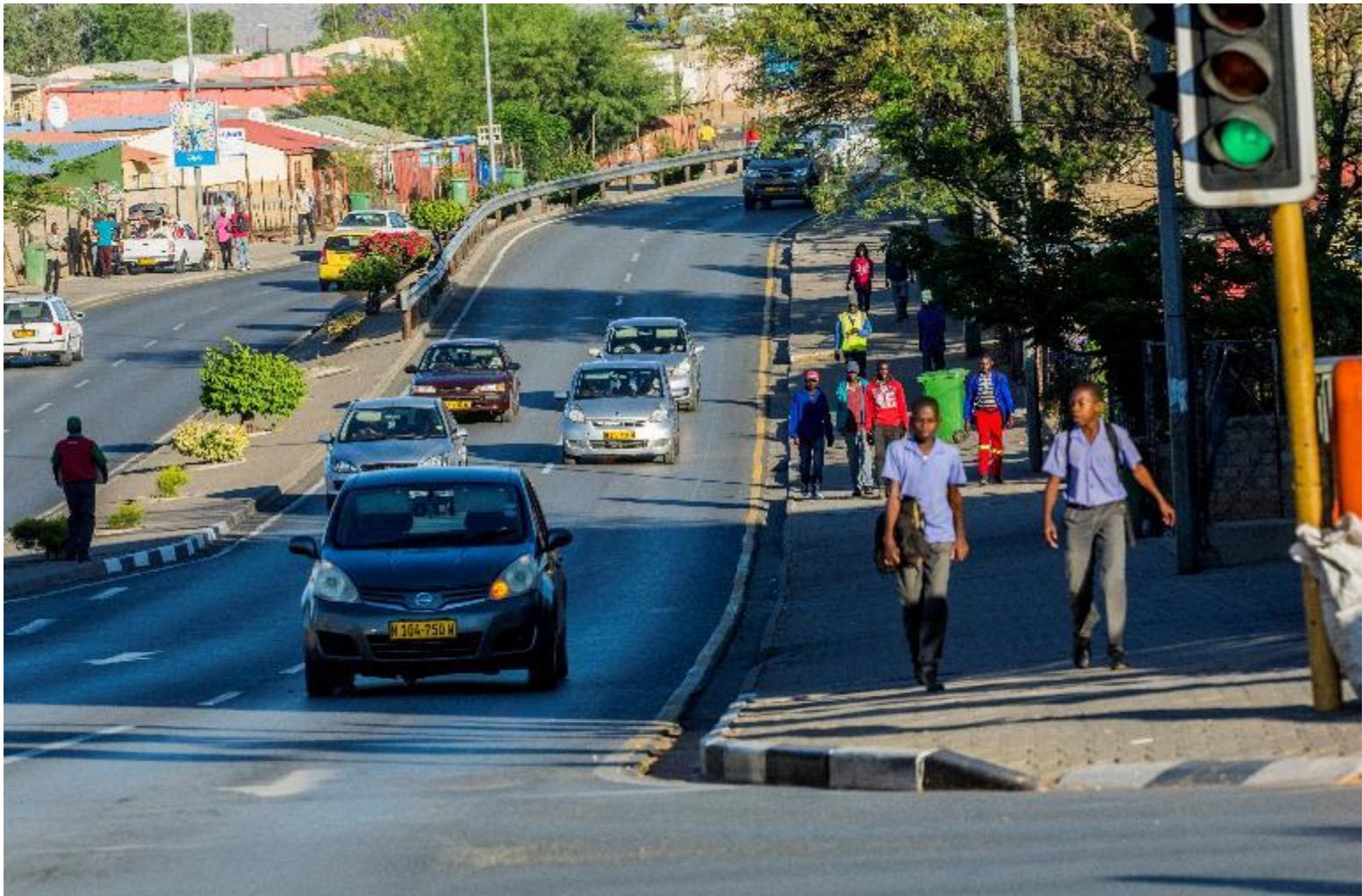




CITY OF WINDHOEK

**NON-MOTORISED TRANSPORT STRATEGY –
FINAL REPORT**

Version 3, 31 May 2018



PREPARED FOR:



PREPARED BY:



SUPPORTED BY:



FOREWORD BY THE HONOURABLE MINISTER OF WORKS AND TRANSPORT



Infrastructure development has been identified as one of the pillars in Namibia's National Strategies, including Vision 2030, the National Development Plan and the Harambee Prosperity Plan. Modern and reliable infrastructure is critical for high and sustained economic growth. Part of the narrative of infrastructure development towards economic growth includes emphasis on sustainable transport provision, especially in urban centres.

The fast urbanisation rate in the country has created an increasing challenge for local authorities to ensure access to basic services for all citizens in a safe and decent manner. Rising accident statistics, high transportation costs and increasing congestion is not only creating a burden for the people but a risk for the national economy.

Windhoek, as the capital city of Namibia, attracts many people from all over the country looking for economic and educational opportunities. Along with many other social challenges such as housing and healthcare, a sound transport system is critical for the healthy functioning and prosperous growth of our capital. Our people are walking everywhere in Windhoek. Only 20% of Windhoek's households can afford to own a car. Roads alone are therefore not enough to secure social sustainability and only worsens already existing income inequality.

Along with its Partners, the City of Windhoek (CoW), the Ministry of Works and Transport

(MWT), with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), embarked on a program to develop a Sustainable Urban Transport Master Plan (SUTMP). This Masterplan identified and investigated measures to guide the sustainable development of transport systems in Windhoek and includes projects and measures to improve public transport services, traffic management as well as walking and cycling.

Expected benefits include improvement in travel time per trip, reduction in emission of greenhouse gases and pollutants, increased road safety by reducing the number of fatalities and injuries and a reduction in transport expenses of low-income households. This should also generate considerable macro-economic benefits through reduced vehicle operating costs, decreased congestion and lower external cost.

Non-motorised transport plays an integral part of our transportation system and requires a well-considered approach to ensure successful implementation in a practical manner.

I congratulate the Mayor of the City of Windhoek in developing this NMT Strategy. It aims to create a safe and pedestrian-friendly transport system and roads environment for pedestrians and cyclists, as it allows citizens access to healthcare, education, social services and most importantly work opportunities.

The Ministry of Works and Transport will support the implementation with road and transport legislation that is in support of NMT as well as appropriate infrastructure guidelines and implementation support and financing.

By improving access for its people and making NMT safer, it will lead to prosperity for all. The successful implementation of this strategy will have pilot character for the whole of Namibia.

Signed:

A handwritten signature in black ink, appearing to read 'John Mutorwa', written over a horizontal line. To the right of the signature is a small, stylized flourish or mark.

John Mutorwa, MP
Minister of Works and Transport

FOREWORD BY HIS WORSHIP, MAYOR OF THE CITY OF WINDHOEK



A Sustainable Urban Transport Master Plan was developed for Windhoek to ensure a sustainable transport future. The need for a new planning approach is acknowledged, which provides sustainable transport options for all citizens, especially the poor, children, elderly and disabled. A key component of this is the City of Windhoek's aspiration to become a cycle and pedestrian friendly city.

To achieve this, the City of Windhoek (CoW), together with the Ministry of Works and Transport (MWT), with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), embarked on a program to develop a Non-Motorised Transport (NMT) Strategy for Windhoek as part of the implementation of the Master Plan. The deliverables of the study were the development of an interconnected cycling and pedestrian network and to identify infrastructure that will take them comfortably, safely and most directly to their destinations. In addition, the strategy includes awareness campaigns and services to support the proposed network.

Extensive consultation with relevant role-players, especially the public, was undertaken to ensure inclusion of the views of our citizens. Roads in Windhoek must be made safer, accessible and attractive to NMT users. The inputs of our people are highly important and valid to ensure government is improving and addressing their needs in the best way.

A working public transport system, supported by an inter-connected NMT network is essential to provide the community with the necessary flexibility to travel around the City. Providing priority for NMT users at certain locations such as the CBD or around schools, will not only improve safety for NMT users, but also increase the awareness of the needs of NMT users. The City of Windhoek wants to ensure efficient and safe transport services to its citizens.

Walking, cycling or using public transport should not be seen as secondary to driving the own vehicle. Persons that make use of these modes of transport should also be able to do it in the most dignified manner. The City has for a long time focused its plans in terms of transport towards the car, but now as a rapidly growing city we are changing our mind set.

The City of Windhoek is ready to take the challenge to become a SMART and Caring City by 2022, including SMART Mobility solutions. But we will need a strong support of the Ministry of Urban and Rural Development and the Ministry of Works and Transport, in order to achieve our goals.

I thank everyone that participated in the development of this project and charge our officials and partners to source the necessary budgets to ensure successful implementation of the NMT Strategy. We will engage with relevant role players to ensure successful implementation of this strategy.

The first step will be to implement a pilot project to experiment on a small scale the feasibility, time, cost and adverse events of non-motorised transport infrastructure. In parallel, CoW will implement a range of NMT-supportive initiatives to make the roads more attractive and safer for the people of Windhoek.

Signed



Muësee Kazapua
Mayor

EXECUTIVE SUMMARY

BACKGROUND

A key consideration for the Namibian government is to plan for the future transport or mobility needs of the Namibian society and in this respect, the City of Windhoek (CoW), together with the Ministry of Works and Transport (MWT), the Ministry of Urban and Rural Development, with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), embarked on a program to develop the Sustainable Urban Transport Master Plan (SUTMP) for the CoW¹. This program has a particular focus on the sustainable provision of public transport (PT) and Non-motorised transport (NMT).

The GIZ, in collaboration with the CoW and participating partners, has undertaken some initial NMT network identification and implementation and now wishes to integrate this initial rollout within a holistic and sustainable framework for the further sustained implementation of NMT facilities and the promotion thereof within Windhoek⁴.

NEED FOR AN INTERVENTION FOR NMT USERS IN WINDHOEK

Approximately 20% of Windhoek's households can afford to own a car. Roads alone are therefore not enough to secure social sustainability and only worsens already existing income inequality. Low-income households in Windhoek spend up to one quarter (25%) of their income on transport. Hence the need is acknowledged by the CoW for a new planning approach, which provides sustainable transport options for all citizens, especially the poor, children, elderly and disabled. The importance of NMT as an integral part of the transport system in providing more sustainable transport options is acknowledged. NMT forms a significant part of the daily activity of people as they commute to and from public transport stops and stations, places of work, places of education and walking to water collection points and means of creating a living. NMT has an important role to play in greening the economy in the context of providing and promoting more sustainable transport options, forming part of more cost-effective solutions in establishing a sustainable transport system to improve economic progression for the residents of Windhoek.

DEFINITION OF NMT AND UNIVERSAL ACCESS

NMT includes all forms of movement that do not rely on an engine or motor for movement. This includes **walking, cycling, rickshaws, animal-drawn carts (especially in rural areas), wheelchairs and rollerblading or skating for recreational purposes²**.

Universal access is a design approach to create an environment that meets the needs of all the potential users to the greatest extent possible. Taking into consideration the diverse abilities of individuals, such as agility, balance, cognition, coordination, endurance, flexibility, hearing, problem solving, sensory processing capacity, strength, vision, and walking speed. It emphasises inclusive design that ensures participation and access for all³.

OVERARCHING VISION OF THE WINDHOEK SUSTAINABLE URBAN TRANSPORT MASTERPLAN

The CoW's aspiration of becoming a pedestrian and cycle friendly city was first officially debated and documented in the Sustainable Urban Transport Master Plan (SUTMP 2012). The SUTMP is an integrated and long-term strategic plan with a specific focus on the role of public and NMT modes within the desired integrated transport system of 2032. The geographical focus is set not only at the municipal area of the CoW but also to ensure good linkages towards Okahandja in the north, Rehoboth in the south, and the Hosea Kutako International Airport to the east; as these connections serve as significant commuter routes.

The main goal of the SUTMP is to ensure an environment that:

- ◆ Improves the economic growth and employment.
- ◆ Increases the PT share in the transport system due to improved access to the PT system, improved PT travel times, improvement in quality of service, and improved perception about PT.
- ◆ Reduces congestion for individual transport and PT users.
- ◆ Increase the use of bicycles as a result of improved cycling network, improved safety of cyclists, and higher bicycle ownership.
- ◆ Leads to a decrease in car usage as a result of a better PT service.
- ◆ Results in a decrease of pedestrian trips as a result of the shift from walking to cycling and PT.
- ◆ Improves travel time per trip as a result of major improvements of the transport system.
- ◆ Reduces emission of greenhouse gases and pollutants due to the decrease in vehicle-km for both cars and PT vehicles.
- ◆ Increases road safety by reducing the number of fatalities and injuries.
- ◆ Reduces transport expenses of low-income households and provides better access to PT.
- ◆ Generates considerable macro-economic benefits through reduced vehicle operating costs, decreased congestion and lower external cost.

NMT therefore plays a fundamental role in the future transport system of Windhoek and requires a well-considered approach to ensure successful implementation and undertaken in a practical manner.

OBJECTIVES OF THE NMT STRATEGY

In response to these overarching goals for the SUTMP and further analyses undertaken of the NMT environment in Windhoek, the NMT Strategy has the following objectives:

- ◆ Create a safe and pedestrian-friendly transport system and roads environment for pedestrians and cyclists
- ◆ Improve the pedestrian network and environments of Windhoek
- ◆ Identify and implement a cycle network for Windhoek
- ◆ Encourage more cycling in Windhoek

The implementation of the NMT Strategy has to be undertaken within a framework of **sustainability, integration and coordination** and key focus areas have been identified for targeted implementation. These focus areas and the necessary programs and strategies are discussed in more detail in the sections hereafter.

NMT ENVIRONMENT IN WINDHOEK

The NMT environment has been investigated in Windhoek in an attempt to guide and form the basis of the implementation of the NMT Strategy in Windhoek. The key findings are presented here.

Lack of NMT network continuity

There is no provision for cyclists made (except for at the Grove Mall); which means current NMT facilities are limited to the walking mode. There are also limited facilities for pedestrians with only 6% of the total road network having paved sidewalks, while the majority of the roads do have some form of gravel sidewalk or shoulder, but not always properly maintained or continuous. The lack of continuity is further expressed by barriers experienced at intersections where there are no dropped kerbs or lack of pedestrian crossing lines at left turn slip lanes.

Road safety for pedestrians and cyclists is an ongoing concern

Road safety is a major issue. Particular hazardous locations include the Western By-pass and the north-western communities. A lack of law enforcement and partially ignorant travel behaviour of motorists and pedestrians leave NMT users even more vulnerable. Conflicts between motorists and pedestrians are a challenge, especially at some signalised intersections with left-turn slip lanes.

Current land use patterns create long travel distance and barriers for NMT users to cross

Dense environments and mixed-land uses with good public-private interfaces that create intensity of activity are not common in large parts of Windhoek. The majority of the public realm in Windhoek consists of spaces that are designed to be mono-functional. In many cases, individual nodes are separated by large zones of land use reserved for future development as mobility and bulk infrastructure corridors. Carriageways in many of these zones are arguably far wider than necessary, encourage high-speed traffic, and have created an urban fabric that is explicitly hostile to NMT users.

The Western By-pass is a barrier to NMT movement

The Western By-pass is a major barrier to NMT movement and requires well-considered strategies to improve crossing safety by reducing informal pedestrian crossing behaviour.

Gender and culture influence NMT behaviour

Considering the significant difference between female and male travel behaviour, specifically in terms of cycling, it is suggested that different strategies for males and females are needed. For example, road safety is predominately a male issue whereas cultural concerns mostly relate to women.

Potential barriers to cycling

Besides the gender issue, which was identified to be one of the major challenges to promote future cycling, accessibility and affordability are additional barriers to cycling. There is also a perception that Windhoek is too hilly for cycling.

Future growth of Windhoek requires sustainable transport solutions

The north-western expansion requires substantial bulk infrastructure investments. It is anticipated that most of the large developments would take approximately two decades to fully develop. A working PT system, supported by an inter-connected NMT network that will connect to these new developments, is essential to provide the community with the necessary flexibility to travel around Windhoek.

The current state of NMT infrastructure development in Windhoek is not at the same level between the north-western areas and south-eastern areas, which is of concern. By taking the Western By-pass as a spatial divider, it is evident that 82% of all paved sidewalks are located in areas east of the Western By-pass and these are mostly in the CBD areas.

Communication and Marketing

Currently communication with respect to the Windhoek SUTMP is being managed with the MoveWindhoek campaign. Its website is up and running and primarily targets public transport users. It also serves as a vehicle for people to provide feedback, but it is not always up to date or real-time

Strategies

Safer and more NMT-friendly Roads

Roads in Windhoek must be made safer, accessible and attractive to NMT users. The first step will be to implement Phase 1A of the proposed NMT Network. In parallel CoW will implement a range of NMT-friendly initiatives to make the roads of Windhoek more attractive and safer for the people of Windhoek. These include the following:

- ◆ Safer routes to schools
- ◆ Improve Roads Signs and Road Markings at Pedestrian Hazardous Locations (Hazlocs)
- ◆ Implement NMT Network for pedestrians and cyclists) – Retrofit and New Build
- ◆ Decluttering of Sidewalks
- ◆ Implementation of Bicycle Parking Facilities
- ◆ Implementation of parts of NMT network by the private sector
- ◆ Developing the Street and Public Space as a Multi-functional Urban Element
- ◆ Upgrading of Infrastructure in informal areas (roads and streets)
- ◆ Prioritisation of universal accessibility at priority areas
- ◆ Pedestrian staircases and pedestrian bridges in areas with steep gradients and across barriers
- ◆ Continuous Maintenance of NMT Infrastructure

Acknowledge gender and culture considerations

- ◆ Establish real-life examples of women cycling safely and conveniently

Adopt pass-wide legislation

- ◆ Develop and adopt pass-wide legislation for cyclists

Improved pedestrian safety across the Western By-pass

- ◆ Provision of safe crossing facilities and direct connections across and along the Western By-pass.
- ◆ Restrict/discourage informal NMT crossings at the Western By-pass

Improved public transport services

- ◆ Reduce NMT walking distance by expanding public transport into informal areas and into new developments in the North-West
- ◆ Subsidized learner transport for outlying communities

Transport operations to prioritize NMT users

- ◆ Priority for NMT users at certain intersections in areas where pedestrian movements are significant
- ◆ Improve pedestrian safety at pedestrian crossing areas
- ◆ Restrict on-street parking progressively over time

Land use planning towards quality urban environments

- ◆ Preparation of NMT Network Plans for new living areas
- ◆ Preparation of NMT Networks in informal areas
- ◆ Developers contributing towards NMT infrastructure towards NMT Infrastructure
- ◆ NMT at future public transport stops and stations

Law enforcement

- ◆ Enforce a zero-tolerance approach towards unsafe driving behavior
- ◆ Improved visibility at pedestrian hazards during peak periods

Integration and coordination of authorities' response to NMT matters

- ◆ Integrated implementation between authorities
- ◆ Integrated and coordinated implementation between CoW line departments
- ◆ Appointment of a NMT champion

Private sector can participate in implementing NMT

- ◆ Facilitate cycling programs for large employers to encourage staff to cycle to work
- ◆ Bicycle distribution via large employers and NGOs in Windhoek
- ◆ NMT infrastructure roll-out as part of new developments
- ◆ Provision of bicycle parking

Increased awareness and marketing of NMT

- ◆ Develop a targeted message to the broader Windhoek Community, as well as within CoW

Services and procedures for CoW to drive NMT

- ◆ Apply available resources via existing organizational structure
- ◆ The MWT, MURD and RA participates in and supports the implementation of the NMT Strategy
- ◆ Train and develop the existing staff to implement the NMT Strategy

IMPLEMENTATION PLAN

An overall NMT Network for Windhoek comprising **315km of which 70km were identified** as Safe Routes to Schools, were developed. From this, a Phase 1 NMT Network was identified for implementation with specific projects to be realised in various phases as part of the rollout plan.

The Phase 1 network was identified based on the following considerations:

- ◆ Identifying cycle routes that can provide a cycle network across Windhoek.
- ◆ Identifying key pedestrian routes that also link to the cycle routes, as well as enable safe crossing of the Western By-pass.
- ◆ Safe routes to schools across and along Monte Christo Road in areas with high pedestrian learner movement.

The proposed **Phase 1 NMT network covers 117 km and its implementation costs are estimated to amount to approximately NAD 350 million**. From this a **Phase 1A NMT Network was identified for priority implementation over a 5-year period (2019/2020 - 2024/2025) amounting to NAD 196 284 477**. This network is 62km long and will provide NMT connectivity to 17 schools and includes 17km of Safe Route to Schools, 2 hospitals and 3 clinics.

Phase 1B amounts to NAD 91 670 474 and is envisaged to be implemented in the period 2025/2026 - 2029/2030. This network is 35km long and will provide NMT connectivity to 3 schools and includes 3km of Safe Route to Schools, 1 hospital and 1 clinic.

Phase 1C amounts to NAD 63 280 752 and is envisaged to be implemented in the period 2030/2031 - 2034/2035. This network is 20km long and will provide NMT connectivity to 2 schools and includes 3km of Safe Route to Schools and 1 hospital.

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Acronyms and Abbreviations

ADV	Animal-Drawn Vehicle
BRT	Bus Rapid Transit
CoW	City of Windhoek
DS	Draft Standard
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GmbH	Gesellschaft mit beschränkter Haftung (Ltd.)
Hazlocs	Hazardous locations
HHVs	Heavy-haul vehicle
HVs	Heavy vehicles
IPTN	Integrated Public Transport Networks
KPI	Key Performance Indicator
MWT	Ministry of Works and Transport
NRSC	National Road Safety Council
NGO	Non-government organisations
NLTA	National Land Transport Act
NMT	Non-Motorised Transport
NRSC	National Road Safety Council
NUST	Namibia University of Science and Technology
PT	Public Transport
RA	Roads Authority
SANRAL	South African National Roads Agency SOC Limited
SDP	Site Development Plan
SUTMP	Sustainable Urban Transport Master Plan for Windhoek
TDM	Travel Demand Management
TIA	Traffic/ Transport Impact Assessment
TOD	Transit Orientated Development
ToR	Terms of Reference
UNAM	University of Namibia

1. INTRODUCTION

A key consideration for the Namibian government is to plan for the future transport or mobility needs of the Namibian society and in this respect, the City of Windhoek (CoW), together with the Ministry of Works and Transport (MWT, the Ministry of Urban and Rural Development, with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), embarked on a program to develop the Sustainable Urban Transport Master Plan (SUTMP) for the CoW⁴. This program has a particular focus on the sustainable provision of public transport (PT) and Non-motorised transport (NMT). There is a global trend towards sustainable development and the role that all people can play in ensuring a healthy environment for future generations.

Partners

The GIZ, in collaboration with the CoW and participating partners, has undertaken some initial NMT network identification and implementation and now wishes to integrate this initial rollout within a holistic and sustainable framework for the further sustained implementation of NMT facilities and the promotion thereof within Windhoek⁴.



Need for an intervention for NMT users in Windhoek

Approximately 20% of Windhoek’s households can afford to own a car. Roads alone are therefore not enough to secure social sustainability and only worsens already existing income inequality. Low-income households in Windhoek spend up to one quarter (25%) of their income on transport. Hence the need is acknowledged by the CoW for a new planning approach, which provides sustainable transport options for all citizens, especially the poor, children, elderly and disabled. The importance of NMT as an integral part of the transport system in providing more sustainable transport options is acknowledged. NMT forms a significant part of the daily activity of people as they commute to and from public transport stops and stations, places of work, places of education and walking to water collection points and means of creating a living. NMT has an important role to play in greening the economy in the context of providing and promoting more sustainable transport options, forming part of more cost-effective solutions in establishing a sustainable transport system to improve economic progression for the residents of Windhoek.



Figure 1-1: Learners walking to and from school along unsurfaced sidewalks

2. DEFINITION OF NMT AND UNIVERSAL ACCESS

NMT includes all forms of movement that do not rely on an engine or motor for movement. This includes **walking, cycling, rickshaws, animal-drawn carts (especially in rural areas), wheelchairs and rollerblading or skating for recreational purposes**⁵.

Universal access is a design approach to create an environment that meets the needs of all the potential users to the greatest extent possible. Taking into consideration the diverse abilities of individuals, such as agility, balance, cognition, coordination, endurance, flexibility, hearing, problem solving, sensory processing capacity, strength, vision, and walking speed. It emphasises inclusive design that ensures participation and access for all⁶.

Targeted categories of NMT users that need to be considered during any NMT planning and design process are defined as follows:

- ◆ Persons with disabilities - People with a physical, sensory or mental disability, which may be permanent or temporary⁷; and the
- ◆ Elderly, pregnant women, scholars, young children and those who are limited in their movements by children.

The following users with functional limitations fall under the auspices of universal access⁸:

- ◆ Life cycle users - these are users who have specific transport needs or need support by virtue of the fact that they happen to be in a particular stage of the human life cycle;
- ◆ Signage users - people who are unable to read or who are unable to understand the language used on the signage, including tourists;
- ◆ Females - whilst safety and security affects all passenger groups and both genders, it should be noted that female passengers (together with people with disabilities) are particularly at risk of crime and abuse;
- ◆ Load carrying users - people carrying bags, luggage, or goods of a size that means that they benefit from accessibility features.



Figure 2-1: Definition of NMT

In short, NMT is an active human or animal powered transportation mode that consists of non-motorised forms of travel such as walking, cycling and manual wheelchairs. The use of donkey or horse carts is not an expected transport mode within the urban area of Windhoek and is therefore not addressed in much detail in the NMT Infrastructure Design Guideline. Irrespective of this, a universal design approach should be followed, enabling the transport system to be accessible for all users, especially if transport modes change within the urban area of Windhoek.



Figure 2-2: People crossing the road informally in front of a bus

3. WINDHOEK SUSTAINABLE URBAN TRANSPORT MASTERPLAN

Overarching Vision of the Windhoek SUTMP

The CoW's aspiration of becoming a pedestrian and cycle friendly city was first officially debated and documented in the Sustainable Urban Transport Master Plan (SUTMP 2012)⁴. The SUTMP is an integrated and long-term strategic plan with a specific focus on the role of public and NMT modes within the desired integrated transport system of 2032. The geographical focus is set not only at the municipal area of the CoW but also to ensure good linkages towards Okahandja in the north, Rehoboth in the south, and the Hosea Kutako International Airport to the east; as these connections serve as significant commuter routes.

The main goal of the SUTMP is to ensure an environment that:

- ◆ Improves the economic growth and employment.
- ◆ Increases the PT share in the transport system due to improved access to the PT system, improved PT travel times, improvement in quality of service, and improved perception about PT.
- ◆ Reduces congestion for individual transport and PT users.
- ◆ Increase the use of bicycles as a result of improved cycling network, improved safety of cyclists, and higher bicycle ownership.
- ◆ Leads to a decrease in car usage as a result of a better PT service.
- ◆ Results in a decrease of pedestrian trips as a result of the shift from walking to cycling and PT.
- ◆ Improves travel time per trip as a result of major improvements of the transport system.
- ◆ Reduces emission of greenhouse gases and pollutants due to the decrease in vehicle-km for both cars and PT vehicles.
- ◆ Increases road safety by reducing the number of fatalities and injuries.
- ◆ Reduces transport expenses of low-income households and provides better access to PT.
- ◆ Generates considerable macro-economic benefits through reduced vehicle operating costs, decreased congestion and lower external cost.

NMT therefore plays a fundamental role in the future transport system of Windhoek and requires a well-considered approach to ensure successful implementation and undertaken in a practical manner.

Objectives for NMT Strategy

In response to these overarching goals for the SUTMP and further analyses⁹ undertaken of the NMT environment in Windhoek, the NMT Strategy has the following objectives:

- ◆ Create a safe and pedestrian-friendly transport system and roads environment for pedestrians and cyclists

- ◆ Improve the pedestrian network and environments of Windhoek
- ◆ Identify and implement a cycle network for Windhoek
- ◆ Encourage more cycling in Windhoek

The implementation of the NMT Strategy has to be undertaken within a framework of **sustainability, integration and coordination** and key focus areas have been identified for targeted implementation as illustrated in Figure 3-1. These focus areas and the necessary programs and strategies are discussed in more detail in the sections hereafter.

Various strategies are also proposed to be implemented within the different focus areas. These strategies are discussed in the sections hereafter. Projects, programs and priorities are also identified and refer to the following timeframes:

- ◆ Short-term: 0-10 years
- ◆ Medium term: 10-15 years
- ◆ Long-term: 15 years and more

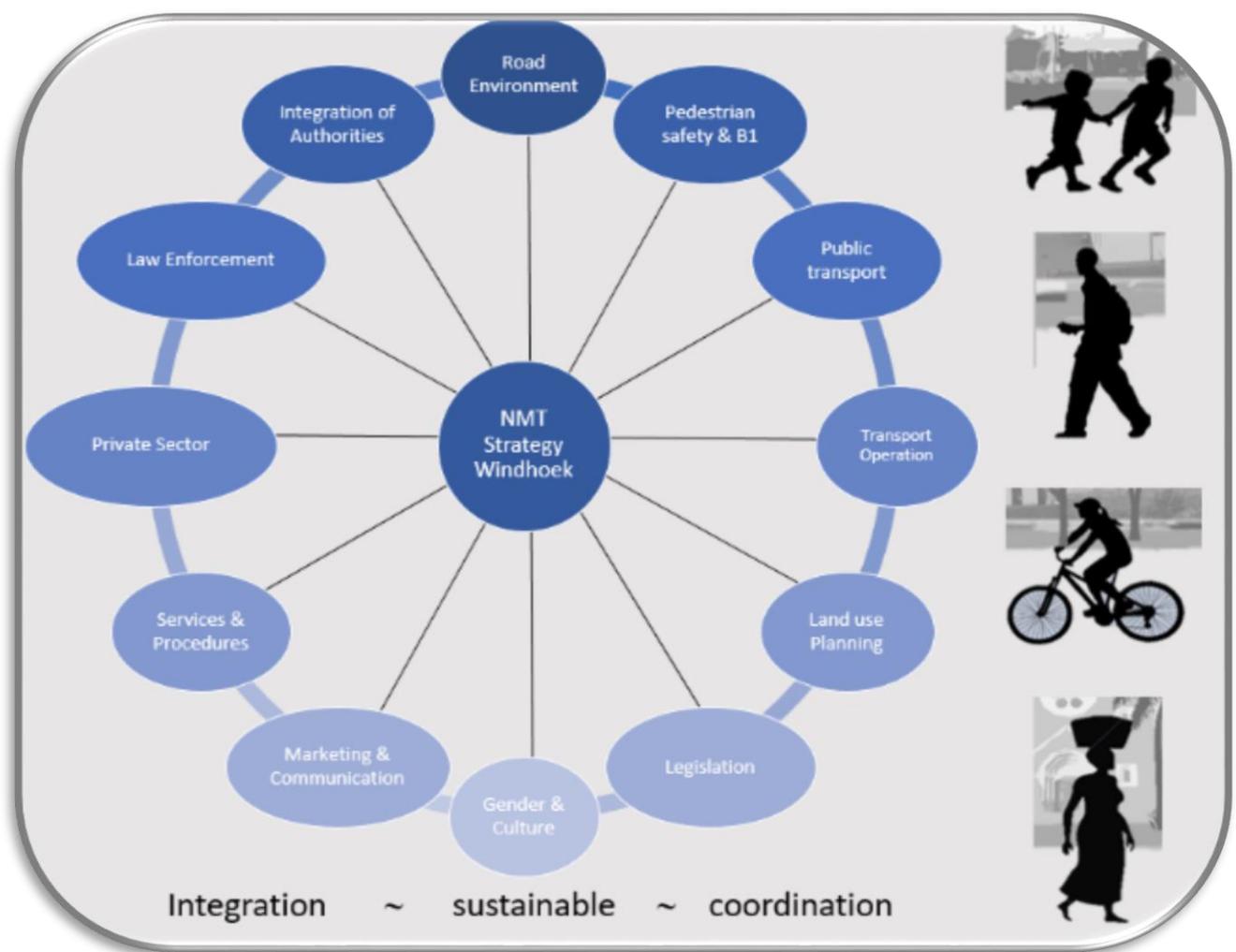


Figure 3-1: Strategic framework for NMT Implementation

4. NMT ENVIRONMENT IN WINDHOEK

The NMT environment has been investigated in Windhoek in an attempt to guide and form the basis of the implementation of the NMT Strategy in Windhoek. The key findings are presented here.

Lack of NMT network continuity

There is no provision for cyclists made (except for at the Grove Mall); which means current NMT facilities are limited to the walking mode. There are also limited facilities for pedestrians with only 6% of the total road network having paved sidewalks, while the majority of the roads do have some form of gravel sidewalk or shoulder, but not always properly maintained or continuous. The lack of continuity is further expressed by barriers experienced at intersections where there are no dropped kerbs or lack of pedestrian crossing lines at left turn slip lanes.

Road safety for pedestrians and cyclists is an ongoing concern

Road safety is a major issue. Particular hazardous locations include the Western By-pass and the north-western communities. A lack of law enforcement and partially ignorant travel behaviour of motorists and pedestrians leave NMT users even more vulnerable. Conflicts between motorists and pedestrians are a challenge, especially at some signalised intersections with left-turn slip lanes.

Of specific concern is the current road safety situation for children. Learners have to travel a long way and pedestrian crossings are not provided adequately. From the stakeholder consultation, it became evident that physical separation from motorised traffic is preferred and required.

A total of 265 NMT-related incidents were recorded between January to July 2017. It is evident that the majority of NMT incidents

happened in the north-western sector of Windhoek, especially along Independence Avenue and Monte Christo Road. Another higher concentration of NMT crashes is found in the wider CBD area. The high prevalence of NMT related incidents could potentially be linked to the high NMT share in these neighbourhoods, lack of adequate NMT infrastructure and high level of informal crossing activity. From the data, it appears that incidents at the Western By-pass are underreported. It is estimated that there are on

During public consultation some of the youth shared the opinion that they don't feel safe going to school, as they have to walk far and cross the main road from Otjomuise (Sam Nujoma Avenue), which is not safe as taxis don't drive carefully. One mentioned that he knows it is unsafe to cross the B1 because "there are too many fast cars", while another noted that he does not often walk much further than to the public swimming pool (about 5/6km from his house), which takes him 1.5 hours. A few agreed that they would use a bicycle if they had access to one and would make use the side of the road (unofficial shoulder) without feeling unsafe.



Figure 4-1: Cyclist cycling along the yellow road edge line

average one to five NMT incidents per month of which most of them are fatal. The data allowed the identification of the share of crashes with children involved. The investigation suggests that children are specifically exposed in the north-western communities

Current land use patterns create long travel distance and barriers for NMT users to cross

Dense environments and mixed-land uses with good public-private interfaces that create intensity of activity are not common in large parts of Windhoek. The majority of the public realm in Windhoek consists of spaces that are designed to be mono-functional. In many cases, individual nodes are separated by large zones of land use reserved for future development as mobility and bulk infrastructure corridors. Carriageways in many of these zones are arguably far wider than necessary, encourage high-speed traffic, and have created an urban fabric that is explicitly hostile to NMT users.

The creation of these barriers has effectively divided Windhoek's urban fabric into isolated 'quadrants'. Most of these quadrants have access to local areas of activity and are accessible for NMT internally, (barring the lack of quality infrastructure such as paved sidewalks). However, access across quadrants for NMT is dangerous, and uncomfortable.



Figure 4-2: Complex pedestrian crossing environment at roundabouts along Independence Avenue

The Western By-pass is a barrier to NMT movement

The Western By-pass is a major barrier to NMT movement and requires well-considered strategies to improve crossing safety by reducing informal pedestrian crossing behaviour. Considerations include significant changes in pedestrian crossing behaviour if crossing facilities are located in line with the pedestrian's desire lines, fencing of the road reserve and the potential provision of pedestrian bridges. With that, education and awareness programmes will be important, in parallel with improved enforcement of traffic rules pertaining to pedestrian crossing.

Gender and culture influence NMT behaviour

Considering the significant difference between female and male travel behaviour, specifically in terms of cycling, it is suggested that different strategies for males and females are needed. For example, road safety is predominately a male issue whereas cultural concerns mostly relate to women. Measures need to be carefully developed to address the sensitivity around the societal values.

Potential barriers to cycling

Besides the gender issue, which was identified to be one of the major challenges to promote future cycling, accessibility and affordability are additional barriers to cycling. There are a number of people who cycle, but this is limited to recreational cycling more outside of the City and a small share of commuter cycling. The overall cycling share of all NMT movements surveyed was 2%. The complexity of the identified barriers requires multiple mitigation strategies, i.e. actions that will address the provision of NMT specific facilities, bicycle accessibility, better road safety education and enforcement, and improved land-use mix of future developments. There is a perception that Windhoek is too hilly for cycling. However, from a quantitative analysis point of view, the actual road gradients of the higher order network do not confirm this.

Future growth of Windhoek requires sustainable transport solutions

The north-western expansion requires substantial bulk infrastructure investments. It is anticipated that most of the large developments would take approximately two decades to fully develop. Since the future developments are located far away from the CBD with current social facilities and amenities, the intention is that the full range of urban facilities and amenities would be available inside the development. If this can be achieved, commuter dependency to outlying areas will be significantly less. Nonetheless, existing movement patterns and places of work will not change overnight. NMT movement between the northern communities across the Western By-pass can also be expected to continue. Accordingly, a working PT system, supported by an inter-connected NMT network that will connect to these new developments, is essential to provide the community with the necessary flexibility to travel around Windhoek.

Quality of NMT infrastructure

The current state of NMT infrastructure development in Windhoek is not at the same level between the north-western areas and south-eastern areas, which is of concern. By taking the Western By-pass as a spatial divider, it is evident that 82% of all paved sidewalks are located in areas east of the Western By-pass and these are mostly in the CBD areas. Generally, there is a lack of adequate NMT infrastructure, specifically a lack of safe crossing points across the Western By-pass and across Monte Christo Rd that are aligned with the



Figure 4-3: Cycling as part of playing

identified NMT desire lines. Furthermore, cycling facilities are almost non-existent.

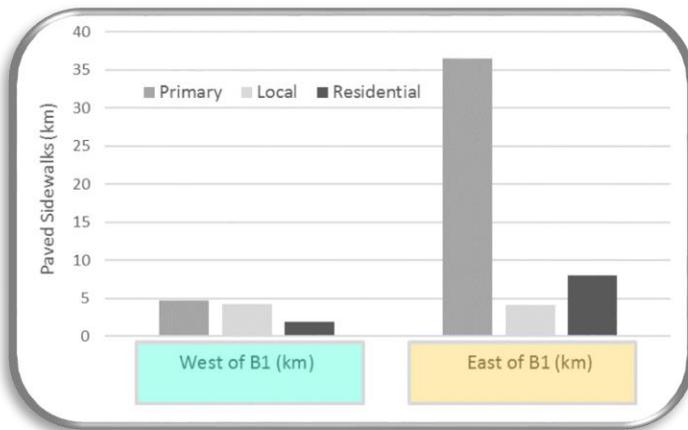


Figure 4-4: Extent of paved sidewalks compared between the areas west versus east of the Western By-pass

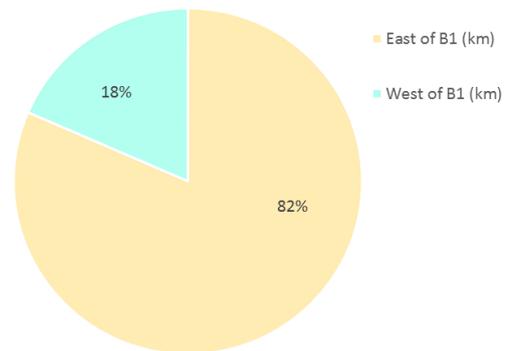


Figure 4-5: Percentage of paved sidewalk provision in the areas west versus the areas east of the Western By-pass

Communication and Marketing

Currently communication with respect to the Windhoek SUTMP is being managed with the MoveWindhoek campaign. Its website is up and running and primarily targets public transport users. It also serves as a vehicle for people to provide feedback, but it is not always up to date or real-time.



Figure 4-6: Current MoveWindhoek website banner

Way Forward for NMT implementation in Windhoek

The Status Quo Assessment indicated gaps that require immediate actions. These gaps are not only in the physical NMT network and the quality of the existing NMT infrastructure, but also refer to operational and

functional gaps; such as the combination of high walking dependency and weak law enforcement, and matters around gender preferences and affordability.

In terms of the spatial **NMT Network Development**, it is of importance that routes are systematically assessed and defined so that recommendations can be made that provide for desired NMT connections. NMT demand is high, specifically walking, but this is not reflected in the current provision of NMT infrastructure. Adding pedestrian safety to this, which currently is of major concern; it is evident that safe routes to school have to be a focus, especially since children are the most vulnerable of all NMT users. A local area network around schools is fundamental in that process. It will provide a safe environment and will assist in making NMT attractive for the next generation. The high share of informal crossings at the Western By-pass requires multiple mitigation strategies, i.e. actions that physically prevent people from crossing informally, messages that convey the safety risk, and improved land-use planning bearing in mind Windhoek's expansion to the north along the Western By-pass. The current NMT travel patterns reveal long daily distances undertaken by foot, which are not sustainable and desirable in the long term. Principles for the network development must be developed so that the NMT network is equally addressed across the different parts of the city. The future NMT network needs to be aligned with existing and proposed public transport stops. Further, this represents a chance to promote cycling. The overall cycling share of all NMT movements surveyed was 2%, indicating that better connectivity along higher-order network could fulfil the potential that cycling has. In addition, as affordability and accessibility were highlighted as challenges for low-income users, it is necessary to investigate the role of bicycle parking schemes, bicycle share schemes and potential locations thereof.

Addressing the needs of NMT users includes considering the movement constraints of people with disabilities. However, only a small percentage of 0.04% of all NMT users surveyed were people with disabilities. In most cases, these were people in wheelchairs. This can either be due to a low percentage of people with disabilities residing in Windhoek or, due to the more likely fact that this user group cannot leave their immediate surrounds as there is no adequate infrastructure provided that will enable them to go from A to B. This points to the importance of understanding the needs of all NMT users; the requirements of the physical infrastructure that would support NMT movement and to agree on solutions that can work; all to be collated in a **NMT Infrastructure Design Guideline for Windhoek**. In general, principles that address Universal Design are essential for 10%, supportive to 40%, and comfortable to 100% of the population¹⁰. Therefore, a review and preparation of quality standards for infrastructure design will ensure adequate NMT consideration of new developments/ upgrading of the road network, which will provide NMT users with more space, safer routes, and better connections.

The actual physical realisation of improved NMT provision requires a number of strategies towards implementation. The **Implementation Plan** will firstly, prioritise physical interventions and secondly, list a number of operational measures that will address more the social nature of NMT use. Considerations include inter alia, how can the cultural perception of women towards cycling possibly be changed and what makes people aware of the risk of road safety and what are effective actions that result in a change of travel behaviour?

5. SAFER AND MORE NMT-FRIENDLY ROADS

Roads in Windhoek must be made safer, accessible and attractive to NMT users. The first step will be to implement Phase 1A of the proposed NMT Network. In parallel CoW will implement a range of NMT-friendly initiatives to make the roads of Windhoek more attractive and safer for the people of Windhoek.

The CoW's transport system is characterised by an extensive road network of 969 km. Most of the higher and lower order roads are paved, whereas the lower order network in the residential areas of the north-western communities consists mainly of gravel roads. Gravel sidewalks can be found throughout the City, which far outweighs the number of the paved sidewalk sections.

Many challenges exist for pedestrians and cyclists in the way that the road is currently functioning. Dual carriageway roads are very wide with at least two lanes per direction. The wide roads are challenging for NMT users to cross. Shoulder widths are mainly narrow if existent at all and some gravel shoulders are also to be found.

Left-turn slip lanes are a common feature at most signalised intersections; which make NMT crossings risky due to the conflict with left-turning vehicles. Pedestrian signal phasing and the width of pedestrian refuge island makes for relatively long NMT crossing distances at intersections.



Figure 5-1: Pedestrian crossing is challenging across double-left turn slip lane

It is accepted that higher order roads are designed to provide a certain level of mobility, but it is also observed that generally lower order streets also provide more for vehicular needs and NMT considerations are not apparent in the overall street network. Of big concern is also the general practice of using sidewalks as parking spaces.



Figure 5-2: Vehicles parking on sidewalks

Overall, the road network suggests that the needs of pedestrians are not prioritised in the design and planning of roads, resulting in a non-friendly pedestrian environment. Over and above that, a lack of connectivity and cohesion in the quality of NMT routes leaves the 'NMT Network' with significant gaps all over Windhoek.

Various strategies are proposed to make the roads in Windhoek safer and more attractive for NMT users.

Safe Routes to Schools

NMT crossing movements were investigated across Monte Christo Drive, which revealed very high numbers of learners crossing the road (more than 700 learners in 2 hours). Informal and formal crossing movements were counted but it was observed that 80% was informal. These high volumes of children informally crossing the road, and in most cases unassisted, coupled with the high level of crashes involving pedestrians, are of great concern.



Figure 5-3: Learners on route to school

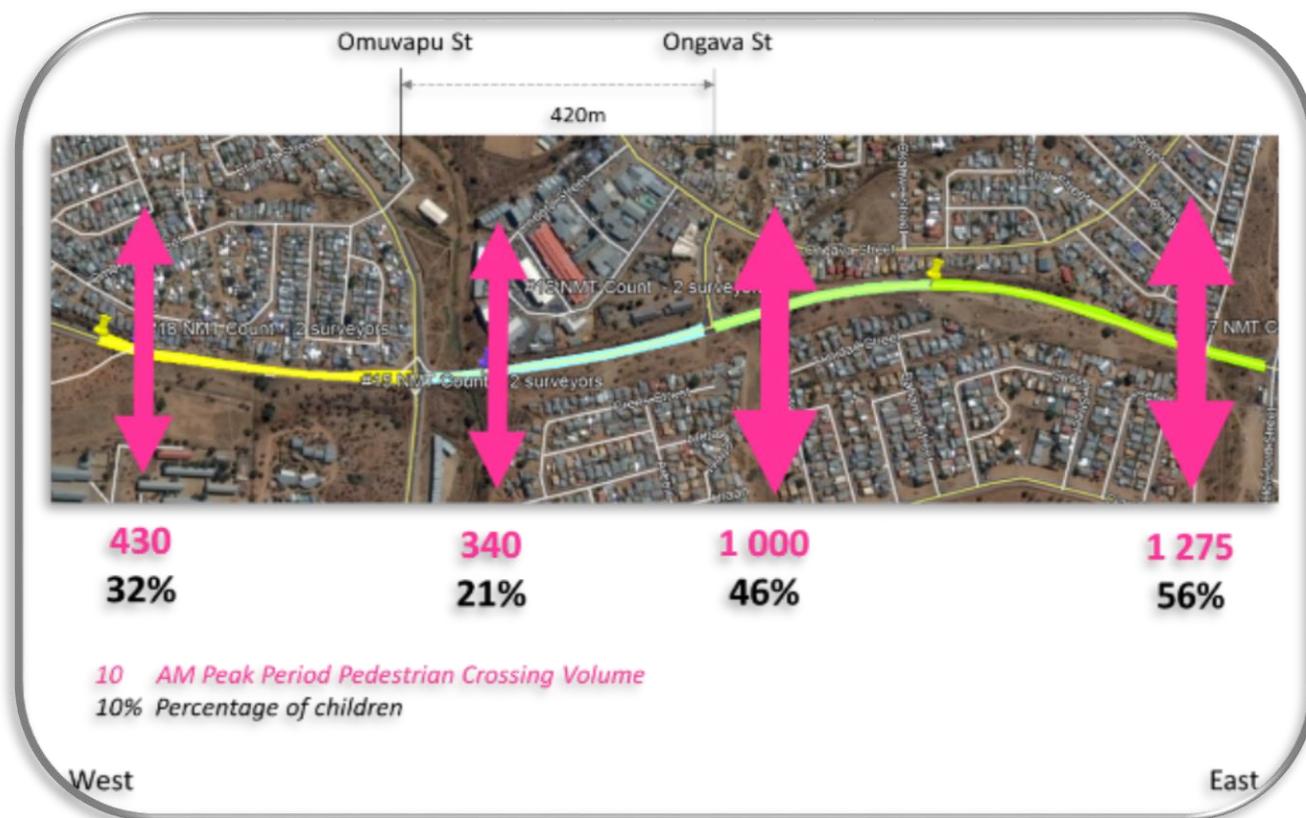


Figure 5-4: Monte Christo Drive - NMT Crossing Volumes

Safe Routes to Schools is an initiative by the CoW to focus on road safety challenges at schools, in particular scholar movements to and from schools. Routes in close proximity, approximately 250m around schools, have been identified. Examples of some infrastructure interventions at the accesses to schools include the following, but more detailed on-site investigations are required to determine the most appropriate infrastructure measures / improvements. As far as possible school accesses should be located on lower order class 4 or 5 roads. The speed limit sign of 40km/ hr must be introduced once this speed limit at schools is formally adopted.

- ◆ Proposed infrastructure interventions include the following:
- ◆ Sidewalks on both sides of the road for at least 100m on either side of the entrance(s) to the school or to the closest side streets if spaced closer than 100m.
- ◆ Yield Raised pedestrian crossings in combination or without scholar patrol or signalised pedestrian crossing if warranted. An alternative layout is to have speed humps spaced 100m



Figure 5-5: Example of raised pedestrian crossing

apart on either side of the pedestrian crossing. In this instance, the pedestrian crossing is not raised. Alternatively, flat tables could be used either side of a yield raised pedestrian crossing to make motorists more aware of the pedestrian crossing ahead.

- ◆ Appropriate road signs and markings, including a speed limit zone of 40km/h surrounding the school, once approved and adopted.
- ◆ Drop-off locations in front of the school in both directions at locations where it is required. It is important to consider the modal split at schools as some learners will primarily walk; others might use public transport or personal transport. Depending on the dominant mode, a drop-off facility should be provided. Site-specific assessments are needed at the various schools, incorporating traffic circulation, parking needs and movement of scholars. If the road reserve width is not wide enough to accommodate drop-off facilities, inclusive of NMT facilities, the school should be consulted to avail land.
- ◆ Dropped kerbs at appropriate crossing locations



Figure 5-6: Children ahead warning sign at school

Improve Roads Signs and Road Markings at Pedestrian Hazardous Locations (Hazlocs)

Road signs and markings for pedestrian and public transport facilities must be provided to guide and warn all road users about the presence of pedestrians and public transport activity and to regulate public transport and pedestrian behaviour. Typically, road markings and signage are provided at pedestrian crossings, along footpaths, along cycle paths / lanes as warning signs to motorists and to guide pedestrians and cyclists.

The Southern African Development Community Traffic Signs Manual (SADC RTSM) includes a range of signage and road markings applicable to NMT implementation. The Namibian Government adopted the SADC RTSM as per Government

Notice No. 42 of 1997 (GG 1512). The stipulations from SADC RTSM, also cited in the NMT Facility Guidelines, will apply when applying NMT road signs and markings.



Figure 5-7: Learners walking to school along gravel shoulder

Implement NMT Network for pedestrians and cyclists) – Retrofit and New Build

A NMT Network has been developed, approximately 350km of which the CoW will implement approximately 50km over a 10-year period. These includes the construction of new sidewalks, a pedestrian bridge over the Western By-pass, converting existing road shoulders to cycle lanes, re-marking the blacktop of some roads to introduce a new cycle lane and constructing new cycle paths on the sidewalks. This will include retrofitting existing facilities and building new facilities.



Figure 5-9: Bicycle lane developed in existing road shoulder



Figure 5-8: Raised pedestrian crossing with bollards



Figure 5-10: Pedestrian bridge across Arrebusch River, Windhoek

Decluttering of Sidewalks

An audit of existing road signage will be undertaken to determine to what extent it can be rationalised. In this manner the effective width of sidewalks can be increased in a relatively cost-effective manner

Should formal or informal trading or related activities within the road reserve impact the effective width of sidewalks, the following possible measures are recommended to increase the effective width or available space needed to implement NMT facilities:

- ◆ The relocation of hawkers and traders to designated areas
- ◆ Improved management of hawkers and traders within or adjacent to the road reserve
- ◆ The installation of fences to prevent the encroachment of shacks into the road reserve
- ◆ The provision of barrier kerbs with or without bollards to prevent vehicles from parking on the sidewalks.
- ◆ Dedicated trading areas to be identified and incorporated into the NMT facility design

Ironically, formal or informal trading or related activities within the road reserve are established because of high frequency of pedestrians, meanwhile while such activities compete for available space, available space for pedestrians is sacrificed and at times pedestrians are forced into the road. In areas where small business are established adjacent to the road reserve, albeit illegally, options must be explored to provide dedicated areas for such activities, or to rezone adjacent properties where possible, to improve road safety, appropriately define attraction points and planning and development of NMT facilities. It is



Figure 5-11: Road sign clutter along arterial street, Pretoria



Figure 5-12: Encroachment along the road reserve



Figure 5-13: Generous sidewalks with landscaping along Robert Mugabe Road, Windhoek CBD

recommended to surface / resurface such public areas to create aesthetically more pleasing pedestrian environments.

Implementation of Bicycle Parking Facilities

Places where bicycle parking can be considered depending on the need, demand, security and attractiveness.

- ◆ Places of work, especially where employers are participating in a scheme to promote cycling with their employees. Employers should be encouraged to provide secure parking on site.
- ◆ Schools, universities and colleges
- ◆ Stadium entrances, gymnasiums and sports fields
- ◆ Shopping centres
- ◆ Civic facilities – community halls, clinics, hospitals, libraries, etc.
- ◆ Public transport facilities such as interchanges, rail stations, etc.

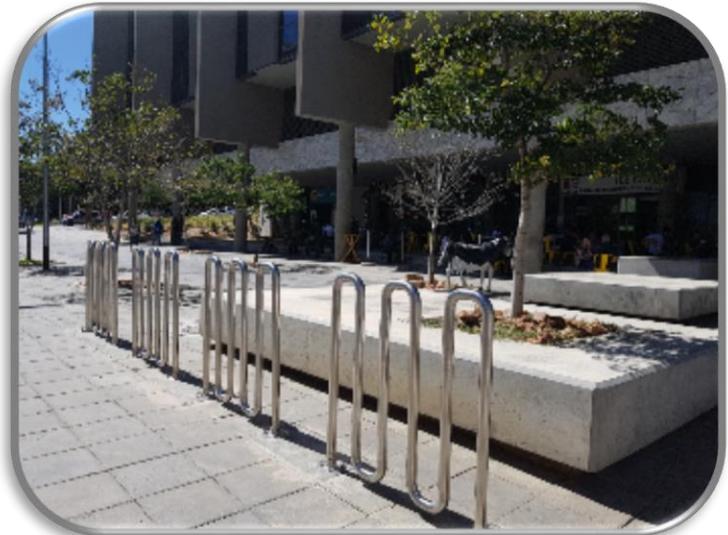


Figure 5-14: Bicycle parking provided along Robert Mugabe Road, Windhoek CBD

Implementation of parts of NMT network by the private sector

It is recommended that with rezoning applications, or large retail activities, a Traffic / Transport Impact Assessment (TIA) be undertaken. This must also include the impacts of NMT and public transport movements and proposed remedial measures must be identified to mitigate the impact or address NMT or public transport needs of the proposed development. Developers must then finance the implementation of the remedial measures for NMT and public transport.

In the future, the establishing of new roads or required road upgrading shall comply with provisions of developing NMT Network Plans for new living areas or developments. Developers will incorporate into their development the NMT-related infrastructure required to mitigate the impact expected from new pedestrian desire lines formed.

The CoW will develop guidelines and incorporate it into CoW by-laws for undertaking TIAs, including the impact on NMT and public transport services, and develop mechanisms for using Development Contributions for upgrading of NMT infrastructure.

Developing the Street and Public Space as a Multi-functional Urban Element

NMT takes place in public streets and public spaces. Therefore, it is most important to consider NMT as part of a larger public space system. Consequently, this infrastructure needs to contribute positively to the better functioning of the public space system as a whole. As a result, an NMT-orientated approach requires streets and walkways to be designed differently.



Figure 5-15: Pedestrians crossing from pedestrian path

Upgrading of Infrastructure in informal areas (roads and streets)

In recent years, Windhoek has experienced significant urbanisation and without the associated rapid expansion of needed social and economic infrastructure such as houses and services; has resulted in the increase of informal settlement areas to the north and north-west of Windhoek. .

NMT provision in informal areas is challenged by the lack of appropriate land use planning, the establishment of the township layout and appropriate land ownership. Challenges include formalising existing pedestrian desire lines in the absence of overall land use planning and land ownership as it might result in abortive investment in infrastructure, as well as providing infrastructure on land that is eventually not part of a road reserve, public right of way or public open space. However, this lack of formal planning should not detract from the NMT needs of the local residents. There are two ways to address NMT in informal areas.

Philippi area “before”



Philippi area “after”

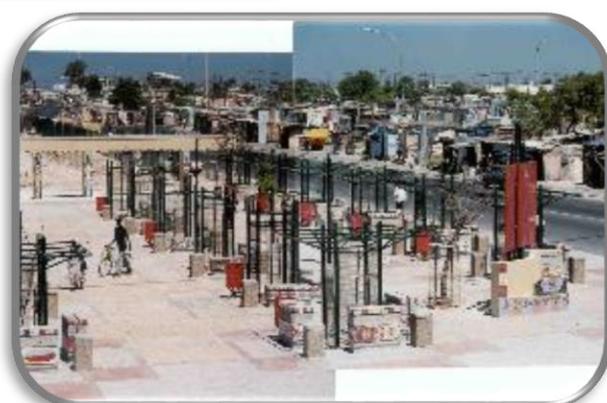


Figure 5-16: Informal areas before and after interventions to improve the urban environment, Philippi in Cape Town

Formalise the informal settlement layout

In the **planning of new developments and formalizing informal settlements** in Windhoek, the NMT design principles must be adhered. The NMT movement to and from the new development and within the new development should be clearly understood to determine the appropriate infrastructure that is needed.

- ◆ Identify the significant pedestrian attractors and generators within the development as well as the surrounding areas. These typically include schools, clinics, places of work, shops and markets, public transport interchanges or stops, sports fields/ stadiums, etc.
- ◆ Identify schools locations and areas where Safe Routes to Schools must be considered
- ◆ Identify the most likely pedestrian desire lines
- ◆ Identify the likely crossing of high-speed mobility routes and assess the feasibility of grade-separated pedestrian facilities or improved safe crossing opportunities.
- ◆ Review the Windhoek NMT Network and identify possible connections between the new development and the existing NMT Network Plan
- ◆ Propose NMT infrastructure in accordance with the expected pedestrian desire lines and possible connections to the NMT Network Plan. This includes pedestrian and cycle paths, pedestrian crossings.
- ◆ Also consider elements in the proposed road network that might give rise to speeding (i.e. Long straight roads) and consider the most appropriate traffic calming for implementation.
- ◆ Ensure that the road reserves and corresponding hierarchy are appropriate to accommodate planned roads and streets, as well as the NMT infrastructure.
- ◆ Also, identify the new roads required to connect to the existing roads in the region (if not already included in the Roads Masterplan for CoW). NMT should be provided if a pedestrian line or crossing opportunity is expected.



Figure 5-17: Public transport taxis in road into informal areas north of Katututra

Provide NMT infrastructure in interim

Should NMT infrastructure be provided in the interim, prior to the formalisation of the informal areas, the following steps should be followed:

- ◆ Identify the significant pedestrian attractors and generators (shops, markets, public transport collection points, sports fields, etc.)
- ◆ Identify the more significant existing desire lines
- ◆ Establish NMT paths in the interim along informal gravel roads or paths.
- ◆ Prioritise the formalisation of such identified / established NMT paths
- ◆ Once formalisation of an informal area is undertaken, these routes are either confirmed and incorporated as part of the NMT network OR amended and paths are redirected according to the newly established street network that includes NMT facilities.



Figure 5-18: Gravel paths in informal settlements north of Katutura

Prioritisation of universal accessibility at priority areas

The CoW prioritised the upgrading of intersections in the Windhoek CBD to universally accessible standards. Universal access should also be implemented at routes to and from public transport facilities, all intersections that are upgraded as part of new developments and routes to and from frequently used public facilities such as hospitals, clinics, libraries and sportsgrounds.



Figure 5-19: Kerb dropped for people using wheelchairs, Waterfront, Cape Town

Pedestrian staircases and pedestrian bridges in areas with steep gradients and across barriers

Off-road footpaths along NMT desire lines in formal and informal areas are also included in the NMT Network. Steps/staircases can also be considered in areas with steep gradients. Where required, U-channels or bicycle chutes should also be provided adjacent to the steps to allow bicycles to be pushed up and down the steps.



Figure 5-20: Examples of pedestrian staircases

Continuous Maintenance of NMT Infrastructure

Regular maintenance

Windhoek has to commence an inventory of NMT facilities and maintain the facilities regularly. Visual inspections must be done annually in the most cost-effective manner and any required maintenance annually.

Road sign diet

NMT paths are typically obstructed by the clutter of urban street furniture such as street lighting poles, road signs, traffic light poles, advertisement and distribution boxes. These are typically located in such a manner that it obstructs the flow of NMT users. It is recommended that an audit of existing road signage be undertaken to determine to what extent it can be rationalised and be undertaken on key pedestrian routes

and implemented over time. In this manner, the effective width of sidewalks can be increased in a relatively cost-effective manner.

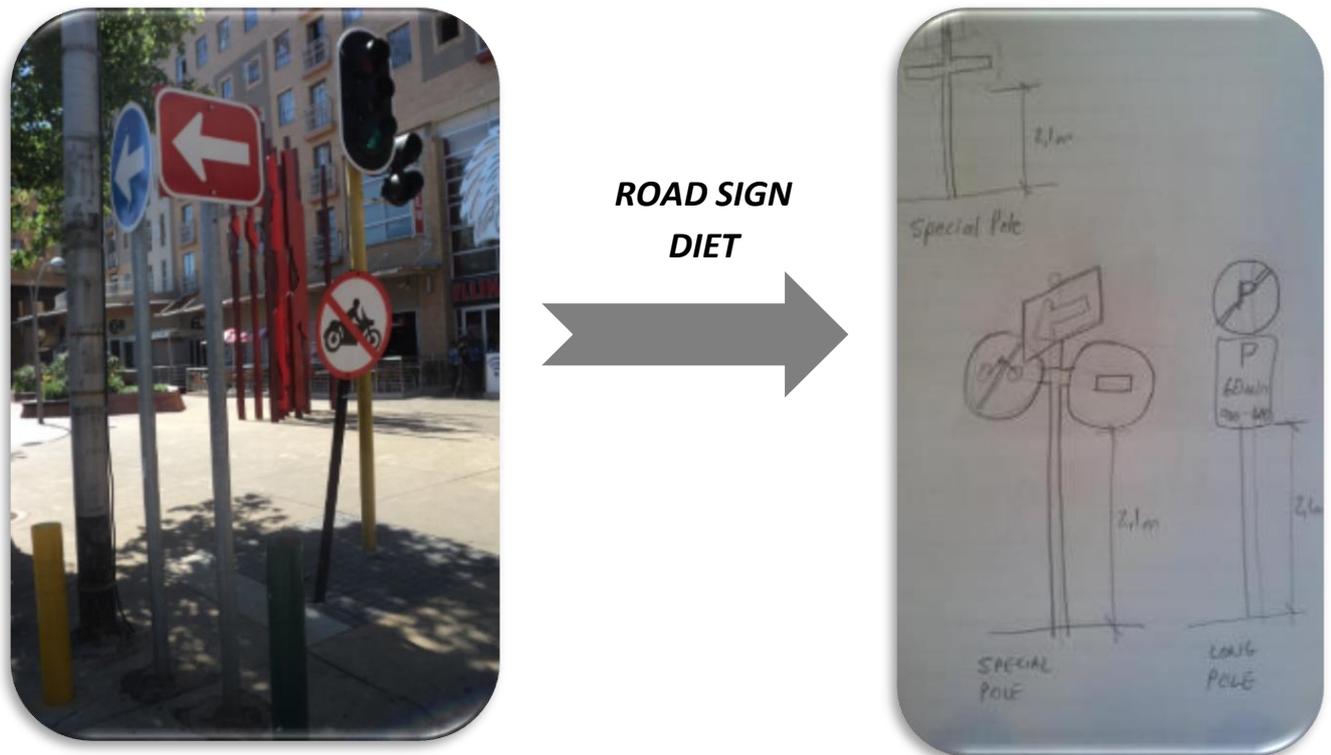


Figure 5-21: Application of a road sign diet

Projects and programs

The associated projects are included below in Table 5-1.

Table 5-1: Projects and Programs – Road Environment

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Road Environment	Safe routes to school	1) Roll-out the school road safety assessment programme <i>Prepare annual plan, develop an annual target of schools visited per year; develop a Monitoring & Evaluation plan, ensure</i>	CoW Urban Planning, Department of Education	Short-term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
		<i>collaboration between different stakeholders and establish institutional arrangements.</i>		
		2) Road safety implementation at school entrances	CoW Urban Planning & Infrastructure	Short-term
		3) Implementation of sidewalks as part of implementing safe routes to schools. <i>Providing road safety measures based on individual assessment of schools and target 10 schools per year</i>	CoW Urban Planning & Infrastructure	Short-term
	Improve road signs & markings at pedestrian hazlocs	4) Identify pedestrian hazlocs	CoW Urban Planning, Traffic Dept.	Short-term
		5) Establish a programme of maintaining/monitoring pedestrian hazlocs	CoW Urban Planning	Short-term
		6) Implement high visibility pedestrian warning signs at pedestrian hazlocs	CoW Urban Planning & Infrastructure	Short-term
	Implement Phase 1A of NMT Network	7) Refer to the NMT Implementation Plan	CoW Urban Planning, Infrastructure	Short- to Medium term
	Decluttering of sidewalks	8) Clean-up sidewalks from any clutter and reposition close to edge of the sidewalk such as bins, poles, advertisement boards, bollards; e.g. Uhland St.	CoW Urban Planning	Short-term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
		9) Road signs diet	CoW Urban Planning	Short-term
	Provision of bicycle parking facilities	10) Identify locations of bicycle parking	CoW Urban Planning	Short-term
		11) Implement bicycle parking	CoW Infrastructure	Short-term
		12) Investigate branded bicycle parking to be provided by private sector	CoW Urban Planning	Short-to medium-term
		13) Developers to implement NMT infrastructure as part of development transport infrastructure provision (sidewalks, bicycle paths, dropped kerbs, pedestrian bridge, pedestrian crossings, etc.)	Private sector	Short-to medium term
	Road infrastructure formalisation in informal areas	14) Identify the main public transport/ NMT/ activity street /road and pave the road/ street in informal settlements	CoW Urban Planning	Medium-term
		15) Surface the main roads to enable public transport services to extend into informal areas	CoW Infrastructure	Medium-term
		16) Provide NMT infrastructure along informal paths	CoW Urban Planning, Infrastructure	Short-term
	Provision of dropped kerbs in CBD areas	17) Intersections in CBD to be converted to intersections that are universally accessible	CoW Urban Planning, Infrastructure, Private Developers	Short- to Medium term
	Pedestrian staircases and pedestrian	18) Identify priority locations and implement the required pedestrian bridges or staircases	CoW Urban Planning,	Medium-term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
	bridges in areas with steep gradients and across barriers		Infrastructure	
	Ensure continuous maintenance of NMT infrastructure	<p>19) Appoint contractor maintenance teams on an annual tender rates basis to undertake NMT maintenance annually.</p> <p><i>Remove any clutter, correct the placement of bins, trim overhanging and over growing vegetation, trees and tree branches and trim grass on sidewalks and NMT facilities.</i></p>	CoW Infrastructure	Medium-Term

6. ACKNOWLEDGE CULTURAL & GENDER IMPLICATIONS

Women and men, including children, must see other women cycling comfortably and safely. Situations must be created to establish real-life examples of women cycling safely and conveniently.

Various viewpoints were raised during public consultation.

People prefer cars

During public consultations a young female stated, *“it depends on the person’s profession whether they will use bicycles as transport alternative or not. As a domestic worker, for example, if my employer provides me with a bicycle, I will use it, as it will save me money. But as a car engineer on the other hand, a bicycle makes no sense, I would prefer a subsidy to buy a car”.*

Safety is paramount

It was agreed by the majority of men that if provision were made for safe cycling and walking, *“with clear demarcations”*, they would be more eager to make use of NMT. In addition, they enquired about whether the municipality/city would provide training for safe bicycle usage and usage of designated pedestrian areas. If so, they would be willing to try it as alternative, because they believe it will be the fastest mode of transport to reach the CBD. *“If bicycle infrastructure is provided it would be an ideal means of transport as you would not get stuck in traffic and it’s a great alternative to walking and driving.”*



Figure 6-1: CoW Councillor addressing the public at a Public Meeting

Fears that bicycle will be stolen

Most females however disagreed and reacted with a strong aversion towards cycling, regardless of whether infrastructure was to be provided, due to a fear of bicycles being stolen. *“Windhoek not a safe place to keep a bicycle, it will be taken at the first four-way stop”.* A female participant summarised the general consensus, by saying, *“If people can afford a taxi, they will take a taxi. The younger generations (students and unemployed) are the ones that will opt for walking and cycling and they are the ones that need NMT infrastructure. There will thus always be a need for both NMT and car infrastructure”.*

Bicycles are for men

“There is a certain barrier towards women cycling, particularly in the black culture. Mechanical things, and these include bicycles, have always been seen as a man’s job.”

Bicycles are thus masculine by default and not seen as feminine enough for a woman to be associated with. She mentions that there are certain exclusions where women would use bicycles, but these are mainly related to

“emergency situations”, like collecting necessities such as water. “A bicycle is an investment to assist in work, owned and used by the man of the house, and often passed down to his son.”



Figure 6-2: A woman cycling

The strategy proposed to address concerns with respect to gender and culture is to establish real-life examples of women cycling safely and conveniently.

Establish real-life examples of women cycling safely and conveniently

Positive examples that can provide the real-life examples of women cycling include

- ◆ Establish a bicycle roll-out programme at academic institutions (UNAM, NUST) with associated support infrastructure programme (training, bicycle distribution, parking, bicycle maintenance)
- ◆ Establish a bicycle distribution program for municipal staff cycling and health care workers
- ◆ Refurbish or source bicycles specifically designed for women
- ◆ Provide bicycle training courses specifically for women

Projects and programs

The associated projects are included below in Table 6-1.

Table 6-1: Projects and Programs – Culture and Gender

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Culture & Gender	Establish real-life examples of women cycling safely and conveniently	1) Establish a bicycle roll-out programme at academic institutions (UNAM, NUST) with associated support infrastructure programme (training, bicycle distribution, parking, bicycle maintenance)	CoW Marketing & Events, MWT, UNAM, NUST, Private Sector	Short-term
		2) Establish a bicycle distribution program for municipal staff cycling and health care workers	CoW Marketing & Events, Dept. of Health	Medium-term
		3) Refurbish or source bicycles specifically designed for women	CoW Marketing & Events	Medium-term
		4) Provide bicycle training courses specifically for women	CoW Marketing & Events	Medium-term
		5) Provide general bicycle riding courses for the public <i>Teach range of competences perceived as necessary for cycling to work; including negotiating the 'dangerous' roads, managing and storing cycling gear when at work, managing personal hygiene and knowing what to wear + bicycle maintenance.</i>	CoW Marketing & Events	Medium-term
		6) Investigate bicycle distribution scheme for large private sector employees	CoW NMT Champion,	Short-term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
			Private Sector	

7. ADOPT PASS-WIDE LEGISLATION

We will engage with the MWT to review our current legislation. Road and transport legislation that is in support of NMT, specifically pass-wide legislation for cyclists, are proposed.

The Road Traffic and Transport Act of 1999 (Act 22 of 1999) was enacted to provide for the establishment of the Transportation Commission of Namibia, for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto. This piece of legislation provides some reference to NMT infrastructure and NMT users but regulation is mainly limited to road signage and specific regulations that govern NMT behaviour and principles of universal design are not incorporated.



Figure 7-1: Schematic for overtaking within 1m of a cyclist

Develop and adopt pass-wide legislation for cyclists

Road and transport legislation that is in support of NMT movement within the road reserves are proposed. A specific strategy is proposed to develop and adopt pass-wide legislation for cyclists. Key elements include the duties of motorists and cyclists¹¹.

- ◆ Motorists may not come closer than 1m to a cyclist
- ◆ Cyclists may not ride abreast of other cyclists, unless they are overtaking another cyclist.

The associated projects are included below in.



Figure 7-2: Example of passing within 1m of a cyclist

Projects and programs

The associated projects are included below in Table 7-1.

Table 7-1: Projects and Programs – Legislation

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Legislation	Adopt pass-wide legislation for cyclists	1) Amend traffic regulations that favour pedestrians and bicyclists, placing the burden of proof on drivers in case of collisions	MWT	Medium to Long-term
		2) Introduce and enforce zero-tolerance law enforcement and increased penalties for motorists, pedestrians, and cyclists who violate traffic regulations	MWT	Long-term
		3) Introduce 1m passing distance between motor vehicle and bicycle	MWT	Long-term

8. IMPROVED PEDESTRIAN SAFETY ACROSS THE WESTERN BY-PASS

Western By-Pass was identified as a barrier to NMT movement from primarily the north-western communities to economic, social and educational opportunities located on the eastern side of the Western By-Pass, resulting in unsafe pedestrian crossing behaviour with the majority of pedestrians crossing the Western By-Pass informally. Safety crossing facilities of the Western By-Pass is required.

The Western By-pass was identified as a barrier to NMT movement from primarily the north-western communities to economic, social and educational opportunities located on the eastern side of the Western By-pass, resulting in unsafe pedestrian crossing behaviour with the majority of pedestrians crossing the Western By-pass informally, especially for pedestrian desire lines across the Western By-pass, north of Independence Avenue.

Pedestrian surveys across the WESTERN BY-PASS indicate that 52% of all crossing movements at the WESTERN BY-PASS are informal.

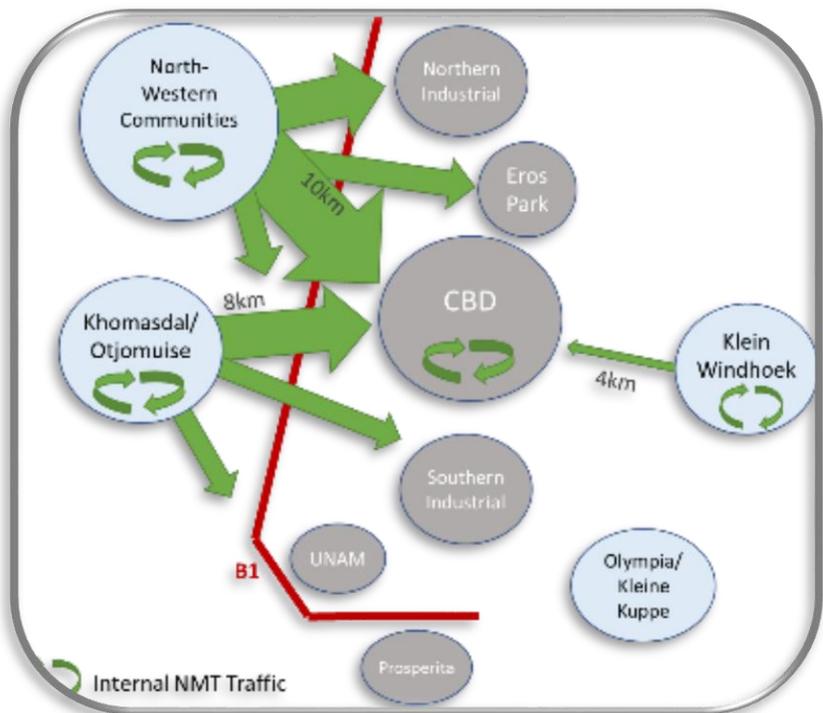


Figure 8-1: More significant pedestrian desire lines, generators and attractors across Windhoek

Pedestrians cross along their movement desired line, in the straightest direct route and, specifically male pedestrians, do not adhere to, or use crossings provided. Pedestrians are likely to cross in other unsafe locations away from the formal crossings and/or a position not expected by motorists, which increases the likelihood of pedestrian crashes. Many informal footpaths were observed, indicating the routes that pedestrians favour to cross the Western Bypass.

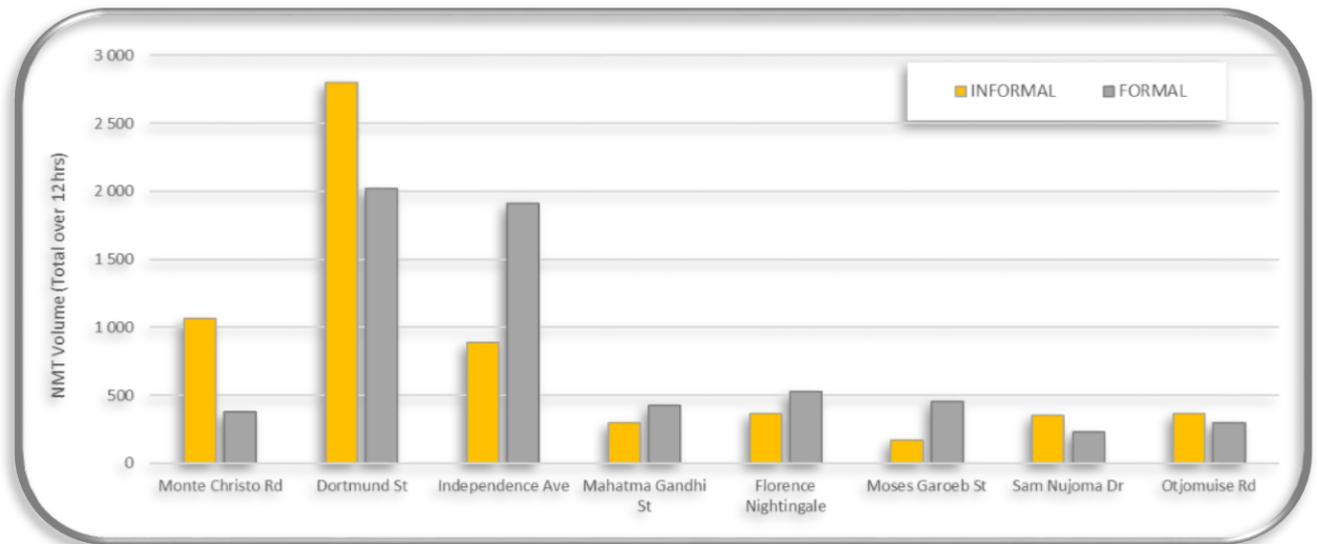


Figure 8-2: Comparison of Formal and Informal NMT Crossing Volumes at the Western By-pass (total 12hrs, both directions)

Pedestrian surveys were done of pedestrians crossing the Western By-pass. More than the majority of all NMT users are men. Strikingly, woman and children prefer formal crossing opportunities.

There is only a small share of cyclists (4% of all NMT users surveyed at the Western By-pass counting sites), and more than 70% of them cross using formal crossings.

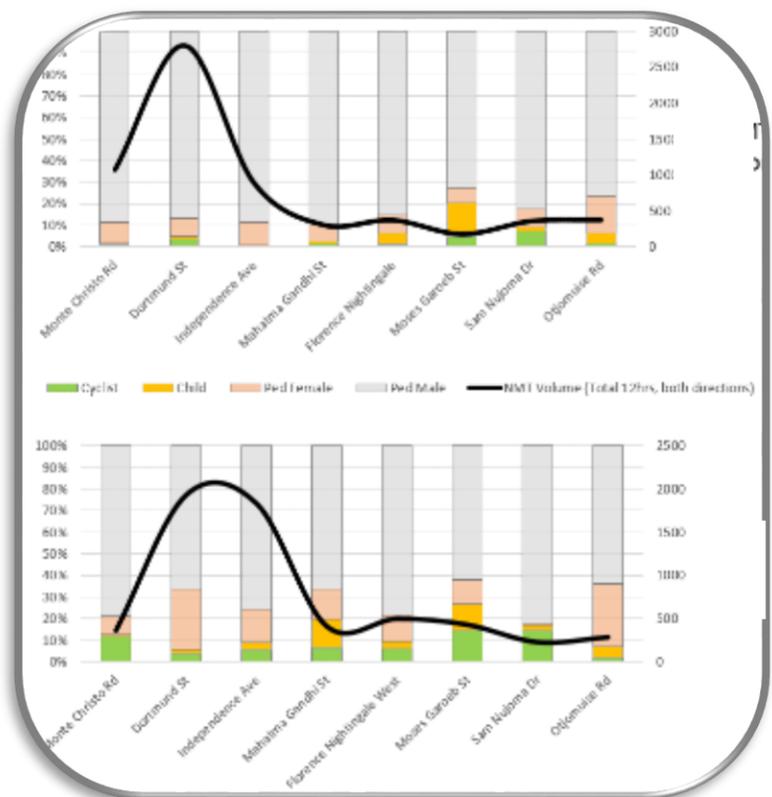


Figure 8-3: Age and Gender Profile of NMT User at the Western By-pass (12 hour volume count)

Table 8-1: Cyclists crossing the Western By-pass

Western By-pass Crossing Location	Cyclists Formal	Cyclists Informal	Percentage Informal
Monte Christo Rd	42	13	24%
Dortmund St	73	89	55%
Independence Ave	104	3	3%
Mahatma Gandhi St	27	4	13%
Florence Nightingale	31	4	11%
Moses Garoeb St	62	8	11%
Sam Nujoma Dr	33	25	43%
Otjomuise Rd	5	6	55%
TOTAL	377	152	29%

Reasons for crossing Western By-pass informally

The majority of all 545 pedestrians asked (a sample of 7% of all NMT users who daily cross informally) indicated that they cross the Western By-pass informally because it is convenient, i.e. they choose to take the most direct and short route. It is interesting, that a quarter of all respondents mentioned the lack of formal crossing points. So, it seems that the general perception is that using the formal crossing opportunities would mean too much of a detour and/or that the crossings are too far from the next / adjacent crossing opportunity. The survey revealed further the impact that social behaviour and habit has; 13% indicated that they cross informally because their friends also do it.

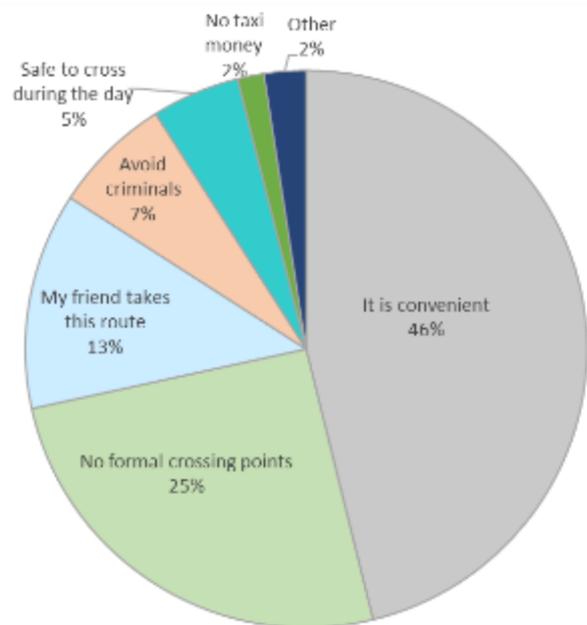


Figure 8-4: Reasons for crossing the Western By-pass informally

Other aspects mentioned include the following:

- ◆ Avoiding criminal activity (risk of being robbed). There seems to be a problem with criminal activity at the long distance PT interchange at Independence Avenue (Western By-pass City Mall), which is one reason why people prefer to cross informally between Dortmund Street and Independence Avenue.
- ◆ It is safe to cross during the day.

- ◆ No means to afford PT, and
- ◆ Proximity to transport drop-off/pick-up.

Trip Purpose when crossing Western By-pass

The majority of people crossing the Western By-pass informally are on their way to work or heading back home.

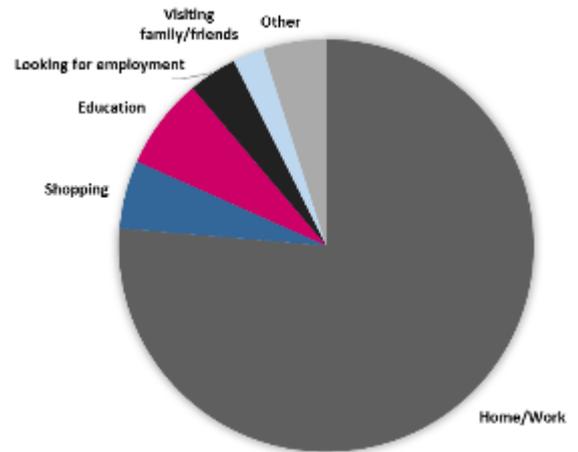


Figure 8-5: Trip Purpose when crossing Western By-pass

Provision of safe crossing facilities and direct connections across and along the Western By-pass.

Safe crossing facilities are of paramount importance, especially along the section of the Western By-pass between Independence Avenue and Monte Christo Road, with the volumes of pedestrians crossing the Western By-pass along this stretch of the Western By-pass.

The existing pedestrian crossing opportunities at the existing interchanges along the Western By-pass, must be investigated and NMT accessibility improved.

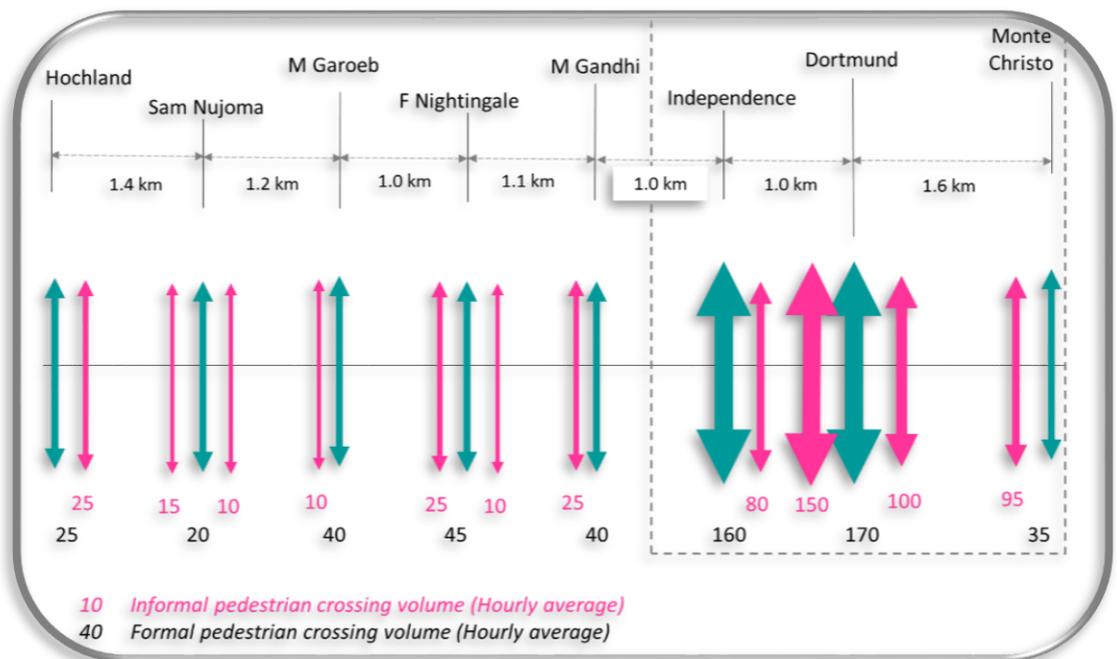


Figure 8-6: Pedestrians crossings across the Western By-pass

NMT crossing facilities (pedestrian bridges with ramps or bicycle chutes) that are located in line with established pedestrians' desire lines will be considered and implemented.

The RA has already investigated the feasibility of a safe NMT path and bridge across the Western By-pass just south of Dortmund Street. A draft proposal includes formalising the informal pedestrian paths leading to the proposed location of pedestrian bridge and providing a walkway and bicycle facility (two-way facility) outside the Western By-pass road reserve.¹²

Other pedestrian bridges across the Western By-pass at appropriate locations and serving significant NMT desire lines must be considered and implemented.

Restrict/discourage informal NMT crossings at the Western By-pass

Fences are used on national roads as a safety measure to prevent pedestrians and animals from entering the roadway. RA currently uses 5-wire fences for large stock areas and 8-wire fences for small stock areas and jackal-proof areas.

In urban areas palisade (steel and concrete) fencing can also be considered. However, pedestrians tend to make openings in almost any type of fence. The only fence that is rarely vandalised is a brick wall. In new developments adjacent to higher-order roads, the formalisation of land use adjacent to the road reserve through the establishment of formal housing/ development along the cadastral boundary with the Western By-pass and the erection of palisade/ brick walls, should be pursued.

Projects and Programs

The associated projects are included below in Table 8-2.

Table 8-2: Projects and Programs – Treatment of the Western By-pass

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
Treatment of the Western By-pass	Provision of safe crossing facilities and direct connections across and along the Western By-pass	1) Upgrade existing pedestrian bridges across the Western By-pass to improve NMT accessibility.	CoW Urban Planning	Short-Term
		2) Implement NMT crossing facilities (pedestrian bridges with ramps or bicycle chutes) that are located in line with established pedestrians' desire lines.	CoW Urban Planning, RA	Short-Term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
		<i>RA' Concept Design proposes a pedestrian bridge south of Dortmund St</i>		
		3) Formalise the informal pedestrian paths leading to the proposed location of pedestrian bridge	CoW Urban Planning, RA	Short-Term
		4) Provide a walkway and bicycle facility (two-way facility) outside the Western By-pass road reserve <i>This must be located on the western side, separated by a boundary wall (ClearVu-fence). NMT path to terminate at Mandume Ndemufayo.</i>	CoW Urban Planning, RA	Medium-Term
		5) Improve the pedestrian accessibility at existing interchanges across the Western Bypass		
	Restrict/Discourage informal NMT crossings at the Western By-pass	6) Formalise the boundary through fencing (brick walls) or through the establishment of formal housing/ development along the cadastral boundary with the Western By-pass <i>Where this is not possible, ClearVu fencing or another similar product should be used, but the underside should be encased in concrete.</i>	CoW Urban Planning, RA	Medium-Term

9. IMPROVED PUBLIC TRANSPORT SERVICES

A working public transport system, supported by an inter-connected NMT network that will connect to these new developments is essential to provide the community with the necessary flexibility to travel around the City.

The north-western urban expansion in Windhoek requires substantial bulk infrastructure investments. It is anticipated that most of the large developments would take approximately two decades to fully develop. Since the future developments are located far away from the CBD and current social facilities and amenities, the intention is that the full range of urban facilities and amenities would be available inside the development and commuter dependency to outlying areas would be significantly less. Nonetheless, existing movement patterns and places of work will not change overnight. NMT movement between the northern communities across the Western By-pass can also be expected. Accordingly, a working PT system, supported by an inter-connected NMT network that will connect to these new developments is essential to provide the community with the necessary flexibility to travel around the City.



Figure 9-1: MoveWindhoek Bus

In public meetings a significant consideration for improving NMT movement for communities in the north-western communities specifically, was to improve the provision of public transport services to penetrate the communities as the current walking distances from the outlying informal areas to public transport boarding and alighting points are too far.

Strategies proposed focuses on reducing the NMT walking distance by expanding public transport into informal areas and the potential provision of subsidized learner transport for outlying communities.

Reduce NMT walking distance by expanding public transport into informal areas and into new developments in the North-West

The current PT operations comprise of the municipal bus service of currently 7 lines, sedan taxi and minibus operations. The CoW operates the public passenger bus service, which is rated poorly by the users (2016 survey). This is mainly due to inefficient operations, characterised by:

- ◆ Low frequency (AM/PM peak services only, overcrowding in-vehicle),
- ◆ Unreliable service (poor on time performance),
- ◆ Poor service coverage (Stops closer to home and work),
- ◆ In-vehicle comfort as well as experience of waiting time,
- ◆ Lack of route connectivity,
- ◆ Lack of NMT provision at bus stop/along route, and
- ◆ General issues around quality and comfort of the service.

Overall, the City plans to operate 14 bus lines, with the rollout envisaged for 2018. One component of the SUTMP is the implementation of the “Move Windhoek” project, which is driving the process of developing new and modified bus routes and an operational concept that results in an integrated bus network while integrating the taxi industry as well. The project will also modernise the bus fleet and procure new busses.

Once all 14 routes are operational, most of CoW’s municipal area will be covered. However, the quality of the service (frequency, stop spacing, travel time, etc.) will determine the success of it. Especially the pricing

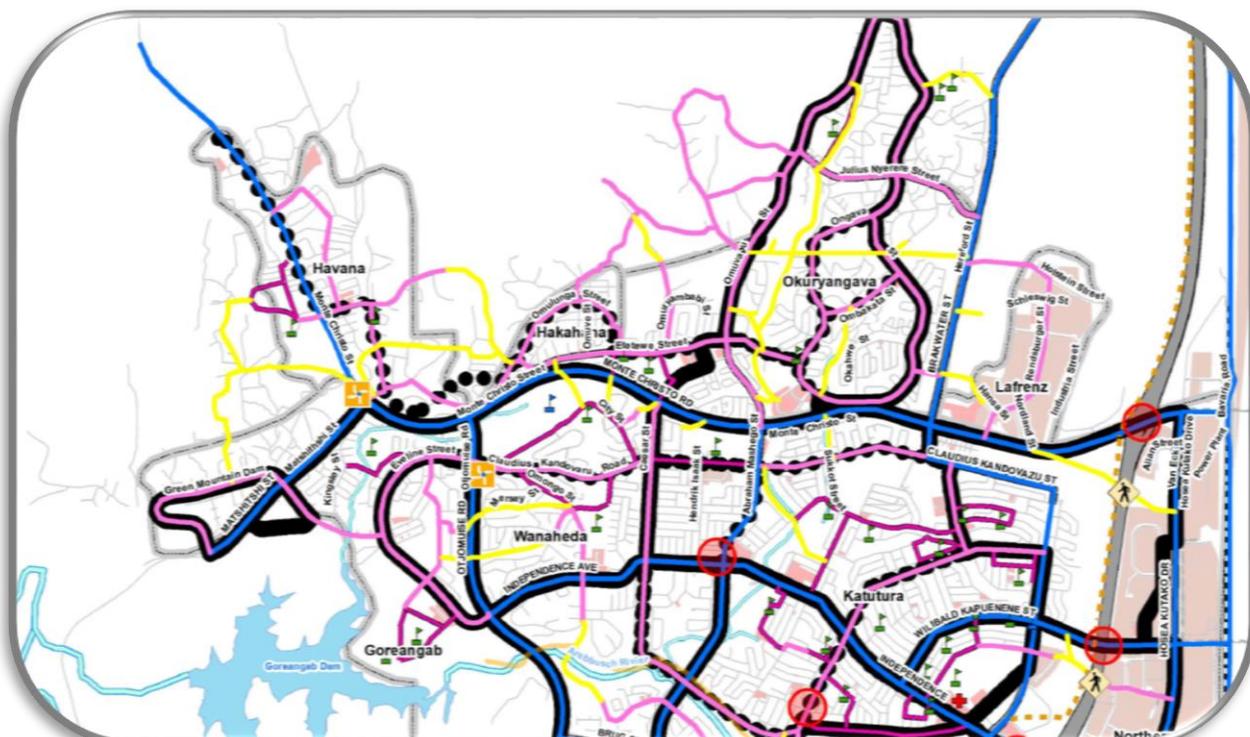


Figure 9-2: Proposed public transport services in the north-western parts of Windhoek

scheme is of utmost importance to make it an inclusive service. It is desired that the future PT network operate in such a way so that it reduces the burden of many people who currently have to cover long distances by foot, often reliant/choosing routes that are unsafe. Ideally, the future pedestrian network should supplement the PT routes; i.e. providing access to the closest PT stop.

Subsidized learner transport for outlying communities

At public meetings, people expressed their concerns about scholars having to walk long distances to get public transport to take them to school. This takes a long time and scholars are also faced with the challenges of using the unsafe roads. Subsidized learner transport for those scholars in outlying communities would assist in reducing the impact of transport, but also improves the safety of scholars on their way to school.

Projects and Programs

The associated projects are included below in Table 9-1.

Table 9-1: Projects and Programs – Public Transport Service

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Public transport service	Reduce NMT walking distance by expanding PT services into informal areas and north-western parts of Windhoek	1) Provide PT stops closer to informal settlements	CoW	Medium-Term
		2) Provide public transport services as outlined for Windhoek in the SUTMP	CoW, MWT	Medium-Term
	Provide subsidized learner transport for outlying communities	3) Investigate the feasibility of learner transport for outlying informal communities	MWT, Department of Education	Long-Term

10. TRANSPORT OPERATIONS TO PRIORITIZE NMT USERS

Current road usage is such that generally vehicles have priority over pedestrians and other NMT users in the urban street network. Providing priority for NMT users at certain pedestrian attractors and generators at certain locations will improve safety for NMT users, but also increase the awareness of the needs of NMT users.

Current transport operations at intersections do not support NMT movement and adds to road safety concerns for pedestrians and cyclists. Particular areas of concern includes the available green time for pedestrian crossings and the conflict between pedestrian crossing movements across left-turn sliplanes at signalised intersection.

The following strategies are proposed to mitigate this:

- ◆ Introduce priority for NMT users at certain intersections in areas where pedestrian movements are significant.
- ◆ Improve pedestrian safety at pedestrian crossing areas (intersections and mid-block pedestrian crossing locations)
- ◆ Restrict on-street parking progressively over time in certain areas with high volumes of pedestrian movement and while doing so, widen the pedestrian sidewalks.

Priority for NMT users at certain intersections in areas where pedestrian movements are significant

Particular areas where NMT should receive priority include CBD environments, the street network around significant public transport interchanges, taxi ranks and train stations.

Improve pedestrian safety at pedestrian crossing areas

The various hazardous locations for pedestrians in Windhoek has been mapped. Pedestrian safety measures should be introduced at these locations. Elements to consider include:

- ◆ Infrastructure such as pedestrian crossings, signage, pedestrian push-buttons, waiting areas, sidewalks, pedestrian crossings, etc.

- ◆ Increase the length of green time available for pedestrian crossing, investigating the warrants for signalised pedestrian crossings
- ◆ Introduce pedestrian safety information at high volume pedestrian crossing locations to encourage safe crossing behaviour. Examples include pedestrian stickers on traffic light poles and information signage boards
- ◆ Investigate the need for left-turn sliplanes at certain signalized intersections. Reconfigure the identified intersections where left-turn sliplanes are not warranted and where required, introduce appropriate pedestrian crossing facilities. The latter includes pedestrian crossing across the sliplane that are signalised, yield to pedestrians, guidelines, etc.

Restrict on-street parking progressively over time

Parking is an effective tool in the “toolkit” of travel demand management strategies since parking is an essential aspect of private vehicle trips. Parking management strategies incorporates the reduction of available free parking places, especially in locations served by congested routes. Over and

There is also an acknowledgement that streets generally need to function as multi-functional urban spaces. Accordingly, strategies for transforming existing streets into better functioning spaces, need to define the different activity zones and their location within such a street space.

Street kerbs can be relocated and have the potential to host a wide variety of uses beyond parking. For example, on-street parking spaces or kerbside travel lanes may be converted to bus lanes or cycle tracks. Two to four parking spaces can be replaced with a parklet or bike corral. On

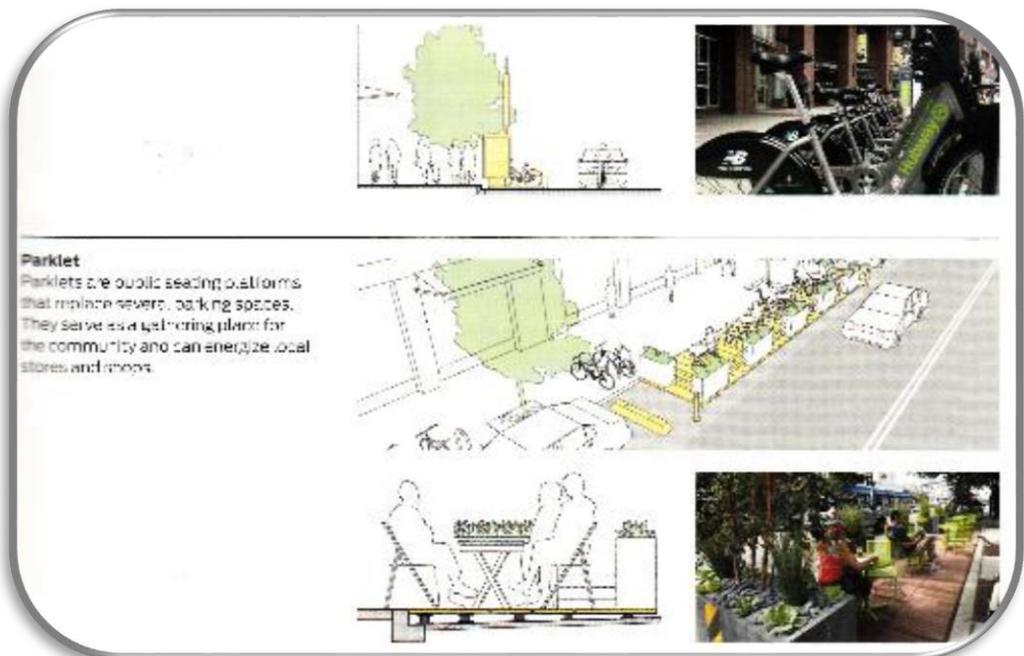


Figure 10-1: Moving the Kerb

weekends or at lunchtime

kerbside areas can host food trucks or vendors that activate street life and create a destination within the street¹³. In addition, consider traffic calming elements, such as pinch points, which alert the user that they are entering a special space within the overall streetscape pattern.

Projects and Programs

The associated projects are included below in Table 10-1.

Table 10-1: Projects and Programs – Transport Operations

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Transport Operations	Introduce priority for NMT users at certain intersections in areas where pedestrian movements are significant	1) Closing-off of Independence Ave on every first Sunday a month	CoW	Long-Term
	Improve pedestrian safety at pedestrian crossing areas (intersections and mid-block pedestrian crossing locations)	2) Identify a list of intersections from the hazloc list with pedestrian safety concerns	CoW Urban Planning	Short-Term
		3) Introduce pedestrian safety remedial measures at the targeted intersections <i>Elements to consider include increase the length of green time available for pedestrian crossing, investigating the warrants for signalised pedestrian crossings</i>	CoW Urban Planning	Short-Term
		4) Introduce pedestrian safety information at high volume pedestrian crossing locations to encourage safe crossing behaviour. <i>Examples include pedestrian stickers on traffic light poles and information signage boards</i>	CoW Urban Planning	Short-Term
		5) Investigate the need for left-turn sliplanes at certain signalized intersections <i>Identify 5 intersections from the list of hazlocs and start the required investigations</i>	CoW Urban Planning	Medium-Term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
		<p>6) Reconfigure the identified intersections where left-turn sliplanes are not warranted and where required, introduce appropriate pedestrian crossing facilities</p> <p><i>The latter includes pedestrian crossing across the sliplane that are signalised, yield to pedestrians, guidelines, etc.</i></p>	<p>CoW Urban Planning</p>	<p>Medium-Term</p>
	<p>Restrict on-street parking progressively over time in certain areas with high volumes of pedestrian movement and while doing so, widen the pedestrian sidewalks</p>	<p>7) Identify 5 locations in the CBD and remove the parking and widen the sidewalks progressively over a period.</p> <p><i>This must be undertaken over a period of 10 years in the priority areas. Each time 3-5 bays can be removed and sidewalks widened.</i></p>	<p>CoW Urban Planning, Infrastructure and Traffic Department</p>	<p>Medium-Term</p>

11. LAND USE PLANNING TOWARDS QUALITY URBAN ENVIRONMENTS

Land use plays a critical role in the allocation of space to both movement and other infrastructure services. A necessary component of successful NMT and active urban areas is a public realm which is welcoming to pedestrians. In most cases this public realm is the street. Thus, the manner in which roads and surrounding land uses are structured have critical implications for the quality, and success of urban environments.

Broad land use structure plays a role in creating areas of intensity at junctions where people congregate. The creation of these spaces allows the implementation of viable transport alternatives to vehicular travel. Thus, NMT should be used to create movement networks that prioritise people over vehicles in streets. This will create public-private interfaces that are viable for a multitude of activities, and not only high-speed mobility. The resultant urban environment in places like these is much more likely to be one that people interact in and want to be.

The treatment of NMT in the planning and implementation of new developments, as well as with the implementation of an improved public transport system in Windhoek has been identified as opportunities to incorporate NMT.

Strategies proposed are as follows:

- ◆ Incorporate NMT planning at new developments (new residential developments and formalisation of informal areas)
- ◆ Developers contributing towards NMT infrastructure

Preparation of NMT Network Plans for new living areas

The CoW is projected to expand northwards towards Brakwater and neighbouring Okahandja due to scarcity of land (mixed residential and industrial use) in the south as it is too mountainous and costly to develop. Future developments are depicted in Figure 11-1 and are summarised below:

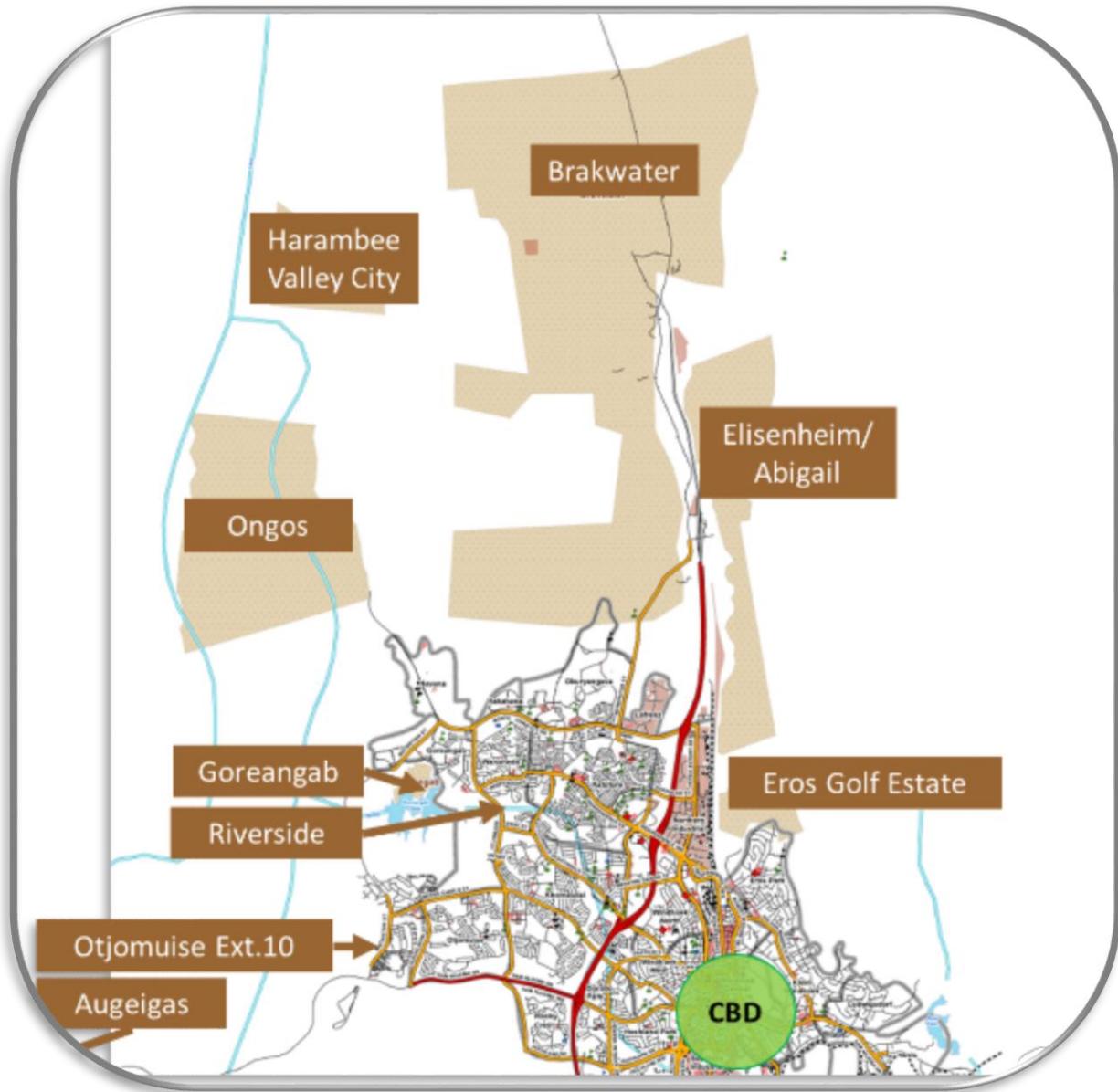


Figure 11-1: Windhoek - Extent of the urban expansion to the north and north-west of Windhoek

The north-western expansion requires substantial bulk infrastructure investments. It is anticipated that most of the large developments would take approximately two decades to fully develop. Since the future developments are located far away from the CBD and current social facilities and amenities, the intention is that the full range of urban facilities and amenities would be available inside the development and commuter dependency to outlying areas would be significantly less. Nonetheless, existing movement patterns and places of work will not change overnight, and a working PT system, supported by an inter-connected NMT network that will connect to these new developments is essential to provide the community with the necessary flexibility to travel around the City. Again, it is of importance that social trips, school trips and access to civic amenities are provided for.

Crossing opportunities over the Western By-pass need to be ensured not only for vehicular traffic but also for NMT. Therefore, safe pedestrian crossings of the Western By-pass north of Monte Christo Roads must be included in the roads masterplanning to accommodate the northwards expansion.

The proposed future PT system does not (yet) extend to any of the future developments in the north, which needs to be addressed in the next update of the SUTMP.

In the **planning of new developments** in Windhoek NMT design principles must be adhered. The NMT movement to and from the site and within the site should be clearly understood and the appropriate infrastructure should be provided.

- ◆ Identify the significant pedestrian attractors and generators within the development as well as the surrounding areas. These typically include schools, clinics, places of work, shops and markets, public transport interchanges or stops, sports fields/ stadiums, etc.
- ◆ Identify locations for schools and areas where Safe Routes to Schools must be considered
- ◆ Identify the most likely pedestrian desire lines
- ◆ Identify the likely crossing of high-speed mobility routes and assess the likelihood that grade-separated pedestrian facilities might be required.
- ◆ Review the Windhoek NMT Network and identify possible connections between the new development and the existing NMT Network Plan
- ◆ Propose NMT infrastructure in accordance with the expected pedestrian desire lines and possible connections to the NMT Network Plan. This includes pedestrian and cycle paths, pedestrian crossings.
- ◆ Also consider elements in the proposed road network that might give rise to speeding (i.e. Long straight roads) and consider the most appropriate traffic calming for implementation.
- ◆ Ensure that the road reserves are appropriate to accommodate planned roads and streets, as well as the NMT infrastructure.
- ◆ Also, identify the new roads required to connect to the existing roads in the region (if not already included in the Roads Masterplan for CoW). NMT facilities should be provided if a pedestrian desire line or the need to cross roads are expected.

Preparation of NMT Networks in informal areas

The CoW has seen significant urbanisation in Windhoek in recent years and without the associated rapid investment in social and economic infrastructure such as houses and roads; it has resulted in the spread of informal settlement areas to the north and west of Katutura.

NMT provision in informal areas is challenged by the lack of appropriate land use planning and the establishment of the township layout and appropriate land ownership. Challenges include formalising existing pedestrian desire

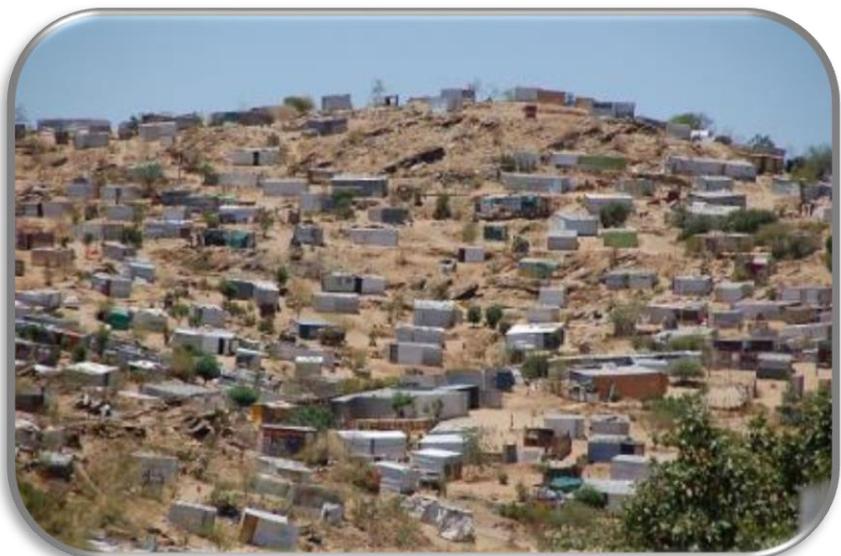


Figure 11-2: Informal settlement areas north of Katutura, Windhoek

lines in the absence of overall land use planning as it might result in abortive investment in infrastructure, as well as providing infrastructure on land that is not zoned road reserve, public right of way or public open space.

However, this lack of formal planning should not detract from the NMT needs of the local residents. The informal settlements must be formalised and the necessary NMT networks be developed, along with the required investments in bulk infrastructure. Alternatively, NMT infrastructure should be provided in the interim. The following steps should be followed should it be agreed that NMT infrastructure be provided in the interim, prior to the formalisation of the informal settlement:

- ◆ Identify the significant pedestrian attractors and generators (spaza shops, markets, public transport collection points, sports fields, etc.)
- ◆ Identify the more significant existing desire lines
- ◆ Formalise and establish NMT paths in the interim
- ◆ Once formalisation of informal area is undertaken these routes are either confirmed and reinforced in new township layout OR amended and paths are removed in favour of new street network that includes NMT facilities

Developers contributing towards NMT infrastructure towards NMT Infrastructure

Typically, with new developments a Traffic / Transport Impact Assessment (TIA) must be undertaken. The transport impacts of the developments are modelled and proposed remedial measures are identified to mitigate the impact of the proposed development. Developers then typically finance the implementation of the remedial measures.

Along with financing the new roads or improvements to roads required, developers will also finance the NMT related infrastructure required to mitigate the impact expected from new pedestrian desire lines formed. These include the following:

- ◆ The internal NMT movement must be assessed and internal pedestrian desire lines identified.
- ◆ Appropriate infrastructure must be proposed along these desires to ensure universal accessibility.
- ◆ Sidewalks must be provided along the frontage of the development.
- ◆ Provision of sidewalks and portions of the bicycle network along desire lines created.
- ◆ Provision of pedestrian bridges when new pedestrian desire lines across freeways can be expected.
- ◆ In doing so, new developers should contribute to the completion of parts of the NMT Network impacted by the proposed development.
- ◆ Affected intersections to be converted to intersections that are universally accessible; i.e. Implement dropped kerbs and pedestrian crossings, where required and signalised intersections should have pedestrian push-buttons.

NMT at future public transport stops and stations

Public transport stops, stations, and the surrounding areas must be designed keeping NMT requirements and universal accessibility in mind. The treatment areas include the areas around the public transport stops and stations, as well as the treatment along the public transport links. In the implementation of public transport services, routes and stops, universal accessibility should be considered. This must be done as follows:

- ◆ For at least 200m around a public transport stop/ station.
- ◆ All routes within 500m from a public transport interchange through the implementation of the identified portions of the CoW NMT Network and converting surrounding intersections to be universally accessible; i.e. Implement dropped kerbs and pedestrian crossings, where required and signalised intersections should have pedestrian push-buttons.

Projects and Programs

In response to the strategies, the following projects listed in Table 11-1 are proposed.

Table 11-1: Projects and Programs – Land Use Planning at Future Nodes

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Land use planning at future development nodes	Incorporate NMT planning at new developments and when formalising informal areas	1) Check that the NMT network planning and the identification of appropriate remedial measures are addressed in the development TIA and in the Site Development Plan (SDP) for the development.	CoW Town Planning / Private Sector	Short- to Medium-Term
	Developers contributing towards NMT infrastructure	2) Develop a policy enabling developers to contribute towards NMT infrastructure	CoW Urban Planning	Medium-Term
	Integrate NMT at public transport stops and stations	3) Ensure PT networks extend up to new developments	CoW Infrastructure	Medium-Term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
		4) NMT paths of reasonable lengths to PT stops should be implemented by private developers where warranted.	CoW: Urban Planning, Private sector	Short- to Medium-Term
		5) NMT network feeding new public transport stops and stations to be developed along with public transport operations and infrastructure planning	CoW: Infrastructure	Medium-Term

12. LAW ENFORCEMENT

City of Windhoek applies a zero-tolerance approach towards unsafe driving behaviour

Law enforcement is a key component of any road safety intervention for the NMT environment in Windhoek. During consultation sessions, the lack of law enforcement with matters relating to NMT road safety was raised as a particular concern. Consultations with officials from law enforcement sector indicated that some road safety programs are being introduced at schools in Windhoek, but the lack of capacity and funding is an obstacle.

A strategy advocating for a zero-tolerance approach to unsafe driving behaviour is proposed.

Enforce a zero-tolerance approach towards unsafe driving behavior

As part of improving road safety for pedestrians and cyclists, law enforcement has a significant role to play. Notwithstanding capacity concerns, a zero-tolerance approach should be applied with respect to road safety. An increase in traffic fines for certain pro-NMT offences and continuous training of officers about road traffic rules, rights of NMT users, hawker trading, etc. are particular activities that should be implemented.



Figure 12-1: Law enforcement activities of public transport vehicles

Improved visibility at pedestrian hazlocs during peak periods

A more positive intervention is for law enforcement officials to be present at pedestrian hazlocs during peak periods and to guide pedestrians and cyclists towards safe crossing behavior. The increased presence and visibility of law enforcement officials will also encourage more safe and lawful behavior of all users of the road environment.

Projects and Programs

The associated projects are included below in Table 12-1.

Table 12-1: Projects and Programs – Law Enforcement

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Law Enforcement	Zero tolerance approach to motorists	1) Introduce increased traffic fines for certain pro-NMT offences	CoW Traffic Police/ Namibia Police	Long-Term
	Education of traffic officers	2) Continuous training of officers about road traffic rules, rights of NMT users, hawker trading, etc.	CoW / Traffic Police/ Namibia Police	Short-Term
	Improved police visibility/surveillance at pedestrian hazlocs	3) Identify 5 pedestrian hazlocs and place traffic officials at these locations to do guide pedestrians and encourage safe crossing behaviour. <i>This must be undertaken on a regular basis to modify existing pedestrian crossing behaviour. For example, once a week.</i>	Traffic Police/ Namibia Police	Short-Term
		4) Monitor pedestrian road safety statistics at the identified pedestrian hazlocs	Traffic Police/	Short-Term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
			Namibia Police	

13. INTEGRATION AND COORDINATION OF AUTHORITIES' RESPONSE TO NMT MATTERS

CoW will consult with the Roads Authority and other relevant role-players such as the National Road Safety Council (NRSC) to discuss and confirm the challenges of pedestrian activity, public transport access along and crossing the Western By-pass in Windhoek, falling under the jurisdiction of the Roads Authority.

A more coordinated approach towards road safety and NMT implementation amongst authorities will improve the effectiveness of the implementation of the NMT strategies. This calls for the integration and coordination of activities of all of those involved in road safety and NMT implementation.

Strategies proposed include the following:

- ◆ Integrated implementation between authorities
- ◆ Integrated and coordinated implementation between specifically the CoW line departments, Urban Planning, Housing, Property Management and Human Settlements and Infrastructure, Water and Technical Services.
- ◆ Appointment of a NMT champion to drive integration and coordination with CoW, but also with other role-players, stakeholders and authorities.

Integrated implementation between authorities

CoW will consult with local transport and roads officials from the MWT, NRSC, the RA and other relevant role-players to discuss and confirm the challenges of pedestrian activity, public transport access along / crossing freeways, as well as the potential pedestrian desire lines of new developments across mobility routes. Impacts to consider include the informal settlement development and potential desire lines across mobility routes, as well as new development applications adjacent to freeways and the associated pedestrian desire lines with the provision of infrastructure.

Integrated and coordinated implementation between CoW line departments

Establish a CoW NMT Working Group lead by the NMT Champion of CoW, tasked with the coordinated effort of NMT implementation across the various line departments. Specific departments include Urban Planning, Housing, Property Management and Human Settlements, Infrastructure, Water and Technical Services and

Marketing and Events Management that forms part of the CEO’s Office. Monthly meetings to be held to discuss status of implementation, issues and challenges.

Appointment of a NMT champion

The NMT Champion should be identified from the current CoW organization structure and be appointed by the CEO and should also report to CEO. An inter-authority NMT Forum lead by the NMT Champion of CoW must be established and drive coordinated effort of NMT implementation across authorities. Bi-monthly meetings to be held to discuss status of implementation, issues and challenges

Projects and Programs

The associated projects are included below in Table 13-1.

Table 13-1: Projects and Programs – Integration and Coordination of Authorities

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/ long-term implementation)
Integration and Coordination of Authorities	Integrated implementation between authorities	1) Establish inter-authority NMT Forum lead by the NMT Champion of CoW <i>Coordinated effort of NMT implementation across authorities. Quarterly meetings to be held to discuss status of implementation, issues and challenges</i>	CoW NMT Champion, RA, MWT	Short-Term
	Integrated and coordinated implementation between CoW line departments	2) Establish CoW NMT Working Group lead by the NMT Champion of CoW <i>Coordinated effort of NMT implementation across the various line departments (Urban Planning, Housing, Property Management and Infrastructure, Water and Technical Services). Monthly meetings to be held to discuss status of implementation, issues and challenges.</i>	CoW line departments	Short-Term
	Appointment of a NMT champion	3) Refer to roles and responsibilities in section 16.	CoW CEO	Short-Term

14. PRIVATE SECTOR CAN PARTICIPATE IN IMPLEMENTING NMT

CoW will consult with the Private Sector, identify and create opportunities for the private sector to participate in the implementation of NMT services and infrastructure across Windhoek.

Along with targeting an integrated and coordinated approach towards NMT implementation, the role of the private sector in supporting this strategy and participating in the implementation thereof, should not be overlooked. In fact, it opportunities should be identified and created for the private sector to participate in the implementation of NMT services and infrastructure across Windhoek.

Facilitate cycling programs for large employers to encourage staff to cycle to work

Large Employers should be supported to encourage staff to cycle to work or only on 1-2 days a week. The CoW should develop an information booklet for large employers how to go about establishing such a program. Elements to consider include:

- ◆ Which employees can or will participate?
- ◆ Can staff afford bicycles or can employers sponsor bicycles?
- ◆ What supporting infrastructure is required at work (lockers, bicycle parking, bicycle maintenance facilities, showers and lockers)?
- ◆ How can staff be incentivised to participate? Possible incentives include free bicycle checks by partnering with a local NGO or bicycle shop to do a regular bicycle check, free helmets, sponsorship for certain local cycle events, free lunch once a week or a 30min-1hr reduction in the workweek.
- ◆ What organisational support is required? This includes free bicycle parking, a guaranteed lift home during bad weather, administrative staff to manage incentive programs and a partnership with CoW and possible bicycle-friendly NGOs.

The CoW should also establish a partnership with the participating employers to provide support where required, establish a communication channel which will also enable monitoring of cycling of staff to work.

Bicycle distribution via large employers and NGOs in Windhoek

CoW should also investigate the feasibility of a Large Employers Bicycle Distribution Program as part of creating increased awareness of cycling as a form sustainable form of transport. New bicycles are very expensive and in discussions with the public, concerns about the affordability of bicycles was raised. Bicycle distribution schemes involving the private sector must be investigated to determine if more affordable bicycles can be sourced or sponsored and then distributed via large employer schemes or NGOs.

CoW must also identify potential large employers and establish a partnership for the implementation of such a program. NGO must also be identified and supported in their current operations of sourcing second-hand bicycles for further distribution in CoW.

NMT infrastructure roll-out as part of new developments

Developers will incorporate into their development the NMT-related infrastructure required to mitigate the impact expected from new pedestrian desire lines formed. Accordingly, it must be considered when undertaking Transport Impact Assessments for developments, remedial measures identified and those NMT-related infrastructures also included. This includes sidewalks, bicycle facilities, pedestrian crossings, bridges, and pedestrian provision at intersections at accesses.

Provision of bicycle parking

The private sector can also introduce bicycle parking at shopping centres, gyms and at residential developments.

Projects and Programs

The associated projects are included below in Table 14-1.

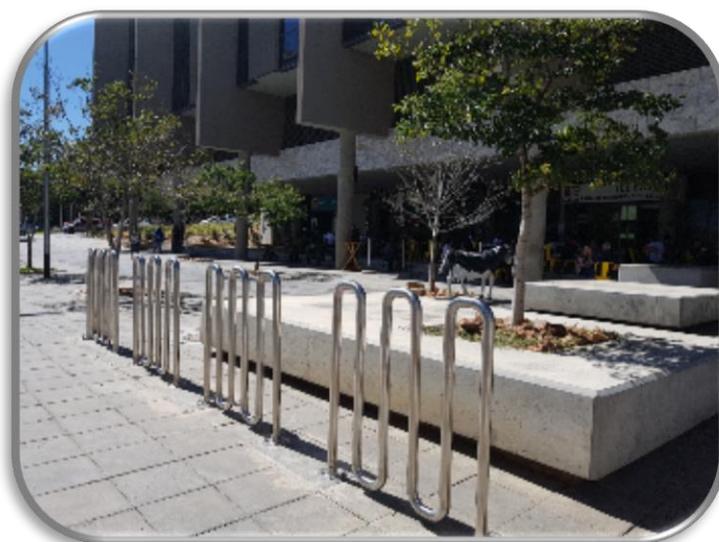


Figure 14-1: Bicycle parking along Robert Mugabe Road, Windhoek CBD

Table 14-1: Projects and Programs – Role of the Private Sector

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Roles & Responsibilities	Priority (short-term/long-term implementation)
Role of the Private Sector	Facilitate cycling programs for large employees to encourage staff to cycle	1) Private sector to encourage and motivate their employees to start cycling to work 1-2 days a week. 2) CoW should develop information booklet for large employers how to go about establishing a cycling program.	Private sector CoW	Short-Term
	Bicycle distribution via large employers within Windhoek	3) Investigate the feasibility of large employers bicycle distribution program	CoW NMT Champion	Short-Term
		4) Identify large employers and establish a partnership for the implementation thereof	CoW NMT Champion	Medium-Term
		5) Identify and source bicycles via NGOs	CoW NMT Champion	Medium-Term
	NMT infrastructure roll-out as part of new developments	6) Refer to section 11	Private sector	Short-Term
	Provision of bicycle parking	7) The provision of bicycle parking to be included as part of conditions of approval of new developments. <i>Private sector must be encouraged to provide bicycle parking at shopping centres, gym, office blocks, etc.</i>	Private sector	Short-Term

15. INCREASED AWARENESS AND MARKETING OF NMT

The community of Windhoek must be persuaded that “NMT is a safe and acceptable form of transport available to all for various trip purposes”. This message must be conveyed to external stakeholders (greater community of Windhoek) and internal stakeholders (officials of City of Windhoek, Ministry of Works and Transport and the Roads Authority) responsible for the implementation of the NMT Strategy.

Various perceptions have been identified that acts as barriers to NMT and cycling specifically. These include:

- ◆ Windhoek is too hilly for cycling
- ◆ Roads are unsafe
- ◆ Cycling is not for women
- ◆ Poor people walk and cycle
- ◆ Cycling is a recreational sport for people who can afford bicycles
- ◆ Unsafe road safety behaviour from different people (pedestrians and drivers of motorised vehicles)
- ◆ General prioritisation of the needs of motorised traffic over the needs of NMT of users.

Develop a targeted message to the broader Windhoek Community, as well as within CoW

The community of Windhoek must be persuaded that NMT is a safe and acceptable form of transport. A targeted message and campaign must be developed that responds to the various target audience and the key message that should be directed to them.

Other strategies include:

- ◆ Build awareness for the NMT project
- ◆ Secure the commitment of those responsible for implementing NMT
- ◆ Support the marketing and communications in other initiatives identified in other focus areas

Objectives of communication to the external community (greater community of Windhoek)

- ◆ Build awareness of the project to implement the Phase 1 NMT Network
- ◆ Build awareness of and increase respect for NMT users
- ◆ Influence the perception of NMT as a transport mode
- ◆ Encourage women to cycle
- ◆ Encourage safe road use (drivers, cyclists and pedestrians)

Objectives of communication to the internal community (officials of City of Windhoek, Ministry of Works and Transport and the Roads Authority)

- ◆ Secure the commitment of those responsible for implementing the Phase 1 NMT network
- ◆ Develop understanding of the needs of NMT users
- ◆ Influence policy-making and budgeting

The target audiences for communication are included in Table 15-1.

Table 15-1: Target audiences for communication

Target audience in Windhoek Community (external)	Target audience in Windhoek Authority (internal)
Learners	Officials of City of Windhoek involved in Transport Planning, Urban Planning, Infrastructure, Town planning, Parks
Women	Officials of Ministry of Works and Transport
Pedestrians	Officials of Ministry of Urban and Rural Development
Public transport users	Officials of Roads Authority
Recreational cyclists	Political leadership that includes:
Motor vehicle drivers	◆ Mayor and Councillors of City of Windhoek
Public transport operators	◆ Minister of Works and Transport
	◆ Minister of Urban and Rural Development

Key message per Target Audience

Specific messages are developed for each target audience to pursue a more target communications approach. The specific message is derived from answering the following 4 questions:

- ◆ What is it that you want to change?
- ◆ What do you want the target audience to know?
- ◆ What do you want them to feel - what perception do you want to create?
- ◆ What do you want them to do - what action do you want as a result?

Communications mix

The following communication media is available for **external stakeholders**:

- ◆ Online (multi-media, social media, MoveWindhoek website)
- ◆ Press (community newspapers, municipal newsletters)
- ◆ Advertising (print, radio, advertising billboards, variable message signs)
- ◆ Print (pedestrian safety coloring book, pedestrian safety course material, booklets, stickers, network maps)
- ◆ Public relations (pedestrian safety course – pedestrian license, cycling events, public transport forum – women)

The following is specifically available for **internal stakeholders**:

- ◆ Conferences
- ◆ Workshops and courses
- ◆ Technical standards and policies aligned with the NMT Infrastructure Guideline
- ◆ Preparation of policies and regulations

The specific media available or applicable to the different external audiences are listed in Table 15-4.



Figure 15-1: Young child on a bike

Table 15-2: Key Message per External Target Audience

Target Audience	What is it that you want to change?	MESSAGE TO EXTERNAL TARGET AUDIENCE		
		What do you want the target audience to know?	What do you want them to feel - what perception do you want to create?	What do you want them to do - what action do you want as a result?
Learners	Road user behaviour	How to use the road safely. Cycling is acceptable. Increases health and well-being	Safe. Cycling is "cool"	Safe road use. Cycle to school
Women	Attitude towards cycling	How to use the road safely. Cycling is acceptable. Increases health and well-being	Safe. Cycling is not a cultural taboo. Healthy	Women must cycle
Pedestrians	Road user behaviour	How to use the road safely. Cycling is acceptable. Increases health and well-being	Confident in using the road environment. Safe. Cycling is "cool"	Use the road safely. Consider cycling as an alternative
Public transport users	Road user behaviour	Their needs also encourage unsafe behaviour by taxi drivers. Cycling is acceptable for short distances	Responsibility for creating a safer road environment. Safe.	Encourage drivers to stop at safe locations
Recreational cyclists	Perception that CoW is not addressing the needs of cyclists	CoW is responding to the needs of cyclists. CoW is working towards implementing a cycle network	Safe. Part of the transport system	Cycle safer. Use bicycle for commuting
Motor vehicle drivers	Attitude towards NMT users. Attitude that they own the roads. Perception that NMT is for poor people that cannot afford motorised transport	Roads do not belong to car drivers. NMT also use the roads. Cycling is "cool", cost effective, sustainable form of transport	Responsibility for creating a safer & "greener" road environment.	Safe road use. Consider cycling as an alternative

Target Audience	What is it that you want to change?	MESSAGE TO EXTERNAL TARGET AUDIENCE		
		What do you want the target audience to know?	What do you want them to feel - what perception do you want to create?	What do you want them to do - what action do you want as a result?
Public transport operators/ drivers	Attitude towards NMT users. Attitude that they own the roads	Their driving behaviour adds to making the road unsafe. NMT users are their customers	Responsibility for creating a safer road environment. They are assisting in keeping the clientele safe	Use the road safely
Advocacy groups	Perception that “nothing is being done”	CoW is doing something	Cycling forms part of the transport system. Acknowledged	Work with the CoW in implementing the NMT Network

Table 15-3: Key Message per Internal Target Audience

Target Audience	What is it that you want to change?	MESSAGE TO INTERNAL TARGET AUDIENCE		
		What do you want the target audience to know?	What do you want them to feel - what perception do you want to create?	What do you want them to do - what action do you want as a result?
Roads and Traffic	View that NMT is not priority	NMT design must form part of road design	Responsibility. NMT design and implementation must be prioritized	Implement Phase 1 of NMT Plan. Implement NMT facilities as part of other projects or roads initiatives
Roads-Maintenance	View that NMT implementation is a Traffic function	NMT facilities can be implemented as part of the road maintenance program	Responsibility. NMT design and implementation must be considered as part of road maintenance programs, where possible	Implement NMT facilities, where possible, as part of the maintenance program
Transport planning	View that NMT is not priority	NMT forms an integral part of any transport or urban development plan	Understanding that NMT forms part of the transport system and must be planned for	Include NMT planning in overall transport planning and public transport planning
Public transport (planning and operations)	View that NMT is not priority	NMT forms an integral part of any public transport plan or operations. Their customers are pedestrians at some point along their journey	Responsibility for the safety of their customer	Include NMT planning in public transport facility and operations planning. Contribute towards implementation
Planning/Spatial Development	View that NMT remedial measures is the responsibility of the local authority alone. Perceived bias towards car-orientated development	Private developers can and must contribute towards addressing NMT needs of their target market or staff	Addressing NMT considerations is important	Prioritize NMT issues in their review of develop proposals. Ensure that issues are addressed at building plan stage/ Site Development Plan stage

Target Audience	What is it that you want to change?	MESSAGE TO INTERNAL TARGET AUDIENCE		
		What do you want the target audience to know?	What do you want them to feel - what perception do you want to create?	What do you want them to do - what action do you want as a result?
Parks	Understanding of NMT requirements	Quality of NMT environment can be improved through their line function responsibilities	Responsibility. NMT design and implementation must be considered as part of Parks' programs, where possible	Implement NMT facilities, where possible, as part of the Parks' program
Ministry of Works and Transport	The traditional view that vehicles have priority	integrated and coordinated implementation will assist with the roll-out	A sense of responsibility. Working with CoW in implementing projects	Co-fund. Coordinate activities
Roads Authority	View that NMT users do not belong on or in the freeway	NMT users are crossing the Western By-pass and the unsafe crossing should be addressed	Acknowledge the use of NMT across the Western By-pass and address it. Cooperation with CoW	Co-fund. Coordinate activities
Mayor and Councillors of City of Windhoek	The traditional view that vehicles have priority	Pedestrians and cyclist form part of the transport system and their needs should be addressed. Adds to the health of the urban environment and the economy	NMT form part of the economic activities	Prioritize the funding for NMT
Minister of Works and Transport	The traditional view that vehicles have priority	Pedestrians and cyclist form part of the transport system and their needs should be addressed. Adds to the health of the urban environment and the economy	NMT form part of the economic activities	Prioritize the funding for NMT

Table 15-4: Communication Media applicable to the various users

Target Audience	External Users				
	Online	Press	Advertising	Print	Public relations
Learners	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Print, radio	Pedestrian safety colouring book. Pedestrian safety course material	Pedestrian safety course with "pedestrian license". Cycling events
Women	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Print, radio	Booklet on women cycling and cycle network pamphlet	Cycling events. Public transport forum. Women cycling initiatives
Pedestrians	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Television advert & program, radio, billboards	Cycle network pamphlet & safe road crossing pamphlet	Cycling events. Public transport forum
Public transport users	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Print, radio, billboards	Stickers for inside vehicles	Cycling events. Public transport forum
Recreational cyclists	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Print, radio	Cycle network pamphlet	Cycling events. Public transport forum
Motor vehicle drivers	Multimedia (video), social media	Community newspaper	Billboards, Variable Message Signboards, radio, television		
Public transport operators/ drivers	Multimedia (video), social media, MoveWindhoek website	Community newspaper	Billboards, Variable Message Signboards, Print, radio, television	Stickers for inside vehicles	Public transport forum. Safe public transport course for operators
Advocacy groups	Multimedia (video), social media, MoveWindhoek website			Cycle network pamphlet	Cycling events Public transport forums

Projects and Programs

The associated projects are included below in Table 15-5.

Table 15-5: Projects and Programs – Information and Marketing

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Roles & Responsibilities	Priority (short-term/ long-term implementation)
Information and Marketing	Develop a targeted message to the broader Windhoek Community, as well as within the CoW municipality	1) Procurement of a service provider to develop a marketing campaign	CoW CEO, NMT Champion and Marketing and Events Management Directorate	Short-term
		2) Development of a marketing campaign <i>Marketing campaign to pitch the “cool factor” of cycling. Consider the following:</i> <ul style="list-style-type: none"> ◆ Nam ownership, urban chic revival, specific and original branding for Windhoek aligned with MoveWindhoek ◆ Professional billboard campaign with innovative slogan/branding ◆ Identify popular public figure to use as champion for cycle programme, target specific groups of population but try to ensure that campaign is aimed at “all”. ◆ Ensure continuous funding for promotional activities. <i>The community of Windhoek must be persuaded that NMT is a safe and acceptable form of transport available to all for various trip purposes.</i>	CoW CEO, NMT Champion and Marketing and Events Management Directorate	Short-term
	Build awareness for the NMT project	3) Implementation of the marketing campaign projects	CoW CEO, NMT Champion and Marketing and Events Management Directorate	Short-to medium term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Roles & Responsibilities	Priority (short-term/long-term implementation)
			nt Directorate	
	Secure the commitment of those responsible for implementing NMT	4) Regularly participate in and host conferences, workshops and courses, develop technical standards and policies aligned with the NMT Infrastructure Guideline and preparation of policies and regulations	CoW CEO, NMT Champion and Marketing and Events Management Directorate	Short-to medium term
	Support the marketing and communications in other initiatives identified in other focus areas	5) Provide road safety education at schools and issue pedestrian/cycle licences as incentives <i>In order to motivate and get the early cooperation and attention of children, learners around 10 years old must be tested in proficiency of certain basic road safety skills and should be issued with a card that can be in the form of a “pedestrian licence”. This should act as an incentive and measure to create responsible citizens of the future. The aim of this will be to create a lifelong awareness amongst the children and make them responsible citizens, who will even have an impact on their parents and the way they act as road users.</i>	CoW Traffic Dept., NMT Champion and Marketing and Events Management Directorate	Medium-term
		6) Host an annual competition with “safe routes to school” where the CoW and the RA make available a certain budget to the school with the most innovative plan towards NMT implementation and the implementation of Safe Routes to Schools.	CoW Urban Planning, NMT Champion and Marketing and Events Management Directorate	Short-term

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Roles & Responsibilities	Priority (short-term/long-term implementation)
			nt Directorate	

16. SERVICES AND PROCEDURES FOR COW TO DRIVE NMT

The NMT Strategy for Windhoek requires a particular approach towards implementation. Although capacity concerns are expressed about implementing the NMT Strategy, it is not necessary to implement a separate organisational structure or implementation unit within CoW to implement the NMT strategy.

The goal of this strategy is to streamline and coordinate NMT implementation so that it can be undertaken by the CoW's existing organisational staff, with technical support from the NMT Champion and Program Manager, along with the participation of the MWT and Ministry of Urban and Rural Development (MURD).

The strategy proposed are as follows:

- ◆ Use the available capacity and expertise of the current organisation structure of the CoW.
- ◆ Train and develop the existing staff to implement the NMT Strategy
- ◆ Identify the roles and responsibilities of the MWT, MURD and RA

Apply available resources via existing organizational structure

A review of the CoW indicates a particular organogram for its management structure. The particular Departments that are/ should be involved in NMT implementation include the following:

- ◆ Urban Planning
- ◆ Housing, Property Management and Human Settlements
- ◆ Infrastructure, Water and Technical Services
- ◆ Marketing and Events Management that forms part of the CEO Directorate

Over and above this, it is also proposed that a NMT Champion be appointed in the office of the CEO. The NMT Champion should also be supported by a Program Manager to provide additional technical capacity and specialist advisory services. The proposed organogram is shown below in Figure 16-1.



Figure 16-1: Departments responsible for NMT implementation

Roles and Responsibilities

The roles and responsibilities of the identified Departments, the new NMT Champion and the MWT and MURD are shown below in Figure 16-2.

Urban Planning

It is expected that the initial project initiation for infrastructure projects will be undertaken within the Urban Planning Directorate.

This directorate is also tasked with

- ◆ Developing bid documents to procure the services of consulting engineers and associated specialists in obtaining the necessary rights and approvals for projects, undertake the detail design and develop the necessary procurement documentation of the various NMT infrastructure (retro-fitting and new built) projects.
- ◆ Applying the NMT design standards to current and future proposed road infrastructure rollout, as well as current transport operations such as traffic signal planning and phasing.

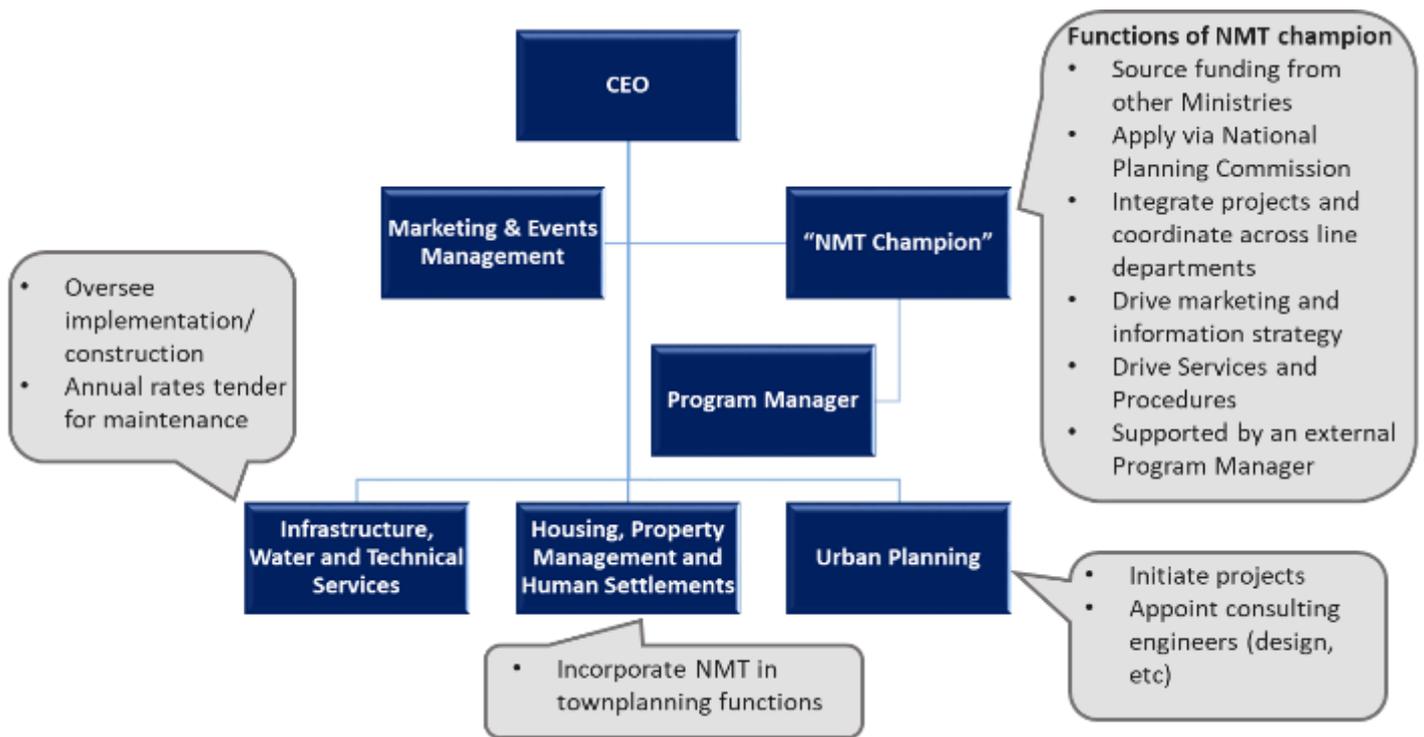


Figure 16-2: Roles and Responsibilities of the identified Departments and NMT Champion

Housing, Property Management and Human Settlements

This Directorate has to ensure that NMT requirements are incorporated in all new developments; private sector and public sector projects alike.

Infrastructure, Water and Technical Services

The Infrastructure, Water and Technical Services Department must ensure that the NMT standards proposed during the design phases of the projects are implemented, as part of their current role of overseeing the implementation of infrastructure projects.

This Directorate should also call for an annual rates tender from contractors to undertake the annual NMT infrastructure maintenance required.

Office of the CEO

Three key functions are proposed to be located within the office of the CEO. These include the existing Marketing and Events Management unit, a newly identified NMT Champion and the supporting Program Manager.

Marketing and Events Management that forms part of the office of the CEO

The existing marketing and events management unit located with the office of the CEO is tasked with the following:

- ◆ With the oversight and guidance of the NMT champion overseeing this team, the unit must implement the identified information and marketing campaigns

- ◆ This team should also source external service providers if and where required to implement the information and marketing initiatives

NMT Champion

The NMT Champion should be identified from the current organization structure and be appointed by the CEO and should report to CEO. The NMT Champion is tasked with the following:

- ◆ Source funding from other Departments within the CoW, Roads Authority, national Ministries, private sector initiatives and potential international donors
- ◆ Successfully lobby the National Planning Commission for funding for NMT implementation
- ◆ NMT implementation lies with various Departments and units within CoW. The NMT Champion has to integrate projects and coordinate the implementation thereof across the various line departments and budgets.
- ◆ Drive (initiate, plan and oversee) the implementation of the marketing and information strategy
- ◆ Support the CEO in implementing the necessary procedures to enable successful NMT implementation
- ◆ Liaison with private sector to encourage their participation in implementing NMT services and infrastructure in Windhoek.



Figure 16-3: People walking to collect water

Due to the specific duties of the NMT Champion, the following characteristics will be required:

- ◆ Have political influence within the current organisation structure to ensure that policy, strategic direction and budgets can be influenced
- ◆ Strong inter-personal skills to establish a sound rapport with the existing staff within the Departments to guide and facilitate integrated NMT implementation.
- ◆ Have a sound working relationship with the existing line managers within the affected Departments, as the NMT Champion will be working closely with technical staff reporting to affected line-managers.
- ◆ Strong sales and marketing skills to successful source funding from private sector and public sector sources alike.

Program manager

It is further proposed that the NMT Champion be supported by an external Program Manager. The Program Manager should report directly to the NMT Champion and the aim of this professional is to provide the NMT Champion with the necessary technical support and capacity to fulfil this function successfully. The tasks of the Program Manager include the following:

- ◆ Prepare and manage a program to monitor overall implementation of the NMT Strategy
- ◆ Prepare and manage a budget and cash flow to monitor overall implementation of the NMT Strategy
- ◆ Provide technical support (planning, design and engineering services) to the NMT Champion and the other Departments tasked with NMT implementation
- ◆ Review the NMT designs
- ◆ Draft the various project identifications, budget formulations and bid documents to procure the services from the private sector (consulting engineers and marketing consultant, as required).

Prerequisites for the Program Manager include the following:

- ◆ Senior engineer/ planner with at least 10 years municipal and private experience in planning, designing and implementing roads infrastructure within the Windhoek or Namibian context
- ◆ Program and budget monitoring experience
- ◆ Sound understanding of the municipal service delivery and financial management regulatory framework

The MWT, MURD and RA participates in and supports the implementation of the NMT Strategy

Although the implementation of certain NMT infrastructure is the responsibility of the CoW, this cannot be undertaken without the necessary enabling environment being created and support provided by the various Ministries (MWT and MURD).

Role of MWT

Although the MWT is not responsible for the implementation of municipal infrastructure such as NMT, it has to provide the necessary regulatory, policy and training environment, along with access to funding, to realise the implementation of the NMT Strategy.

The role of the MWT is as follows:

- ◆ Developing of standards and policies enabling the implementation of NMT facilities
- ◆ Funding and organizing training opportunities
- ◆ Investigate the establishment of a national grant for NMT infrastructure implementation
- ◆ Making funding available for local authorities to implement NMT facilities in support on national sustainability goals.
- ◆ Create liaison forums to better coordinate and integrate NMT and road safety implementation where responsibilities and mandates overlap, such as in the case of the Western By-pass through Windhoek.

- ◆ Facilitate and lead discussions between the RA and the CoW to develop safe opportunities for people to cross the Western By-pass and to create opportunities for people to walk or cycle along the Western By-pass where facilities are totally separated.

Role of RA

The function and mandate of the RA is to manage the national road network with a view to achieving a safe and efficient road sector. The RA is responsibility for the most significant spatial barrier for NMT movement in Windhoek and pedestrian safety along and across the Western By-pass must be addressed. A coordinated response from all authorities are required.

The role of the RA is as follows:

- ◆ Liaise with the CoW with respect to matters affected by the surrounding land use, developments, pedestrian safety matters, etc. to enable the implementation of the NMT Strategy.
- ◆ Participate in NMT liaison forums
- ◆ Source funding for road safety improvements for the Western By-pass
- ◆ Funds and activities and can be aligned to enable coordinate road safety and NMT implementation.
- ◆ Infrastructure upgrades of the Western By-pass must take pedestrian movements into consideration.
- ◆ Work with the CoW in formalising the road reserve, install, and regularly maintain fencing.
- ◆ Plan, design and implement pedestrian bridges where required.

Role of the MURD

The role of the MURD is as follows:

- ◆ Improve the accessibility of people through means of cycling in Windhoek.
- ◆ Establish relationships with potential NGO's, private sector role-players to assist with the distribution of bicycles
- ◆ Work with CoW towards creating the required changes in municipal by-laws for private sector to contribute towards NMT related infrastructure.
- ◆ Provide the necessary funding for NMT marketing campaigns and programs in support of the Namibian sustainability goals encapsulated in the SUTMP.
- ◆ Actively participate in the CoW NMT Forums and Liaison Groups

Train and develop the existing staff to implement the NMT Strategy

As part of raising awareness of NMT users in the transport environment, it is proposed that the internal audience to the CoW be trained in NMT planning, design and implementation. CoW should regularly participate in conferences, training, workshops and courses to develop a greater understanding and capacity for NMT implementation. Consulting engineers should also be encouraged to attend, as they will be tasked with the design of NMT facilities.

Technical standards and policies aligned with the NMT Infrastructure Guideline and the preparation of policies and regulations in favour of NMT should be developed so that the regulatory framework of the CoW is aligned with the implementation of NMT. This will provide a more NMT-receptive environment for officials to undertake their work.

Projects and Programs

The associated projects are included below in Table 16-1.

Table 16-1: Projects and Programs – Services and Procedures

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
Services and Procedures	Use the available capacity and expertise of the current organisation structure of the CoW	1) Appointment of a NMT champion to drive integration and coordination with CoW, but also with other role-players, stakeholders and authorities	CoW CEO	Short-term
		2) Establish a CoW NMT Working Group	CoW CEO	Short-term
		3) Appoint the Program Manager to provide the necessary support to the NMT Champion and the CoW line departments.	CoW CEO	Short-term
		4) Procure the services on consulting engineers to implement the identified priority projects.	CoW Urban Planning, Program Manager	Short-term
	Train and develop the existing staff	5) NMT training workshops to implement NMT infrastructure	GIZ	Immediate

NMT Focus Areas in Windhoek	NMT Strategies	NMT Programme Response – List of Projects	Responsibility	Priority (short-term/long-term implementation)
	to implement the NMT Strategy	6) Send staff annually to NMT training courses and conferences	CoW CEO	Short to medium term
	The MWT, MURD and RA participates in and supports the implementation of the NMT Strategy	7) The MWT to facilitate and lead discussions between the RA and the CoW to develop safe opportunities for people to cross the Western By-pass and to create opportunities for people to walk or cycle along the Western By-pass where facilities are totally separated	MWT	Short-term

17. IMPLEMENTATION PLAN

Developing a NMT Network Plan

The Status Quo Assessment, through the stakeholder consultation, site observations and NMT surveys, formed the basis of defining a NMT Network for Windhoek. The spatial distribution and magnitude of existing NMT volumes were observed and future mobility patterns were presumed, based on expected future growth. This overall NMT Network comprise 315km of which 70km were identified as Safe Routes to Schools. Refer to Map No 1: Phase 1 NMT network at the end of this chapter.

From the proposed NMT Network for Windhoek, a Phase 1 NMT Network was identified for implementation with specific projects to be realised in various phases as part of the rollout plan.

With reference to Figure 17-1 the approach to the Implementation Plan was as follows:

- ◆ Identify a Phase 1 NMT network to be implemented. The Phase 1 network was identified based on the following:
 - Identifying cycle routes that can provide a cycle network across Windhoek.
 - Identifying key pedestrian routes that also link to the cycle routes, as well as enable safe crossing of the Western By-pass.
 - Safe routes to schools across and along Monte Christo Road in areas with high pedestrian learner movement.
- ◆ Provide an indicative cost estimate for the Phase 1 NMT network.
- ◆ Allocate projects for implementation over a 5-year cycle for a 15-year time period starting from 2019/2020 and ending at 2034/2035. The three phases referred to Phase 1A, Phase 1B and Phase 1C.
- ◆ Identify projects that can be implemented in the next 5 years (2019/2020 - 2024/2025) and provide a high-level cost estimate. These projects are referred to as the Phase 1A-Network and concept designs for these projects are included in Annexure A .
- ◆ Phase 1A was selected based on the following :
 - Identify those routes that are essential in facilitating movement from origins to their destinations or to public transport facilities and incorporate the main NMT desire lines.
 - Based on historic crash data and current NMT hazardous locations, identify areas in need of road safety intervention.
 - Based on the outcomes of the NMT audit of the Phase 1 network, propose the NMT class per route (Class 1, 2, 3 or 4) and identify the form of separation.
 - Identify intersections with left-turn sliplanes and determine whether these left turn sliplanes are warranted and identify the most appropriate form of pedestrian crossing across the left-turn sliplanes, if the latter is required.
 - Propose urban design interventions at certain sections along the route.
 - Locate the need for pedestrian bridges, including low-level bridges across small streams.

- ◆ Identify projects that can be implemented in the next 5 to 10 years as well as in the coming 10 to 15 years and provide a high-level cost estimate for these projects grouped as Phase 1B and Phase 1C respectively.

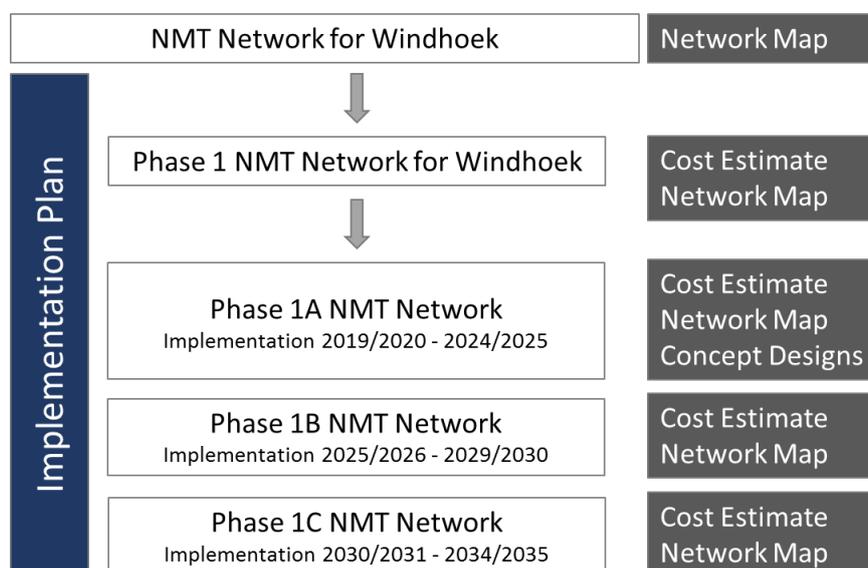


Figure 17-1: Approach to the NMT Implementation Plan

Phase 1 NMT Network Implementation

The proposed Phase 1 NMT network covers 117 km and its implementation costs are estimated to amount to approximately NAD 350 million. Refer to Map No 2: Phase 1 NMT network at the end of this chapter. Also, refer to Table 17-2 for the more detailed breakdown of the Cost Estimate.

Methodology

The following considerations lead to the prioritisation of projects that form the basis of the Implementation Plan.

- ◆ Develop a cycling network that is implementable. The focus was on which routes can be practically implemented that connect the north-western communities with the CBD and to improve road safety of those areas that currently experience very high pedestrian activities.
- ◆ Ensure provision of two or three “east-west” routes that cross the Western By-pass, the railway line and link the north-western communities with the CBD. These routes are about 5 to 10 km long and give long distance continuity for commuters. Those routes need to be linked to “north-south” routes west and east of the Western By-pass.
- ◆ Ensure existing NMT desire lines are addressed and direct NMT routes are integrated and provided.
- ◆ Upgrading of current informal links to provide direct internal connections that are weather resistant and accessible throughout the year.
- ◆ Address NMT hazardous locations and propose appropriate road safety measures.

Phase 1 Implementation Cost Summary

The Cost Estimate for Phase 1 amounts to about NAD 350 million. The estimated costs for the proposed sub-phases (1A, 1B and 1C) are shown below in Table 17-1.

Table 17-1: Cost Estimate of Sub-phases of Phase 1

Sub-Phase	Timeline	Cost Estimate
Phase 1A <i>See Note 1</i>	2019/2020 - 2024/2025	NAD 196 284 477
Phase 1B	2025/2026 - 2029/2030	NAD 91 670 474
Phase 1C	2030/2031 - 2034/2035	NAD 63 280 752
TOTAL		NAD 351 235 704

Note:

This cost estimate includes Monte Christo upgrade and the pedestrian bridge at Dortmund.

Table 17-2: Phase 1 NMT Plan – Cost Summary

NMT Implementation Plan Phase 1 Cost Summary										
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1	1A	1	Hosea Kutako south	Independence Ave	John Meinert St	2 834			NMT Class3	NAD 1 545 960
2	1A	2	John Meinert east	Hosea Kutako	R Mugabe	655			NMT Class2	NAD 1 141 838
3	1B	3	Robert Mugabe	Uhland	Independence Ave	678			NMT Class2	NAD 1 168 176
4	1A	4	Pedestrian crossings @ Monte Christo Rd			N/A	Safe route to school	C.J. Brandt SS, Moses Garoeb PS, Hage Geingob SS, A Shipena SS	Midblock ped crossings	NAD 523 992
5	1A	5	Formalise gravel path	Monte Christo Rd	School entrance	290	Safe route to school	C.J. Brandt SS	NMT Class1	NAD 1 528 914
6	1A	6	City Street	C Kondovanzu St east	C Kondovanzu St west	1 360	Safe route to school	C.J. Brandt SS, Faith PS	NMT Class4	NAD 4 059 607
7	1A	7	Simmentaler St	Ped bridge	Hosea Kutako	523			NMT Class3	NAD 1 755 466
8	1A	8	Iscor Street	Solingen Street	NMT link Iscor St to H Kutako	1 895			NMT Class3	NAD 3 430 062
9	1A	9	Solingen Street	Hosea Kutako	Iscor Street	40			NMT Class3	NAD 377 366
10	1A	10	NMT link Iscor St to H Kutako	Iscor Street	Hosea Kutako	40			NMT Class1	NAD 316 803
11	1A	11	Hosea Kutako northA	Monte Christo	Solingen St	933			NMT Class2	NAD 5 752 145
12	1A	12	Hosea Kutako northB	Solingen St	Independence	2 098			Provide sidewalk	NAD 11 166 347
13	1B	13	Uhland/ Kaunda St	Robert Mugabe Ave	Nelson Mandela	2 556			NMT Class4	NAD 1 277 124
14	1A	14	Hereford St south	Monte Christo Rd	C Kondovanzu St	236			NMT Class2	NAD 877 681

NMT Implementation Plan Phase 1 Cost Summary										
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
15	1A	15	Hans Dietrich Genscher north	C Kondovanzu St	Dortmund St	958			NMT Class2	NAD 2 890 887
16	1A	16	Dortmund	Hans Dietrich Genscher	Hosea Kutako	1 012			NMT Class2	NAD 3 627 765
17	1A	17	C Kondovanzu St east	Hereford	Hans Dietrich Genscher	920			NMT Class2	NAD 2 267 767
18	1A	18	Florence Nightingale	Brug St	Pasteur	4 709			NMT Class 2/3	NAD 10 198 097
19	1A	19	Pasteur Street	Florence Nightingale	Davey	403			NMT Class3	NAD 1 439 985
20	1A	20	Davey Street	Pasteur	John Meinert St	257			NMT Class3	NAD 270 728
21	1A	21	John Meinert west	Davey	Hosea Kutako	270			NMT Class2	NAD 483 672
22	1A	22	Independence	Otjomuise Rd	Hosea Kutako	5 365			NMT Class 2/3	NAD 8 197 498
23	1B	23	Mandume Ndemufayo Ave north	John Meinert St	Rehobother Rd	3 396			NMT Class 2/3	NAD 2 798 060
24	1C	24	Mandume Ndemufayo Ave south	Rehobother Rd	Western Bypass	3 630			NMT Class 2/3	NAD 13 591 630
25	1A	25	Abraham Mashego	Monte Christo Rd	Brug St	2 553			NMT Class 2	NAD 7 026 180
26	1A	26	Hereford St north	J Nyerere St	Monte Christo Rd	1 538			NMT Class 2	NAD 5 642 925
27	1A	27	Hans Dietrich Genscher south	Dortmund St	Independence Ave	952			NMT Class 3	NAD 3 186 159
28	1A	28	C Kondovanzu St west	Otjomuise	City St east	1 185			NMT Class 2	NAD 3 791 205
29	1A	29	Otjomuise Rd	Monte Christo Rd	Independence Ave	1 452			NMT Class 2	NAD 5 649 098
30	1C	30	Auas Road	Western Bypass	Mandume Ndemufayo Ave	2 995			NMT Class 2	NAD 4 003 485

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NMT Implementation Plan Phase 1 Cost Summary										
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
31	1B	31	Bach Street	Florence Nightingale	Pasteur	689			NMT Class 3	NAD 1 500 167
32	1B	32	Hendrik Witbooi Drive	Sam Nujoma	Bach St	1 645			NMT Class 2	NAD 3 996 106
33	1C	33	Hendrik Witbooi Drive	Bach St	Mandume Ndemufayo Ave	4 347			NMT Class 2/3	NAD 11 178 048
34	1A	34	Matshitshi Road	Monte Christo Rd	Green Mountain Dam Rd	1 576			NMT Class 2	NAD 3 449 444
35	1B	35	Pasteur Street	Bach St	Florence Nightingale	855			NMT Class 3	NAD 2 355 408
36	1A	36	Rand St	Florence Nightingale	Mahatma Gandhi St	1 530	Safe route to school	Khomasdal PS, Acacia SS	NMT Class 4	NAD 4 576 719
37	1A	37	Formalise gravel path	Etetewe Street	Monte Christo Road	440			NMT Class 1	NAD 2 270 139
38	1A	38	Omongo Street	Claudius Kondovanzu Street	Marti Atisaari Street	490	Safe route to school	Martti Ahtisaari PS	NMT Class 2	NAD 1 861 393
39	1A	39	Wilibald Kapuenene	Independence Ave	Hans Dietrich Genscher Street	1 180	Safe route to school	Steekamp PS, Jan Jonker SS, Shifidi SS, Goreangab SS	NMT Class 2	NAD 2 714 460
40	1A	40	Richard Kamuhukua Street	Independence Ave	Hans Dietrich Genscher Street	1 100	Safe route to school	Steekamp PS, Jan Jonker SS, Shifidi SS, Goreangab SS	NMT Class 2	NAD 2 765 924
41	1A	41	Munjuku Nguvauva	Wilibald Kapuenene	Richard Kamuhukua Street	100			NMT Class 4	NAD 364 392
42	1A	42	Shanghai Street	Rand Street	Florence Nightingale	730	Safe route to school	Eldorado SS	NMT Class 4	NAD 1 996 914
43	1A	43	Mahatma Gandhi Street	Rand Street	Hans Dietrich Genscher Street	680			NMT Class 4	NAD 2 089 907

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NMT Implementation Plan Phase 1 Cost Summary												
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate		
44	1A	44	Hans Dietrich Genscher Street	Mahatma Gandhi Street	Florence Nightingale	660	Safe route to school	Cosmos SS, Greeff PS	NMT Class 3	NAD 1 965 580		
45	1A	45	Visarend Street	Florence Nightingale	Gladiola Street	810			NMT Class 3	NAD 3 291 268		
46	1A	46	Gladiola Street	Visarend Street	Krisante	410	Safe route to school	E du Plessis SS	NMT Class 4	NAD 1 107 374		
47	1A	47	Krisante Street	Gladiola Street	David Bezuidenhout Street	680			NMT Class 4	NAD 2 128 662		
48	1A	48	David Bezuidenhout Street	Krisante Street	Anemone Street	640			NMT Class 4	NAD 1 939 092		
49	1A	49	Anemone Street	David Bezuidenhout Street	Andrew Kloppers	230			NMT Class 1	NAD 110 427		
50	1A	50	Andrew Kloppers	Florence Nightingale	Moses Garoeb Street	1 000	Safe route to school	D Bezuidenhout SS	NMT Class 2	NAD 869 168		
51	1B	51	John Ludwig St / S Nujoma Dr	Nelson Mandela Ave	Jan Jonker	1 060	Safe route to school	Dagbreek School	NMT Class 3	NAD 1 489 819		
52	1B	52	Jan Jonker	Nelson Mandela Ave	Sam Nujoma Dr	720	Safe route to school	St. Paul's SS	NMT Class 3	NAD 2 234 384		
53	1C	53	Mose Tjitendero Street (Malcolm Spencer Street)	Laurent Desire Kabila Street	Jason Hamutenya Ndadi Street	950	Safe route to school	Delta SS	NMT Class 4	NAD 2 025 428		
54	1C	54	Esther Brand Street	Malcolm Spencer Street	Jason Hamutenya Ndadi Street	1 130	Safe route to school	Delta SS	NMT Class 4	NAD 3 295 519		
55	1C	55	Bevil Rudd Street	Esther Brand Street	Malcolm Spencer	400	Safe route to school	Delta SS	Sidewalk only	NAD 49 429		
56	1C	56	Jason Hamutenya Ndadi Street	Frankie Fredericks Dr Street	Robert Mugabe Ave	820			NMT Class 3	NAD 2 640 934		

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NMT Implementation Plan Phase 1 Cost Summary										
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
57	1A	57	Omuwapu St	Monte Christo	J Nyerere St	2 051			NMT Class 2/3	NAD 6 289 831
58	1A	58	J Nyerere St	Omuwapu St	Hereford St	1 433			NMT Class 2	NAD 4 720 317
59	1A	59	Etewe St	Omuwapu St	Monte Christo	1 458	Safe route to school	Moses Garoeb PS	NMT Class 3	NAD 4 344 623
60	1A	60	Formalise gravel path	Ongava St	Ongava St	683			NMT Class 1	NAD 3 523 876
61	1A	61	Ongava St	Ongava St	Monte Christo	194			NMT Class 3	NAD 731 143
62	1A	62	Formalise gravel path	Monte Christo	C Kondovanzu St	307			NMT Class 1	NAD 1 947 590
63	1A	63	Eveline St	C Kondovanzu St	Independence Ave	2 102			NMT Class 2/3	NAD 5 495 404
64	1B	64	Otjomuise Rd	Independence Ave	Sam Nujoma Dr	4 635			NMT Class 2	NAD 16 565 844
65	1B	65	Moses Garoeb St	Otjomuise Rd	Matshitshi Road	2 712			NMT Class 2	NAD 6 913 950
66	1B	66	Matshitshi Road	Moses Garoeb St	Sam Nujoma Dr	1 578			NMT Class 2	NAD 2 191 408
67	1B	67	Sam Nujoma Drive	Matshitshi Road	Mandume Ndemufayo	8 318			NMT Class 3	NAD 23 090 998
68	1B	68	Dusseldorf St	Moses Garoeb	Sam Nujoma	1 960			NMT Class 2	NAD 4 265 607
69	1B	69	Frankfurt St	Matshitshi St	Dusseldorf St	872			NMT Class 4	NAD 2 504 529
70	1B	70	Beijing St	Kitchener St	Bonn St	607			NMT Class 4	NAD 1 843 338
71	1B	71	Kitchener St	Beijing St	Dusseldorf St	602			NMT Class 4	NAD 2 003 400
72	1B	72	Bonn St	Moses Garoeb	Otjomuise Rd	1 598	Safe route to school	Michelle Maclean	NMT Class 2	NAD 4 647 972
73	1C	73	Sean McBride	Auas Rd	F Fredericks	922			NMT Class 3	NAD 2 449 692
74	1C	74	F Fredericks	Sean McBride	J Hamutenya Ndadi	582			NMT Class 3	NAD 1 797 995

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NMT Implementation Plan Phase 1 Cost Summary											
No	Sub-Phase	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate	
75	1C	75	LD Kabila St	M Spencer St	Bloekom St	1 165	Safe route to school	Suiderhof PS	NMT Class 3	NAD 3 454 139	
76	1C	76	Bloekom St	LD Kabila St	Toivo-ya-Toivo St	216			NMT Class 3	NAD 781 685	
77	1C	77	Toivo-ya-Toivo St	Bloekom St	Mandume Ndemufayo	676			NMT Class 3	NAD 2 235 121	
78	1B	78	Brug St	Otjomuise Rd	Florence Nightingale	730			NMT Class 2	NAD 1 046 279	
79	1A	79	C Kondovanzu St east	Informal path	Hereford	695			NMT Class 2	NAD 2 631 155	
80	1A	80	M Ahtisaari St	Omongo St	Zambezi St	325	Safe route to school	Moses Garoeb PS, Hage Geingob SS	NMT Class 4	NAD 1 636 936	
81	1A	81	Etewe St/Omungwindi St	Monte Christo Rd west	Monte Christo Rd east	880	Safe route to school	Moses Garoeb PS, Hage Geingob SS	NMT Class 2	NAD 3 328 938	
82	1C	82	Rehobother Rd	Western Bypass	F Fredericks St	855			NMT Class 2	NAD 3 971 322	
83	1C	83	F Fredericks St	Rehobother Rd	Chassie St	330			NMT Class 2	NAD 582 948	
84	1C	84	Chassie St	F Fredericks St South	F Fredericks St North (Koinseb St)	1 015			NMT Class 2	NAD 1 482 791	
			Separate project budget:								
85	1A	85	Monte Christo	Otjomuise Rd	Hosea Kutako	6 173			NMT Class 2	NAD 16 080 304	
86	1A	86	Pedestrian bridge across B1 @ Dortmund	Dortmund St	Simmentaler St	472			NMT Class 1	NAD 14 627 448	
Bicycle parking no: 6										NAD 74 646	
Road sign & urban street furniture diet (Uhland St, J Meinert, M Ndemufayo CBD)										NAD 500 000	
OPEX Maintenance										NAD 29 221 755	
						116 753 m	Total Project Cost Phase 1			NAD 351 235 704	

Phase 1A Network Implementation

Refer to Map No 3: Phase 1A NMT Network at the end of this chapter. The **route selection** of Phase 1A is based on the following considerations:

- ◆ In terms of “north-south”-routes, Hosea Kutako Dr is identified as a link to be prioritised. It provides access to a range of employment opportunities and space in the road reserve is sufficient with limited pedestrian conflict. Further south it links up with the CBD at John Meinert St and Frans Indongo St. The connection via Hereford/ H.-D. Genscher St allows convenient access from Okuryangava to Katutura hospital, linkage to Independence Ave and Northern Industrial, as well as further south to the CBD via Hosea Kutako Dr.
- ◆ The current volumes of informal crossing movements across the Western By-pass are alarmingly high and require immediate attention. Therefore, as one of the first priorities of the Implementation Plan it is proposed to provide a pedestrian bridge across the Western By-pass to improve road safety and to provide a direct link from the residential areas west of the B1 to China Town. This is already identified as a priority intervention by the RA and CoW.
- ◆ Monte Christo Dr and Florence Nightingale were identified as important links and are good candidates for cycle paths. Florence Nightingale offers sufficient space, although it has some steep hills, but it passes close to UNAM Khomasdal Campus and provides a link to the CBD via Pasteur St/ John Meinert St. Monte Christo Dr is an important east-west link connecting residential areas with places of employment, such as Lafrenz and Northern Industrial. Monte Christo Dr was identified as a high-risk location in terms of road safety, especially crossing of Monte Christo Dr in the vicinity of schools. Learner safety is a priority and needs to be addressed in the short term.
- ◆ Safe routes to school are included in the Phase 1A network serving 17 schools, namely: Moses Garoeb, PS, C.J. Brandt SS, Faith PS, Hage Geingob SS, D Bezuidenhout SS, E du Plessis SS, Cosmos SS, Greeff PS, Eldorado SS, Martti Ahtisaari PS, Steekamp PS, Jan Jonker SS, Shifidi SS, Goreangab SS, Khomasdal PS, Acacia SS, A Shipena SS (refer to Phase 1A network map).
- ◆ Further, Independence Avenue is another important “east-west” connection and is a high valued activity spine providing direct access to the Katutura hospital and the Northern Industrial area.
- ◆ It is seen beneficial in promoting a cycle movement to provide cycle links to tertiary facilities in Windhoek. Students of UNAM/NUST are seen to be more likely to change current travel patterns than other population segments. Students and learners are still in their formative stage in their lives and any changes in behaviour at this age will have a certain tendency to be retrieved later during adulthood. Research shows that young adults are also more confident in navigating traffic, which makes them more so a suitable target group.
- ◆ Therefore, Mandume Ndemufayo Avenue is identified as one long-term priority project as the route terminates at UNAM and further connects major land uses such as the CBD and Southern Industrial area.
- ◆ The Status Quo Assessment revealed that fear of bike theft is a challenge, which as a result prevents potential users from starting, or re-starting, practical cycling. Therefore, thoughtful bicycle parking is important to encourage cycling and it is also an inexpensive way to make an impact. As part of Phase 1, locations to provide cycle racks where they can be locked and parked are proposed.

The **total project costs for Phase 1A** intended for implementation in the period 2019/2020 - 2024/2025 are estimated at NAD 200 million. This is almost 60% of the Phase 1 cost estimate. It is proposed that new implementation plans will be developed after 5 years. Refer to the costing breakdown provided hereafter.

Table 17-3: Phase 1A NMT Plan – Cost Summary

NMT Implementation Plan Phase 1A 2019/2020 - 2024/2025 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1A	1	1	Hosea Kutako south	Independence Ave	John Meinert St	2 834			NMT Class 3	NAD 1 545 960
1A	2	2	John Meinert east	Hosea Kutako	R Mugabe	655			NMT Class 2	NAD 1 141 838
1A	3	4	Pedestrian crossings @ Monte Christo Rd			N/A	Safe route to school	C.J. Brandt SS, Moses Garoeb PS, Hage Geingob SS, A Shipena SS	Midblock ped crossings	NAD 523 992
1A	4	5	Formalise gravel path	Monte Christo Rd	School entrance	290	Safe route to school	C.J. Brandt SS	NMT Class 1	NAD 1 528 914
1A	5	6	City Street	C Kondovanzu St east	C Kondovanzu St west	1 360	Safe route to school	C.J. Brandt SS, Faith PS	NMT Class4	NAD 4 059 607
1A	6	7	Simmentaler St	Ped bridge	Hosea Kutako	523			NMT Class3	NAD 1 755 466
1A	7	8	Iscor Street	Solingen Street	NMT link Iscor St to H Kutako	1 895			NMT Class3	NAD 3 430 062
1A	8	9	Solingen Street	Hosea Kutako	Iscor Street	40			NMT Class3	NAD 377 366
1A	9	10	NMT link Iscor St to H Kutako	Iscor Street	Hosea Kutako	40			NMT Class1	NAD 316 803
1A	10	11	Hosea Kutako northA	Monte Christo	Solingen St	933			NMT Class2	NAD 5 752 145
1A	11	12	Hosea Kutako northB	Solingen St	Independence	2 098			Provide sidewalk	NAD 11 166 347
1A	12	14	Hereford St south	Monte Christo Rd	C Kondovanzu St	236			NMT Class2	NAD 877 681
1A	13	15	Hans Dietrich Genscher north	C Kondovanzu St	Dortmund St	958			NMT Class2	NAD 2 890 887
1A	14	16	Dortmund	Hans Dietrich Genscher	Hosea Kutako	1 012			NMT Class2	NAD 3 627 765
1A	15	17	C Kondovanzu St east	Hereford	Hans Dietrich Genscher	920			NMT Class2	NAD 2 267 767
1A	16	18	Florence Nightingale	Brug St	Pasteur	4 709			NMT Class 2/3	NAD 10 198 097
1A	17	19	Pasteur Street	Florence Nightingale	Davey	403			NMT Class3	NAD 1 439 985
1A	18	20	Davey Street	Pasteur	John Meinert St	257			NMT Class3	NAD 270 728
1A	19	21	John Meinert west	Davey	Hosea Kutako	270			NMT Class2	NAD 483 672
1A	20	22	Independence	Otjomuise Rd	Hosea Kutako	5 365			NMT Class 2/3	NAD 8 197 498
1A	21	25	Abraham Mashego	Monte Christo Rd	Brug St	2 553			NMT Class 2	NAD 7 026 180

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NMT Implementation Plan Phase 1A 2019/2020 - 2024/2025 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1A	22	26	Hereford St north	J Nyerere St	Monte Christo Rd	1 538			NMT Class 2	NAD 5 642 925
1A	23	27	Hans Dietrich Genscher south	Dortmund St	Independence Ave	952			NMT Class 3	NAD 3 186 159
1A	24	28	C Kondovanu St west	Otjomuise	City St east	1 185			NMT Class 2	NAD 3 791 205
1A	25	29	Otjomuise Rd	Monte Christo Rd	Independence Ave	1 452			NMT Class 2	NAD 5 649 098
1A	26	34	Matshitshi Road	Monte Christo Rd	Green Mountain Dam Rd	1 576			NMT Class 2	NAD 3 449 444
1A	27	36	Rand St	Florence Nightingale	Mahatma Gandhi St	1 530	Safe route to school	Khomasdal PS, Acacia SS	NMT Class 4	NAD 4 576 719
1A	28	37	Formalise gravel path	Etetewe Street	Monte Christo Road	440			NMT Class 1	NAD 2 270 139
1A	29	38	Omongo Street	Claudius Kondovanu Street	Marti Atisaari Street	490	Safe route to school	Martti Ahtisaari PS	NMT Class 2	NAD 1 861 393
1A	30	39	Wilibald Kapuenene	Independence Ave	Hans Dietrich Genscher Street	1 180	Safe route to school	Steekamp PS, Jan Jonker SS, Shifidi SS, Goreangab SS	NMT Class 2	NAD 2 714 460
1A	31	40	Richard Kamuhukua Street	Independence Ave	Hans Dietrich Genscher Street	1 100	Safe route to school	Steekamp PS, Jan Jonker SS, Shifidi SS, Goreangab SS	NMT Class 2	NAD 2 765 924
1A	32	41	Munjuku Nguvauva	Wilibald Kapuenene	Richard Kamuhukua Street	100			NMT Class 4	NAD 364 392
1A	33	42	Shanghai Street	Rand Street	Florence Nightingale	730	Safe route to school	Eldorado SS	NMT Class 4	NAD 1 996 914
1A	34	43	Mahatma Gandhi Street	Rand Street	Hans Dietrich Genscher Street	680			NMT Class 4	NAD 2 089 907
1A	35	44	Hans Dietrich Genscher Street	Mahatma Gandhi Street	Florence Nightingale	660	Safe route to school	Cosmos SS, Greeff PS	NMT Class 3	NAD 1 965 580
1A	36	45	Visarend Street	Florence Nightingale	Gladiola Street	810			NMT Class 3	NAD 3 291 268
1A	37	46	Gladiola Street	Visarend Street	Krisante	410	Safe route to school	E du Plessis SS	NMT Class 4	NAD 1 107 374
1A	38	47	Krisante Street	Gladiola Street	David Bezuidenhout Street	680			NMT Class 4	NAD 2 128 662
1A	39	48	David Bezuidenhout Street	Krisante Street	Anemone Street	640			NMT Class 4	NAD 1 939 092
1A	40	49	Anemone Street	David Bezuidenhout Street	Andrew Kloppers	230			NMT Class 1	NAD 110 427
1A	41	50	Andrew Kloppers	Florence Nightingale	Moses Garoeb Street	1 000	Safe route to school	D Bezuidenhout SS	NMT Class 2	NAD 869 168
1A	42	57	Omuvalu St	Monte Christo	J Nyerere St	2 051			NMT Class 2/3	NAD 6 289 831

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NMT Implementation Plan Phase 1A 2019/2020 - 2024/2025 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1A	43	58	J Nyerere St	Omuwapu St	Hereford St	1 433			NMT Class 2	NAD 4 720 317
1A	44	59	Etewe St	Omuwapu St	Monte Christo	1 458	Safe route to school	Moses Garoeb PS	NMT Class 3	NAD 4 344 623
1A	45	60	Formalise gravel path	Ongava St	Ongava St	683			NMT Class 1	NAD 3 523 876
1A	46	61	Ongava St	Ongava St	Monte Christo	194			NMT Class 3	NAD 731 143
1A	47	62	Formalise gravel path	Monte Christo	C Kondovanzu St	307			NMT Class 1	NAD 1 947 590
1A	48	63	Eveline St	C Kondovanzu St	Independence Ave	2 102			NMT Class 2/3	NAD 5 495 404
1A	49	79	C Kondovanzu St east	Informal path	Hereford	695			NMT Class 2	NAD 2 631 155
80	50	80	M Ahtisaari St	Omongo St	Zambezi St	325	Safe route to school	Moses Garoeb PS, Hage Geingob SS	NMT Class 4	NAD 1 636 936
81	51	81	Etewe St/Omungwindi St	Monte Christo Rd west	Monte Christo Rd east	880	Safe route to school	Moses Garoeb PS, Hage Geingob SS	NMT Class 2	NAD 3 328 938
1A	52	85	Monte Christo	Otjomuise Rd	Hosea Kutako	6 173			NMT Class 2	NAD 16 080 304
1A	53	86	Pedestrian bridge across B1 @ Dortmund	Dortmund St	Simmentaler St	472			NMT Class 1	NAD 14 627 448
Bicycle parking no: 3										NAD 37 323
Road sign & urban street furniture diet (Uhland St, J Meinert, M Ndemufayo CBD)										NAD 500 000
OPEX Maintenance										NAD 9 740 585
						61 509 m			Total Project Cost Phase 1A	NAD 196 284 477

Concept Designs

An overall concept design was undertaken for Phase 1A of the NMT network to inform the first step of implementation. These included the following:

- ◆ Class of facility (bicycle path or bicycle lane, see paragraph below)
- ◆ Remarking of lanes
- ◆ Pedestrian crossings, bridges, etc. required
- ◆ Urban design interventions required
- ◆ Dropped kerbs at intersections
- ◆ Investigation into the warrants for left-turn sliplanes at some intersections
- ◆ Urban design pictures

Bicycle infrastructure is classified to plan and design safe pedestrian and bicycle facilities. These classes of bicycle infrastructure are described hereafter.

- ◆ Class 1: Located along an independent separate alignment outside of the road reserve and reserved for either cyclist only or shared by pedestrians and cyclists. This is commonly referred to as a cycle path.
- ◆ Class 2: Path which is located within the road reserve, located adjacent to the road way on the same alignment, but separated from the road way by level difference and / or kerb and reserved for either cyclists only or shared by pedestrians and cyclists. This is commonly referred to as a cycle path.
- ◆ Class 3: Bicycle path that forms part of the street or the carriageway and is marked accordingly. This is commonly referred to known as a cycle lane.
- ◆ Class 4: Located on a low-volume street to serve as a feeder link in a cycle network of cycle paths and lanes. The route is indicated by signs and markings. This is commonly referred to as a cycle route.

A high level concept design for the majority of projects of Phase 1A was prepared. Refer to the example in Figure 17-2. This was done per road section, specifying the type of proposed cross-sections, proposed NMT class facility and providing high-level comments detailing the proposed interventions. The complete set of concept designs for Phase 1A, detailing the infrastructure proposals for the identified projects, is included in Annexure A. However, as projects are implemented, a concept design at a project level must still be undertaken, informed by a site-specific contextual analysis, site constraints, etc. This more detailed level of site analyses can well result in a different conceptual design, to be followed by more detailed design process to inform the cost estimate and project implementation.

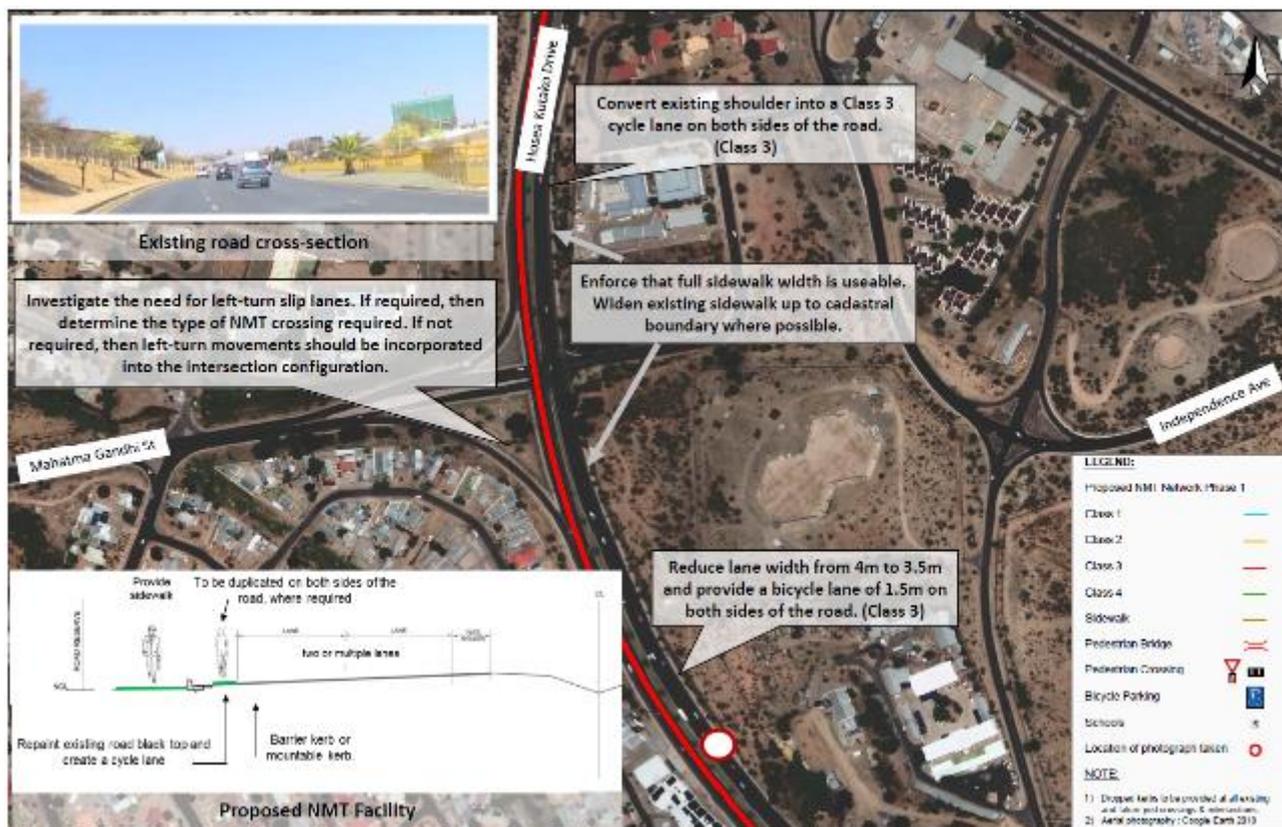


Figure 17-2: Example of concept design

Phase 1B Network Implementation

The Phase 1B NMT Network connects Otjomuise with the CBD and provides continuous links from the north-western communities (Phase 1A) to the more central parts of Windhoek. Refer to Map No 4: Phase 1B NMT Network at the end of this chapter. Three schools are being served by the added routes, namely: Michelle Maclean, Dagbreek School, St. Paul's SS.

The total project costs for Phase 1B intended for implementation between 2025/2026 - 2029/2030 are estimated at about NAD 92 million, covering approximately 30% of the Phase 1 cost estimate. The list of projects of Phase 1B are shown in

Table 17-4 and are subject to the progress in implementing the projects of Phase 1A, as well as to the review of the Implementation Plan at a five-year interval.

Table 17-4: Phase 1B NMT Plan – Cost Summary

NMT Implementation Plan Phase 1B 2025/2026 - 2029/2030 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1B	1	3	Robert Mugabe	Uhland	Independence Ave	678			NMT Class2	NAD 1 168 176
1B	2	13	Uhland/ Kaunda St	Robert Mugabe Ave	Nelson Mandela	2 556			NMT Class4	NAD 1 277 124
1B	3	23	Mandume Ndemufayo Ave north	John Meinert St	Rehobother Rd	3 396			NMT Class 2/3	NAD 2 798 060
1B	4	31	Bach Street	Florence Nightingale	Pasteur	689			NMT Class 3	NAD 1 500 167
1B	5	32	Hendrik Witbooi Drive	Sam Nujoma	Bach St	1 645			NMT Class 2	NAD 3 996 106
1B	6	35	Pasteur Street	Bach St	Florence Nightingale	855			NMT Class 3	NAD 2 355 408
1B	7	51	John Ludwig St / S Nujoma Dr	Nelson Mandela Ave	Jan Jonker	1 060	Safe route to school	Dagbreek School	NMT Class 3	NAD 1 489 819
1B	8	52	Jan Jonker	Nelson Mandela Ave	Sam Nujoma Dr	720	Safe route to school	St. Paul's SS	NMT Class 3	NAD 2 234 384
1B	9	64	Otjomuise Rd	Independence Ave	Sam Nujoma Dr	4 635			NMT Class 2	NAD 16 565 844
1B	10	65	Moses Garoeb St	Otjomuise Rd	Matshitshi Road	2 712			NMT Class 2	NAD 6 913 950
1B	11	66	Matshitshi Road	Moses Garoeb St	Sam Nujoma Dr	1 578			NMT Class 2	NAD 2 191 408
1B	12	67	Sam Nujoma Drive	Matshitshi Road	Mandume Ndemufayo	8 318			NMT Class 3	NAD 23 090 998
1B	13	68	Dusseldorf St	Moses Garoeb	Sam Nujoma	1 960			NMT Class 2	NAD 4 265 607
1B	14	69	Frankfurt St	Matshitshi St	Dusseldorf St	872			NMT Class 4	NAD 2 504 529
1B	15	70	Beijing St	Kitchener St	Bonn St	607			NMT Class 4	NAD 1 843 338
1B	16	71	Kitchener St	Beijing St	Dusseldorf St	602			NMT Class 4	NAD 2 003 400
1B	17	72	Bonn St	Moses Garoeb	Otjomuise Rd	1 598	Safe route to school	Michelle Maclean	NMT Class 2	NAD 4 647 972
1B	18	78	Brug St	Otjomuise Rd	Florence Nightingale	730			NMT Class 2	NAD 1 046 279

NMT Implementation Plan Phase 1B 2025/2026 - 2029/2030 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
			Bicycle parking		no: 3					NAD 37 323
			OPEX Maintenance							NAD 9 740 585
						35 212 m			Total Project Cost Phase 1B	NAD 91 670 474

Phase 1C Network Implementation

The Phase 1C NMT Network covers the remainder of Phase 1 not included yet in Phase 1A and Phase 1B. Two schools are being served by the added routes, namely: Delta SS and Suiderhof PS. Refer to Map No 5: Phase 1C NMT Network at the end of this chapter.

The **total project costs for Phase 1C** intended for implementation between 2030/2031 - 2034/2035 are estimated at about NAD 63 million, covering 20% of the Phase 1 cost estimate. The list of projects of Phase 1C are shown in Table 17-5 and are subject to the progress in implementing Phase 1A and Phase 1B, as well as to the review of the Implementation Plan at a five-year interval.

Table 17-5: Phase 1C NMT Plan – Cost Summary

NMT Implementation Plan Phase 1C 2030/2031 - 2034/2035 Cost Summary										
Sub-Phase	No	Unique ID	Project	From	To	Length (m)	Safe routes to school	Name of school(s)	Proposed Intervention	Cost Estimate
1C	1	24	Mandume Ndemufayo Ave south	Rehobother Rd	Western Bypass	3 630			NMT Class 2/3	NAD 13 591 630
1C	2	30	Auas Road	Western Bypass	Mandume Ndemufayo Ave	2 995			NMT Class 2	NAD 4 003 485
1C	3	33	Hendrik Witbooi Drive	Bach St	Mandume Ndemufayo Ave	4 347			NMT Class 2/3	NAD 11 178 048
1C	4	53	Mose Tjitendero Street (Malcolm Spencer Street)	Laurent Desire Kabila Street	Jason Hamutenya Ndadi Street	950	Safe route to school	Delta SS	NMT Class 4	NAD 2 025 428
1C	5	54	Esther Brand Street	Malcolm Spencer Street	Jason Hamutenya Ndadi Street	1 130	Safe route to school	Delta SS	NMT Class 4	NAD 3 295 519
1C	6	55	Bevil Rudd Street	Esther Brand Street	Malcolm Spencer	400	Safe route to school	Delta SS	Sidewalk only	NAD 49 429
1C	7	56	Jason Hamutenya Ndadi Street	Frankie Fredericks Dr Street	Robert Mugabe Ave	820			NMT Class 3	NAD 2 640 934
1C	8	73	Sean McBride	Auas Rd	F Fredericks	922			NMT Class 3	NAD 2 449 692
1C	9	74	F Fredericks	Sean McBride	J Hamutenya Ndadi	582			NMT Class 3	NAD 1 797 995
1C	10	75	LD Kabila St	M Spencer St	Bloekom St	1 165	Safe route to school	Suiderhof PS	NMT Class 3	NAD 3 454 139
1C	11	76	Bloekom St	LD Kabila St	Toivo-ya-Toivo St	216			NMT Class 3	NAD 781 685
1C	12	77	Toivo-ya-Toivo St	Bloekom St	Mandume Ndemufayo	676			NMT Class 3	NAD 2 235 121
1C	13	82	Rehobother Rd	Western Bypass	F Fredericks St	855	0	0	NMT Class 2	NAD 3 971 322
1C	14	83	F Fredericks St	Rehobother Rd	Chassie St	330	0	0	NMT Class 2	NAD 582 948
1C	15	84	Chassie St	F Fredericks St South	F Fredericks St North (Koinseb St)	1 015	0	0	NMT Class 2	NAD 1 482 791
Bicycle parking no: 0										NAD 0
OPEX Maintenance										NAD 9 740 585
						20 032 m			Total Project Cost Phase 1C	NAD 63 280 752

Strategy for Urban Design Interventions

It is most important to consider NMT as part of a larger public space system. Consequently, this infrastructure needs to contribute positively to the better functioning of the public space system as a whole. As a result, an NMT-orientated approach requires streets and walkways to be designed differently.

Therefore, in designing NMT infrastructure, a holistic set of public space design principles must be considered, including:

- ◆ Human scale and dimensions
- ◆ Safety, from both vehicles, and potential muggers
- ◆ Definition of space
- ◆ Designation for different uses
- ◆ Shelter and shade
- ◆ Durable and even surfaces created from a palette of materials that reflect the texture and colour of the surrounding landscape.



Figure 17-3: Formalised NMT route through informal settlement area, Khayelitsha, Cape Town

Steps to include are:

- ◆ Developing the Street and Public Space as a Multi-functional Urban Element
- ◆ Defining Aesthetic Appropriateness and Considering Physical Comfort for Streets
- ◆ Structuring Informality starting with tree planting and paving at key nodal intersections, followed by establishing pedestrian paths and bus shelters and over time expanding and provide pedestrian street crossings. Over time, expand on existing infrastructure until a fully developed state is reached with buildings defining the street space.

Priority Interventions

The following priority actions and activities must be undertaken along with the implementation of the Phase 1A NMT Network and to further support the infrastructure roll-out.

- ◆ Roll-out the school road safety assessment programme
- ◆ Investigate bicycle distribution scheme for large private sector employees
- ◆ Check that the NMT network planning and the identification of appropriate remedial measures are addressed in the development TIA and in the Site Development Plan (SDP) for the development.
- ◆ NMT paths of reasonable lengths to PT stops should be implemented by private developers where warranted.

- ◆ Identify 5 pedestrian hazlocs and place traffic officials at these locations to do guide pedestrians and encourage safe crossing behaviour.
- ◆ Establish an inter-authority NMT Forum lead by the NMT Champion of CoW
- ◆ Provide bicycle parking to be included as part of conditions of approval of new developments.
- ◆ Investigate the feasibility of large employers bicycle distribution program
- ◆ Procure a service provider to develop a marketing campaign
- ◆ The MWT to facilitate and lead discussions between the RA and the CoW to develop safe opportunities for people to cross the Western By-pass and to create opportunities for people to walk or cycle along the Western By-pass where facilities are totally separated
- ◆ The CoW must appoint the Program Manager to provide the necessary support to the NMT Champion and the CoW line departments
- ◆ Appoint a NMT champion to drive integration and coordination with CoW, but also with other role-players, stakeholders and authorities
- ◆ Establish a CoW NMT Working Group

ANNEXURE A: MAPS

18. LIST OF REFERENCES

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