevalence of driving under the influence of alcohol and drugs
- Use of seatbelts and child restraints
- Use of hand held mobile phones while driving

Studies should also be done to monitor progress with the implementation of relevant projects as well as to monitor the impact it has on the accident rates. The opinion survey proposed as a special project should form part of the monitoring process.

Progress with the activities of the Road Safety Business plan will be done through the assessment of the Action Plans which will show the following:

- Targets
- Expected outputs
- Performance indicators
- Actual results received
- Timelines
- Reporting format and agreed frequencies
- Rewards
- Budgetary allocation and expenditure
- Challenges