

4

CREATING LIVEABLE STREETS *THE PLAN*

The *Knox Liveable Streets Plan 2012-2022* will guide Council in all aspects of its street planning, design, development and management activities, and support partnerships between Council, the community and infrastructure agencies.

4.1 OVERVIEW

The *Plan* is based on seven liveable street themes. Each has a clear goal that will be achieved through a number of identified approaches and actions.

A rolling four-year action plan (Section 6) will turn the goals and approaches into real change.

Progress towards each goal will be measured through defined indicators (Section 6).

Liveable streets design guidelines (Section 5) are a key part of the *Plan*. These will guide the Council and the community on the standards to be achieved in future street design.



Typical street in Bayswater with wide nature strips and a variety of native street trees

4.2 LIVEABLE STREETS

Liveable streets are places where people feel proud to live, work and play. The character of a street and the broader neighbourhood are pivotal to the community's sense of place and home.

The Plan promotes seven key themes and benefits together with the triple-bottom-line approach to sustainability and *Knox's Vision 2025* (KCC, 2007).

WHAT LIVEABLE STREETS MEAN IN THESE TERMS

1. Streets as places

Streets should be treated as places for people as well as spaces for vehicles and services. They are places to be enjoyed, places to be lived in. Local streets are a large part of every neighbourhood, and a key element in neighbourhood character.

2. Streets for travel

Streets connect us. They provide a network of footpaths, cycle lanes and roadways that helps us move around our area, and link us to other places.

3. Streets for the environment

Streets are part of our environment. They can play a valuable role in catching and reusing rainwater. Street trees and plants can create habitat links and produce food for people and local wildlife.

4. Streets and the economy

Well designed and attractive streets contribute to economic viability. Liveable streets include the places where we work and shop. Even major roads need to become more liveable through good design.

5. Safe streets

Safe streets are places where we can meet

and play with comfort and without the feeling of danger.

6. Streets for the community

Liveable streets are places where people feel comfortable to be.

7. Streets for infrastructure

Liveable streets are living entities that provide all kinds of services and are infrastructure in themselves. All streets require care and maintenance.

This way of thinking about liveable streets is new and exciting. Knox can take a leadership role in actively delivering this vision.

The streetscape is the visual identity of a neighbourhood and plays an important role in facilitating interaction between residents and creating a community. Well designed streetscapes encourage connection understanding and community spirit among residents. (COA, 2008, pp29)

4.3 VISION

In summary, the vision for liveable streets in Knox is:

- Knox's streets are places that people are proud to call home.
- Liveable streets create connections, between people, for the environment, for infrastructure services and for travelling.
- Liveable streets are sustainable, interesting, diverse and attractive and are places for plants and animals too.
- Liveable streets are attractive streetscapes for residents, shoppers, workers and visitors.
- Liveable streets are safe and happy environments.
- Liveable streets are great places to be and are places for people to rest, socialise and play.
- Liveable streets provide multiple functions and balance the needs of vehicles, pedestrians, cyclists, services, vegetation, infrastructure and access.

Streets should be part of our living space and a common area for the community, equal to the park and footpath... A good street is one in which you can chat with your neighbour without having to shout over traffic noise, or worry about your safety and that of small children (COA, 2008, pp29)

4.4 DESIGN PRINCIPLES

Good design is an essential part of creating liveable streets.

The principles for good street design have been informed by a review of local and international design guidelines. These include:

- *Manual for Streets*, Department for Transport, United Kingdom 2007;
- *Moreland Street Landscape Strategy 1997–2017*, Moreland City Council 1997;
- *City of Salisbury Landscape Plan*, by Hassell, South Australia 2007;
- *Street Design Guidelines*, Landcom, NSW Government 2010; and,
- Commission for Architecture and the Built Environment, United Kingdom (various reports)

The following six principles underpin best practice in liveable street design.

A. STREETS FOR EVERYONE

Streets have multiple uses and users. The needs of all should be catered for. The needs of vehicles should not overtly dominate street design.

B. STREETS AS LINKAGES

Streets should form a well-connected network that offers multiple routes and transport modes to destinations. Add special walking and cycling linkages where possible. Keep urban traffic dispersed, low speed and moving.

C. ACCESSIBLE AND EASY STREETS

Make footpaths that are comfortable. Build narrow carriageways and compact intersections, and make streets that are easier to cross. Design for the diverse access and mobility needs of the community.

D. GREEN STREETS

Green streets contribute to good water management, reduce urban heating, and include trees for shade and as habitat.

E. STREETS AS PUBLIC SPACES

Recognise that streets are a primary component of the public realm, where people can interact and build community.

F. STREETS OF ADEQUATE SIZE

Scale for people, for bicycles and cars together, recognising the function of each type of street.

These principles should be used in conjunction with the *Liveable Streets Design Guidelines* in the planning, design and maintenance of streets in Knox.

4.5 THEMES, GOALS AND APPROACHES

The following table summarises the themes, goals and approaches of the seven themes in this *Plan*.

THEME	APPROACHES
<p>1. STREETS AS PLACES</p> <p>Streets are the public 'face' of an area; they are places in which the community of Knox lives, works and plays. The plan explores how streets help create the character of the city.</p> <p>GOAL To create and strengthen Knox's distinct sense of place through high quality streets</p>	<ol style="list-style-type: none"> 1. Commit to a coordinated Council approach to street design and implementation to ensure best possible infrastructure, community and environmental outcomes 2. Promote and enhance Knox's distinctive urban, suburban and rural landscape identity through the design of its major streets and gateways 3. Enhance Knox's neighbourhood character through integrated street design 4. Support community participation in street activities
<p>2. STREETS FOR TRAVEL</p> <p>This plan explores streets to better serve all modes of travel including walking and cycling, to increase connectivity throughout neighbourhoods, suburbs and the whole City of Knox</p> <p>GOAL To improve the ability of streets to cater for an increase in sustainable transport options in Knox</p>	<ol style="list-style-type: none"> 1. Encourage travel behaviour change by supporting alternative travel modes 2. Make walking a viable choice for residents 3. Make cycling a viable choice for residents 4. Encourage pedestrian use of residential streets by reducing vehicle speed 5. Provide accessible footpaths and crossings 6. Implement shared use zones and home zones in streets to promote walking and cycling
<p>3. STREETS FOR THE ENVIRONMENT</p> <p>Streets for the environment look at ways that streets can care for environmental factors such as flora and fauna, water and shade and the connection they have with Knox's goals for climate change</p> <p>GOAL To improve environmental sustainability of streets in Knox</p>	<ol style="list-style-type: none"> 1. Increase sustainable water use, capture and treatment in streets 2. Improve biodiversity and habitat values through enhancement of Knox's street vegetation 3. Design and implement environmentally sustainable streetscapes

THEME	APPROACHES
<p>4. STREETS AND THE ECONOMY</p> <p>This theme looks at how streets contribute to the economy through retail, industry and business and how they contribute to property value and health costs for residents.</p> <p>GOAL To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities</p>	<ol style="list-style-type: none"> 1. Build the capability of the residents to work collectively to 'populate' the streets to make it a desirable, healthy place to live and work 2. Build capacity of the commercial and retail 'people' to animate the refreshed streetscape 3. Refresh streets in activity centres and neighbourhood shopping strips to enable improved economic outcomes 4. Improve economic longevity of street pavements through appropriate street tree planting 5. Promote walking and cycling activity in Knox streets to reduce community health costs and increase well-being
<p>5. SAFE STREETS</p> <p>This sections looks at ways to activate streets, helping create safer environments for residents and visitors.</p> <p>GOAL To improve the safety of Knox's streets for pedestrians, cyclists and motorists</p>	<ol style="list-style-type: none"> 1. Decrease vehicle speed in residential streets and retail environments 2. Improve pedestrian access and amenity in streets to provide equitable space for non-vehicle movement 3. Provide safe areas for parking of vehicles 4. Create community destinations – reasons to be on the street
<p>6. STREETS FOR THE COMMUNITY</p> <p>In local residential streets, communities can inhabit the street space to create their own sense of place, shaping it with plants, art and activity. In such streets neighbours meet, children play, people are active and involved.</p> <p>GOAL To increase community pride and action in Knox streets</p>	<ol style="list-style-type: none"> 1. Design streets to enable community activity 2. Support community initiatives in streets 3. Streets as places to produce, harvest and share food <p>Note: all actions need to contribute to consistent neighbourhood character</p>
<p>7. STREETS FOR INFRASTRUCTURE</p> <p>This section explores the many types of infrastructure needs that streets provide and house. It investigates maintenance, access and integration with other uses and community needs.</p> <p>GOAL Coordinate street design and maintenance to balance infrastructure and community needs</p>	<ol style="list-style-type: none"> 1. Improve the coordination of street design, works and maintenance between Council, state authorities and utility providers 2. Improve the coordination of street design, works and maintenance across Council 3. Improve the quality of street design 4. Make sustainability a priority for future infrastructure works 5. Ensure a balanced approach to on-street car parking

4.6 STREETS AS PLACES

The streets within Knox help create the character of the city, from the major connecting boulevards and highways through to the narrower residential streets.

Streets are an important part of the public realm. They are the public 'face' of every area. Most importantly, they are the places in which people interact. Streets are much more than just transport corridors, they are the places where the Knox community lives, works and plays.

GOAL

To create and strengthen Knox's distinct sense of place through high quality streets

OPPORTUNITIES

- Create a clear and legible urban structure;
- Build community pride;
- Strengthen transport links and nodes; and,
- Create a stronger sense of place for residents.

CHALLENGES

- VicRoads manages most of Knox's main roads and Council needs to coordinate with VicRoads to achieve desired outcomes;
- Traffic on major roads cannot be considered in isolation but rather as part of a broader integrated traffic management system;
- Highly constrained major road easements where the issues of inter-suburban travel and vehicle speed are paramount;
- Little tolerance exists in VicRoads standards to achieve desirable tree and vegetation planting; and,
- Competing interests between streets as places and streets dominated by vehicles. In particular, community and business expectations of on-street car parking.



Zetland in Sydney, a good example of a street with water sensitive urban design and shady native tree planting

APPROACHES

1. Commit to a coordinated Council approach to street design and implementation to ensure best possible infrastructure, community and environmental outcomes
2. Promote and enhance Knox's distinctive urban, suburban and rural landscape identity through the design of its major streets and gateways
3. Enhance Knox's neighbourhood character through integrated street design
4. Support community participation in street activities

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- dynamic services and facilities;
- accessible transport choices;
- sustainable natural environment;
- balanced quality urban development; and,
- prosperous modern economy,

And it is supported by the Vision 2025 commitment to:

- partnering and engaging;
- innovation and excellence;
- effective governance; and,
- social and environmental responsibility.

4.6 STREETS AS PLACES

MEASURE OF SUCCESS

- This *Plan* adopted by 2012 and part of each directorship's yearly planning
- Increase the number of projects guided and assessed by the liveable streets checklist
- Liveable streets design guidelines adopted by 2012
- *Liveable Streets Plan* and its *Action plan* reviewed each year and actions receive funding on an ongoing basis
- Risk management review undertaken and projects can proceed with confidence with Council and VicRoads support
- Dandenong Creek gateways completed by 2018
- Bush boulevards and principle avenues planted by 2022
- Paths into the hills planted in 2027
- Street improvements comply with checklist
- Memorandum of understanding with VicRoads adopted by 2012
- Revision of the *Knox Streetscape Policy* by 2012
- Street improvements comply with checklist and criteria
- Implement three green neighbourhood streets in by 2016
- Collaborative consultation approach with residents and levels of community participation
- Clear easy procedures for community based events and activities available on web and through customer service
- Record number of people who download information and number of activities that occur
- Collaborative consultation approach with residents and level of community participation
- Number of community groups and residents approaching Council for stakeholdership
- Number of community initiated groups increase

Measure of success for community

- Increased number of community initiated street projects in Knox
- Level of community involvement in street projects
- Increased number and extent of edible and gardens for wildlife private gardens

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Knox Urban Design Framework*;
- *Knox Neighbourhood Character Study*;
- *Knox Street Tree Strategy*;
- *Knox Pedestrian Plan*;
- *Knox Nature Strip Policy*;
- *Knox Arts Plan*; and,
- *Melbourne 2030*.



Community project 'Streets for living project', Bayswater

GOAL

To create and strengthen Knox's distinct sense of place through high quality streets

OPPORTUNITIES

This section looks at four specific opportunities that will help build a distinctive sense of place:

- Create a clear and legible urban structure;
- Build community pride;
- Strengthen transport links and nodes; and,
- Create a stronger sense of place for residents.

Create a clear and legible urban structure

The structure of an urban area is created by the way that land uses are organised and interconnected. Streets and roads, along with bicycle paths and footpaths, are important connectors between home, work, school and leisure places.

The best urban forms are ones that are well interconnected, accessible and 'legible', where people find it easy to find their way around.

Overall, Knox has a traditional geometric network of grid streets and subdivision patterns across varied topography with wide linear streetscapes and typically large lot land parcels. (KCC, 2005)

Build community pride

Building a strong sense of community pride applies equally from local street communities right through to the community of Knox as a whole.

Community pride creates active participation and a sense of wellbeing.

Strengthen transport links and nodes

Linking neighbourhoods through accessible public transport is a vital part of activating local areas and streets. Building walking and cycling networks is a key component.

Section 4.7 looks in detail at travel and transport in Knox.

Create a stronger sense of place for residents

A sense of identity and belonging improves the social wellbeing and personal health of residents.

Neighbourhood character plays an important role in enhancing a sense of belonging and identity within each local community.

Enhancing a sense of place in each street and neighbourhood is a significant design challenge. Many streets have qualities that are highly valued by the community, but many changes are also being called for. Some of these need to be addressed through a more integrated approach to street design.

The design of each street can add to or detract from the local character. For example, the widths of the street, pavement, nature strip and trees all contribute to the street's appearance, and a consistent design approach can help build streets into neighbourhoods, giving each neighbourhood an interesting and distinctive character.

4.6 STREETS AS PLACES

CHALLENGES

There are some major challenges in building a distinctive sense of place in streets, including:

- Council needs to coordinate with VicRoads to achieve desired outcomes, as VicRoads manages most of the Knox's main roads;
- considering traffic on major roads as part of a broader integrated traffic management system and not in isolation;
- the issues of inter-suburban travel and vehicle speed are paramount but are highly constrained in major road easements;
- little tolerance exists in VicRoads standards to achieve desirable tree and vegetation planting; and,
- competing interests between streets as places and streets dominated by vehicles. In particular, community and business expectations of on-street car parking.

COMMUNITY PERSPECTIVES

The community consultation revealed that:

- most people generally like the street that they live in, but equally most want some changes;
- most people know their neighbours and many get involved in at least some local neighbourly activities, but few so far have actively participated in a street-based improvement project;
- most people want quiet streets, and the desire for less traffic is almost universal;
- most people use and feel connected to local facilities, and many already walk to them; and,
- the design qualities of streets are important. People like streets that are well-designed and maintained, that have street trees, and few cars parked on the street. Wide streets with a sense of spaciousness are liked as are meandering streets.



A collaborative departmental street design workshop, where Council officers used the 'kit of parts' to design a street together

GOAL

To create and strengthen Knox's distinct sense of place through high quality streets

ACHIEVING CHANGE

Vision

The streets of Knox will become valued public places, creating and reinforcing a sense of community identity and pride. Connectivity, accessibility and legibility will be enhanced at a local and city-wide level.

Goal

It supports the following ideas in *Vision 2025*:

- Healthy, connected communities;
- Supporting culturally rich and active communities;
- Sustainable natural environment; and,
- Balanced quality urban development.

It is supported by the *Vision 2025* commitment to:

- Partnering and engaging;
- Innovation and excellence; and,
- Social and environmental responsibility.

Approaches

1. Commit to a coordinated Council approach to street design and implementation to ensure best possible infrastructure, community and environmental outcomes
2. Promote and enhance Knox's distinctive urban, suburban and rural landscape identity through the design of its major streets and gateways
3. Enhance Knox's neighbourhood character through integrated street design
4. Support community participation in street activities

4.6 STREETS AS PLACES

ACHIEVING CHANGE

APPROACH 1 – Commit to a coordinated Council approach to street design and implementation to ensure best possible infrastructure, community and environmental outcomes

Action 1.1

Council to commit to the implementation of this *Plan* over the next 10 years with a review every 3 years. Each year clear priorities should be agreed to, budgeted for and implemented

Action 1.2

Ensure each street project is guided and assessed by the liveable streets checklist. Update checklist after a period of use and review

Action 1.3

Adopt the liveable streets design guidelines for all new street design and redesign by Council

Action 1.4

Review *Liveable Streets Plan* and action plan annually to measure success and update where necessary

Action 1.5

Develop a risk mitigation plan of street design, maintenance and community street activities

APPROACH 2 – Promote and enhance Knox’s distinctive urban, suburban and rural landscape identity through the design of its major streets and gateways

Action 2.1

Implement planting and design of Knox’s key streets:

- Dandenong Creek Gateways,
- Bush boulevards,
- Principal avenues,
- Paths into the hills

Action 2.2

Implement the liveable streets design guidelines to achieve the desired character for Knox’s main streets and gateways

Action 2.3

Establish a protocol or memorandum of understanding with VicRoads for non-standard streets to achieve greater liveability

Action 2.4

Revise the *Knox Streetscape Policy (2003)* to include recommendations from the:

- Neighbourhood Character Study;
- Sustainable Environment Strategy;
- Sites of Biological Significance;
- Net Gain Policy;
- Native Vegetation Framework;
- Draft Native Vegetation Generic Integrity Policy;
- Indigenous Roadside Vegetation programme;
- WSUD Strategy;
- Knox Heat Island Effects Study and to
- Develop a Street Tree Management Plan
- Develop a Street Tree Selection Tool
- Conduct a Street Tree Audit to feed into the plans above
- Develop a Nature Strip Planting Application form and process

GOAL

To create and strengthen Knox's distinct sense of place through high quality streets

APPROACH 3 – Enhance Knox's neighbourhood character through integrated street design**Action 3.1**

Ensure street design is consistent with Knox's residential design guidelines and the liveable street design guidelines

Action 3.2

Adopt and implement green neighbourhood streets as a priority street type for improving neighbourhood character

APPROACH 4 – Support community participation in street activities**Action 4.1**

Talk to local communities to list the qualities that give their locality a sense of place, and bring their perspectives into the design process and maintenance, in particular for home streets

Action 4.3

Work with community groups to facilitate community involvement in streetscape design and maintenance

Action 4.2

Facilitate and promote street and neighbourhood-based sustainable streets, community events and activities (e.g. street parties, garden clubs, nature strip maintenance groups)

Action 4.4

Encourage community initiated groups to form and be proactive in street design and use

Actions under other themes will also contribute to enhancing streets as places

COMMUNITY ACTIONS – Communities can contribute to this goal by:**Community initiation**

Community groups initiating residential streetscape projects and working with Council to deliver neighbourhood green streets projects

Community participation

Participating in street-based programs to improve the design of local streets including Gardens for Wildlife and 'edible streets' and the design of their garden to enhance neighbourhood character

4.7 STREETS FOR TRAVEL

Traditionally streets have been viewed by government and the community as primarily for vehicles – road space for cars, trucks, buses – both in transit and parked.

This *Plan* challenges this view by considering how streets can better serve other modes of travel, such as walking and cycling, and thereby increase connectivity throughout neighbourhoods, suburbs and the whole City of Knox.

The *Knox Sustainable Environment Strategy* (Context, 2008) points out that the urban structure of Knox – the way the suburbs are laid out – has a major impact on how people can move around. Suburbs that are spread out and connected by large roads and freeways are designed to be ‘car dependent’, highlighting the challenge of change for Knox.

The streets in Knox vary in type and activity. A street typology recognising the role of all forms of movement is an important part of this *Plan*. A new type of street called the ‘Green Neighbourhood Street’ is proposed that balances the needs of pedestrians, bicycle, public transport and car movements.

Some streets carry heavy through traffic while others serve only the residents who live on that street. For example, major arterial roads such as Burwood Highway and Stud Road carry traffic moving through Knox and beyond.

Smaller streets also play important local roles. For example, Albert Avenue in Boronia or Taylors Lane in Rowville are key streets within their suburb, connecting important community facilities such as educational campuses, open space and local shops.

On all these streets, people drive, cycle, walk and use public transport.

GOAL

To improve the ability of streets to cater for an increase in sustainable transport options in Knox.

OPPORTUNITIES

- Increasing connectivity;
- Increasing non-car based travel;
- Walkable communities;
- Equal access; and,
- Creating Green Neighbourhood Streets.

CHALLENGES

- Connectivity is difficult to achieve with suburbs that have been designed around the cul-de-sac model with large roads becoming barriers;
- Reducing trips to work by car when most such trips are to locations outside the municipality;
- Overcoming perceptions about safety and walking in suburban neighbourhoods;
- Providing streets that accommodate the needs of all the community when space is limited and only moderate capital budgets exist; and,
- Upgrading existing streets is dependant on available funds, and road works generally are prioritised according to road safety issues.



O'hay Street, Coburg with an off-road shared path. Cars give way to pedestrians and cyclists at crossing points

APPROACHES

1. Encourage travel behaviour change by supporting alternative travel modes
2. Make walking a viable choice for residents
3. Make cycling a viable choice for residents
4. Encourage pedestrian use of residential streets by reducing vehicle speed
5. Provide accessible footpaths and crossings
6. Implement shared use zones and home zones in streets to promote walking and cycling

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- dynamic services and facilities;
- accessible transport choices;
- sustainable natural environment;
- balanced quality urban development; and,
- prosperous modern economy.

And it is supported by the Vision 2025 commitment to:

- partnering and engaging;
- innovation and excellence;
- effective governance; and,
- social and environmental responsibility.

4.7 STREETS FOR TRAVEL

MEASURE OF SUCCESS

- Refer to *Knox Pedestrian Plan*, *Knox Bicycle Plan* and *Knox Integrated Transport Plan* success indicators
- Implement 3 Green Neighbourhood streets in 5 years
- 10 hotspots identified in the Knox Pedestrian Plan improved and additional hotspots identified
- All newly constructed roads have at least one footpath
- Shared use zones implemented in key pedestrian priority locations in commercial and residential areas
- Candidates for home zones identified, prioritised and two home zones implemented in five years

Measure of success for community

- Implementation of prototype
- Increase in pedestrian activity and social connectivity within home zone area
- Increase in perceptions of safety
- Increase in number of pedestrians and cyclists
- Number of people observed using pause points



Crossing point, South Yarra showing the road raised to pedestrian level and paved in the foot path material, to prioritise pedestrians

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Knox Integrated Transport Strategy*;
- *Knox Pedestrian Plan*;
- Knox Structure Plans (Boronia, Bayswater, and Mountain Gate) for proposed shared use streets;
- *Knox Access and inclusion Plan for People with Disabilities*;
- Knox Bike Strategy; and,
- Knox Sustainable Environment Plan (Approach 6.1 Improve Walkability and Cycle ability).

OTHER USEFUL REFERENCES

- *Manual for Streets*, Department for Transport, England and Wales;
- *Mothers living well Bayswater community plan*; and,
- <http://www.homezones.org>.

‘Where dysfunctional street patterns already exist in place, new linkages can be created. Although it is rarely possible to retrofit new streets in established neighbourhoods, it is often possible to make use of natural land features, utility corridors, waterways and other open space to create walking and bicycling trails.’ (Burden D., 2001)

GOAL

To improve the ability of streets to cater for an increase in sustainable transport options in Knox.

OPPORTUNITIES

This section looks at five opportunities that would help enhance the use of streets for all modes of travel:

- Connectivity;
- Increasing non-car based travel;
- Walkable communities;
- Equal access; and,
- Creating Green Neighbourhood Streets.

Connectivity

Melbourne 2030 (SGV, 2005) advocates the development of local and regional nodes for shopping, community facilities, employment and recreation. These nodes can then support nearby increases in residential density. Connectivity is a key in enabling this strategy to work.

The benchmark maximum desirable walkable distance to local shops and facilities, including public transport, is 400 metres. As the distance increases, people are more likely to drive.

The *Knox Integrated Transport Plan* (KCC, 2004) found that most people in Knox rely almost entirely on a car as their main mode of transport. In the community consultation for this *Plan*, Knox people said that they walked to local facilities, mainly to shops and schools, a few times a week, but fewer people cycled. Distance and time are the main barriers to increased walking.

Looking across the municipality, about half of Knox residents have community facilities within 400 metres walking distance (see *Figure 8 Pedestrian Connectivity*).

Connectivity is also about vehicle movements. A typical suburban street pattern has a hierarchy of streets where vehicles move from the local street to a collector road and out onto major roads. This is based on the primary movement being by car from home in a 'dormitory' suburb to workplaces located some distance away.

Often local streets are closed to through traffic to protect the amenity of the street and lower vehicle numbers.

In this *Plan*, the focus is on increasing connectivity for vehicles, foot and bicycle travel, while enhancing the liveability of all streets. For example, this could mean creating new links between streets where an opportunity arises. The result would be decreased traffic funnelling onto one main street and a more even flow of traffic within neighbourhoods. As well, such links would serve pedestrians and cyclists, bringing local facilities closer (in travel distance) to home.

This *Plan* includes a street typology and proposes design treatments to enhance connectivity. The typology is in Section 5.1, and is illustrated on *Figure 9 VicRoads and Council Streets Asset Management Hierarchy* and *Figure 10 Proposed Street Hierarchy*.

Legend

- City of Knox Boundary
- 400m zone
- Local facility

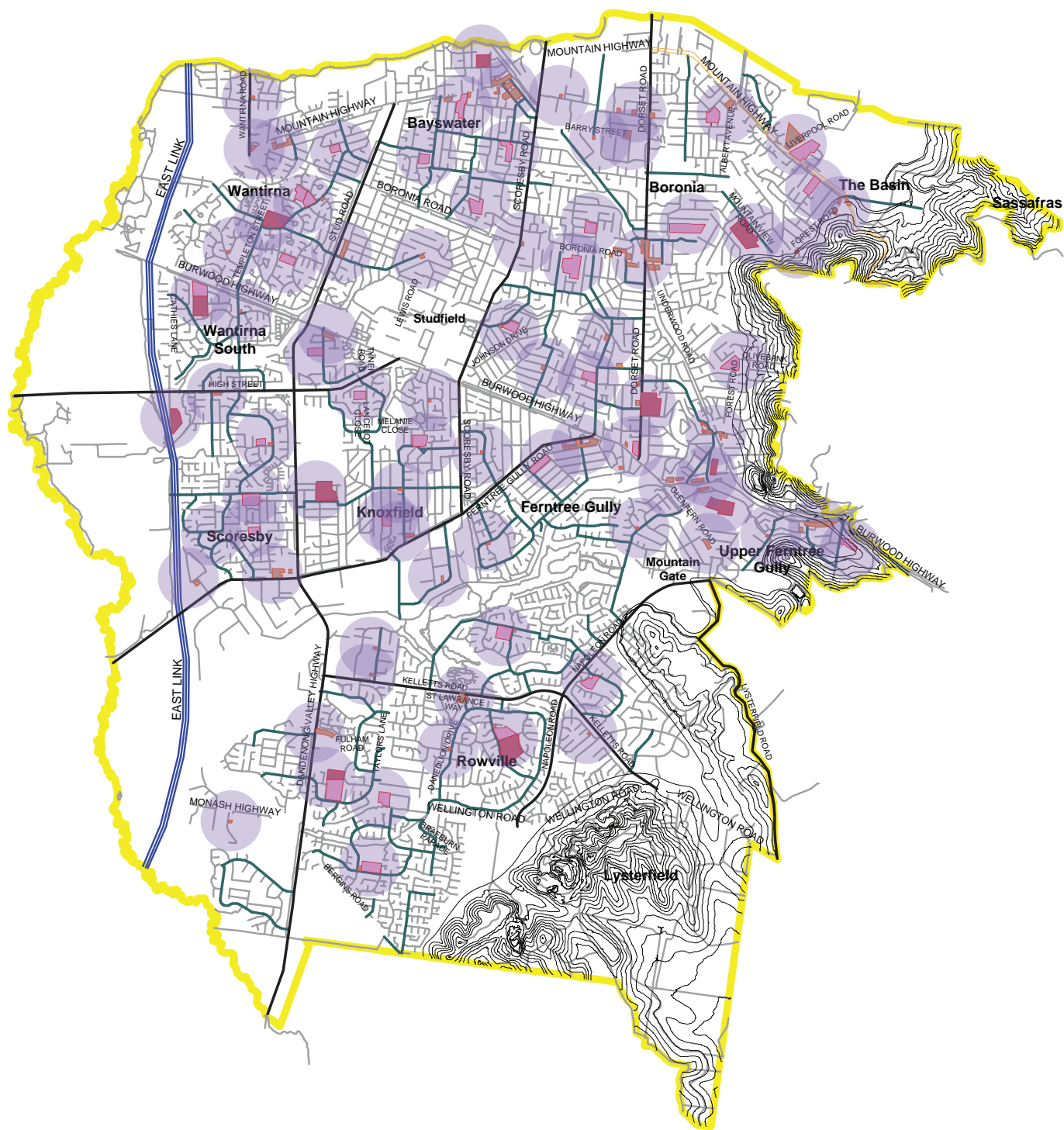





Figure 8: Pedestrian Connectivity, showing the residential areas that have local facilities within a 400m radius (typical walking distance).

Legend

-  City of Knox Boundary
-  East Link
-  VicRoads

Knox City Council Streets

-  Link Road
-  Collector Road
-  Industrial Road
-  Access Road
-  Unsealed Road

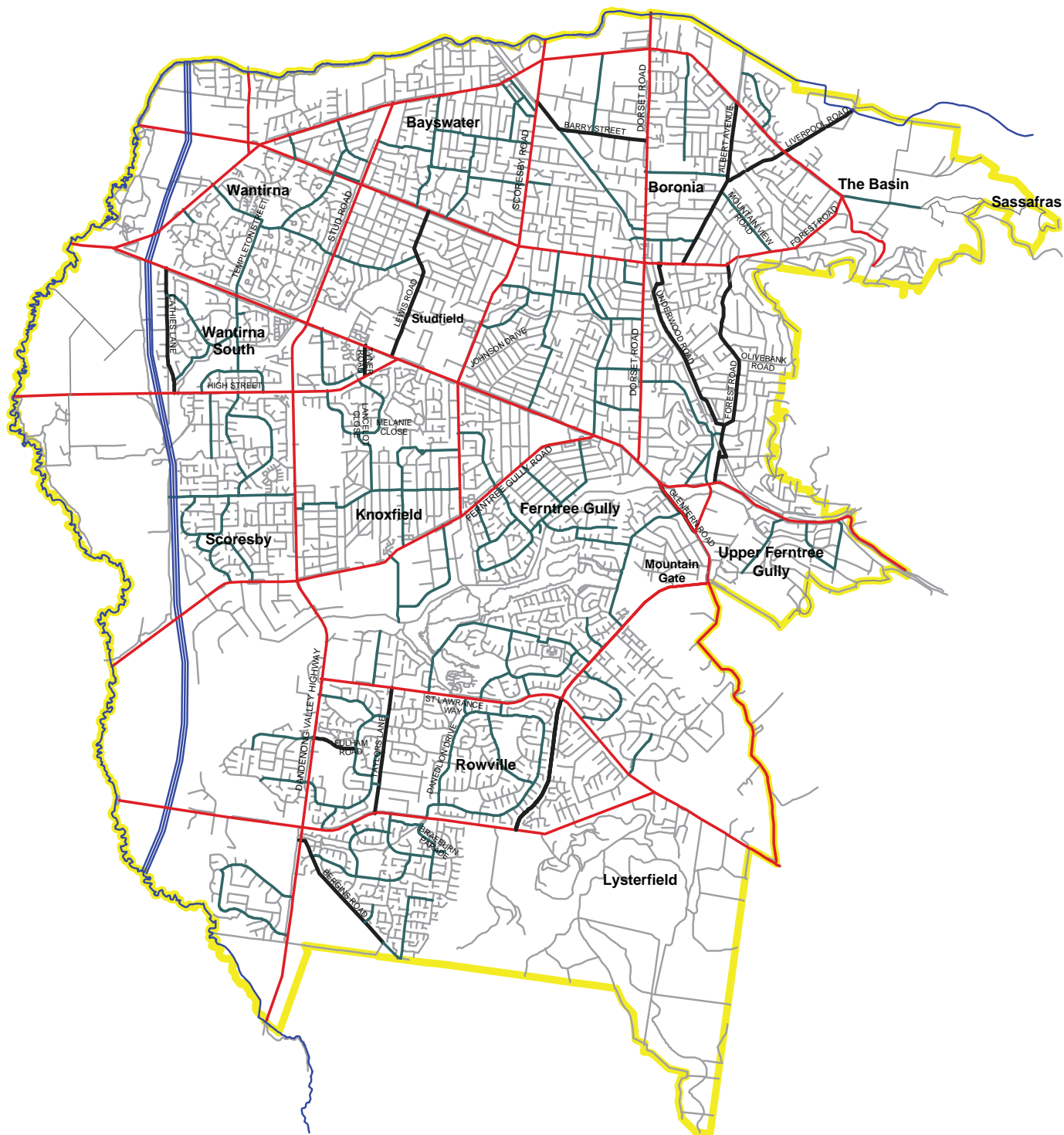


Figure 9: VicRoads and Council Streets Asset Management Hierarchy

Legend

- City of Knox Boundary
 - Principle Avenues
 - East Link
 - Paths into the Hills
 - Dandenong Creek Gateways
 - Community Link Streets
 - Bush Boulevards
 - Neighbourhood Green Streets
 - all Residential Streets
- For the following streets, refer individual maps
- Industrial Streets
 - Shopping Streets and
 - all Residential Streets



Figure 10: Proposed Street Hierarchy

4.6 STREETS FOR TRAVEL

OPPORTUNITIES

Increasing non-car based travel

Integrated transport means interlinking all of the different ways people move around their neighbourhood, travel across Knox and beyond. It means building a more diverse array of travel options including walking, cycling, public transport, and car use, and working towards the seamless integration of these modes. This is a substantial task, and Knox is not alone in tackling it.

The liveable streets concept seeks to make streets more attractive, safe and interesting places for travel on foot and by bicycle. It does this through recognising the importance of easy access to public transport nodes and local services, and by shifting the emphasis from streets for vehicles to streets for all modes of travel. As a result, traffic congestion can be reduced and public transport, walking and cycling can become more viable choices for residents.

Most journeys to work made by Knox people are by car, and most as the driver (79% of these journeys). Only small numbers walk (1.6%), catch public transport (1.6%) and cycle (1.3%) (ABS, 2006). This reflects the nature of the City of Knox.

MODE	KNOX (%)	MELBOURNE (Average %)
Car/as driver	69.6	62.1
Car/as passenger	5.0	5.2
Motorbike	0.4	0.4
Truck	1.5	1.1
Taxi	0.1	0.2
Train	4.5	7.1
Bus	1.0	1.3
Tram	0	2.0
Bicycle	0.4	0.8
Walk	1.0	2.4
Other	16.4	17.4

Figure 11: Modes of travel to work
Source: Knox Integrated Transport Plan 2004

'Adding modes to a transport system improves mobility and accessibility and development opportunities.' (Layman, 2009)

Increasing cycling

The City of Knox has the most extensive shared path network in Victoria. These networks connect with natural features of the municipality, chiefly the Dandenong Creek Valley. In comparison, there are few designated commuter cycle routes.

There is an opportunity to increase the uptake of cycling for short and longer journeys within Knox by increasing both off-road and on-road networks. The *Knox Bicycle Plan* (KCC, 2008) seeks to make cycling a realistic travel choice for all Knox residents.

Liveable streets can assist by supporting the creation of more interconnected networks, enabling access from home, shops and work to bicycle and shared paths and by enabling safer cycling. For example, cyclists need clearly marked lanes so that they can ride safely on-road.

4.7 STREETS FOR TRAVEL

OPPORTUNITIES

Accessing public transport

Knox is poorly served by public transport. *Figure 12*, public transport catchment in Knox, shows 1km radius zones around train stations and 400m radius zones around bus routes.

There is only one rail line serving the north-east of the municipality. Richard Layman, urban revitalisation advocate and consultant, Washington, USA., says 'One line doesn't do it. You need a system of connected lines and a density of stations. That's the key difference in all of the systems constructed from the 1960s forwards.' (Layman, 2009)

The City of Knox has been actively advocating a range of public transport initiatives (KCC, 2003) including:

- Rail extension to Rowville from either Huntingdale or Glen Waverley and terminating at a transport interchange in Rowville
- SmartBus Service along Stud Road is essentially complete from Dandenong Station to Ringwood Station; will involve upgrade of Stud Road to three lanes in places to ensure reliable operation of bus services.
- Burwood Highway tram extension from Vermont South to Knox City to link a new Knox City transport interchange with the Stud Road SmartBus Service and local feeder bus services
- Development of a transport interchange at Stud Park Shopping Centre To link Stud Road SmartBus service and rail line terminus with local feeder bus services
- Upgrade Ferntree Gully Station to premium Station status – complete.




- Improve bus service levels
Improve service levels in relation to bus route service spans and operating frequency. For example: extending operating hours to 6am and 10pm, 7 days a week; increasing weekday frequency to 15 minute intervals in the peak, and 30 minutes at other times.
- Bus Route Review
Implement recommendations of the examination of existing local routes for accessibility and functionality.

CASE STUDY / CITY OF YARRA

There are good examples of bicycle lane marking within the City of Yarra, which have not only made bicycle commuting safer, but also increased awareness and volumes of cycling. The City of Yarra has the highest level of cycling of any municipality in Victoria (City of Yarra, 2010)

'Providing first class bike infrastructure will help maximise bike use in Yarra which will ease congestion and reduce carbon emissions in our city... Many of these projects not only benefit cyclists, but pedestrians too, which encourages more residents to leave their cars at home and choose healthy and more sustainable forms of transport' (City of Yarra, 2010)

Legend

-  City of Knox Boundary
-  1km zone from train station
-  400m zone along bus route

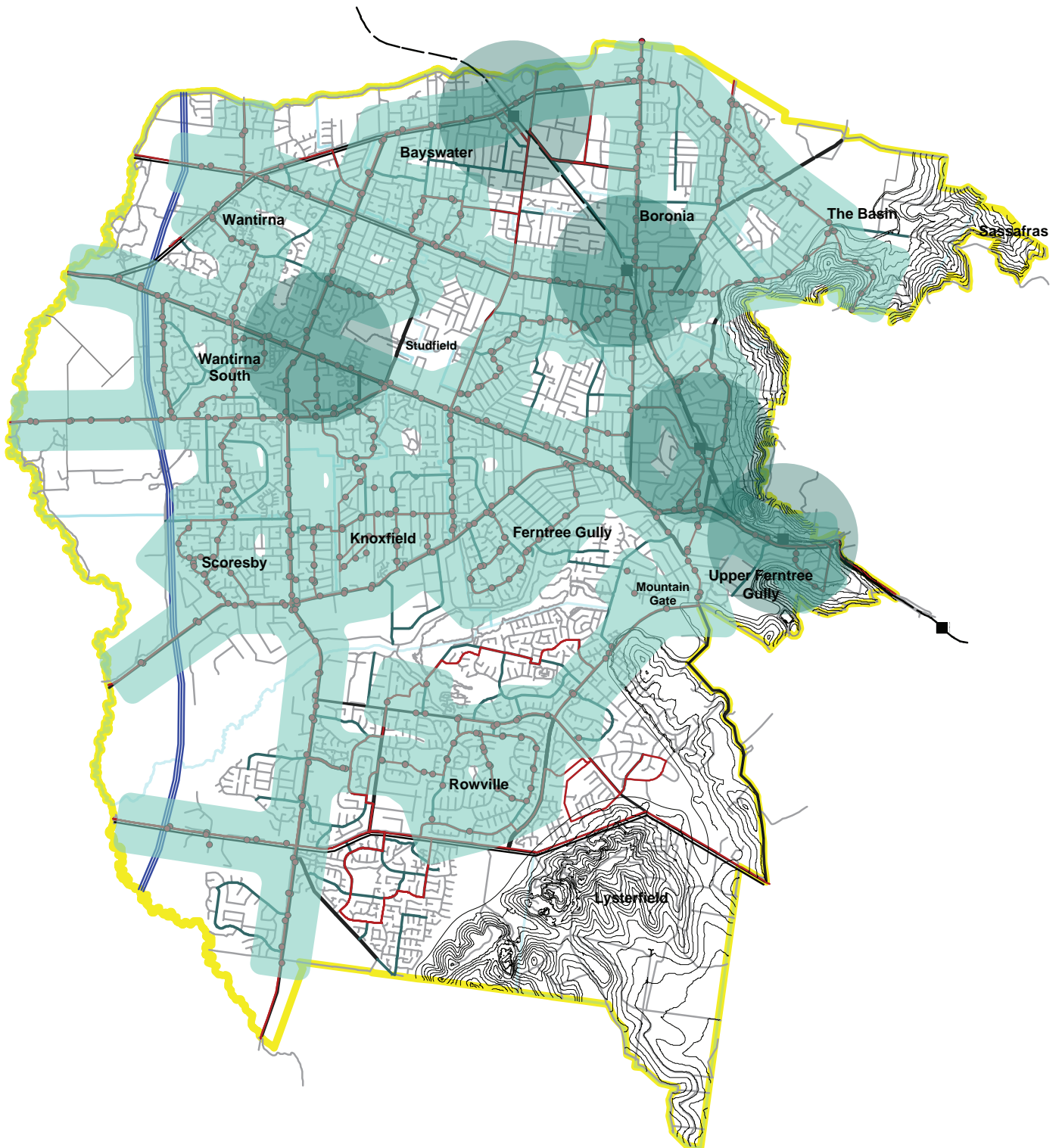


Figure 12: Public transport catchment in Knox

4.7 STREETS FOR TRAVEL

OPPORTUNITIES

Walkable communities

Liveable streets can help create walkable communities – neighbourhoods where walking and cycling is safe and enjoyable. Liveable streets help people get to local facilities.

The *Knox Pedestrian Plan* (David Lock Associates & PBAI, 2005) identifies the main characteristics of a walkable environment as being interesting and attractive, feeling safe, offering frequent opportunities to meet, sit and rest (with infrastructure such as signage and seating), creating a continuous link between major destinations, and being comfortable and easy to use for all.

Walking offers both community and personal benefits. As a mode of transport it is accessible, affordable and equitable. Walking creates more social interaction, improved fitness, and increased on-street safety. *The Knox Pedestrian Plan* (David Lock Associates & PBAI, 2005) identified the following benefits:

- a deeper level of engagement between people and their surroundings, stemming from enhanced opportunities to interact with other people and a greater awareness of things that can only be appreciated on foot (or on bicycle) such as bird song, the texture and colour of autumn leaves and spring blossom;
- older people retain their independence for longer;
- a lower rate of illness, directly through activity and indirectly through reduced pollution and accidents;
- a higher degree of social inclusion and community engagement; and,
- drivers increasingly consider, and are more aware of, pedestrians.

Many Knox residents already walk to local facilities, and the development of more liveable streets will enhance the quality of streets as walking environments.

Equal access

Ensuring that everyone can use local streets is important, and requires particular attention to the design of details that can otherwise become a barrier to equal access. By creating streets as spaces that everyone can use, people are able to maintain greater personal independence. This will become increasingly important in an ageing community.

Equal access means considering those who have limitations on their mobility. This may mean that they use a walking device (walking frame), a wheelchair, or an electric scooter. Scooters have the same rights to footpaths and obligations as pedestrians.

Equal access also means considering the needs of those with young children: for instance in prams or pushers, on tricycles or tag-along bicycles.

Achieving equal access means paying attention to the quality of footpaths and pedestrian areas, designing crossings to accommodate wheelchairs, scooters, prams and the like, and in busier locations widening footpaths to allow easier passing. Other desirable attributes in the pedestrian environment include features such as resting points and seats with backs.

‘Towns and portions of towns identified as neighbourhoods must be planned and assembled to walking scale. Towns are built of many intact neighbourhoods. History has proven that a distance of a quarter mile (400m, or 5 min. walk) radius forms the near perfect place for people to interact.
(Burden D., 2001)

GOAL

To improve the ability of streets to cater for an increase in sustainable transport options in Knox.

Creating Green Neighbourhood streets

An opportunity that arises from the need to build connectivity, increase non-car based travel, and create walkable communities and equal access is the development of a new street type – ‘*green neighbourhood streets*’. A series of streets across Knox could become a set of green neighbourhood streets. These would primarily be collector streets in residential neighbourhoods that provide key links to facilities such as local shops, schools and parks. Green neighbourhood streets would provide high quality shade, seating and cycle routes to promote inter-neighbourhood walking and cycling and to reduce the number of car trips to local facilities. The design guidelines that would transform streets into green neighbourhood streets are contained in Section 5.10, *Liveable streets design guidelines*.



Forest Road, The Basin with an on-road cycle lane



Mountain Highway, The Basin with an off-road shared path

4.7 STREETS FOR TRAVEL

CHALLENGES

There are some major challenges in enhancing the use of streets for all modes of travel, including:

- connectivity is difficult to achieve with suburbs that have been designed around the cul-de-sac model with major roads becoming barriers;
- reducing trips to work by car when most such trips are to locations outside the municipality;
- overcoming perceptions about safety and walking in suburban neighbourhoods;
- providing streets that accommodate the needs of all the community when space is limited and only moderate capital budgets exist; and,
- upgrading existing streets is dependant on available funds, and road works generally are prioritised according to road safety issues.

Each opportunity also presents some challenges, these include:

Connectivity

- The post-1970s street patterns common throughout Knox, with many cul-de-sacs, combined with residential estates having limited interconnections, limit opportunities to move easily between adjoining areas.

Non-car based travel

- Distances between work and home make travel alternatives such as cycling and walking impractical.
- Limited number of commuter bicycle paths currently exist.
- Limited public transport options restrict choice for those who want to reduce car use.

Walkable communities

- Community perceptions of safety in neighbourhoods.
- Community perception of a lack of time to walk, especially to accompany children to school.

Equal access

- The scale of the redesign and improvements needed to achieve equal access across Knox.
- The increasing need to provide electric power points in public spaces for recharging of electric scooters.

Green neighbourhood streets

- Retrofitting of existing streets to the design needed for green neighbourhood streets will require funds beyond traditional street upgrades.



Shared street, Main Street, Broadmeadows, showing various materials to decrease driver speed

GOAL

To improve the ability of streets to cater for an increase in sustainable transport options in Knox.

COMMUNITY PERSPECTIVES

Community consultation revealed that:

- speeding traffic and the associated safety issues within their neighbourhoods is a major concern;
- better pedestrian crossing points, and changes that will slow down traffic are desired;
- many people walk to local facilities, although fewer cycle, with distance and time available being the main barriers;
- footpaths are important and streets without footpaths are less liked and used; lack of connecting footpaths is seen as a barrier to walking to local facilities; and,
- streets are valued as play spaces and neighbourhood activities, and the amount of traffic is a barrier to participation.

'The neighbourhood environment should offer pleasant walking and cycling opportunities where the landscape is engaging, distinct and offering differing user amenity such as shade, seating opportunities and vegetation... thus creating rich and stimulating street environments that are safe and easy to access influencing the propensity to walk (DFT, 2007b)⁷

ACHIEVING CHANGE

Vision

Liveable streets offer greater equality between vehicles, pedestrians and cyclists. They are safer and more interesting places, enhancing the journey and increasing the attractiveness of walking and cycling.

Goal

It supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- dynamic services and facilities;
- accessible transport choices;
- sustainable natural environment;
- balanced quality urban development; and,
- prosperous modern economy.

It is supported by the *Vision 2025* commitment to:

- partnering and engaging;
- innovation and excellence;
- effective governance; and,
- social and environmental responsibility.

Approaches

1. Encourage travel behaviour change by supporting alternative travel modes
2. Make walking a viable choice for residents
3. Make cycling a viable choice for residents
4. Encourage pedestrian use of residential streets by reducing vehicle speed
5. Provide accessible footpaths and crossings
6. Implement shared use zones and home zones in streets to promote walking and cycling

4.7 STREETS FOR TRAVEL

ACHIEVING CHANGE

APPROACH 1 – Encourage travel behaviour change by supporting alternative travel modes

Action 1.1

Make better provision for cyclists and pedestrians in streets and open spaces to support increased take-up of walking and cycling as an alternative to car travel for short (5 min.) and medium (15 min.) journeys

Action 1.2

Improve the number and amenity of pedestrian and cyclist links between neighbourhoods and key attractions.

Refer to *Knox Pedestrian Plan*, *Knox Bicycle Plan* and *Knox Integrated Transport Plan*

Action 1.3

Improve pedestrian and cyclist connections to public transport nodes, by improving the safety and comfort of the journey and facilities at waiting points – e.g. at bus stops, road crossings – through increased seating, shelter, safety, shade

APPROACH 2 – Make walking a viable choice for residents

Action 2.1

Walking trips to schools, shops and community facilities by the footpath to be made safe and more accessible with the introduction of green neighbourhood streets. See Section 5 *Liveable Street Design Guidelines*

Action 2.2

The 10 hotspots identified in the Knox Pedestrian Plan should be extended to include all key pedestrian generators such as schools and shops

Action 2.3

Align capital and maintenance works with the *Knox Footpath and Shared Path Asset Management Plan*

Action 2.4

Ensure a separation (via nature strips and planting) between the carriageway and pedestrian pathways to increase comfort and safety

Action 2.5

Implement Knox walkable school programs and support programs, for example a 'walking school bus' program.

Refer to *Knox Pedestrian Plan*, *Knox Bicycle Plan* and *Knox Integrated Transport Plan*

Action 2.6

Ensure adequate pedestrian lighting in key pedestrian streets as identified in the *Knox Pedestrian Plan*

Action 2.7

Implement footpaths on at least one side of the street and preferable both sides of the street

APPROACH 3 – Make cycling a viable choice for residents

Action 3.1

Design and implement a network of commuter bike routes in accordance with the recommendations of the *Knox Bicycle Plan*

Action 3.2

Indicate entrances to bike paths through signage or artwork, and implement signage on bike paths with distance markers to destinations such as shopping centres

GOAL

To improve the ability of streets to cater for an increase in sustainable transport options in Knox.

APPROACH 4 – Encourage pedestrian use of residential streets by reducing vehicle speed**Action 4.1**

Provide road pavement treatments to highlight a non-car dominated space and encourage drivers to slow down

Action 4.2

Ensure carriageway widths for vehicles meet the minimum safety and legislative requirements

APPROACH 5 – Provide accessible footpaths and crossings**Action 5.1**

Provide accessible crossings to all streets

Action 5.3

Provide seats with backs and arm rests along streets and at pedestrian pause points

Action 5.2

Determine appropriate widths of footpaths to facilitate pedestrian movement in commercial and residential environments (e.g. minimum 1.4 metres for residential streets and 2.5 metres for commercial streetscapes), as defined in the *Footpath and Shared Path Asset Management Plan*

APPROACH 6 – Implement shared use zones and home zones in streets to promote walking and cycling**Action 6.1**

Identify streets in residential and commercial areas which have the capacity to become shared use zones and prioritise for implementation

Action 6.2

Identify through the *Knox Pedestrian Plan* those streets that are likely candidates for home zone treatment and prioritise

Actions under other themes will also contribute to enhancing integrated travel in streets.

COMMUNITY ACTIONS – Communities can contribute to this goal by:**Home Zones**

Communities to work with Council to implement a prototype home zone

Walking School Bus

Communities to promote and utilise walking and cycling to school programmes

Shared Use Zones

Communities to work with Council to implement shared use zones

Pause Points

Communities to promote and utilise pause points

4.8 STREETS FOR THE ENVIRONMENT

The streets of Knox provide a large proportion of the open space in the City. They provide the leafy green character which is a distinctive and desired aspect of Knox.

As open space, caring for streets also carries an environmental obligation to manage and reuse the water that falls on them, to respect the flora and fauna that have found a home there, and to address the effects that streets can have on the environment.

Knox City Council's goals for climate change adaptation and mitigation (greenhouse action) are to reduce greenhouse gas emissions, improve air quality and to be well prepared for climate change. (Context, 2008)

GOAL

To improve environmental sustainability of streets in Knox.

OPPORTUNITIES

- Creating a green and leafy character;
- Saving water;
- Enhancing the local ecology; and,
- Reducing environmental impacts.

CHALLENGES

Creating a green and leafy character

- Trees and above ground powerlines compete for space.
- Trees and car parking compete for space.

Saving water

- Retrofitting WUSD to roads as part of capital works requires coordination with existing services and existing road usage.

Enhancing the local ecology

- The aesthetics of indigenous vegetation are not always appreciated.
- Attitudes towards indigenous trees are generally unfavourable in the Knox community.

Mitigating climate change

- Introduction of edible streetscapes requires management of streets in partnership with the community to ensure success.



Mountain Highway, Boronia showing a roadway Site of Biological Significance

APPROACHES

1. Increase sustainable water use, capture and treatment in streets
2. Improve biodiversity and habitat values through enhancement of Knox's street vegetation
3. Design and implement environmentally sustainable streetscapes

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- sustainable natural environment; and,
- balanced quality urban development.

And it is supported by the Vision 2025 commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental responsibility.

4.8 STREETS FOR THE ENVIRONMENT

MEASURE OF SUCCESS

- Ensure links to WSUD strategy, identify opportunities for water reuse and recycling
- Revise the *Knox Street Tree and Nature Strip Policy* by 2011
- Incorporated into revised *Knox Street Tree and Nature Strip Policy*
- Increase in number of trees planted annually
- Review Council's street lighting policy by 2012
- Design and implement one edible street prototype
- Two edible streets created by the community in five years
- Installation of tree pits for water quality, tree health and drainage solutions
- Implement a care for your street tree program

Measure of success for community

- Number of WSUD treatments that are being accessed

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Water Sensitive Urban Design Guidelines for the City of Knox, 2002*
- *Knox City Council Streetscape Policy, 2003*
- *Knox Neighbourhood Character Study*
- *Gardens for Wildlife*
- *Sustainable Environment Strategy 2008/2018*
- *Greenhouse Action Plan*
- *Knox Open Space Plan*
- *Municipal Strategic Statement*
- *Foothills Policy*
- Site of Biological Significance
- Net Gain Policy
- Native Vegetation Framework
- Draft Native Vegetation Generic Integrity Policy
- Vegetation Removal and Pruning
- Council employed tools for ESD policy:
 1. 'STEPS' (Sustainable Tools for Environmental Performances Strategy) by the City of Moreland; and
 2. Sustainable Design Score Card, by the City of Port Phillip.
- Policy 'A' - General Nature Strip Areas
- Policy '8' - Nature Strips and Special Circumstances.

OTHER USEFUL REFERENCES

- *Register of Significant Trees by the National Trust*
- Australian Conservation Foundation
- Victorian Local Sustainability Accord
- Refer also *Melbourne 2030*, Policy 5.5.

GOAL

To improve environmental sustainability of streets in Knox.

OPPORTUNITIES

This section looks at four specific opportunities that will help enhance the environment and sustainability of streets:

- Creating a green and leafy character;
- Saving water;
- Enhancing the local ecology; and,
- Reducing environmental impacts.

Creating a green and leafy character

The City of Knox is surrounded by the large landscape features of the Dandenong Creek Valley and Mount Dandenong. Several creeks punctuate the municipality and there are significant areas of rare and endangered flora and fauna.

These areas of natural beauty are great resources for the region and contribute significantly to the 'green and leafy' image of Knox.

Each suburb and neighbourhood within Knox has a distinct vegetative quality. For example, parts of Rowville and Boronia have street plantings of small trees and shrubs, while in Ferntree Gully tall trees dominate.

The character of commercial, industrial and retail areas is also strongly influenced by the presence of different types of vegetation.

Shade

Shade is crucial in the Australian outdoor environment. It provides relief from direct sunlight, cooler microclimates and reduces the accumulation of heat in pavements and buildings (the heat island effect).

Street trees

Trees can have a very large impact on a street's quality, according to their scale, number and character. Street trees contribute to the skyline and views throughout Knox, and are therefore important contributors to the neighbourhood's wider landscape, creating benefits well beyond a single street.

Trees and climate

Trees in streets mitigate the effects of climate change by reducing greenhouse gasses. Trees provide protection from rain, sun, and heat for pedestrians and cyclists.

Street trees' ability to reduce the heating of pavements through the shading of those pavements, and to thus reduce the heat island effect, is well documented in not only a recent report for Knox Council on the subject (Cardno Grogan Richards, 2009), but also by Buden (2008) in his article '*Benefits of Urban Street Trees*' and by Dr G.M. Moore (2009) in his article '*Urban Trees: Worth more than they cost*'.

Street trees can contribute to the reduction in stormwater discharge to waterways, in particular during large storm events, and reduce consequent flooding.

'Trees have important symbolic values for people, the different kinds of trees convey different ideas and ideals... The various species are "read" differently within the cultural context of heritage, both as something we inherit and as something we create.'
(Shepherd, 1992)²

4.8 STREETS FOR THE ENVIRONMENT

OPPORTUNITIES

Trees and local ecology

Trees can support locally native species, contribute to local biodiversity, provide wildlife corridors and enhance native remnant bushland values.

Trees and neighbourhood character

Community consultation shows the presence of street trees to be one of the most significant contributing factors to the liking of a street and neighbourhood. Trees contribute to a street's visual interest, screen and soften the effects of utility and lighting poles, and with gardens create the 'green and leafy' image of Knox.

Further information on these issues can be found in:

- Cardno Grogan Richards, 2009, *Analysis of the Heat Island Effects*, section 5.3, for Knox City Council;
- Hassell, 2007, *City of Salisbury Landscape Plan*, South Australia; and,
- Moore, 2009, 'Managing Trees in a Changing Environment' and 'Urban Trees: Worth More Than They Cost', Burnley College, University of Melbourne.

Nature strips

The humble nature strip is an iconic feature of the Australian suburban streetscape. Varying in design and appearance, nature strips reflect both the character of the local area and its residents, provide space for social interaction and street tree planting. Nature strips absorb rainwater and reduce storm water run off; and visually soften the effect of hard streetscape elements such as roads, footpaths, driveways, fences and buildings.

Nature strips are an important component of Knox's street environment. The nature strip creates a safe public walking area, and provides an easement for service infrastructure (including electricity, water, gas and telecommunications).

Most importantly, nature strips are designed to complement the neighbourhood's landscape setting and create a space for street tree planting.

In Knox, many residents are keen to plant out their nature strips. Their reasons include:

- the lack of rainfall to keep the grass green;
- desire for low maintenance drought tolerant planting;
- to create a greener, softer and more natural looking environment;
- to enhance the resident's property and the appearance of the streets;
- to restrict the parking of vehicles; and,
- to control erosion where a steep nature strip exists.

Nature strip plantings add beauty to streetscapes, provide habitat, biodiversity and help activate the space as local residents get involved. Nature strips can become a creative extension of front gardens.

Well-maintained nature strips add to the appearance and presentation of the neighbourhood and can bring economic benefits to business and property owners.

Median, verge and roundabout plantings suffer from extra pressures, including temperature fluctuations, excess carbon dioxide levels, higher amounts of airborne particulate matter, soil compaction, less permeable soil area and constricted root zone area (Hassell, 2007).

'The nature strip is public land, although it is accepted practice that residents maintain the nature strip areas and provide water to street trees during periods of warmer weather. Most residents within the City of Knox regard the nature strips as an extension of their own garden.' (KCC, 2003)

GOAL

To improve environmental sustainability of streets in Knox.

Appropriate tree selection

Street trees are overwhelmingly desired by residents throughout Knox. However, the chosen species of tree remains a hot topic.

Knox City Council wants to plant indigenous trees wherever possible to increase biodiversity and enhance the natural landscape (Context, 2008). However, Council acknowledges that other species, including exotics, may be more appropriate in some neighbourhoods.

The *Neighbourhood Character Study* (Mike Scott & Assoc. et. al. 1999) recommends specific vegetation types for different neighbourhoods based on the heritage and perceived amenity of that locality.

Other factors that should influence street tree selection include the nature of adjacent conditions and spaces, maintenance costs and threats from weeds and pests such as the Elm Leaf Beetle.

Tree selection should involve assessing local character, understanding the environment and historical context, and consulting the local community so as to ensure that street tree selection meets short, medium and long term objectives. Planning parameters, associated infrastructure works and maintenance regimes must be clearly defined.

Retrofitting a 'natural' ecology into an established built up area is difficult and often inappropriate. The street landscape should be designed to create a new ecology appropriate to the houses and infrastructure present and enhanced by taking up opportunities for water harvesting, the reintroduction of appropriate indigenous plant species to support native fauna, and other environmental and community measures. The streetscape should aim to operate in a way where it is 'part of the natural cycles of the local environment.' (COA, 2008)



Water sensitive urban design treatment in a carpark



Planted nature strip



Nature strip in Knox

4.8 STREETS FOR THE ENVIRONMENT

OPPORTUNITIES

Saving water

Water is a valuable resource. Knox is located in a relatively high rainfall area within the greater metropolitan region. A lot of water falling on hard surfaces goes straight into stormwater drains rather than naturally filtering through the ground.

Liveable streets provide a great opportunity to collect, clean and filter water before it enters the creek and river systems.

Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) is a strategy designed to retain and re-use stormwater, and reduce the negative impacts of our urban development on the natural water cycle. WSUD aims to design urban environments to match more closely the original water cycle that occurred pre-development (*Water Sensitive Urban Design Guidelines* of the City of Knox).

Implementation of WSUD also contributes to the beautification of streetscapes through planting and soft material choices and allows the passive irrigation of plants and turf.

The benefits of WSUD include:

- improving urban stormwater quality, primarily by reducing the levels of pollutants and nutrients (gross pollutants, suspended solids, metals, toxic organics, oils and surfactants, nutrients, micro-organisms and oxygen demanding chemicals); and,
- reducing the amount of stormwater, i.e. reducing the frequency and amount of water that runs-off.

Retrofitting WSUD into all street types would create substantial environmental benefits.

Appropriate WSUD treatments that could be applied to existing and new streets include:

- ‘rain gardens’ – specifically constructed garden beds with associated filter media in the soil profile – located in nature strips and at the edge of carriageways;
- passive irrigation of nature strips and trees by redirecting storm water runoff from roads;
- permeable surfaces that allow rainwater to penetrate the soils beneath; and,
- local collection, treatment and harvesting of stormwater for open space and garden watering.

Refer to *Water Sensitive Urban Design Guidelines of the City of Knox* (Murphy Design Group et. al, 2002) for definition of appropriate WSUD treatments for streets and the *Water Sensitive Urban Design (WSUD) – Interim Policy, 2010*. (KCC, 2010)

‘The impact of suburban development on the vegetation structure of a region is dramatic. The modified landscape is a mosaic of buildings, gardens, parks and highly fragmented patches of original habitat.’

(Davis and Glick, 1978), (Taylor, 1987)

GOAL

To improve environmental sustainability of streets in Knox.

Enhancing the local ecology

Knox has a wealth of natural systems and sites of special interest and conservation value. It is vital to enhance and extend these systems so as to not lose the local ecology and biodiversity.

Streets have the ability to contribute positively to the natural environment locally and on a regional scale. As Melbourne grows, remnant environments diminish and the pressure on remaining environments increases. Streets can provide much needed habitat for indigenous flora and fauna and contribute to the biodiversity of Knox.

The *Knox Sustainable Environment Strategy* (Context, 2008) lists a number of approaches and indicators in its ambition to improve biodiversity and health of ecosystems.

Where vegetation is planted at sites of Biological Significance, local provenance stock must be used.

Reducing environmental impacts

The Australian Conservation Foundation's *'Consumption Atlas'*, (ACF, 2010) maps the pattern of consumption and its environmental impact across Australia.

In Knox, each person (on average):

- creates 18.45 tonnes of greenhouse gases (the Victorian average is 19.73 tonnes); (See Figure 13)
- uses 735,000 litres of water directly and indirectly in goods and services (the Victorian average is 750,000 litres) (See figure 14); and,
- uses 6.065 hectares of land to supply their lifestyle demands (the Victorian average is 6.03. hectares). (See figure 15)

Local streets offer some opportunities to reduce these impacts.

WSUD/SWH for Local Government

Presented By:
Rod Wiese
Principal Engineer, STORM CONSULTING PTY. LTD.

STORM CONSULTING
www.stormconsulting.com.au

Introduction to WSUD
Drivers for WSUD/SWH
Evolution of stormwater management
Sustainable examples
WSUD Toolbox
Case studies
General discussion

Title slide for 'bench marking' workshop with Council. By Rod Wiese, Storm Consulting

4.8 STREETS FOR THE ENVIRONMENT

OPPORTUNITIES

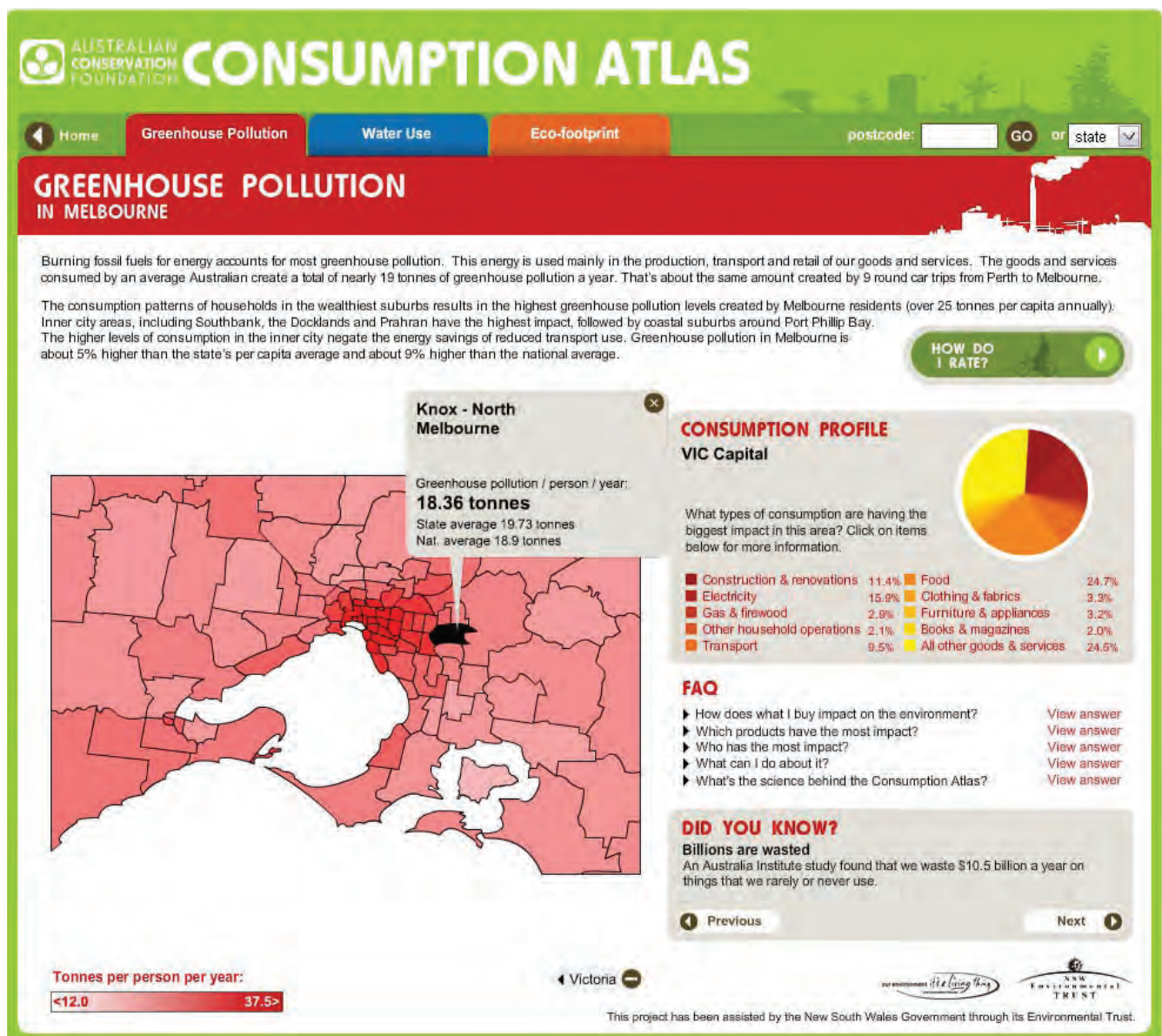


Figure 13: Consumption Atlas: Greenhouse Pollution (Knox)

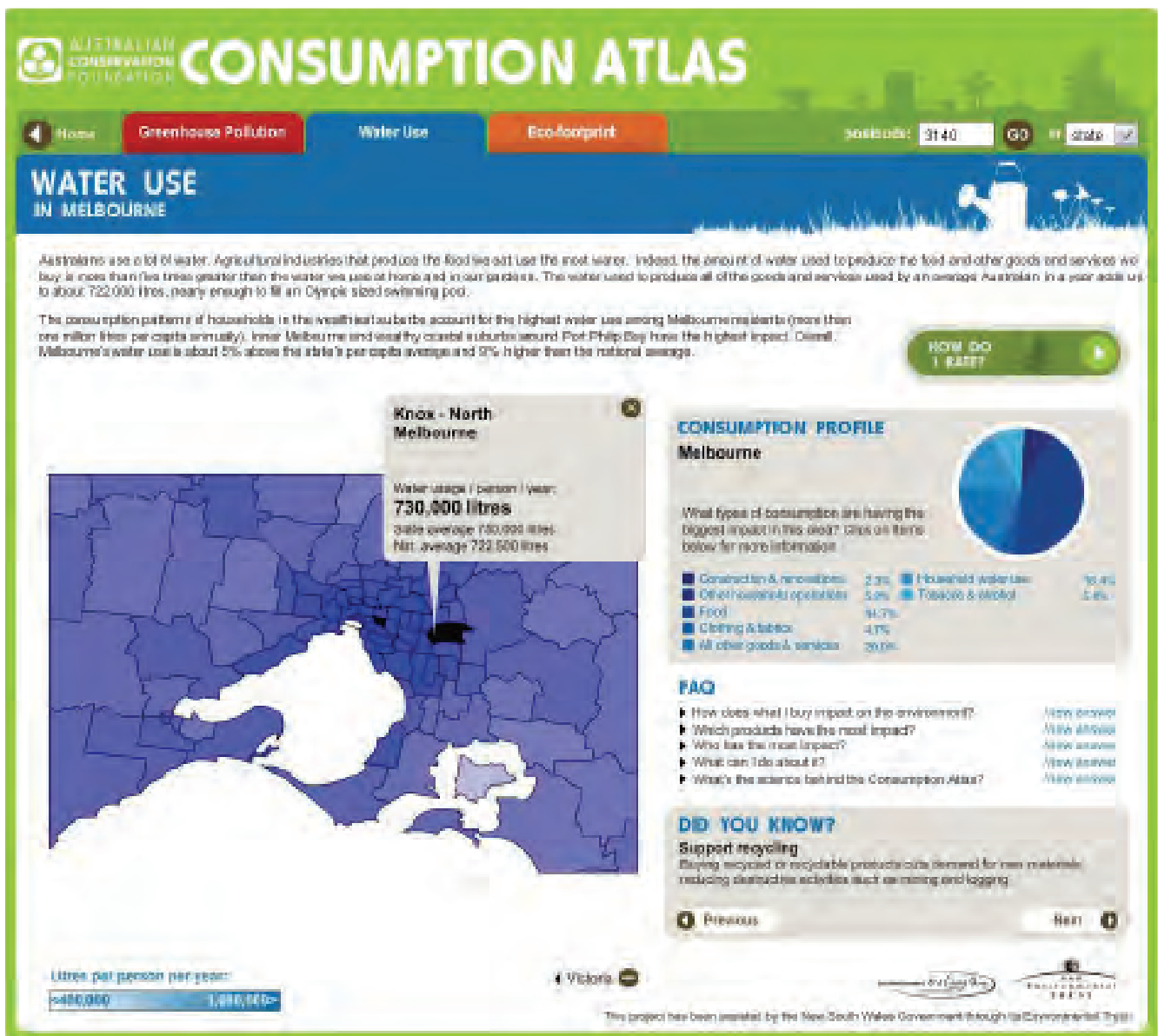


Figure 14: Consumption Atlas: Water Use (Knox)

4.8 STREETS FOR THE ENVIRONMENT

OPPORTUNITIES

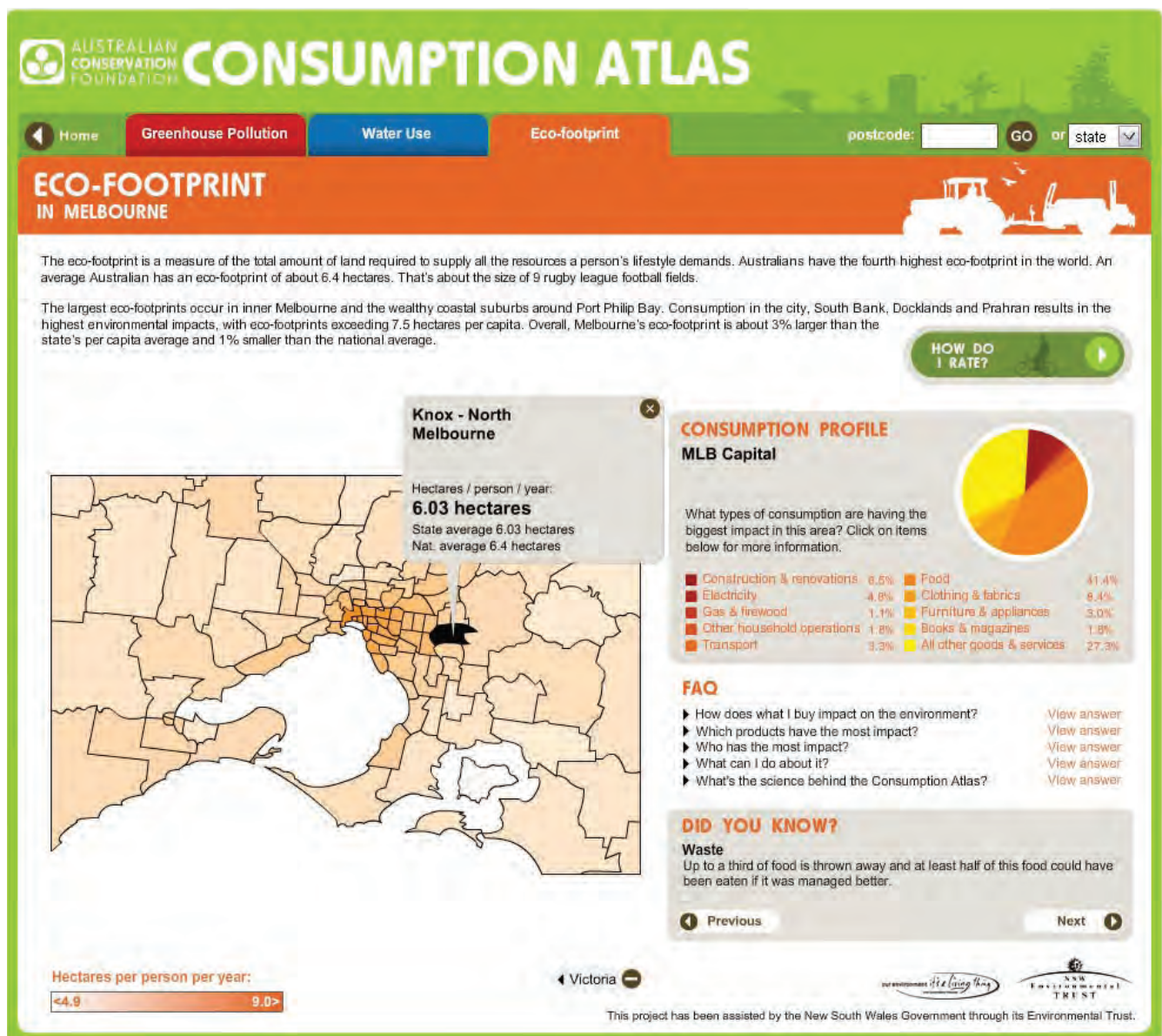


Figure 15: Consumption Atlas: Eco-Footprint (Knox)

GOAL

To improve environmental sustainability of streets in Knox.

Wind

Wind power can be collected in different ways. Small, domestic sized turbines can be placed on homes or in streets. Large industrial scale turbines are usually located away from residential areas.

The potential to include small-scale wind turbines in streets is worth further research by Knox City Council.

Solar lighting

Knox streets are lit at night to provide illuminated and safe travel routes for traffic, cyclists and pedestrians. The *Pedestrian Plan* (David Lock Assoc. et. al, 2005, see *Table 7.1.3*) provides guidelines on pedestrian lighting. Lighting is a major energy use in the city.

Knox can reduce long-term energy for lighting by installing solar collectors, and by adopting other sustainable lighting forms.

High levels of artificial lighting in the city reduce the opportunities for people to appreciate the night sky and can impact on nocturnal species. Better lighting design can maintain safety but reduce over-lighting and energy wastage.

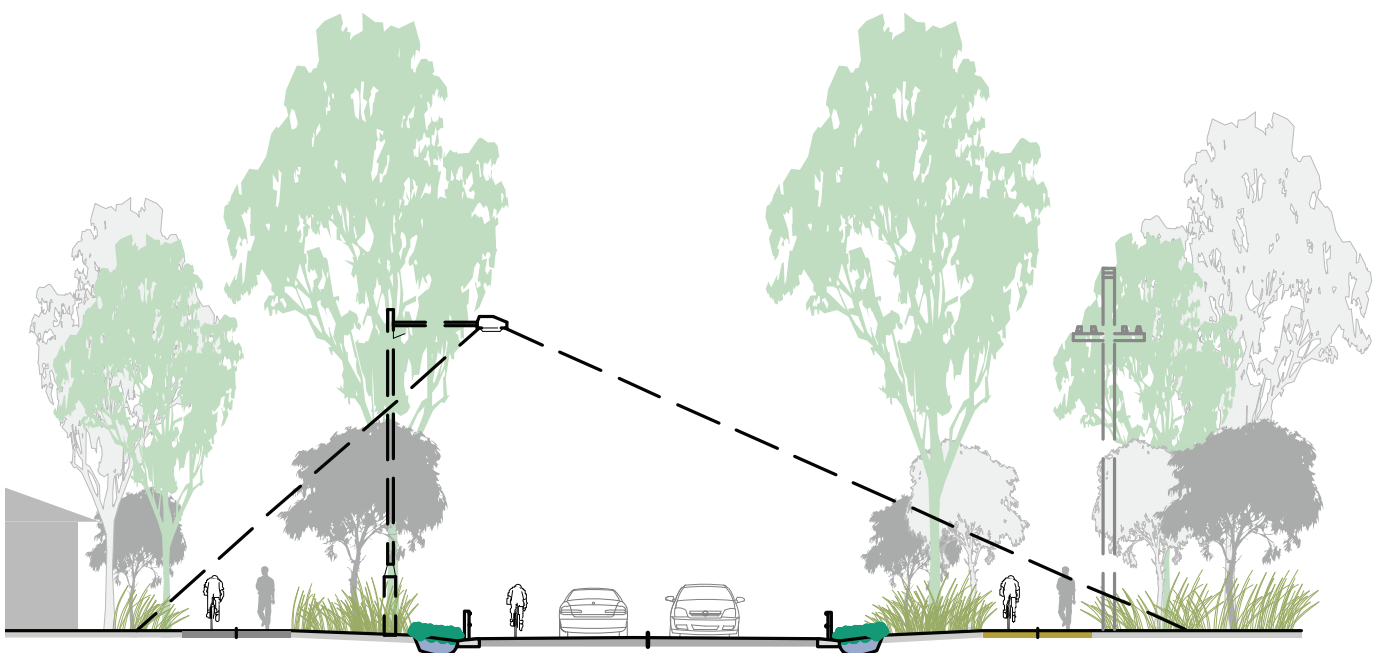


Figure 16: Section showing the street lighting illuminating the pedestrian path

4.8 STREETS FOR THE ENVIRONMENT

OPPORTUNITIES

Edible streetscapes

Streets can provide spaces for small-scale local food production to help reduce the amount of land, water, fertiliser and transport needed to produce food brought in from elsewhere. Fruiting street trees are the most obvious example of how to achieve food production in a street. The nature strip could also be used to produce vegetables.

Urban food production also allows distribution of locally grown food, at farmers markets for example. Food growing and markets should be considered a valuable part of activating public open spaces.

The Victorian Eco Innovations Lab (VEIL) has produced a map and database which locates community gardens, market gardens, public spaces and householders who produce food. (See Figure 17)

The VEIL Map acts as a database for people to base the design of new products & services. Refer to www.communitywalk.com/veil-map for locations.

The heat island effect

Large areas of pavement and buildings collect and retain heat from the sun. This subsequent release of heat increases average local temperatures. This effect is known as the 'heat island effect'.

Selection of street materials and planting with trees that will achieve an extensive canopy are common approaches to reducing heat gain, as is the employment of WSUD which allows for evapo-transpiration.

Legend

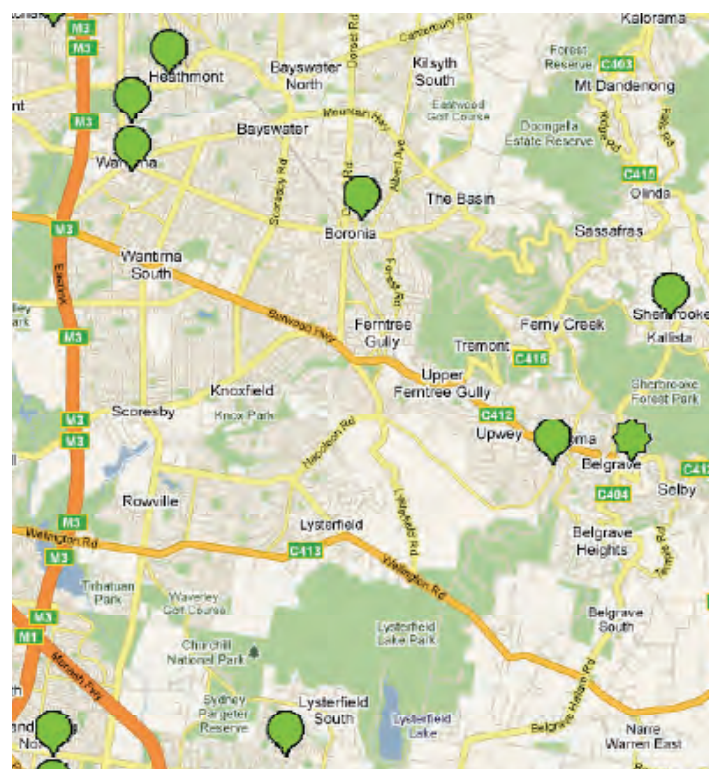


Figure 17: VEIL Community Map (Knox)

GOAL

To improve environmental sustainability of streets in Knox.

CHALLENGES

Challenges are also associated with each of the outlined opportunities to create streets for the environment.

Creating a green and leafy character

- Trees and above ground powerlines compete for space.
- Trees and car parking compete for space.

Saving water

- Retrofitting WUSD to roads as part of capital works requires coordination with existing services and existing road usage.

Enhancing the local ecology

- The aesthetics of indigenous vegetation are not always appreciated.
- Attitudes towards indigenous trees are generally unfavourable in the Knox community.

Mitigating climate change

- Introduction of edible streetscapes requires management of streets in partnership with the community to ensure success.

COMMUNITY PERSPECTIVES

Community consultation revealed that:

- tree-lined streets are judged as the most attractive streets by Knox people;
- there are very different views about native trees and exotic trees;
- other plantings along streets are also strongly liked, but residents agree that careful design is needed to ensure they don't block views of children and cyclists; and,
- trees, while loved and seen as a valuable asset in a local street, are also recognised as causing a variety of problems.

ACHIEVING CHANGE

Vision

Liveable streets will embrace natural ecosystems and work towards creating a sustainable landscape that offers habitat, water, sun, shade, food, flora and fauna and actively adds to the sustainability of the neighbourhood.

Goal

It supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- sustainable natural environment; and,
- balanced quality urban development.

It is supported by the *Vision 2025* commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental responsibility.

Approaches

1. Increase sustainable water use, capture and treatment in streets
2. Improve biodiversity and habitat values through enhancement of Knox's street vegetation
3. Design and implement environmentally sustainable streetscapes

4.8 STREETS FOR THE ENVIRONMENT

ACHIEVING CHANGE

APPROACH 1 – Increase sustainable water use, capture and treatment in streets

Action 1.1

Incorporate Stormwater Quality Improvement (SQUID) and Water Sensitive Urban Design (WSUD) – into all new streets as per current best practice guidelines as published by Melbourne Water, CSIRO and Monash University

Action 1.2

Coordinate SQUID/WSUD works with *Knox Road Asset Management Plan*, *Knox WSUD Strategy* and capital works programme to ensure incorporation into all works

Action 1.3

Implement SQUID/WSUD through the street network as opportunities arise, based on the *Liveable Streets Design Guidelines*

Action 1.4

Capture stormwater on a street scale and allow residents to use it

APPROACH 2 – Improve biodiversity and habitat values through enhancement of Knox's street vegetation

Action 2.1

Revise the *Knox Street Tree and Nature Strip Policy* as separate policies to include recommendations from the:

- Neighbourhood Character Study;
- Sustainable Environment Strategy;
- Sites of Biological Significance;
- Net Gain Policy;
- Native Vegetation Framework;
- Draft Native Vegetation Generic Integrity Policy;
- Indigenous Roadside Vegetation programme;
- WSUD Strategy;
- Knox Heat Island Effects Study and to
- Develop a Street Tree Management Plan
- Develop a Street Tree Selection Tool
- Conduct a Street Tree Audit to feed into the plans above
- Develop a Nature Strip Planting Application form and process

Action 2.2

Revise the *Knox Street Tree and Nature Strip Policy* to include:

- A valuation method for street trees that includes economic, habitat and amenity values
- Recommendations from the Bushfires Royal Commission

Action 2.3

Increase street tree planting across the municipality to provide shade and reduce summer heat gain

Action 2.4

Review Council's street lighting policy to preserve views of the night sky and respond to the needs of nocturnal species. This should take into account community safety issues and Australian standards

GOAL

To improve environmental sustainability of streets in Knox.

APPROACH 3 – Design and implement environmentally sustainable streetscapes

Action 3.1

Promote the development of edible streetscapes within the *Street Tree and Nature Strip Policy*

Action 3.2

Design and implement one edible street prototype

Action 3.3

Use appropriate vegetation in conjunction with maintenance in fire prone areas to reduce fire risk and balance environmental outcomes

Action 3.4

Develop a palette of materials for street construction that will enhance the environmental sustainability of the street. Incorporate this materials palette into the *Liveable Streets Design Guidelines* and apply to all new street works

Action 3.5

Investigate the feasibility of wind collectors within public recreational spaces and in streets

Action 3.6

Implement solar lighting for pedestrian path and shared path lighting

Action 3.7

Educate residents about the contribution that street trees make to environmental sustainability and involve them in programs to care for their local street trees. Undertake through a “care for your street tree” program that distributes brochures about how to care for your street tree to each resident

Action 3.8

Educate residents regarding safe use of treated stormwater. Identify opportunities where streets can contribute to wildlife corridors or connect sites of biological significance. Particularly important in foothills area close to the national parks

Action 3.9

Use porous paving adjacent to significant trees when constructing streets and repairing footpaths

Actions under other themes will also contribute to enhancing integrated travel in streets.

COMMUNITY ACTIONS – Communities can contribute to this goal by:

Participation

Getting involved when their street is being redesigned, and working with Council to implement improvements

Instigation

Initiating a local activity in their street such as Gardens for Wildlife or edible streetscapes

Maintenance

Care for their street nature strips and vegetation through maintaining their street tree, not parking on nature strips and disposing of rubbish responsibly

Stormwater use

Utilisation of detained water from WSUD treatments for residential purposes such as gardening and car washing

4.9 STREETS AND THE ECONOMY

The streets within Knox provide routes for distributing goods and services and are the locations for retail, business and industry. Well designed and attractive streets contribute to commercial viability: they create distinctiveness, offer comfortable environments for workers and customers, and reduce energy costs.

In residential areas, high-quality streets, especially those with good street trees, will enhance property values.

Well designed streets also encourage people to walk and cycle more, increasing individual health and wellbeing and decreasing health costs across the community.

GOAL

To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities.

OPPORTUNITIES

- Enhancing property values;
- Recognising the financial value of street trees;
- Gateways;
- Enhancing commercial and industrial streets;
- Reducing energy costs; and,
- Improving health and well-being.

CHALLENGES

- To ensure appropriate street trees are planted to increase the neighbourhood character and amenity.
- Gateway designs can create too much diversity in a neighbourhood and are not always well integrated into streetscape character;
- Long term maintenance of gateways is not always adequate;
- Gateways may rely on feature walls and structures rather than trees and vegetation which bring other benefits;
- Gateways may create the perception of a gated, exclusive community;
- To promote pedestrian and cycle ways in conjunction with providing for vehicles in commercial and industrial streets;
- To educate and communicate to business the benefits of pedestrians and a high quality streetscape;
- To reduce energy costs though increased street tree planting and other shade structures despite restrictions in the availability of space in and around commercial and retail environments;
- To educate the community on the benefits of walking and cycling, and to inspire a community in which vehicle travel is entrenched and dominant for even small trips.



Alchester Village Shopping Centre, The Basin

APPROACHES

1. Build the capability of the residents to work collectively to 'populate' the streets to make it a desirable, healthy place to live and work
2. Build capacity of the commercial and retail 'people' to animate the refreshed streetscape
3. Refresh streets in Activity Centres and neighbourhood shopping strips to enable improved economic outcomes
4. Improve economic longevity of street pavements through appropriate street tree planting
5. Promote walking and cycling activity in Knox streets to reduce community health costs and increase well-being

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- sustainable natural environment;
- balanced quality urban environment; and,
- a prosperous, modern economy.

And it is supported by the Vision 2025 commitment to:

- innovation and excellence;
- stewardship of finances and assets; and,
- social and environmental sustainability.

4.9 STREETS AND THE ECONOMY

MEASURE OF SUCCESS

- Visible signs of community maintaining their nature strips
- Increase in community street groups
- Increased resources in the 2010/11 budget to implement a 'no net loss' of street tree numbers
- Achieve 'no net loss' of tree numbers
- Increased number of streets being planted because of community initiated action, and increase in treed streets
- All new gateway elements are designed according to *Liveable street design guidelines*
- Trader associations for each shopping precinct
- Undergrounding of powerlines in key activity centre main streets undertaken by 2015
- Each retail and business precinct has adequate street trees, footpaths, pedestrian seating, bins and cycle hoops
- All new public car parks to achieve minimum standards of: shade trees, appropriate WSUD treatments, and pedestrian paths
- All traders have applied for a street trading permit and all retail areas have 1.2m clear space along building frontage
- Ensure street trees provide shade to road pavements where possible
- Implement three green neighbourhood streets in five years
- Number of kilometres of improved amenity along paths
- Community initiated street events increase

Measure of success for community

- Community initiated street tree planting increased
- Increase in shop frontage upgrades
- Trader associations for each shopping precinct

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Municipal Strategic Statement*
- *Knox Healthy Ageing Strategic Plan 2009-2013*
- *Off to a Flying Start, an Early Years Plan for Families with Children Aged from Birth to Twelve Years: Snapshot 2005-2008*
- *Integrated Transport Plan, Alternatives in Motion*



Childers in Queensland, an example of parking and street tree balance in a shopping street

'A streetscape that looks inviting is more likely to encourage people to live there, increasing demand and property prices.' (COA, 2008)

'A general reduction in quality of life and property value has resulted from overly high urban traffic speeds.' (Burden, 2001)

GOAL

To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities.

OPPORTUNITIES

This section looks at six specific opportunities that would help build recognition of the economic benefits of liveable streets:

- Enhancing property values;
- Recognising the financial value of street trees;
- Gateways;
- Enhancing commercial and industrial streets;
- Reducing energy costs; and,
- Improving health and well-being.

Enhancing property values

Property values are based on a large number of factors. One significant contributor to the value of a home or commercial property is the neighbourhood and street character. Liveable streets will enhance property values by increasing the desirability of that street as a place to live, work and conduct business.

In Knox, residential streets with higher traffic volumes are disliked, while well-designed and maintained 'green and leafy' residential streets are strongly preferred.

At the neighbourhood scale, creating an interesting and distinctive landscape character can enhance commercial and residential precincts. For example, a 'gateway', such as a planting or works of public art, can create a strong entry point to an area, defining neighbourhood boundaries and creating a sense of arrival.

Recognising the financial value of street trees

Street trees are a significant contributor to the appearance of a street, especially where they are the dominant or a unifying element.

Several methods have been developed to assess the financial value of street trees. By one such method, the *2003 Knox Streetscape Policy* (KCC, 2003) estimated the total value of Knox's 65,000 street trees as in excess of \$70 million (in 2003).

'Good street tree cover can increase property values, due to a unified and "green and leafy" image that is desirable.' (COA, 2008)

'The US Forestry Service documents that a single urban tree pays back US\$58,000 individual dividends to a community.' (Burden, 2001)

4.9 STREETS AND THE ECONOMY

OPPORTUNITIES

Gateways

In general, gateways can be described as landscape and architectural elements located at the entrances to residential or business estates or precincts and that mark the transition into the place.

Gateways for residential, commercial and industrial estates can provide a positive sense of identity.

Typically gateways include a signage or naming element, a wall, trees and planting beds. If designed well and in scale with the surrounding neighbourhood they can provide a positive identifying element in the neighbourhood. At their worst they can date one year after being installed, dominate the streetscape, and instil a perception of a gated community.

However, gateways offer an important opportunity to name, mark, brand, promote and differentiate a particular precinct or neighbourhood.

Enhancing commercial and industrial areas

As Melbourne becomes denser, major Activity Centres and local shopping areas will become important focal points. Good urban design and liveable streets are a vital investment in the future.

The attractiveness of commercial and retail areas is an important factor in their economic success.

Customers are drawn to accessible and attractive shopping areas. Trees and plants, shade, seats and quality pavements are needed to cater for shoppers, encouraging them to stay longer and to return. Active frontages along the street – rather than blank walls – will increase safety and encourage use. Section 5 defines specific principles and guidelines to guide the development and enhancement of these areas.



Mountain High Centre, Bayswater showing distinct planters at the entrance



Nicholson Street, Footscray, trees and parking share the street

GOAL

To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities.

Knox has two main types of shopping areas:

- Major shopping centre destinations such as Knox City, Boronia Shopping Centre and Stud Park, that serve a large catchment, often outside of the municipality, as well as local shoppers; and,
- Local shopping areas that primarily serve local residents and have a much smaller catchment.

Each type of shopping area can benefit by building its own character and distinctiveness. The concept and principles behind liveable streets can be effectively used to enhance the attractiveness of all shopping areas.

The same is true of industrial estates where high quality urban design, and streets based on liveable street principles, will attract businesses and customers, and create better working environments.

Connectivity within and between commercial and residential areas is another important design consideration. Shared paths, for example, can increase walking and cycling by offering easy access to local shops, other facilities and public transport. Larger shopping destinations also need to be well connected by foot and cycle paths, and have good public transport interchanges and facilities. *Melbourne 2030* (SGV, 2005), the *Knox Sustainable Environment Strategy* (Context, 2008) and the *Pedestrian Plan* (David Lock Assoc. et. al., 2005) all recognise the importance of connectivity.

Adequate provision for cyclists to lock bicycles and for pedestrians to rest will increase the likelihood that people will walk or cycle to shopping destinations.

Many shopping, commercial and industrial areas have vast and unattractive car parks that offer little shade or amenity for users. Parking areas can be easily designed differently, with lots of shade, trees, garden beds and water sensitive urban design features to recover and reuse rain. Increased amenity will add value to a retail shopping area.

Reducing energy costs

Increasing shade protection to buildings, pavements and car parks through large trees, shrubs, shade structures and other design techniques will lessen heat build up in summer and reduce the need for energy-intensive air-conditioning. This will save money, reduce greenhouse gas emissions and create more liveable public spaces.

Reducing health costs

This kind of activity is a type of preventative action against illness. Our health system and economy benefit, with increased productivity and less resources spent in hospitals and in health centres.

'Shoppers report being willing to pay nine to twelve per cent more for goods and services in districts having a quality urban forest. Rental rates of commercial office properties were about seven per cent higher for sites having a quality landscape that included trees.' (Wolf K., 2005)

'Respondents (to a visual survey on road types and settings) indicated psychological inferences based on landscape character. The 'green' community was characterised as being a more appealing place for shoppers, including positive merchant traits and product quality. A greener place was also judged to be a more favourable environment for new business.' (Wolf K., 2006)

4.9 STREETS AND THE ECONOMY

CHALLENGES

Challenges are also associated with each of the opportunities outlined.

Enhancing property values

The key challenge here is to ensure appropriate street trees are planted to increase the neighbourhood character and amenity. Such trees are ones that will not require significant amount of maintenance on either them or adjacent infrastructure.

Gateways

The key challenges in creating a positive and character enhancing gateway is:

- to avoid eclectic styles, themes and dated designs that create too much diversity in a neighbourhood;
- when gateways are constructed by developers and passed to Council to maintain, long term maintenance is not always adequate;
- gateways are not always well integrated into the streetscape character and look like 'stand alones';
- some gateways rely on feature walls and structures rather than trees and vegetation which bring other benefits such as ecological, shade etc.; and,
- the potential for gateways to be used to create the perception of a gated, exclusive community, which is counter to the idea of a connected neighbourhood.

Enhancing commercial and industrial streets

Commercial, and in particular industrial, areas are dominated by vehicles and vehicle parking. The key challenge in this environment is to promote pedestrian and cycle-ways in conjunction with providing for vehicles.

In the commercial and retail environment, more education and communication is needed to promote to business the benefits of pedestrians and a high quality streetscape.

Reducing energy costs

The key challenge to reducing energy costs through increased street tree planting and other shade structures, is predominantly the availability of space in and around commercial and retail environments. In general, this available space is shared between trees, car parks and service access.

Reducing health costs

Reducing health costs is a significant government and community agenda item. The challenge is to educate the community in the benefits of walking and cycling, and to inspire a community in which vehicle travel is entrenched and dominant for even small trips.

GOAL

To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities.

COMMUNITY PERSPECTIVES

Community consultation revealed that:

- commercial streetscapes without trees were seen as cold and sterile; and,
- trees were recognised as adding to property values in residential streets, and scored highly on attractiveness.

ACHIEVING CHANGE

Vision

Public spaces within shopping, commercial and industrial areas will enhance the economic and environmental sustainability of these areas, attracting business, customers and employees.

Goal

It supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- sustainable natural environment;
- balanced urban environment; and,
- a prosperous, modern economy.

It is supported by the *Vision 2025* commitment to:

- innovation and excellence;
- stewardship of finances and assets; and,
- social and environmental sustainability.

Approaches

1. Build the capability of the residents to work collectively to 'populate' the street to make the place a desirable, healthy place to live and work
2. Build capacity of the commercial and retail 'people' to animate the refreshed streetscape
3. Refresh streets in Activity Centres and neighbourhood shopping strips to enable improved economic outcomes
4. Improve economic longevity of street pavements through appropriate street tree planting
5. Promote walking and cycling activity in Knox streets to reduce community health costs and increase well-being

'Walking is a suitable physical activity for most people. Regular walking can help you lose body fat, maintain a healthy weight, improve your fitness and reduce your risk of developing conditions such as heart disease, type 2 diabetes, osteoporosis and some cancers.' (SGV, 2010)

4.9 STREETS AND THE ECONOMY

ACHIEVING CHANGE

APPROACH 1 – Build the capability of the residents to work collectively to ‘populate’ the streets to make them desirable, healthy place to live and work

Action 1.1

Create and encourage ownership and pride. Support and allow residents to plant their own trees and shrubs on nature strips

Action 1.2

Enable appropriate community action through education programs, distribution of guidelines for street based activities, provision of Council grants to groups and in-kind support

Action 1.3

Revise *Knox Street Tree and Nature Strip* Policy as separate policies, to include a valuation method for street trees’ economic, habitat and amenity value. This will help promote the economic value of street trees and how they contribute to residential desirability

Action 1.4

Targeted street tree planting: streets ranked at a higher priority if they have no street trees currently, if the residents in the street approach Council as a collective, or if the planting will have a large impact on the surrounding area

Action 1.5

Encourage new developments to implement well designed and appropriate threshold and gateway treatments to residential areas to increase desirability. Refer to Liveable Street Design Guidelines

APPROACH 2 – Build capacity of the commercial and retail ‘people’ to animate the refreshed streetscape

Action 2.1

Council to support traders to develop cohesive traders associations in order to work together to improve their shopping streets

Action 2.2

Based on trader interest, willingness and drive, develop a priority plan for refreshing shopping streets

Action 2.3

Develop a templates toolbox that can be used by traders to develop ideas for enhancing the commercial and pedestrian capacity of their shopping street

Action 2.4

Develop a matching funding program for shopping streets and traders associations

APPROACH 3 – Refresh streets in Activity Centres and neighbourhood shopping strips to enable improved economic outcomes

Action 3.1

Assess the potential for undergrounding powerlines in key shopping areas and defined Activity Centres to improve the liveability of selected streets and areas

Action 3.2

Implement minimum amenity standards including shade, bins, seating, threshold treatments and pedestrian pavements to retail and business precincts, progressively improving the public realm for all

GOAL

To build and advocate for quality streets that attract, retain and enhance business and workers, families and communities.

Action 3.3

Establish car park design standards, based on Liveable Streets Design Guidelines and *Knox WSUD Policy*, and apply to all public car parks (including those associated with retail and commercial developments)

Action 3.4

Make allowances for street trading (goods for sale, A-frames), particularly on wide paths in shopping areas. Allowance of 1.2m clear spaces along building frontage as required by local law

APPROACH 4 – Improve economic longevity of street pavements through appropriate street tree planting

Action 4.1

Plant appropriate street trees that provide shade to road pavements helping to increase their longevity through reduced exposure to heat

APPROACH 5 – Promote walking and cycling activity in Knox streets to reduce community health costs and increase well-being

Action 5.1

Enact green neighbourhood streets to increase walking and cycling in local areas

Action 5.2

Increase pedestrian and cycle amenity to make journeys more desirable with a priority on links to major destinations points such as open space, community hubs, schools and shopping precincts

Action 5.3

Promote street and neighbourhood community events to build a local sense of identity and connection. Develop clear and easy procedures for community members to run these events

Actions under other themes will also contribute to enhancing the economic value of streets

COMMUNITY ACTIONS – Communities can contribute to this goal by:

Residents Initiated Activities

Communities identifying opportunities to improve the street tree planting and nature strips in their local streets

Trader Initiated Activities

Traders can improve their shopping area by upgrading their shop frontages

Traders to develop cohesive traders associations in order to work together to improve their shopping area

4.10 SAFE STREETS

Safe streets are places where people feel comfortable to dwell or move through. This is often achieved where higher numbers of people are active within the streets, for instance walking the dog or gardening.

GOAL

To improve the safety of Knox's streets for pedestrians, cyclists and motorists.

OPPORTUNITIES

- To reduce traffic speeds to improve safety for vehicle users.
- To improve pedestrian safety.

CHALLENGES

- Negotiating with VicRoads to arrive at a memorandum of understanding that supports the principle of street trees along Knox's main roads and streets;
- Effectively researching and trialling different traffic calming techniques to reduce speed in primarily residential streets;
- Implementing a shared use space in Knox when there is no local benchmark to follow. Shared space will be a new model for the community and Council;
- Ensuring that lighting for increased pedestrian safety does not conflict with other Council policies; and,
- Balancing available funds with priority safety works across the entire road network.



A paved street in Knox that suggests a pedestrian priority and slow vehicle speed

APPROACHES

1. Decrease vehicle speeds in residential streets and retail environments
2. Improve pedestrian access and amenity in streets to provide equitable space for non-vehicle movement
3. Provide safe areas for vehicle parking
4. Create community destinations – reasons to be on the street

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- supporting culturally rich and active communities; and,
- access transport choices.

And it is supported by the Vision 2025 commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental sustainability.

4.10 SAFE STREETS

MEASURE OF SUCCESS

- Traffic counts showing speed reduction and reduced accidents
- Increased number of shared use zones
- No new streets have ongoing speeding issues
- Increase in footpaths
- Increase in pedestrians and cyclists
- Priority lighting projects in *Knox Pedestrian Plan* undertaken
- Reduction in reported crimes and complaints to police and safer communities group within Council
- Reduction in reported crimes and complaints to police and safer communities group within Council
- Each suburb having their own Mothers Living Well program
- Reduction in complaints to Council and increased pedestrian activity
- Vehicles parked legally and safely
- Minimal ongoing use of nature strips for residential parking
- Fewer complaints recorded
- Streets designed in accordance with *Liveable Streets Design Guidelines*
- Increased pedestrian activity on streets

Measure of success for community

- Increase in community reporting of issues
- Active neighbourhood watch groups across Knox
- Increase activity in streets
- Less reported complaints about private vegetation
- Increase in gardening as a recreational activity

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Knox Pedestrian Plan*, which recommends specific design responses in relation to safety. See in particular, table 7.1.2: Social Street Principles
- *Knox Integrated Transport Plan*
- *Road Asset Management Plan*
- *Footpath and Shared Path Asset Management Plan*

OTHER USEFUL RESOURCES

- *Urban Trees and Traffic Safety: Considering US Roadside Policy and Crash Data*
- *Melbourne 2030*, Policy 5.3, Improve community safety and encourage neighbourhood design that makes people feel safe. Refer to Initiatives 5.3.1 through 5.3.5

'The common thread in the new approach to traffic engineering is a recognition that the way you build a road affects far more than the movement of vehicles. It determines how drivers behave on it, whether pedestrians feel safe to walk alongside it, what kinds of businesses and housing spring up along it.'

(McNichol, 2004)

GOAL

To improve the safety of Knox's streets for pedestrians, cyclists and motorists.

OPPORTUNITIES

This section looks at two specific opportunities to create safer streets:

- reducing traffic speed to improve safety for vehicle users; and,
- improving pedestrian safety.

Reducing traffic speed to improve safety

The reduction of speeding traffic is a key issue in making streets liveable. The safety of pedestrians, cyclists and vehicle occupants is crucial to the development of liveable streets.

Speeding cars are often seen within wide, quiet streets as drivers have a wide field of vision and are inclined to speed up. Unfortunately, wide quiet streets are also considered highly desirable by Knox residents.

Vehicle Speed

Regarding the potential economic benefits of traffic calming, the *TDM Encyclopaedia* (no year) notes the following:

- traffic calming creates economic revitalisation and increases residential and commercial property values;
- traffic calming creates more attractive environments, reduces vehicle speeds and increases safety for pedestrians, cyclists, drivers and other users of the streets. This is good for business;
- traffic calming encourages local residents to buy in their own neighbourhoods and also attracts customers from a wider area due to reduced travel times, hassle and cost. Traffic calming can also help people live less car-dependent lifestyles;
- most businesses are concerned about the quality and quantity of customer parking and access for delivery trucks; and,
- traffic calming projects often require only minimum 'down time' for construction, and most do not require investment from business owners.

Each street needs to be designed in response to different parameters, including vehicle speed, traffic volumes, driver behaviour, technical constraints, along with community perceptions and the local context. In residential and school areas, for example, it is particularly important to decrease the speed of traffic.

There are two distinct and potentially conflicting approaches to the design of streets for speed reduction.

1. Clear zones: This approach, used by VicRoads, advocates removing obstacles that an errant vehicle may encounter. This approach is enforced on major arterials but is not desirable or appropriate when applied to the full measure for higher speed roads, and within lower speed suburban streets. The removal of all obstacles adjacent to the street carriageway can reduce the ability of the driver to judge their own speed.
2. Behavioural design: as discussed by McNichol (2004), this approach proposes that by changing the design of the environment it is possible to change driver behaviour.

Curvy lines, trees and other objects are brought closer to the carriageway and sometimes different road surface treatments (such as paving) are used at the threshold. This design approach narrows the field of view and alerts the driver to a smaller scaled environment which requires slower speeds.

4.10 SAFE STREETS

OPPORTUNITIES

Safety and Roadside Vegetation

The debate concerning roads and safety and the impact of roadside vegetation is both ongoing and one in which many authorities and community groups have taken serious interest.

The strict application of current VicRoads and AusRoads standards to Knox's VicRoads-controlled roads would entail a significant reduction in future tree planting along Knox's major roads. Many of Knox's main roads would have a 5-8 metre 'no go zone' for trees (or trees with a calliper (trunk) larger than 200mm diameter. This suggests that future street tree planting will either not be possible or at best minimal in the space remaining.

The key issue for increasing street tree planting in Knox's main roads is negotiation with VicRoads to firstly develop a memorandum of understanding on the future design of all Knox's main roads, and secondly, on a street by street basis, to negotiate a higher quality landscape outcome. Installation of crash barriers between the road and trees is a visually undesirable outcome.

It is not part of the scope of this study to review in detail the VicRoads and AusRoads standards that guide the design and maintenance of roads in Knox. However, it is within this study's scope to highlight the many benefits of the 'behavioural design' approach were it to be applied to a significant majority of the streets of Knox. Many of the components of the behavioural design approach are not incompatible with VicRoads standards.

Research undertaken in Australia and overseas provides much evidence for the effectiveness of more passive treatments to reduce vehicle speed or speeding in streets.

This evidence includes:

- Urban street trees create vertical walls framing streets, and a defined edge, helping motorists guide their movement and assess their speed (leading to overall speed reductions). Street tree safety comparisons show a reduction in both run off the road crashes and overall crash severity when street tree sections are compared with equivalent treeless streets (Burden, 2008).
- A study in Toronto Canada found that street landscape improvements reduced accidents by 5% to 20% (generating significant public cost savings) and boosted pedestrian use of urban arterials (Rosenblatt Naderi 2003) (Wolf and Bratton, no year).
- Brain injury resulting from hitting a narrow object such as a tree or pole was found to vary 'strongly with speed, with brain injury 5.5 times more likely in 100-110km/h zones compared with 40-60km/hr zones' (Royal Auto, 2007).
- The government response to the *Road Safety Committee Inquiry into Crashes Involving Roadside Objects*, (October 2005) recommends that Victorian road authorities consider the use of earth, gravel shrubs and other frangible vegetation as a means of slowing out-of-control vehicles as they travel across roadsides, thereby reducing object severity.

'It is important that both the actual and perceived safety for users is addressed. If people feel that a particular route or public transport facility is unsafe, and should only be used when absolutely necessary, it is not a legitimate transport choice.' (KCC, 2004)

GOAL

To improve the safety of Knox's streets for pedestrians, cyclists and motorists.

Improving Pedestrian Safety

Shared spaces and pedestrian priority

A shared space is a street being shared between cars, pedestrian and bicycles on an equal basis and generally on a single surface or level pavement. Shared spaces are appropriate for low volume streets where pedestrians outnumber motor vehicles and where it is difficult to have a separate pedestrian pavement. They are also useful in areas where there are a high number of pedestrians and their movements crossing streets need to be prioritised over vehicles.

Research into shared use spaces has demonstrated potential for reduced vehicle and pedestrian accidents. Shared use zones encourage slower traffic and force drivers to increase their awareness of pedestrians. Refer Section 4.11 *Streets for the Community* for additional information.

Lighting

Lighting is vital to night time safety on Knox's streets, especially at intersections. To increase street usage, it is critical to improve lighting for pedestrians for those streets which connect with public transport, community facilities and retail areas.

The *Knox Pedestrian Plan* identifies the appropriate lighting for pedestrians on streets.

Passive surveillance

A key principle for safety in our communities is passive surveillance. Passive surveillance means the casual watching of pedestrians and drivers by the neighbourhood and individual householders.

Consequently, streets that encourage walking and slow driving, both day and night, provide additional surveillance and increased community safety.

Streets that encourage activities such as play, and gardening on nature strips also encourage indirect surveillance on streets.

Crime Prevention through Environmental Design

Crime Prevention Through Environmental Design (CPTED) is a design-based approach for public spaces intended to minimise opportunities for crime while enhancing the quality of the physical environment for both comfort and enjoyment.

Safety on public transport

The *Knox Integrated Transport Plan* says 'for people to choose public transport, a safe environment needs to be provided. Safety, and the perception of safety, should encompass all aspects of a public transport journey – to facilities, waiting times for services, the travel experience and disembarkation.'

Relevant principles of good design recommended in The *Knox Integrated Transport Plan* (2004) include:

- lighting and maintenance along footpaths and in carparks;
- safe crossing facilities;
- integration of transport with land use;
- minimising concealment opportunities at embarkation points;
- lighting at stations and bus stops; and,
- providing detailed and accurate service information.

Maintenance and surface quality

Surface quality and consistency are important factors in the safety of carriageways and footpaths.

Maintenance of footpaths to help remove cracking and lifting, for example, will reduce the risk of tripping.

4.10 SAFE STREETS

CHALLENGES

Challenges are also associated with each of the outlined opportunities to create safe streets.

Reducing traffic speed and increasing safety

The key challenges to reducing traffic speeds and increasing street tree planting on streets include:

- negotiation with VicRoads to arrive at a memorandum of understanding that supports the principle of street trees along Knox's main roads and streets; and,
- effectively researching and trialling different traffic calming techniques to reduce speed in primarily residential streets.

Improving pedestrian safety

The key challenges to improving pedestrian safety include:

- implementing a shared use space in Knox when there is no local benchmark to follow. Shared space will be a new model for the community and council; and,
- ensuring that lighting for increased pedestrian safety does not conflict with other Council policies.

Maintenance and surface quality

The key challenges to improving maintenance and surface quality includes:

- balancing available funds with priority safety works across the entire road network.

COMMUNITY PERSPECTIVES

Community consultation revealed that:

- traffic volumes and speeds are a major issue and concern for residents, and are a major contributing factor to the enjoyment of residential streets;
- people prefer wider streets with street trees and minimal on-street car parking;
- well designed streets are strongly favoured; and,
- risks to children, pedestrians and cyclists were recognised in some street designs.

GOAL

To improve the safety of Knox's streets for pedestrians, cyclists and motorists.

ACHIEVING CHANGE

Vision

Safe streets are places where people feel comfortable to dwell or move through. They are places where we do not feel threatened by speeding vehicles or isolated spaces.

Goal

It supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- supporting culturally rich and active communities; and,
- access transport choices.

It is supported by the *Vision 2025* commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental sustainability.

Approaches

1. Decrease vehicle speeds in residential streets and retail environments
2. Improve pedestrian access and amenity in streets to provide equitable space for non-vehicle movement
3. Provide safe areas for vehicles parking
4. Create community destinations – reasons to be on the street



Safe street in Footscray. Small speed humps reduce speed



Shared use space, Springthorpe Estate, Macleod

4.10 SAFE STREETS

ACHIEVING CHANGE

APPROACH 1 – Decrease vehicle speeds in residential streets and retail environments

Action 1.1

Work with LATM (Local Area Traffic Management) plans to improve problematic streets with treatments that will reduce vehicles speeds

Action 1.2

Identify potential shared use zones and implement a program of pilot studies into different areas. For example short streets, school streets, residential courts, transport hubs and within key Activity Centres
See also Theme: Streets for Travel

Action 1.3

Ensure all new and upgraded streets are designed to reduce vehicle speed and increase pedestrian safety

APPROACH 2 – Improve pedestrian access and amenity in streets to provide equitable space for non-vehicle movement

Action 2.1

Implement footpaths to at least one side of streets and preferably to both sides
See also Theme: Streets for Travel

Action 2.2

Enact green neighbourhood streets to promote bike and pedestrian travel
See also Theme: Streets for Travel

Action 2.3

Implement safety lighting as set out in the *Knox Pedestrian Plan* with a review to ensure appropriate sustainability and environmental outcomes

Action 2.4

Apply CPTED (Crime Prevention Through Environmental Design) principles to all new capital works projects and public transport structures

Action 2.5

Encourage residents to improve the safety of their homes, through clear sightlines between street and front door

Action 2.6

Expand the *Mothers Living Well* program across all suburbs. This program encourages walking and playing in public spaces

Action 2.7

Ensure adequate maintenance of footpaths, as per *Knox Footpath and Shared Path Asset Management Plan*

GOAL

To improve the safety of Knox's streets for pedestrians, cyclists and motorists.

APPROACH 3 – Provide safe areas for parking of vehicles**Action 3.1**

Educate residents on legal parking options, ie on the road, not on the footpath or nature strips

Action 3.2

Mark parking lanes on wider streets

Action 3.3

Ensure all new streets provide minimum width for car parking with car parks housed in landscape outstands. Refer to the *Liveable Streets Design Guidelines*

APPROACH 4 – Create community destinations –reasons to be on the street**Action 4.1**

Work with communities and planning permit applications to increase the number of interesting destinations in residential streets, such as gardens of interest, artwork, places for play, meeting places and pause points

Actions under other themes will also contribute to promoting safe street streets.

COMMUNITY ACTIONS – Communities can contribute to this goal by:**Community reporting**

Community members identifying opportunities for improved driver and pedestrian safety

Neighbourhood watch

Becoming active in neighbourhood watch type activities

Activities

Actively using the street

4.11 STREETS FOR THE COMMUNITY

Liveable streets are places where the community actively uses the spaces. Walking, cycling, play, gardening and talking to a neighbour are all indicators of a successful street in a neighbourhood.

Most of Knox's streets are residential streets. All these streets could become more liveable by designing them as community spaces.

There are a number of community led initiatives within Knox that are building the liveability of streets.

This theme explores a range of well-established ways to enhance the use of streets as community spaces, and discusses some of the challenges involved.

GOAL

To increase community pride and action in Knox streets

OPPORTUNITIES

- Community orientated streets, including:
 - Shared use zones;
 - Home zones (Woonerfs); and,
 - Play and local movement.
- Pedestrian prioritisation in Activity Centres;
- Putting the 'nature' back into nature strips and gardens;
- Public art in streets; and,
- Gateways.

CHALLENGES

- Implementing shared use spaces and home zones in the City of Knox where there exists no local benchmark to follow;
- Increasing pedestrianisation in Activity Centre areas sometimes requires a reduction in on-street car parking;
- Educating and promoting the benefits of planted nature strips, in particular indigenous and edible vegetation;
- Ensuring that nature strips are planted in accordance with the proposed Nature Strips Policy;
- Encouraging and supporting residents in maintaining their nature strip's planting;
- Ensuring public art is not creating a driver or pedestrian safety problem; and,
- Ensuring that public art is well integrated into the street and the street's character.



Community initiated project, The Basin

APPROACHES

1. Design streets to enable community activity
2. Support community initiatives in streets
3. Streets as places to produce, harvest and share food

Note: all actions need to contribute to consistent neighbourhood character

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- culturally rich and active communities;
- sustainable natural environment; and,
- balanced quality urban development.

And it is supported by the Vision 2025 commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental responsibility.

4.11 STREETS FOR THE COMMUNITY

MEASURE OF SUCCESS

- Priority list of home zones by 2012
- Two home zone prototypes implemented in 5 years
- By 2012 communities have been involved in the planning and design of at least 3 green neighbourhood streets
- Templates and toolbox are available to the community by 2012
- Increased dog walking in residential streets
- Streamlined process and checklist for community street events by 2012
- Increased number of community based programs in Knox
- 3 community arts projects annually
- Matching community grants program established by 2015
- Design and implement one edible street prototype
- 2 edible streets created by the community in 5 years
- Increase in private edible gardens

CURRENT PROGRAMS, PLANS AND POLICIES

The following programs, plans and policies will help achieve this goal:

- *Knox Pedestrian Plan*, which recommends specific design responses in relation to safety. See in particular table 7.1.2: Social Street Principles, also refer here for seating recommendations;
- *Knox Integrated Transport Plan*;
- *Road Asset Management Plan*; and,
- *Footpath and Shared Path Asset Management Plan*.
- *Knox City Council Arts Plan*

OPPORTUNITIES

This section looks at five specific opportunities that would help create streets that work as community spaces:

- Community orientated streets, including: Shared use zones; Home zones (Woonerfs); and, Play and local movement.
- Pedestrian prioritisation in Activity Centres;
- Putting the 'nature' back into nature strips and gardens;
- Public art in streets; and,
- Gateways.

'The success of a home zone can be judged by the extent to which the people who use the street or live there recognise the need for the scheme and take ownership of it. Such ownership largely depends upon effective community participation and involvement at all stages' (DFT, 2005)

GOAL

To increase community pride and action in Knox streets.

Community Orientated Streets

Shared Use Zones

Shared use zones are areas where pedestrians, cyclists and vehicles share the roadway.

Shared use zones can be used in commercial, retail and residential areas that have a low traffic volume or highly controlled traffic speeds.

There is a direct connection between traffic speeds in residential streets and liveability – as speeds increase ‘neighbourhood liveability ratings decline’ (Online TDM Encyclopaedia 2007).

A shared use zone creates a space where traffic is slowed, making a street safer and more inviting.

Shared space under Victorian Road Rules states that:

- Cars at all times need to give-way to pedestrians.
- That a pedestrian must not move directly into the path of a driver and must not unreasonably obstruct the path of any driver or another pedestrian.

In traditional street layouts, footways and carriageways are separated by a kerb. In a street with a shared surface, this demarcation is absent and pedestrians and vehicles share the same surface.

The key aims are to:

- encourage low vehicle speeds;
- create an environment in which pedestrians can walk, or stop and chat, without feeling intimidated by motor traffic;
- make it easier for people to move around; and,
- promote social interaction.

Home zones (Woonerfs)

Home zones (originally pioneered in the Netherlands and known as Woonerfs) strike a balance between vehicles and everyone else who uses the street – pedestrians, cyclists, business people and residents. Home zones reclaim local streets from the car, improve safety and return peace to neighbourhoods that are becoming overwhelmed with speeding traffic (<http://www.homezones.org>).

In Knox, the home zones idea could be extended into designated streets where pedestrians have priority over vehicles. Residential streets, especially those that are not through roads or are short in length, are well suited to this concept.

The design of a home zone has been defined by Appleyard (1981) as a space that includes:

- a ‘gateway’ to announce to drivers that they are entering a home zone;
- curves to slow vehicles;
- amenities such as trees and play equipment –these also act to slow traffic;
- no kerbs;
- intermittent parking so cars do not form a continuous barrier; and,
- a speed limit of around 16km/hr.

Refer to *Section 5 Liveable Streets Design Guidelines* and the *Knox Pedestrian Plan* for specific recommendations and design guidelines.

4.11 STREETS FOR THE COMMUNITY

OPPORTUNITIES

Play and local movement

Playing street cricket and other games with neighbours within the street is certainly less prevalent now than 20 years ago. There are many reasons for this change, but among the most significant, are concerns for both children's safety in relation to 'stranger danger' and accidents with vehicles.

The potential for outdoor play with neighbours increases both activity on the street and passive surveillance, making the street a safer environment. Play actively increases social networking within the local community, leading to other positive community outcomes and encouraging community initiated activities such as community gardens. Children also have greater opportunity to explore their local natural environment and develop respect for it.

Destinations

In developing the community's bonds to its neighbourhood and locality, it is important to create facilities and destinations that reflect the values and interests of that community's individuals. These places may be at the local shops, scout hall, library or school.

These places are important to the neighbourhood and need to be well designed, enhance the locality, and be well cared for.

Getting to these places is also important. The approach of Green Neighbourhood Streets recommended in this Plan is designed to provide key routes that safely connect community facilities and that will become the focus for community activity and identity.

Pedestrian prioritisation in Activity Centres

A key principle of Melbourne 2030 is the idea of Activity Centres – locations where increased residential density is combined with services and employment hubs. Activity Centres are located strategically across Melbourne.

Knox Central is designated as a principal Activity Centre. The core area is the commercial and industrial land located along Burwood Highway between Stud Road and Scoresby Road. In response to the need to protect the amenity and quality of the precinct's residential surrounds, Knox City Council has developed the *Knox Central Urban Design Framework (2005)*.

Knox also has 4 Major Activity Centres: Bayswater, Boronia, Mountain Gate, and Rowville/Stud Park, and each of these offers opportunities to combine new development with renewal of streets to enhance liveability.

The Melbourne 2030 Activity Centre Design Guidelines emphasise the importance of creating street life, a sense of place, high quality design of public spaces, and connectivity (SGV, 2005).

The primary type of new development occurring in Knox is medium density mixed-use and medium density residential.

The increased population density that will form around Knox's Activity Centres will place pressure on the existing open spaces and streetscapes. Streets in these areas will need to accommodate more daily use and increased demand for more casual recreation space for residents.

Streets in Activity Centres will become the focus for debates about how new development responds to the existing neighbourhood character. Street redesign can assist with integration and create opportunities to provide high quality streetscapes suited to increased densities and mixed uses.

GOAL

To increase community pride and action in Knox streets.

Putting the 'nature' back into nature strips and gardens

The minimum setback of houses from the street is determined by the planning scheme, and the position and outlook of the house by the owner. Most of residential Knox is already developed, and in many areas the setback is consistent across neighbourhoods. The setback of houses along a street creates the overall urban form and gives character to a street and neighbourhood.

The nature strip is also an important part of the streetscape.

Front yards are often spaces that are not used as much as the backyard because they lack privacy. On the other hand, front yards are part of the streetscape and are places where neighbours can interact as part of a street community.

Programmes such as 'Gardens for Wildlife' often hold demonstrations or open gardens and curate community events and activities. Whole streets have been dedicated to these spaces.

Likewise, the idea of edible streetscapes is catching on in many areas, focusing on food gardening in public spaces and streets, and with the produce available for all to share.

'Mothers Living Well' is a three year health promotion project exploring ways to enhance the wellbeing of mothers in Bayswater and Bayswater North. This project takes a broader approach to neighbourhoods, creating activities designed to build community connections and increase physical activity. Initiatives include street parties, upgrading of footpaths, and community art projects.



An edible street community project

4.11 STREETS FOR THE COMMUNITY

OPPORTUNITIES

Public art in streets

Community art and public art within the streetscape can create landmarks, areas for interaction conversation, and involvement (KCC, 2010)

Knox Placemakers is a Council-based initiative to create or strengthen a sense of place through artists and the community working together to design, create and install art that has a sustainability focus and will enhance public places in Knox .

Gateways

There are many gateways within the Knox municipality. These range from major entrances to the City – for example the Dandenong Creek Gateways, to the smaller gateways that mark the entrance to suburbs, business parks, shopping destinations and neighbourhoods.

For example, Boronia Shopping precinct has planting and unique signage.

Siemens Offices along Mountain Highway in Bayswater offer a distinctive gateway to their building.

Gateways help define boundaries of places and create landmarks that are associated with different communities.

For more on gateways, refer to the 'streets for economy section'.



Boronia Shopping precinct sign



Gardens for wildlife

GOAL

To increase community pride and action in Knox streets.



Siemens Offices showing a planted gateway and frontage to Mountain Highway, Bayswater

4.11 STREETS FOR THE COMMUNITY

CHALLENGES

Challenges are also associated with each of the outlined opportunities to create streets that work as community spaces.

Community orientated streets

Implementing shared use spaces and home zones in the City of Knox where there is no local benchmark to follow, will require education and community capacity building. Shared space will be a new model for community and Council to embrace.

Pedestrian prioritisation in Activity Centres

Increasing pedestrianisation in activity centers areas sometimes requires a reduction in on-street car parking. This reduction should be managed in conjunction with wider precinct car parking strategies to ensure appropriate capacity is provided across the entire centre rather than being managed on a street by street scale.

Putting the 'nature' back into nature strips and gardens

The main challenges with this opportunity are:

- educating and promoting the benefits of planted nature strips, in particular indigenous and edible vegetation;
- ensuring that nature strips are planted in accordance with the proposed Nature Strips Policy; and,
- encouraging and supporting residents in maintaining their nature strips planting.

Public art in streets

Public art in streets is a vital process for including local culture and community groups into the broader community, and for commenting on the broader neighborhood.

The challenges with public art in streets are:

- ensuring it is not creating a driver or pedestrian safety problem; and,
- that it is well integrated into the street and the street's character. Public art can easily become 'plonk art' where the art is treated like an object and is not developed as an integrated component of the broader street design.

Gateways

Refer to the Economy of Streets section

GOAL

To increase community pride and action in Knox streets.

COMMUNITY PERSPECTIVES

City of Knox community consultation has revealed that:

- people value quiet green streets where it is easy to get to local facilities;
- people don't like speeding cars and traffic in residential streets;
- street trees are valued, but often cause problems;
- people like having trees and plantings in the street because they enhance the street character, provide habitat and support biodiversity;
- most people know their neighbours, but only a quarter get involved in activities in their street;
- of those who get involved, the most popular activities are football and cricket, riding bicycles and Christmas parties;
- many people walk to local facilities – shops and schools – but fewer cycle. Distance and time are seen as the barriers to walking and cycling, along with the lack of connecting footpaths; and,
- the most desired change to residential streets is improving and connecting footpaths, followed by better cleaning and maintenance, better plantings, better lighting and fewer cars.

ACHIEVING CHANGE

Vision

In local residential streets, communities use street space to create their own sense of place, shaping it with plants, art and activity.

In such streets neighbours meet, children play, people are active and involved. Everyone feels safe.

Goal

It supports the following ideas in *Vision 2025*:

- healthy, connected communities;
- culturally rich and active communities;
- sustainable natural environment; and,
- balanced quality urban development.

It is supported by the *Vision 2025* commitment to:

- partnering and engaging;
- innovation and excellence; and,
- social and environmental responsibility.

Approaches

1. Design streets to enable community activity
2. Support community initiatives in streets
3. Streets as places to produce, harvest and share food

Note: all actions need to contribute to consistent neighbourhood character

4.11 STREETS FOR THE COMMUNITY

ACHIEVING CHANGE

APPROACH 1 – Design streets to enable community activity

Action 1.1

Develop a priority list of achievable home zones in Knox based on current list provided by the *Pedestrian Plan (2005)*
See also Theme: Streets for Travel

Action 1.2

Based on community interest and willingness to participate, develop a prototype for a home zone
See also Theme: Streets for Travel

Action 1.3

Initiate community consultation of the green neighbourhood streets in identified priority suburbs. Green neighbourhood streets primary function is to increase community use of key streets in each Knox suburb

Action 1.4

Develop templates and toolbox that can be used by residents to develop ideas for enhancing the community capacity of their street

Action 1.5

Promote dog walking in neighbourhood streets. Dog walking promotes community socialisation and improves the mental and physical health of the community.

Refer to the *Knox Domestic Animal Management Plan*

APPROACH 2 – Support community initiatives in streets

Action 2.1

Work with community groups to establish local street and neighbourhood events focused on creating streets as community spaces

Develop a simplified process and checklist for the community

Action 2.2

Support and promote specific community based programs including 'Gardens for Wildlife', 'Mothers Living Well' and edible streetscapes

Council to provide training, modest resources, education and publications

Action 2.3

Identify potential opportunities for community art programs in local streets

Action 2.4

Develop a matching community grants program and guidelines which provides matching funding and resourcing to improve their street

GOAL

To increase community pride and action in Knox streets.

APPROACH 3 – Streets as places to produce, harvest and share food**Action 3.1**

Work with community groups and residential street groups to create edible streets and private edible gardens

Actions under other themes will also contribute to enhancing community spaces in streets.

COMMUNITY ACTIONS – Communities can contribute to this goal by:**Community Groups**

Develop a local community group of interested residents to work with Council to identify opportunities and to improve community spaces and activities in their streets

Community involvement in street design

Getting involved when their street is being redesigned, and working with stakeholders and Council to implement improvements

Community Newsletter

Develop a community newsletter of local activities

Initiate a local activity

In their street such as;

- Gardens for Wildlife
- Edible streetscapes
- Walking tour of edible gardens
- Walking tour of gardens for wildlife
- 'Walking pool system' with people in your street.
- Encourage a 'count the birds competition' in your street
- Develop a 'barter with your neighbours system' e.g. walk their dogs in return for lemons off their tree
- Run a garden competition in your street
- Parent supervised play groups in local playgrounds
- Adopt a street tree program

4.12 STREETS FOR INFRASTRUCTURE

Streets provide a network of infrastructure and services. Vital services such as power, gas and water supply, drainage, sewerage and telecommunications infrastructure are all located within the street reserve. These infrastructure services all need to be maintained and at times upgraded, and require access by their associated authorities.

Streets provide access for public and private services such as postal and other deliveries, collection of rubbish and recycling, emergency vehicles and street sweepers. Streets need to be designed to take into account the needs of such services.

Streets also contain 'travel' infrastructure: the roadway (for vehicles and cyclists), footpaths, and on-street car and bicycle parking areas.

Finding space for this range of infrastructure is a significant challenge, especially in older streets where the infrastructure has developed incrementally over many years.

Streets are not just for infrastructure. Finding space for trees, for example, is often constrained by the existing infrastructure, achieving a less than optimal outcome for residents and for infrastructure authorities. New approaches to integrated design are needed. The cycle of infrastructure renewal can provide opportunities for this to happen.

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.

OPPORTUNITIES

- Introducing integrated water management.
- Designing for services and infrastructure.
- Integrating on-street car parking.
- Improving road and footpath assets.
- Coordinating an approach to trees and infrastructure.

CHALLENGES

- Providing WSUD or SQIUD treatments to traditional street design and construction will require support from the community and the provision of additional design resources compared to traditional street design projects.
- The location of underground and above ground services can severely limit opportunities to plant trees. This can limit the desired 'leafy and green' streetscape character.
- Education promoting nature strips as places not intended to be used for car parking.
- Working with limited budgets across the entire street network to achieve both safety and amenity works.



Mountain Highway at Bayswater – view to train level crossing. A street dominated by vehicles and services

APPROACHES

1. Improve the coordination of street design, works and maintenance between Council, state authorities and utility providers
2. Improve the coordination of street design, works and maintenance across Council
3. Improve the quality of street design
4. Make sustainability a priority for future infrastructure works
5. Ensure a balanced approach to on-street car parking

VISION 2025

This goal supports the following ideas in *Vision 2025*:

- dynamic services and facilities;
- sustainable natural environment; and,
- balanced quality urban development.

And it is supported by the Vision 2025 commitment to:

- innovation and excellence;
- effective governance;
- stewardship of finances and assets; and,
- social and environmental sustainability.

4.12 STREETS FOR INFRASTRUCTURE

MEASURE OF SUCCESS

- Powerline undergrounding priority plan by 2015
- Missing links footpaths built as per *Knox Pedestrian Plan* action list
- All new streets designed to enable optimum street tree growth

CURRENT PROGRAMS, PLANS AND POLICIES

- The following programs, plans and policies will help achieve this goal:
- Knox Integrated Transport Plan;
- Road Asset Management Plan;
- Footpath and Shared Path Asset Management Plan; and,
- Knox City Council Road Management Plan.

OPPORTUNITIES

This section looks at five specific opportunities that will help achieve a good balance between infrastructure and community. These are:

- introducing integrated water management;
- designing for services and infrastructure;
- integrating on-street car parking;
- improving road and footpath assets; and,
- coordinating an approach to trees and infrastructure.

Introducing integrated water management

Streets contain three water-related services: water supply, stormwater drainage and sewerage.

Water and sewerage infrastructure

Water supply and sewerage infrastructure systems are generally contained within the street reserve, often below the road pavement or nature strip.

Replacement and repair of these two services can impact on a street, especially when excavation or tree removal is required to access these services.

Planned programs of replacement and repair may create opportunities to improve service placement and other aspects of street design and layout. Emergency repairs do not offer this opportunity.

‘Over time the city infrastructure is renewed. This cycle takes approximately 75 years for a typical suburb, though inner city suburbs are being renewed at a faster rate of 35-40 years. This provides an opportunity to retrofit the built environment in an ecologically sustainable matter.’
(Melbourne Water, WSUD Case Studies)

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.



A street with a central swale to capture and clean the storm water from the carriageway, Springthorpe, Macleod

Using stormwater effectively

Managing stormwater effectively is the second component to integrated water management.

Rainfall on a street runs into the gutter and then into stormwater pipes below the street. From there, the stormwater is generally piped through 'drains' into the local creek system, and eventually into Port Phillip Bay.

New approaches to stormwater involve retaining and using this water locally, recognising that it is a valuable resource. These new approaches are generally referred to as 'water sensitive urban design' or WSUD.

Knox has recently begun promoting SQUID. SQUID stands for stormwater quality in urban design. In effect, Knox is saying that treating storm water should be an integrated, designed approach – not just insertions of rain gardens into streetscape works.

Water sensitive design can be incorporated into both existing and new streets and can, for example, redirect water to irrigate nature strips and street trees. WSUD actions are discussed under the Section 4.8 *Streets for the environment theme*.

Liveable streets harness stormwater by collecting, cleaning and using it for passive irrigation before releasing any excess back into the drainage network.

Stormwater drainage infrastructure requires regular maintenance and repair, and the upgrading of Knox's drainage capacity is planned to take place over the next ten years. Introduction of WSUD and other water management systems can help reduce the need for future stormwater capacity upgrades.

The table below compares construction costs of WSUD compared to conventional drainage design.

Comparison of WSUD and conventionally designed drainage works at Lynbrook Estate (based on a typical 160m length of road covering 7 lots). See the City of Knox's Water Sensitive Urban Design Guidelines (p29).

4.12 STREETS FOR INFRASTRUCTURE

OPPORTUNITIES

CONVENTIONAL DESIGN			
5 X side entry pits	@ \$	929.46/pit	= \$ 4,647.30
76 x 1m: 300 diameter drainage pipe	@ \$	45.87/1m	= \$ 3,486.12
60 x 1m: 375 diameter drainage pipe	@ \$	61.21/1m	= \$ 3,672.60
24 x 1m: 450 diameter drainage pipe	@ \$	71.39/1m	= \$ 1,713.36
7 x standard house drain to pipe	@ \$	227.11/hd	= \$ 1,589.77
160 x 1m kerb and channel	@ \$	26.74/1m	= \$ 4,278.40
7 x driveway lay backs	@ \$	141.94/lay back	= \$ 993.58
TOTAL			AUS \$ 20,381.13

WATER SENSITIVE URBAN DESIGN			
1 x swale side entry pit	@ \$	1400.00/pit	= \$ 1,400.00
24 x 1m: 300 diameter drainage pipe	@ \$	45.87/1m	= \$ 1,100.88
7 x swale house drain and pit	@ \$	766.50/hd&pit	= \$ 5,365.50
160 x 1m swale trench and turf	@ \$	26.09/1m	= \$ 4,174.40
160 x 1m kerb	@ \$	21.71/hd	= \$ 3,473.60
7 x swale lay back	@ \$	159.25/lay back	= \$ 1,114.75
64 m ² pavement	@ \$	18.21/m ²	= \$ 1,165.44
738 m ³ earthworks cut	@ \$	4.90/m ³	= \$ 3,616.20
TOTAL			AUS \$ 21,410.77

Table 5.1 Comparison between WSUD and Conventionally design Drainage works at Lynbrook Estate (based on typical 160m length of road covering 7 lots).
Source: Lloyd, Wong & Poter, 2000

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.

Designing for services and infrastructure

Streets need to be designed so that services such as post and other deliveries, garbage and recycling collections, and emergency vehicles, can access every street easily and safely.

It is both important and necessary to clearly define the specific requirements of these services in order to facilitate good street design: typically this means defining minimum road dimensions, turning areas, and suitable grades.

Built infrastructure – pipes, cables, poles, signs, hydrants – distribute water, power, gas, and telecommunications services. Newly built streets typically have all these services underground, including electricity. Older streets typically have electricity and telecommunications services above ground.

The position of these services within the street reserve can limit the potential for nature strips, street trees and other vegetation. The best approach is to contain all services beneath the footpath or edge of carriageway, providing an area of nature strip within which street trees can grow unimpeded.

Clearance requirements for overhead lines also limit opportunities for tree planting. Undergrounding of electricity and telecommunications can enable planting of larger street trees, improving the street amenity.

Service authorities have the right to access their infrastructure for upgrading, maintenance and repair. This right needs to be recognised in street and infrastructure design. Where pavements and other surfaces need to be dug up, the usual approach is to 'make good' the pavement. Such an approach does not necessarily replace the pavement with identical material. Over time this can lead to an ugly, patchwork surface. Current legislation gives Council little control over the final outcome.

Lighting

Street lighting creates a safer environment. Good lighting design can help reduce energy use, improve the distribution of light, and reduce adverse impacts such as glare and spill-over light into adjoining properties. Retaining views of the night sky and accommodating the needs of nocturnal species are also important considerations for good lighting design.

Actions in relation to street lighting and the environment are addressed in *Streets for the environment* (Section 4.8).

Integrating on-street car parking

The effective integration of on-street car parking is critical. In each street, the road reserve needs to achieve a balance between the needs of vehicles, cyclists and pedestrians.

City of Knox community consultation revealed that people like the appearance of streets where there is no on-street parking. And yet some on-street parking is inevitable in residential streets, in retail areas and at transport nodes.

The safety of all street users needs to be considered in the design of on-street parking. For example, it is not desirable to have angled parking where there are on-road cycle lanes as it reduces cyclist safety. Council has endorsed a new *Indented Car Parking Policy*, that should be referred to for new guidelines.



Bus lane on Stud Road

4.12 STREETS FOR INFRASTRUCTURE

OPPORTUNITIES

Improving road and footpath assets

Our streets are constantly being maintained, upgraded and renewed. Asphalt is re-laid, kerbs replaced, footpaths and crossings installed. Ongoing maintenance of all of Council's road and footpath assets is essential to maintain quality, useability and to respond to increasing development intensity where and when that occurs.

Knox City Council is custodian of 707km of local roads comprising road surface, road pavement and kerb and channel assets, with a total replacement value of more than \$325 million (KCC, 2007), with additional streets being developed in the south-east of the municipality. The upkeep and upgrading of streets in Knox is a significant capital cost and represents 30% of Knox's total budget. Despite that expenditure, the current levels of funding only allow for 1.3% of the road pavement to be renewed annually, considerably less than the desirable replacement rate according to the Road Asset Management Plan.

Safety concerns determine priorities for capital works improvements to roads. Council has a series of asset management systems to ensure the safety of streets and pavements used by vehicles, bicycles and pedestrians.

Knox has approximately 1200km of footpaths. Generally, older suburban areas have wide road reserves and concrete footpaths on both sides of the road, semi-rural areas often have either no footpaths or just simple gravel paths, and new residential areas often have a footpath on one side of the road only. In addition there are around 70km of shared paths maintained by Knox within public reserves and along railway and creek corridors (David Lock and Ass., in association with PBAI, 2005)

Knox City Council has defined standards for managing footpaths, based on two classifications: footpaths that access commercial and retail places and footpaths that serve local residents and small businesses.

When major capital works are planned, the opportunity exists to introduce new integrated water management measures (WSUD), to review and replace street trees, to upgrade cycle and pedestrian infrastructure and to introduce new ideas such as home zones, pause points, edible streetscapes and more.

CLASSIFICATION	COUNCILS CURRENT APPROACH TO MANAGING FOOTPATHS
Footpaths that are commercial access routes	Undertake annual hazard inspections Programmed update for DDA compliance Encourage sealed pavements with low defect tolerances Service with paths on both sides of the road
Footpaths that are local access routes	Undertake hazard inspections Both sealed and unsealed surfaces are appropriate options It is appropriate to service low use areas either with paths on one or both sides of the road

Table 5.6.6 Council management of footpaths

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.

Coordinated approach to trees and infrastructure

Streets and trees work together to provide a safe, healthy and high amenity environment.

Street trees should be chosen to maximize amenity benefits while ensuring no damage is caused to street infrastructure.

In the past, inappropriate street tree selection has caused some damage to infrastructure: for example clogged drains, cracking of pavement, kerbs and drainage systems, and excessive shedding of leaves or seeds on paths.

In new and upgraded streets, the street infrastructure should be designed to allow for the growth of the tree and its root system, so that the end result is a healthy mature tree and undamaged infrastructure.

Maintenance of street trees is essential to ensure healthy and well-formed trees. Such maintenance includes pruning and shaping, inspection, watering or irrigation, and the removal of tree litter and prunings.

Street trees can help improve the longevity of asphalt surfaces through providing shade. Sunlight accelerates asphalt's aging processes.

'No matter whether we consider arterial roads, rail corridors or even those bike corridors that exist, there is much to be said for an integrated plan of retrofitting that would optimise personal and vehicle safety, user convenience and aesthetic considerations'.
(Russell, 2007)

4.12 STREETS FOR INFRASTRUCTURE

CHALLENGES

There are some major challenges to re-balancing the needs of infrastructure and the community. These include:

- providing WSUD or SQUID treatments to traditional street design and construction will require support from the community and the provision of additional design resources compared to traditional street design projects;
- the location of underground and above ground services can severely limit opportunities to plant trees. This can limit the desired 'leafy and green' streetscape character;
- education promoting nature strips as places not intended to be used for car parking; and,
- working with limited budgets across the entire street network to achieve both safety and amenity works.

COMMUNITY PERSPECTIVES

City of Knox community consultation revealed that:

- street trees are regarded as valuable contributors to the quality of a street, but that in many instances trees also cause some problems;
- litter is an issue of concern, including litter from trees;
- wider, well-designed and well-maintained streets with no on-street parking are the most favoured;
- the amount and speed of traffic in residential streets is the most significant issue for most people;
- footpaths are strongly favoured and streets with a footpath on one side received negative comments; and,
- lack of an interconnecting footpath network was one barrier to walking to local facilities.



Shared space in Canberra with water sensitive urban design treatment gardens

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.

ACHIEVING CHANGE

Vision

In streets for infrastructure, there is room for trees to grow amongst under ground services. All forms of movement are safely accommodated in the street and environmentally sensitive measures are integrated with infrastructure systems.

Goal

It supports the following ideas in *Vision 2025*:

- dynamic services and facilities;
- sustainable natural environment; and,
- balanced quality urban development.

It is supported by the *Vision 2025* commitment to:

- innovation and excellence;
- effective governance;
- stewardship of finances and assets; and,
- social and environmental sustainability.

Approaches

1. Improve the coordination of street design, works and maintenance between Council, state authorities and utility providers
2. Improve the coordination of street design, works and maintenance across Council
3. Improve the quality of street design
4. Make sustainability a priority for future infrastructure works
5. Ensure a balanced approach to on-street car parking. Refer to Councils indented car parking policy.

4.12 STREETS FOR INFRASTRUCTURE

ACHIEVING CHANGE

APPROACH 1 – Improve the coordination of street design, works and maintenance between Council, state authorities and utility providers

Action 1.1

Develop a priority plan for undergrounding of overhead power lines to improve visual amenity in main shopping streets and built up residential areas. Priority plan should be based on feasibility and value for money assessment

Action 1.2

Develop a priority plan for undergrounding of overhead power lines in fire hazard areas. This requires coordination with relevant authorities and subject to State Government review and Bushfire Royal Commission recommendations

Action 1.3

Coordinate between service authorities and Council's works programs to ensure works are undertaken in the best sequence

APPROACH 2 – Improve the coordination of street design, works and maintenance across Council

Action 2.1

Periodic reviews of all capital works to ensure best value for money and recommendations made to improve

Action 2.2

Ensure all works identified in the *Knox Road and Footpath* and *Shared Path Asset Management Plans* are reviewed on a yearly basis of with this *Plan*

APPROACH 3 – Improve the quality of street design

Action 3.1

Develop a priority street renewal plan incorporating the Liveable Street Design Guidelines where appropriate

Action 3.3

Build the missing footpath links identified in the *Knox Pedestrian Plan*

Action 3.2

Ensure maintenance principles and requirements inform the design process and final physical outcomes

Action 3.4

Ensure consistency of speed control measures and other road treatments across the municipality

GOAL

Coordinate street design and maintenance to balance infrastructure and community needs.

APPROACH 4 – Make sustainability a priority for future infrastructure works**Action 4.1**

Design of new streets must incorporate all requirements such as road widths and adequate nature strip width for required trees. A holistic approach to the design process

Action 4.2

Facilitate the consideration of integrated water managing systems (ie SQUID and WSUD) in all new and retrofitting streetscape works. Refer to draft *Knox WSUD Plan*

APPROACH 5 – Ensure a balanced approach to on-street car parking**Action 5.1**

Ensure the design and location of on-street car parking is responsive to the needs of pedestrians and cyclists and the space requirements for street tree and nature strip planting. Refer to Knox Planning Policy in regards to car parking requirements on streets

Actions under other themes will also contribute to promoting safe street streets.

COMMUNITY ACTIONS – Communities can contribute to this goal by:

Reporting promptly any issues with their street to Council

Work with Council in the maintenance of their streets. For example 'adopt a street tree program' and mowing their nature strip