Transport Network Operations Plan

Inner Hobart

September 2023

City of HOBART

Tasmanian Government

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List of Acronyms

Acronym	Description
CBD	Central Business District
LOS	Level of Service – a description of performance ranging from A (best) to E (worst)
RUH	Road User Hierarchy – a map showing locations on the network where a particular mode is to be prioritised
TNOP	Transport Network Operations Plan – this document

Photo: Department of State Growth

Photo: Natasha Mulhall

Introduction

An integrated approach to managing Hobart's transport system aims to balance the needs of different road user groups, making the best use of what we have now as well as continuing to plan and develop Hobart's transport network for the future.

There are a number of competing demands on Hobart's road and street network and the subsequent transport-related needs can vary according to the time of day, day of the week, and even time of the year. Previously, operational decisions to preference one aspect over another have been made on particular need basis, and without an overarching strategic rationale.

Scope

This Inner Hobart Transport Network Operations Plan (TNOP) provides a guide to managing competing priorities on the road network, and ensures that the operation of the road network is aligned with the strategic objectives of the whole city. As well as providing a framework for current day operations, it can also be used to guide longer-term improvement works that affect the operation of the transport network.

The Hobart TNOP provides an approach for operating Hobart's road network that makes it more efficient, safer for all road users and supports the development of areas as places where people live and work. This document guides the operation and development of the transport network by acknowledging there are potential conflicts and competing priorities between transport modes, road users and adjacent land uses, and by setting a framework for how these are to be managed. The TNOP makes no effective distinction between roads and street ownership, as the focus is on a cohesive network for users.

Process

The process of determining the TNOP is shown below. Strategic objectives, road user hierarchies and place values are combined to generate a target minimum Level of Service (LOS) for each travel mode on each part of the network. Descriptions of what each LOS means for each mode can then be referenced when planning the operations of the network.

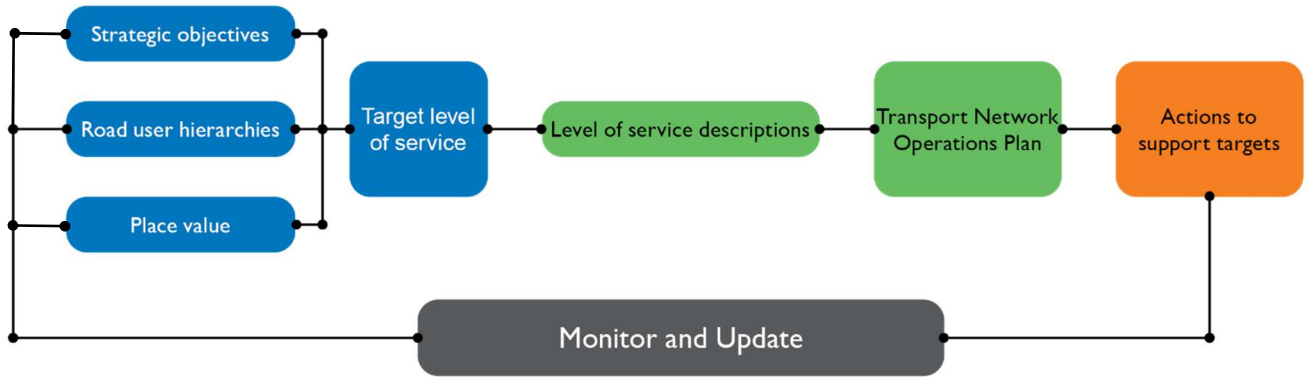


Figure 1 Transport Network Operations Plan Process

Application

Network Operations Planning recognises that there are a range of demands that are placed on the road network, and that it is often not possible to provide a superior Level of Service for all road users at the same place, or at the same time of day. It also may not be possible to achieve the Target Minimum LOS for a particular mode or

movement, without significant works, or to the detriment of other road users. Conversely, it may be that the Target Minimum LOS is lower than what is currently being achieved for a particular mode, providing an opportunity to downgrade performance by reallocating signal timings, or road space, to another mode.

This TNOP does not generate a single "answer" to the question of how the network or a particular intersection should be operated. Rather, it provides guidance to the relevant road authorities by giving an indication of relative priorities for different modes in a specific location and establishes a framework for the balanced management of the network on a day-to-day basis.

Variations to the TNOP may be considered for special events such as festivals or sporting events, with context-specific Strategic Objectives, Road User Hierarchies and Place values contributing to a Target Minimum LOS suitable for each particular situation.

Plan Development

This TNOP has been developed in partnership between the Department of State Growth and City of Hobart, as the primary road authorities in the study area. The Plan will be reviewed and updated periodically, as necessary to maintain currency.

Stakeholder input and supporting advice to create this TNOP is detailed in the "Acknowledgements" section on page 34.

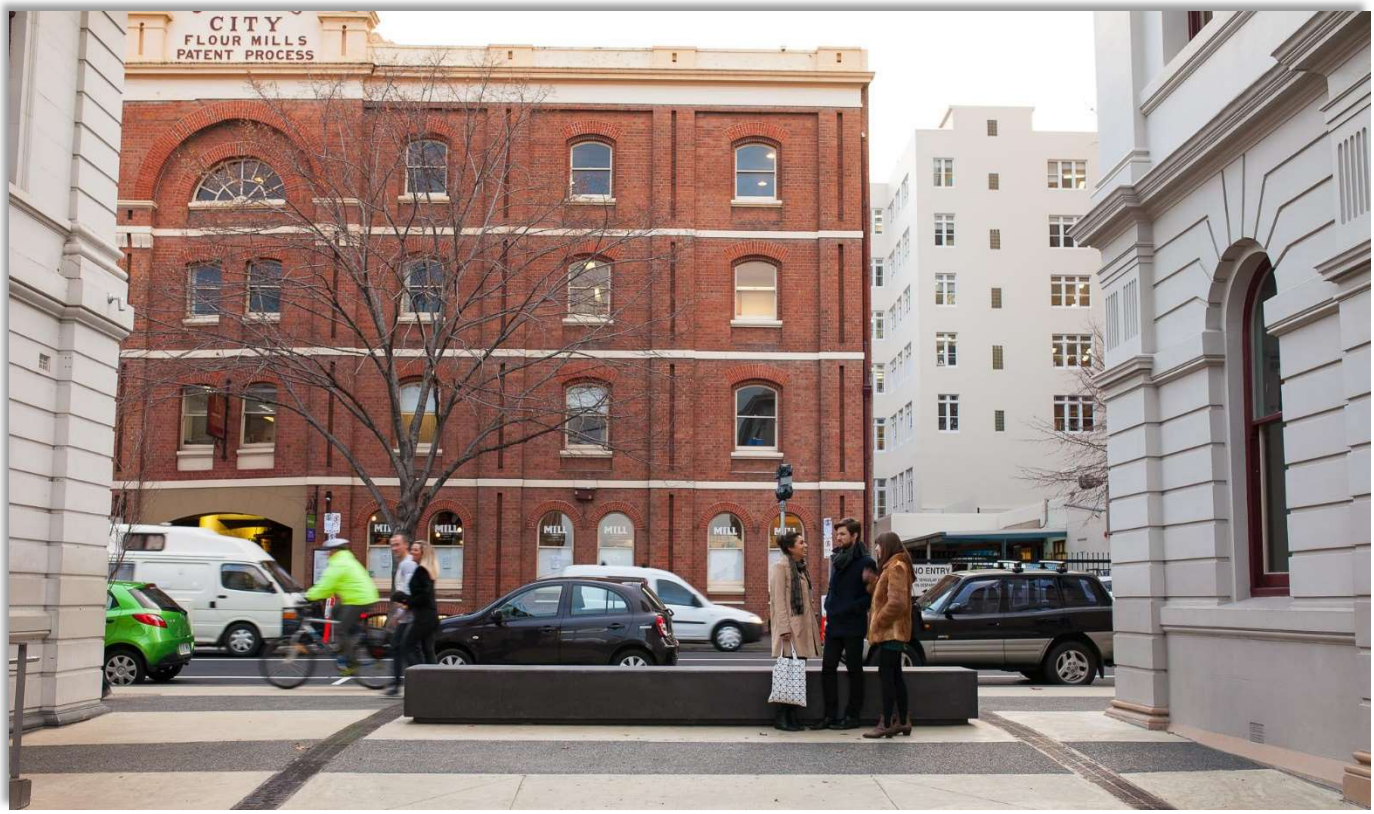


Photo: City of Hobart

Strategic Objectives

The Transport Network Operations Plan supports the achievement of a range of strategic objectives for the inner Hobart study area. The Strategic Objectives for the TNOP are shown below, reflecting the relevant objectives of a range of strategic documentation prepared variously by the Tasmanian Government, City of Hobart and others, detailed on the next page.

Photo: Natasha Mulhall

	TNOP Strategic Objectives				
Strategic Document	Balanced and efficient network	Increase public transport	Safe and efficient movement of people and goods	Desirable and innovative city	Walking, cycling and micro-mobility
Southern Tasmania Regional Land Use Strategy 2010-2035	✓	✓	✓	✓	✓
Southern Integrated Transport Plan	✓	✓	✓		
Tasmania Statement: Working Together for the Health and Wellbeing of Tasmanians	✓			✓	
Tasmanian Walking and Cycling for Active Transport Strategy	✓	✓		✓	✓
Tasmania's Climate Change Action Plan 2017-2021	✓	✓	✓		✓
Transport Access Strategy	✓	✓	✓	✓	✓
State Roads Infrastructure Service Policy	✓	✓	✓		
30 Year Infrastructure Strategy	✓		✓		✓
2050 Vision for Greater Hobart	✓	✓	✓	✓	✓
Hobart City Deal	✓	✓	✓	✓	✓
Hobart Transport Vision	✓	✓	✓	✓	✓
Hobart: A Community Vision for Our Island Capital	✓	✓	✓	✓	✓
Capital City Strategic Plan 2019-2029	✓	✓	✓	✓	✓
City of Hobart Transport Strategy	✓	✓	✓	✓	✓
Central Hobart Precincts Plan (Central Hobart Plan)	✓	✓		✓	✓
Hobart 2010: Public Spaces and Public Life	✓	✓		✓	✓
UTAS Southern Transformation	✓	✓		✓	✓
Healthy Tasmania Research and Evaluation Framework	✓			✓	✓

Movement and Place

Movement and Place is a cross-disciplinary, place-based approach to the planning, design, delivery and operation of transport networks. It recognises and seeks to optimise the network of public spaces formed by roads and streets and the spaces they adjoin and impact[1].

Roads and streets are not only used for the movement of people and goods. They are also public spaces that are used by people in a variety of ways including for transport, recreation, gathering and socialising.

There are varying approaches to Movement and Place that are being implemented by road authorities around the world. However, they all include the recognition of different road or street environments typologies depending on the combination of Movement function and Place value.

By recognising the different types of street environments that arise from the combination of Movement and Place functions, road managers can make more informed decisions that provide for the wide variety of uses of a particular section of road or street.

This TNOP is not a Movement and Place strategy per se, although it uses a combination of Movement value (Road User Hierarchies, discussed on page 5) and Place value (discussed on page 14) to set Target Minimum Levels of Service that reflect the role of Place in determining how transport outcomes should be achieved. It is, however, adaptable to reflect a more formal Movement and Place strategy for Hobart, should one be developed in the future. Such actions are proposed within the current Draft (2023) Central Hobart Plan (structure plan).

Photo: Natasha Mulhall

[1] Transport for NSW, movementandplace.nsw.gov.au

Road User Hierarchies

Road User Hierarchies (RUH) define the relative priority of different parts of the road network for each mode of travel. For this TNOP the RUH have been based on input from a range of stakeholders (refer page 34), and have been developed for the following modes:

- Walking
- Cycling (including scooters)
- Bus
- General traffic
- Freight

Photo: Department of State Growth

The RUH establish 4 levels for each mode:

1. **Strategic** Corridors, being the highest order connections between and within regions.
2. **Connecting** Corridors, supporting the Strategic Corridors and providing important connection for movement within an area.
3. **Local** Corridors, being focussed on providing access to local areas from higher order connections.
4. No assigned classification, noting that the RUH is not necessarily an indication of whether access is available, but rather what modes will be prioritised in a location. For example, pedestrians will be able to walk wherever there is a footpath, and provision for pedestrians will need to be made even if not in the hierarchy. Freight will be able to service the CBD, but it may not be prioritised in all locations.

Road User Hierarchies do not indicate that a specific type of facility is or will be provided, or that a particular performance outcome will be achieved.

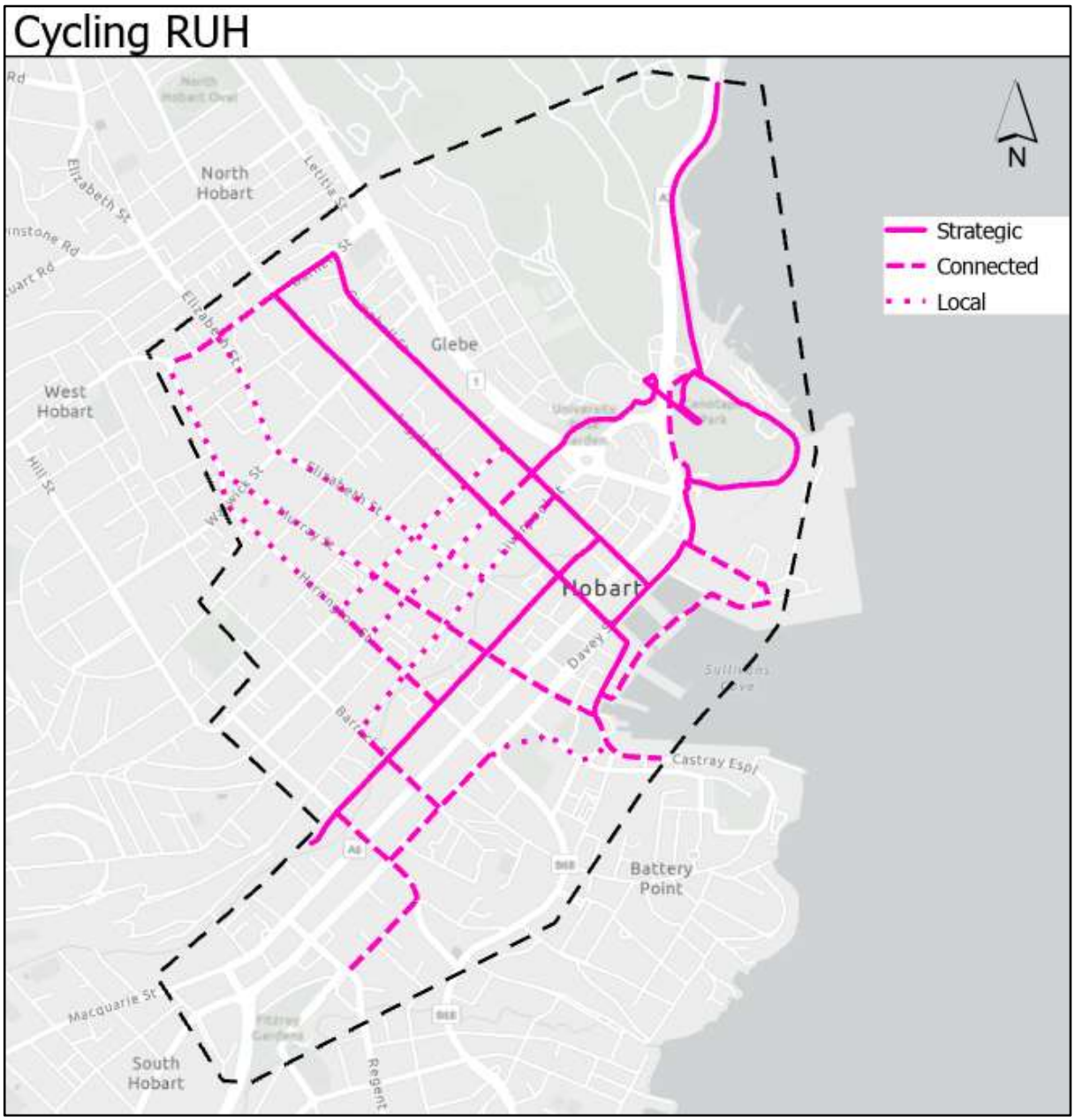
These Road User Hierarchies reflect current desired day-to-day operation of the network and are suitable for immediate implementation. However, they also include some aspirational elements, where it appropriate to commence working towards these in the immediate to short term.

Further changes to the Road User Hierarchies may be considered over time, in response to changes in the network, or other factors such as land use changes and future planning policies.

Walking Road User Hierarchy

Classification	Description
Strategic	North / South and East / West spines through CBD Connection to strategic off-road facilities Core retail precinct and activity areas
Connecting	Connections between activity areas Connections to surrounding residential areas
Local	Movement within activity areas

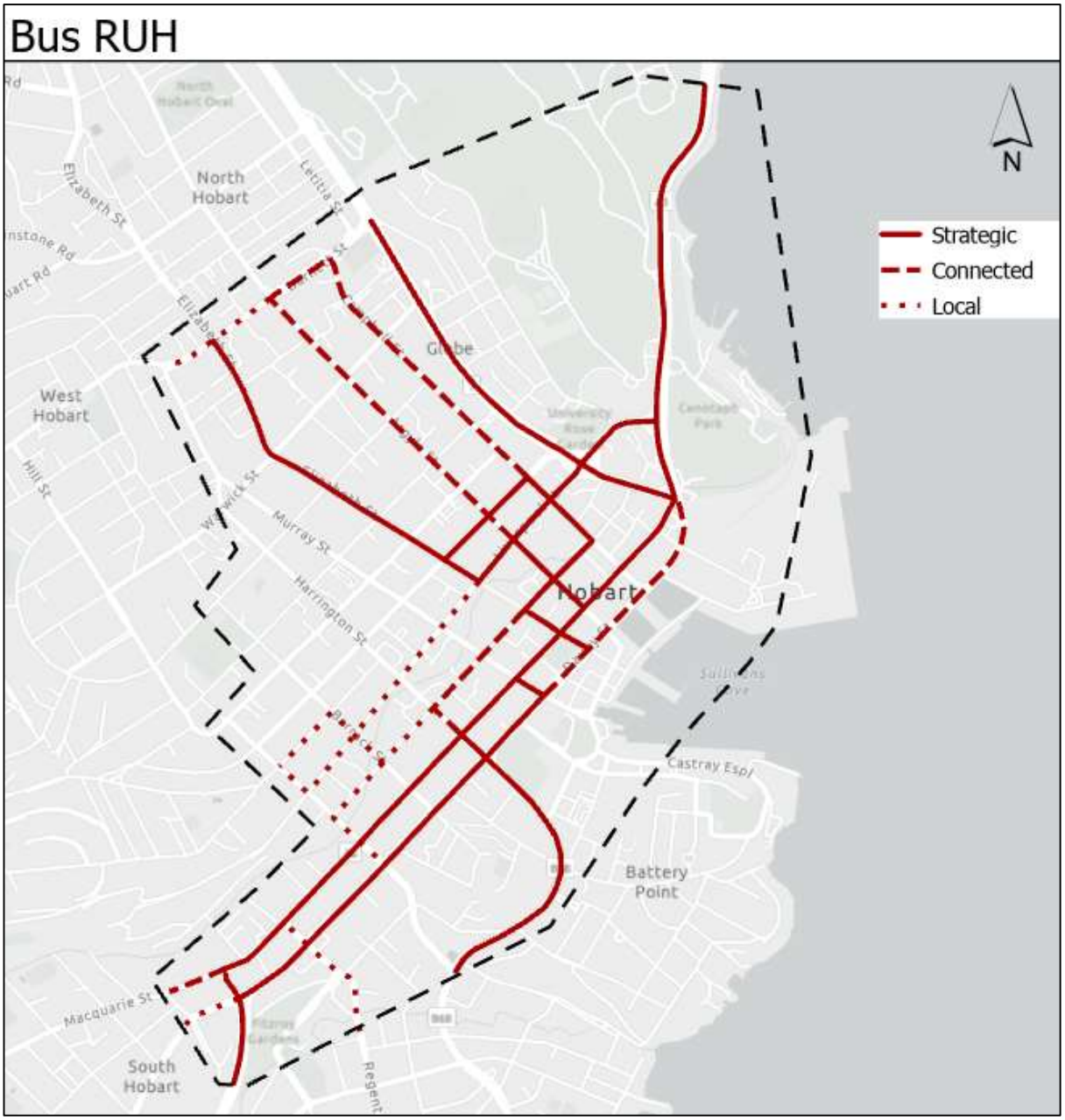
Photo: City of Hobart



Cycling Road User Hierarchy

Classification	Description
Strategic	Access to CBD from major off-road facilities East / West connectivity in CBD Connections to inner north suburbs
Connecting	Connection to Waterfront Connection to Sandy Bay Connections between the CBD and strategic routes
Local	Local access within the CBD and other activity areas

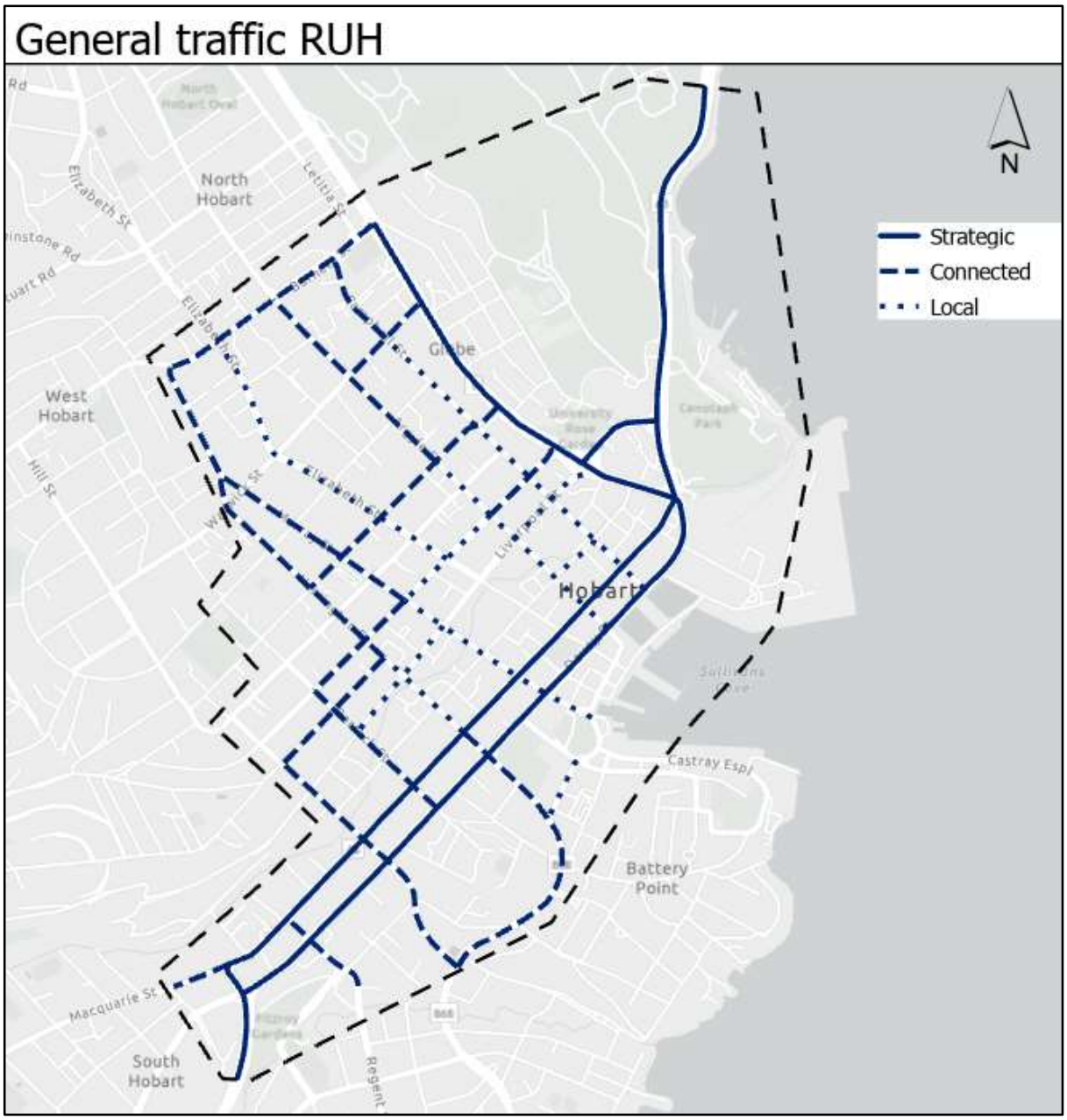
Photo: City of Hobart



Bus Road User Hierarchy

Classification	Description
Strategic	Trunk routes connecting city and suburbs
Connecting	Express routes CBD circulation
Local	Local and low-frequency corridors

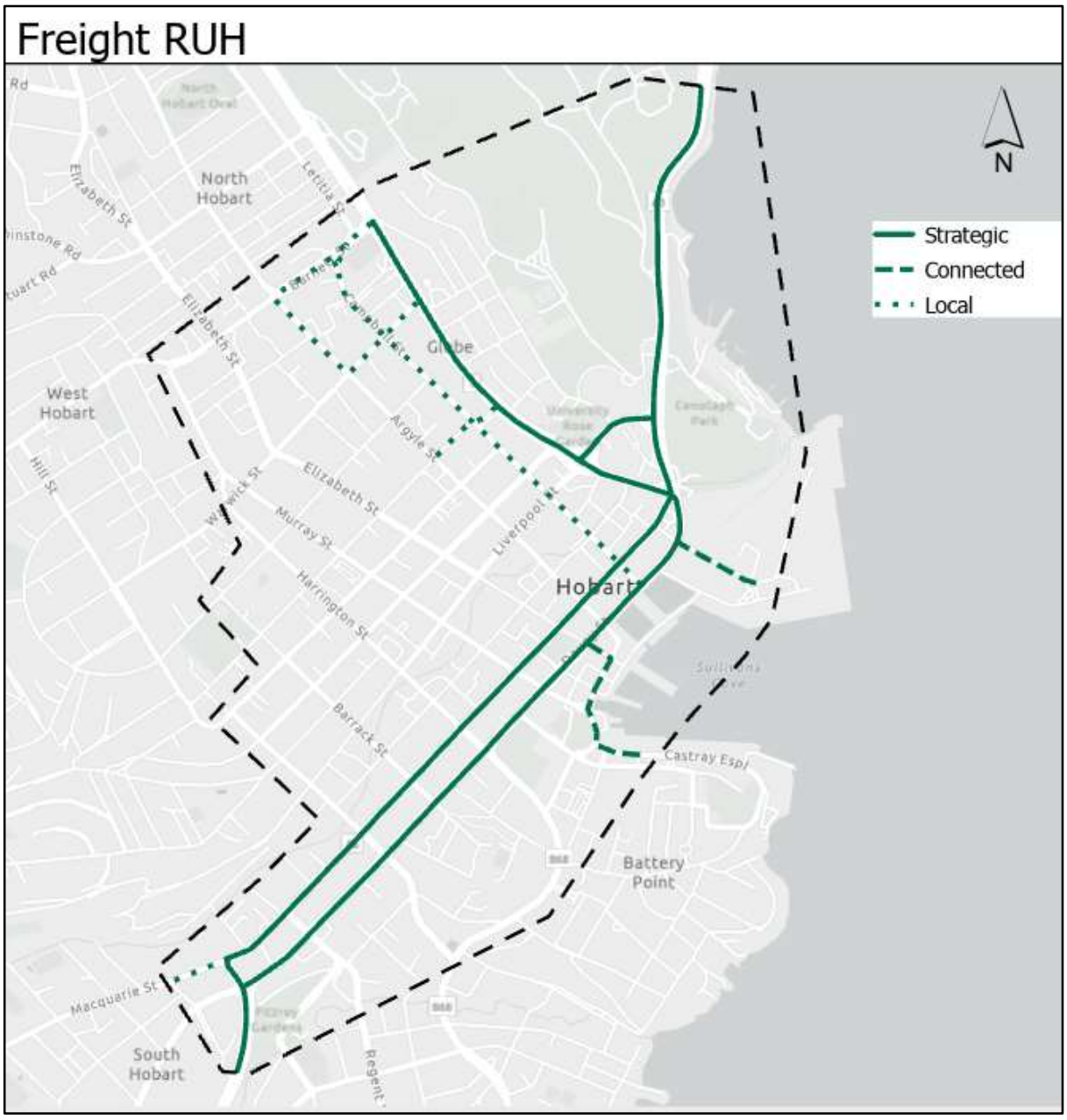
Photo: City of Hobart



General Traffic Road User Hierarchy

Classification	Description
Strategic	State Road Network Provide connectivity to and through the inner city area Key commuter and tourist corridors
Connecting	Provide connectivity from to primary movement corridors Enable access around the CBD core Provide connections to surrounding suburbs
Local	Local access, including for major off-street car parking areas

Photo: Department of State Growth



Freight Road User Hierarchy

Classification	Description
Strategic	Major arterial roads approved for B-double and Higher Mass Limit access
Connecting	Access to the port
Local	CBD streets approved for B-double and Higher Mass Limit access

Photo: Department of State Growth

Place Value

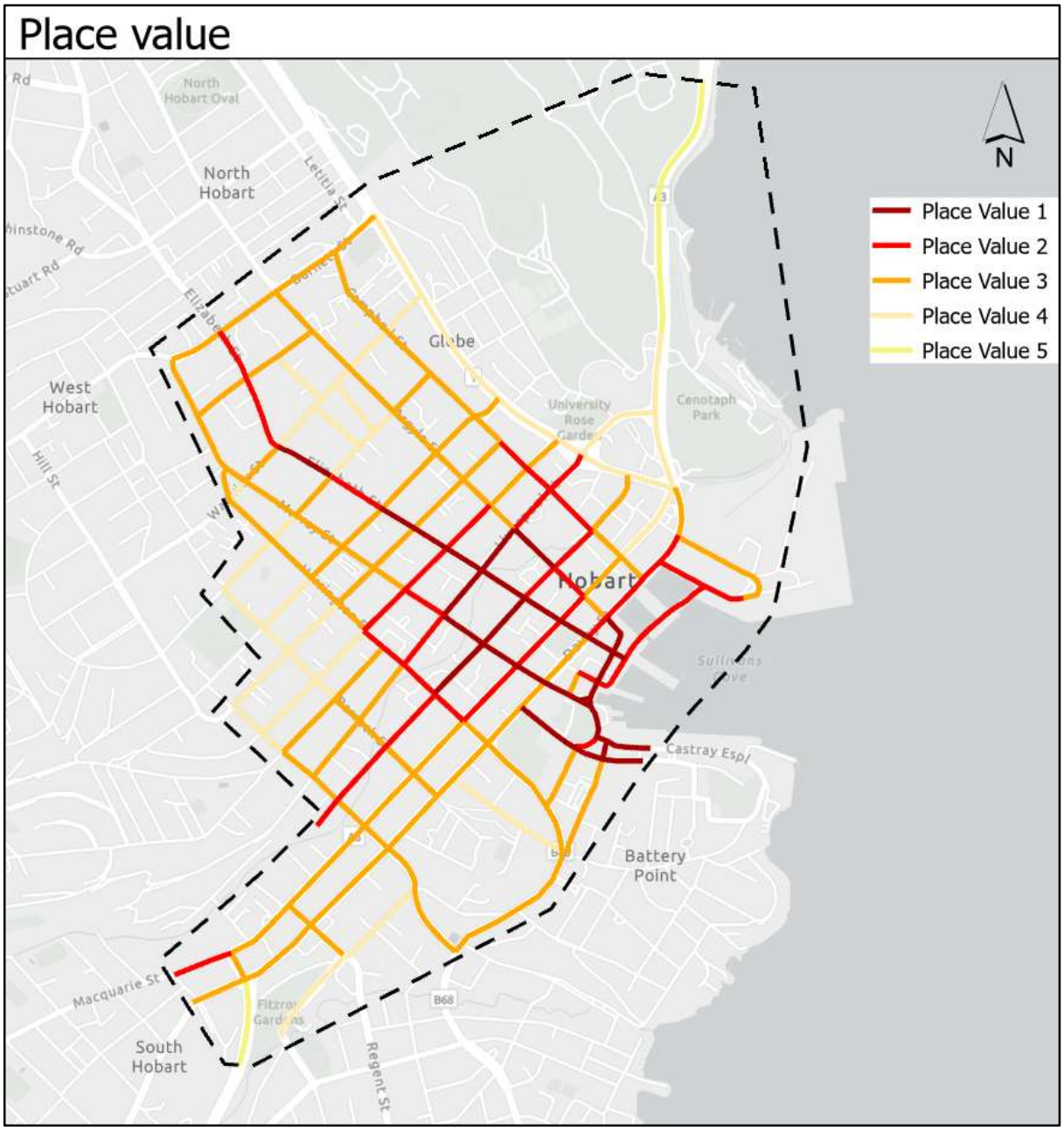
For the TNOP, a Place value has been assigned to each street segment in the network, based on the following descriptors. The nominated level of pedestrian activity is indicative only.

	Descriptors	**Indicative level of pedestrian activity**
1	Highest order of place. Usually city centre or key destinations. The street has many on-street staying activities, and active street frontages, and/or services significant off-street land uses. High levels of people activity including strolling, lingering, meeting people, exploring, sight-seeing, window-shopping, experiencing the city.	Usually busy (day and night)
2	Second order of place. The street has a moderate number of on-street staying activities and active street frontages, and services important off-street land uses.	Usually busy during the day, often busy at night
3	Third order of place. Neighbourhood streets with local shops or amenities, or workplaces. The street has a few on-street staying activities, with a few active street frontages.	Regular peaks in activity, with frequent quiet periods
4	Neighbourhood street environments, low pedestrian city streets. Streets serving people from immediate neighbourhoods and providing access to residential properties and workplaces.	Generally low level of activity
5	Almost or no on-street place function or 'optional' pedestrian activity. e.g. highway or industrial estate	Rarely busy

Higher value places will generally have a higher level of pedestrian activity (busy-ness), for a greater span of time in the day.

Place value is used in the TNOP to adjust the Target Level of Service for each mode (see page 16 for further information).

Photo: Department of State Growth


Place value
N
Place Value 1
Place Value 2
Place Value 3
Place Value 4
Place Value 5
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart
Cenotaph Park
Castray Esp
Macquarie St
Regent St
Hill St
B68

Target Minimum Level of Service

A Target Minimum Level of Service has been determined for each segment of the network, for each mode of travel, as the primary indicator for informing operational decisions and planning infrastructure works.

The target minimum is based on the Road User Hierarchy for that mode, as well as the Place value. In general, where place value is high, the target minimum LOS for motorised modes of travel will be lower than where place value is low. This reflects that efficiency of motorised movement is generally less important than safety and amenity for pedestrians in high value places. In higher-value places, it is important to provide a relatively high LOS for walking and cycling, even if the streets are not included in the RUH. In lower-value places that are not assigned to the RUH, it may be feasible to achieve a higher LOS for general traffic, freight and bus, simply because these areas will have lower traffic volumes and fewer competing demands that cannot be reconciled.

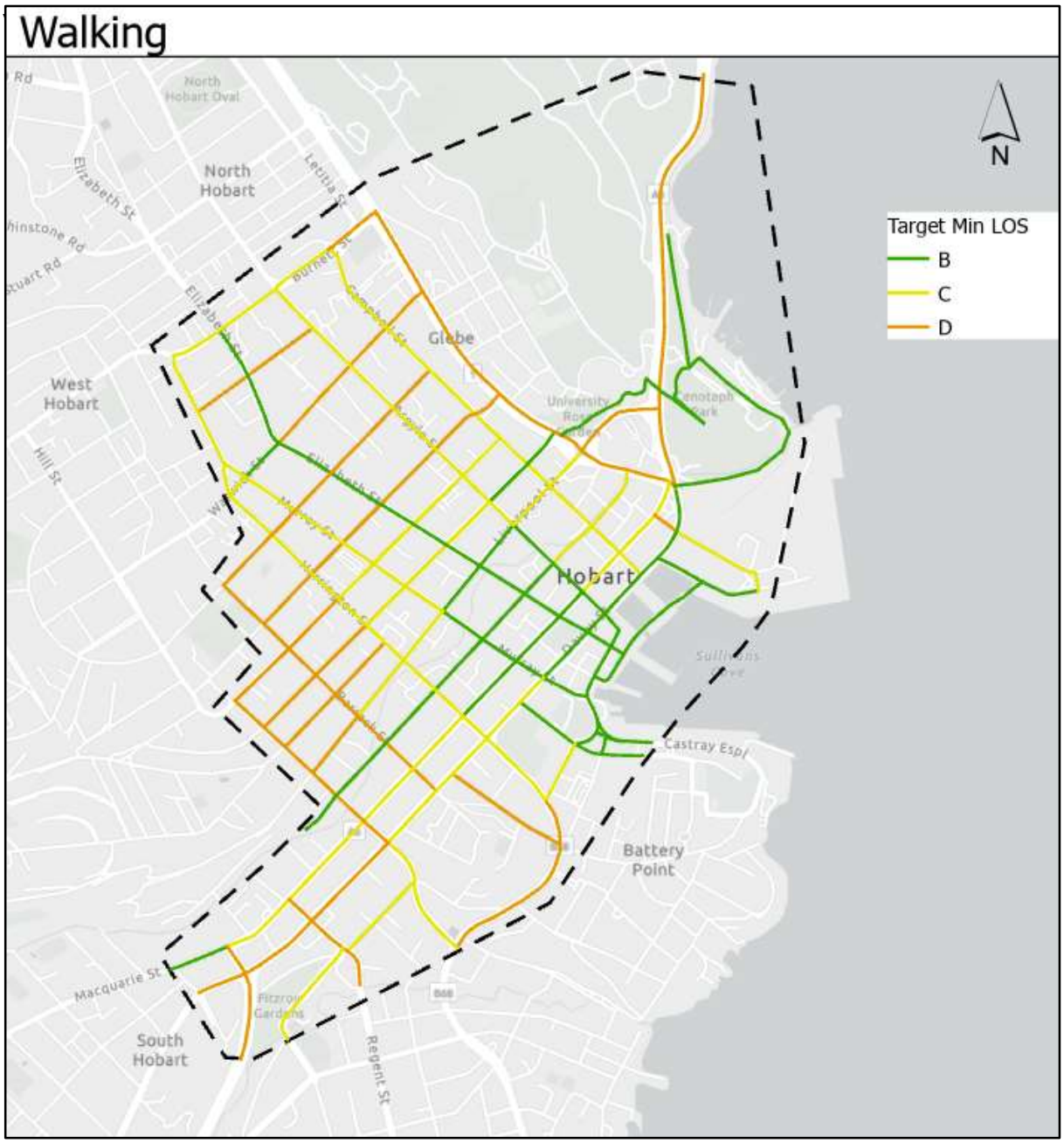
Calculation of Target Minimum LOS for each travel mode is based on the following matrices. Note that in a highly urbanised environment such as the Hobart CBD, where there are many constraints in terms of road width, volume of activity and competing demands, it is not feasible to set a Target Minimum of LOS A for any mode, although there may be instances where this can be achieved. However, the Level of Service provided for each mode should be as high as possible, once the target minimum needs of all other modes have been taken into account.

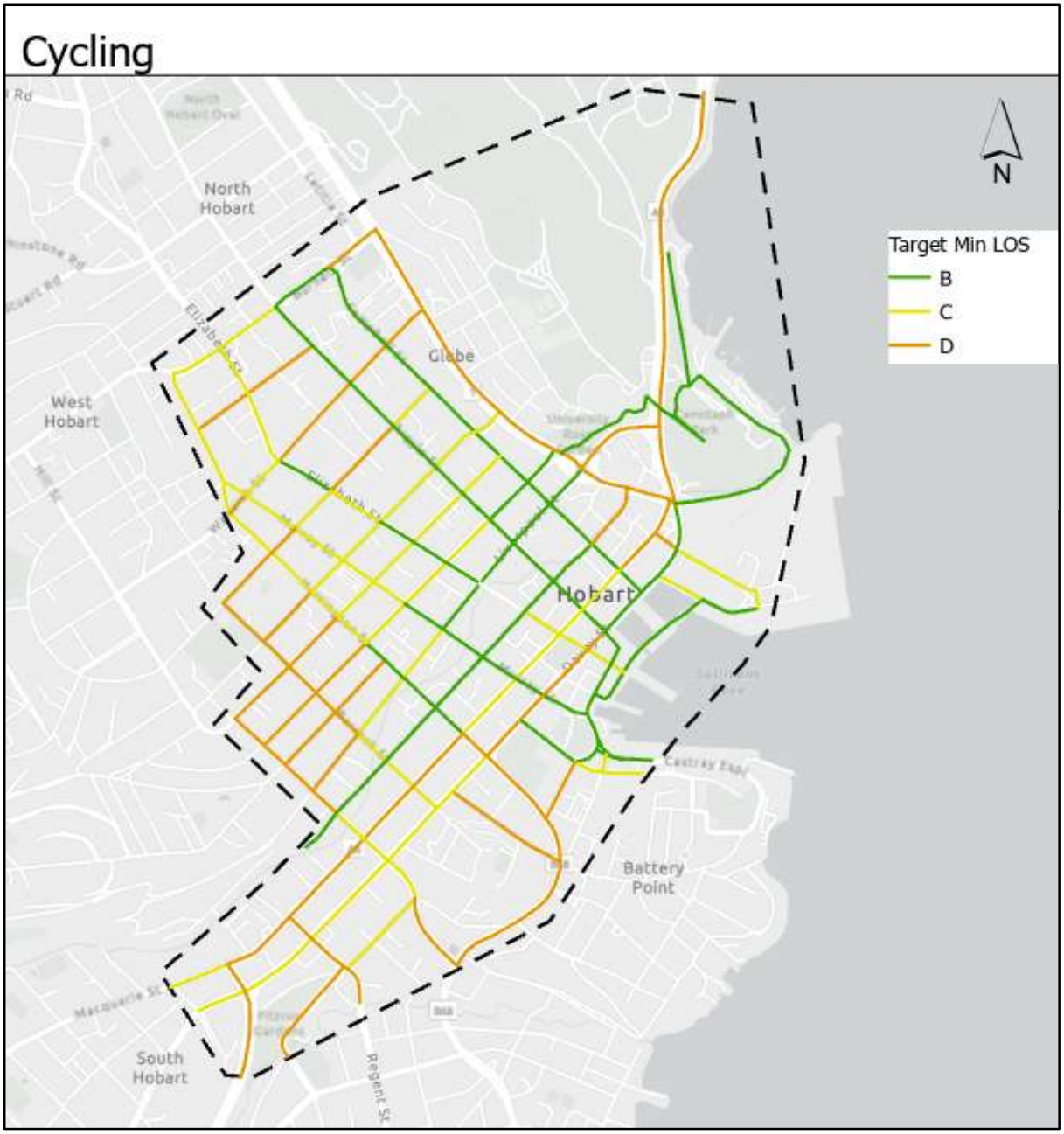
General Traffic, Freight, Bus			Place Value				
			High				Low
			1	2	3	4	5
Road User Hierarchy	High	Strategic	C	C	B	B	B
		Connecting	D	C	C	B	B
		Local	D	D	C	C	B
	Low	Not assigned	D	D	D	C*	C*

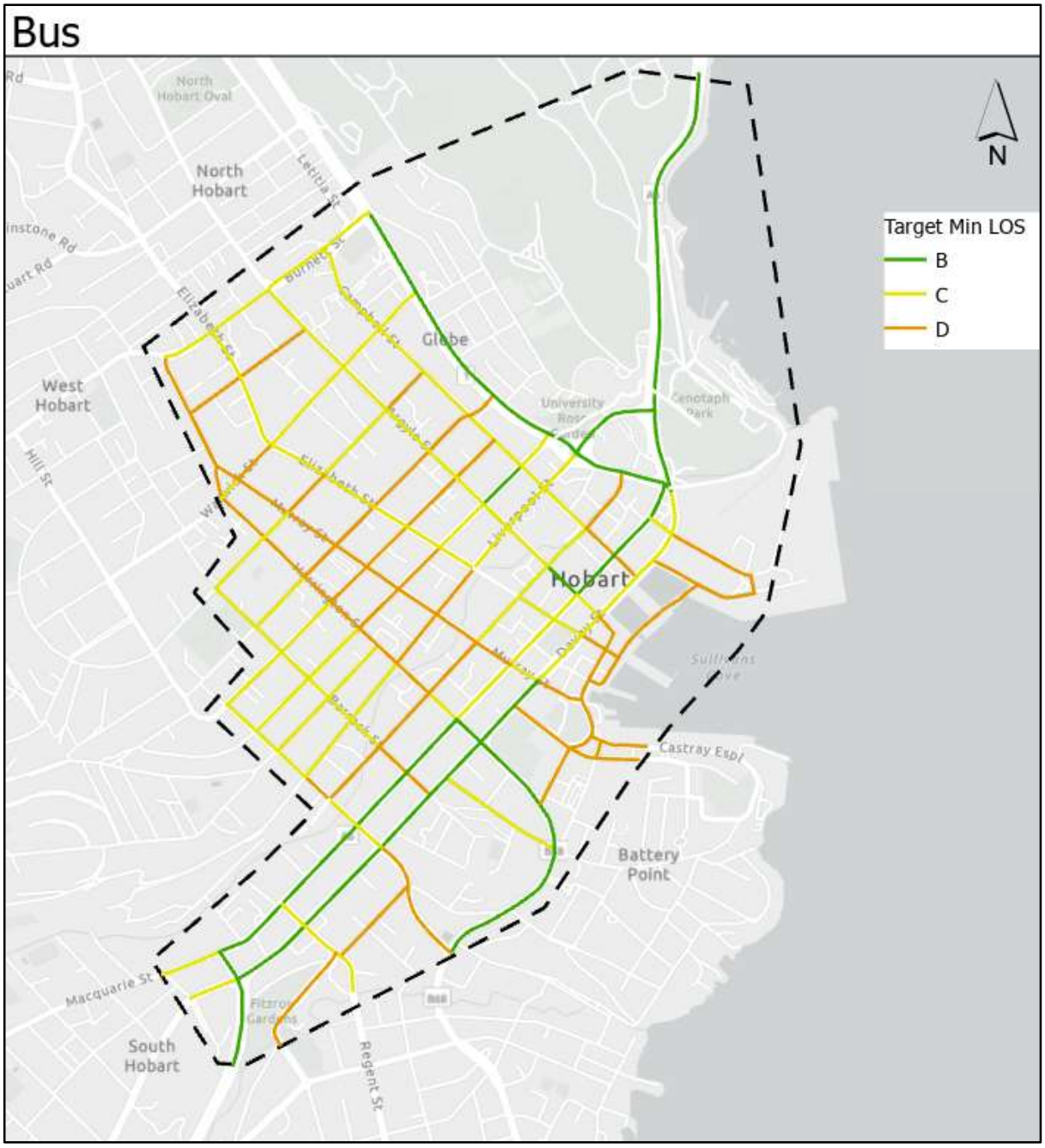
Walking, Cycling			Place Value				
			High				Low
			1	2	3	4	5
Road User Hierarchy	High	Strategic	B	B	B	C	C
		Connecting	B	B	C	C	D
		Local	B	C	C	D	D
	Low	Not assigned	C*	C*	D	D	D

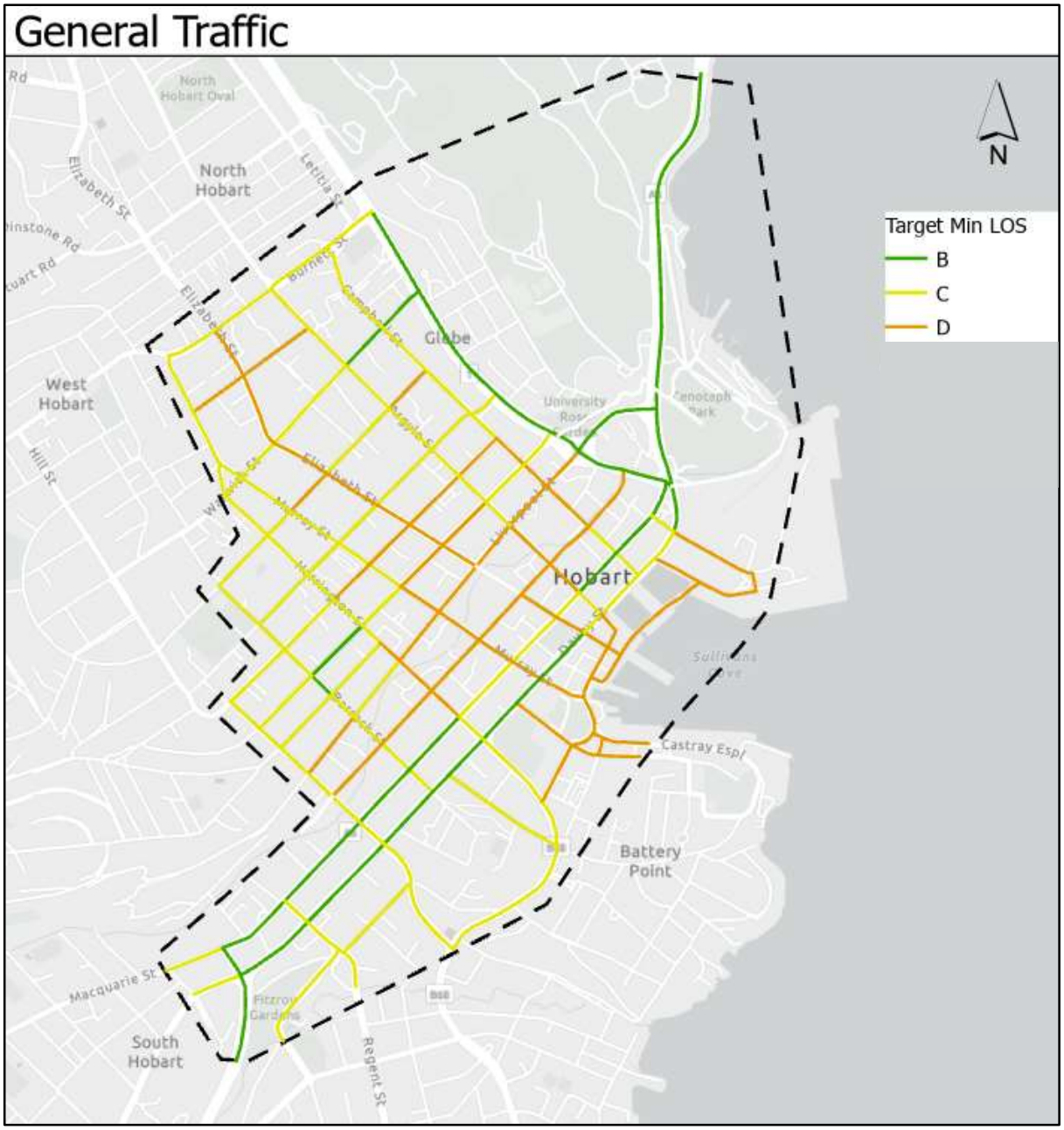
** Note that where a road or street has not been assigned in the RUH for a particular mode, achievement of a Target Minimum LOS C should not be prioritised, except where a specific need is identified.*

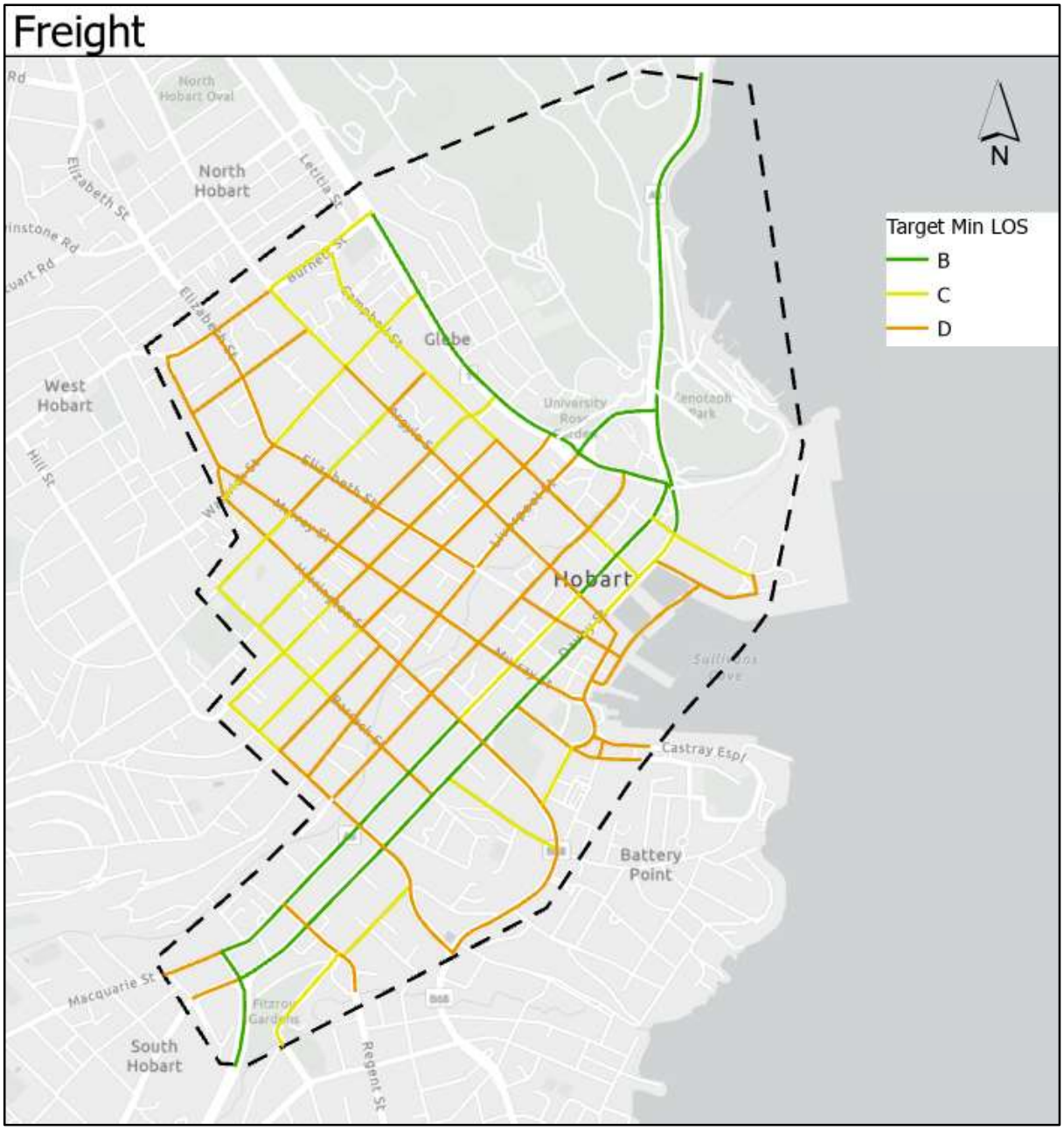
Descriptions of each Level of Service for each mode are provided on pages 22-27.


Walking
N
Target Min LOS
B
C
D
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart
Macquarie St
Castray Esp
Regent St
Elizabeth St
Hill St


Cycling
N
Target Min LOS
B
C
D
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart


Bus
North Hobart Oval
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart
Macquarie St
Castray Esp
Regent St
N
Target Min LOS
B
C
D


General Traffic
N
Target Min LOS
B
C
D
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart
Macquarie St
Castray Espl
Regent St
Hill St
Elizabeth St
Letitia St
Burnett St
Campbell St
Argyle St
Murray St
Liverpool St
Davey St
Patrick St
North Hobart Oval
University
Cenotaph
Sullivans Cove
Fitzroy Gardens


Freight
N
Target Min LOS
B
C
D
North Hobart
West Hobart
Glebe
Hobart
Battery Point
South Hobart
Macquarie St
Regent St
Castray Esp

Level of Service Descriptions

The TNOP relies on two types of Level of Service descriptions for each mode. The Type 1 descriptions have a broad focus and can be applied to both intersections and mid-block locations. Type 1 deals with both performance of the network, and also comfort and user experience. Type 2 descriptions are focussed on traffic signal operations, and how the broader intent of the Type 1 descriptions can be supported at this specific facility.

Both Type 1 and Type 2 descriptions are broad in nature and are not prescriptive. They are intended to indicate a range of outcomes that could be achieved in a number of possible ways. Both use qualitative, rather than quantitative, language to minimise data collection and analysis requirements, and give some flexibility in interpretation, whilst also being clear in the aspirational outcome for road users.

Walking

	Type 1 Description – Broad Focus	**Type 2 Description - Signal Focus**
Themes	Safety, lighting, separation from vehicles Path width and obstructions, footpath grades Canopy coverage / seating Delays to cross at intersections	Delays to cross Conflict with turning traffic
A	Safe, well-lit footpaths clearly separated from vehicles Generous path widths, flat grades and free of obstructions Good canopy coverage with a lot of seats / dwelling areas Minimal to no delay in crossing at intersections	On average little or no delay required to cross Little or no conflict from turning traffic
B	Generally safe, well-lit footpaths with some separation from vehicles Sufficient path widths, flat to mildly steep grades and generally free of obstructions Good canopy coverage with a lot of seats / dwelling areas Short delay in crossing at intersections	On average short delay required to cross Occasional conflict from turning traffic
C	Moderately safe, lit footpaths with some separation from vehicles Generally sufficient path widths, mild to moderately steep grades and some obstructions Reasonable canopy coverage with some seats / dwelling areas Moderate delay in crossing at intersections	On average moderate delay required to cross Some conflict from turning traffic
D	Reasonably safe, lit footpaths with no separation from vehicles Restrictive path widths, steep grades and several obstructions Some canopy coverage with some seats / dwelling areas Significant delay in crossing at intersections	On average significant delay required to cross Moderate level of conflict from turning traffic
E	Unsafe and unlit footpaths with no separation from vehicles Narrow path widths, steep grades and several obstructions No canopy coverage and no seats / dwelling areas Significant delay in crossing at intersections	On average major delay required to cross at signals Filtering right turns at signals conflict with pedestrian movements High level of conflict from turning traffic

Cycling

	Type 1 Description – Broad Focus	**Type 2 Description - Signal Focus**
Themes	Safety, levels of conflict and rider stress Road surface, gradients Route continuity Delays at crossings Bike parking	Crossing delays Level of conflict with traffic
A	Safe and attractive to all cyclists. Low levels of conflict and environment stress, low level of traffic volume. This may include separated cycleways or cycle streets or facilitated through safe and prioritised travel options. Good road surface conditions. Uphill gradient is limited or supported by dedicated space for cyclists. Continuous routes with no gaps. Little to no delay and/or multiple crossing conflicts. High number of sheltered parking u-rails or bays to service adjacent land use.	Minimal delay at intersections, with a high proportion of cyclist traffic arriving during the green phase Almost no delays from pedestrians or opposing traffic, and little or no conflict with vehicles
B	Safe and attractive to most cyclists. Low levels of conflict and environment stress, and low traffic volumes. Good road surface conditions. Uphill gradient is limited or supported by dedicated space for cyclists. Marked bicycle lane and cycle streets with some physical separation. Continuous routes with minimal gaps. Minimal delay and/or multiple crossing conflicts. High number of parking u-rails or bays to service adjacent land use.	Low delays at intersections, with a moderate proportion of cyclist traffic arriving during the green phase Minimal delays from pedestrians or opposing traffic, and occasional conflict with vehicles
C	Safe and acceptable to most cyclists. Little environment stress, and moderate traffic volumes. Acceptable road surface conditions. Marked bike lanes are provided at midblock and at intersections and for uphill sections. Generally continuous routes with some missing connections. Moderate delay and/or multiple crossing conflicts. Moderate number of parking u-rails or bays to service adjacent land use.	On average moderate delays at intersections, as cyclists generally have to stop Some delays from pedestrians or opposing traffic, and some conflict with vehicles
D	Some safety concerns and acceptable only to seasoned cyclists. High traffic stress, and moderate to high traffic volumes including heavy vehicles. Acceptable to bad road surface conditions. No marked bicycle lanes including on uphill gradient. Generally continuous routes with some missing connections. Moderate to high delay and/or barriers to crossing. Low number of parking u-rails or bays to service adjacent land use.	On average significant delay required to cross at signals Frequent delays from pedestrians or opposing traffic, and moderate conflict with vehicles
E	Generally unsafe and unacceptable to all cyclists. High traffic stress, and high traffic volumes including heavy vehicles. Bad road surface conditions. No marked bicycle lanes. Route has missing key connections. Extreme delay and/or barriers to crossing. No parking u-rails or bays to service adjacent land use.	On average major delay required to cross at signals Frequent delays from pedestrians or opposing traffic, and high levels of conflict with vehicles

Bus

	Type 1 Description – Broad Focus	**Type 2 Description - Signal Focus**
Themes	Journey reliability (bus priority) Bus stop quality and capacity Supporting active transport infrastructure e.g. pedestrian and bike access	Journey reliability, level of delay *Conflict with opposing movements when turning*
A	Buses not impacted by traffic conditions or adjacent parking activity Bus stops have comfortable seating areas and shelter available No crowding or conflict between bus passengers and other footpath users Superior level of supporting active transport infrastructure	Buses reliably do not have to stop at an intersection, through bus priority measures or low levels of congestion No delays from downstream blockages or traffic waiting to turn *No delays from pedestrians or other opposing movements*
B	Buses may occasionally be impacted by traffic conditions or adjacent parking activity Bus stops have comfortable seating areas and shelter available Minimal crowding or conflict between bus passengers and other footpath users Good level of supporting active transport infrastructure	Buses reliably pass through the intersection within 1 signal cycle and are not delayed downstream Minimal delays from traffic waiting to turn *Minimal delays from pedestrians or other opposing movements*
C	Buses regularly impeded by traffic conditions or adjacent parking activity Bus stops have some seating areas and shelter available Some crowding or conflict between bus passengers and other footpath users, especially at peak times Moderate level of supporting active transport infrastructure	Buses generally pass through the intersection within 1 signal cycle and may experience some downstream delays Some delays from traffic waiting to turn *Some delays from pedestrians or other opposing movements*
D	Buses severely impeded by traffic conditions or adjacent parking activity Bus stops have seating areas, but no shelter available Frequent crowding and conflict between bus passengers and other footpath users Limited supporting active transport infrastructure	Buses regularly experience significant delays on approach and on departure from an intersection Frequent delays from traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*
E	Buses delayed and speed restricted by traffic conditions or adjacent parking activity No bus priority infrastructure present along the route No seating area and no shelter available at bus stops Significant crowding and conflict between bus passengers and other footpath users No supporting active transport infrastructure	Buses regularly experience major delays on approach and on departure from an intersection Frequent delays from traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*

Italics indicate that this applies where the priority route turns at the intersection.

General Traffic

	Type 1 Description – Broad Focus	**Type 2 Description - Signal Focus**
Themes	Traffic flow, delays at signals Lane width, impact of adjacent parking or obstructions	Delays at signals, downstream blockages, turn lane blockages *Conflict with opposing movements when turning*
A	Optimised traffic flow that is relatively unimpeded but uses road space effectively. (i.e. signals cleared within signal cycle, acceptable delay at intersections) Road cross section allows for vehicles to pass through without interruption or interaction from parked vehicles or other obstructions on the roadside	Minimal delay at intersections, with a high proportion of traffic arriving during the green phase No regular downstream blockages preventing vehicles progressing through the intersection No delays to through traffic from traffic turning from the same approach (i.e. turn lanes can contain queue) *Almost no delays from pedestrians or other opposing movements*
B	Relatively optimised traffic flow that is relatively unimpeded but uses road space effectively. (i.e. signals cleared within signal cycle, acceptable delay at intersections) Drivers are somewhat restricted in choosing their desired speeds Road cross section allows for vehicles to pass through with minor interruption or interaction from parked vehicles or other obstructions on the roadside	Low delays at intersections, with a moderate proportion of traffic arriving during the green phase Minimal downstream blockages preventing vehicles progressing through the intersection Minimal delays to through traffic from traffic turning from the same approach (i.e. turn lanes can contain queue) *Minimal delays from pedestrians or other opposing movements*
C	Relatively optimised traffic flow that is relatively unimpeded but uses road space effectively. (i.e. signals cleared within signal cycle, delay at intersections, some restriction in choosing desired speed) Vehicles passing through may be impeded by parked vehicles or other obstructions on the roadside	At signalised intersections vehicles generally have to stop but clear the intersection in 1 signal cycle Some downstream blockages preventing vehicles progressing through the intersection Some delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue) *Some delays from pedestrians or other opposing movements*
D	Very restricted traffic flow conditions Drivers have virtually no freedom to select desired speeds and small increase in traffic significantly increases delay Vehicles passing through are impeded by parked vehicles or other obstructions on the roadside	At signalised intersections, vehicles always join the back of an existing queue and take up to 2 signal cycles to clear the intersection Frequent downstream blockages preventing vehicles progressing through the intersection Frequent delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue) *Frequent delays from pedestrians or other opposing movements*

	Type 1 Description – Broad Focus	Type 2 Description - Signal Focus
E	Traffic flow is characterized by significant delays Drivers have virtually no freedom to select desired speeds and minor disturbance will cause breakdown in the traffic stream Vehicles passing through are impeded by parked vehicles or other obstructions on the roadside	At signalised intersections, vehicles can take 3 or more signal cycles to clear the intersection Frequent downstream blockages preventing vehicles progressing through the intersection Frequent delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue) *Frequent delays from pedestrians or other opposing movements*

Italics indicate that this applies where the priority route turns at the intersection.

Photo: Department of State Growth

Freight

	Type 1 Description – Broad Focus	**Type 2 Description - Signal Focus**
Themes	Traffic flow conditions Loading bays and parking availability Infrastructure suitability for vehicle mix	Delays at signals, downstream blockages, turn lane blockages *Conflict with opposing movements when turning*
A	Free flow and freight vehicles are virtually unaffected by other vehicles More loading bays/ high turnover parking than needed to meet needs of adjacent land uses Road geometry and other infrastructure elements fully cater for the expected mix of freight vehicles	Minimal delay at intersections, with a high proportion of traffic arriving during the green phase No delays from downstream blockages or traffic waiting to turn *No delays from pedestrians or other opposing movements*
B	Stable flow and freight vehicles still have reasonable freedom to select their desired speed Sufficient number of loading bays/ high turnover parking to meet the needs of adjacent land uses Road geometry and other infrastructure elements are generally more than required for the expected mix of freight vehicles	Low delays at intersections, with a moderate proportion of traffic arriving during the green phase Minimal delays from downstream blockages or traffic waiting to turn *Minimal delays from pedestrians or other opposing movements*
C	Somewhat restricted flow and freight vehicles' general level of comfort and convenience declines Moderate number of unloading bays/ high turnover parking where needed for adjacent land uses Road geometry and other infrastructure elements are generally appropriate for the expected mix of freight vehicles	At signalised intersections vehicles generally have to stop in a queue but clear the intersection in 1 signal cycle Some delays from downstream blockages or traffic waiting to turn *Some delays from pedestrians or other opposing movements*
D	Close to the limit of stable flow and freight vehicles are severely restricted Adequate number of unloading bays/ high turnover parking where needed for adjacent land uses Road geometry and other infrastructure elements may limit access for the expected mix of freight vehicles	At signalised intersections, vehicles always join the back of an existing queue and take up to 2 signal cycles to clear the intersection Frequent delays from downstream blockages or traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*
E	Flow is unstable and traffic volumes are at or close to capacity No unloading bays/ high turnover parking to serve adjacent land uses. Road geometry and other infrastructure elements are likely to limit access for the expected mix of freight vehicles	At signalised intersections, vehicles can take 3 or more signal cycles to clear the intersection Frequent delays from downstream blockages or traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*

Italics indicate that this applies where the priority route turns at the intersection.

Implementation

Road managers from the Department of State Growth and City of Hobart meet regularly to discuss, plan and manage the operation of the network, and the implementation of this TNOP. However, this TNOP does not detail specific measures that could or should be undertaken, and so these will require further investigation. Actions and interventions may be staged to align with specific projects as they are planned and/or delivered, or they may be developed in response to network issues as they arise. The steps involved in identifying suitable actions or interventions are:

1. Identify Road User Hierarchies and Place Value
2. Determine Target Minimum Level of Service
3. Review LOS Descriptions
4. Develop Operational Strategies or other Interventions
5. Confirm Alignment with Strategic Objectives

These steps are illustrated by way of a worked example commencing on page 30.

Types of Interventions

Implementation of this TNOP will generally involve interventions that fall into one of the following categories:

- Coding-only intersection changes, requiring no physical changes to the layout of an intersection or approaches, and no changes to the traffic signal displays or supporting infrastructure. Examples will include changes to phase times and cycle lengths, signal linking, and pedestrian walk introduction, that can be introduced remotely.
- Minor works, which would generally be considered as "maintenance" or "operational" activities, and require minimal external approvals, and be funded from operational budgets.
- Projects, involving more significant physical works at an individual location or across a wider area. Projects will need to be planned and executed in accordance with the processes of the relevant road authority and may require specific funding.

Coding-only intersection changes can often be applied immediately, and if necessary trialled, before permanent adoption. Incremental changes are less likely to result in significant behaviour changes but are also less likely to generate stakeholder resistance.

Data Requirements

Any changes to network operations may need to be investigated through traffic modelling or other processes to provide some confidence that the intended outcome will be achieved (including avoidance of unintended adverse outcomes).

While there is no need to definitively measure the existing performance of each mode on various parts of the network, it is appropriate to use observations as well as data (both qualitative and quantitative, where available) to inform decision making.

Achievement of the Target Minimum LOS may involve an improvement in conditions where the existing performance of the network is less than the target. Conversely, it may also involve a downgrading of performance where existing conditions exceed the target minimum. This is important to remember when there is a conflict between modes at a particular location.

Managing Conflicting Targets

Application of this TNOP, and achievement of the Target Minimum LOS for each mode in each location, will not always be straightforward. Inevitably, there will be cases where it will not be possible to achieve the Target Minimum LOS for one mode without compromising on the Target Minimum LOS for another mode, or without a significant investment that may take some time to arrange, or that may not be feasible at all.

In such situations, it is necessary to look at the specific context of a street or intersection and make some judgement that takes into account the strategic objectives for this TNOP, and other constraints that may apply. Individual movements can also be looked at, rather than just the combined approaches to an intersection. It is appropriate for the mode that has the higher RUH value to be prioritised over the mode that has a lower RUH value, although efforts should be made towards achieving the Target Minimum LOS for each. If the RUH value for two competing modes are equal, then a compromise situation may be the best outcome in the short term. Where a conflict cannot be resolved, a revision of the RUH or Place value (and hence the Target Minimum LOS) may also be considered.

Other Applications

Use of this TNOP for special events or other applications requires event-specific RUH and Place values to be assigned, and Target Minimum LOS re-calculated.

Photo: Department of State Growth

Worked Example – Collins Street / Molle St Intersection Traffic Signal Operations

The City of Hobart has been progressively developing a strategic walking and cycling corridor to connect the suburban area of South Hobart to the Hobart CBD along the Hobart Rivulet and Collins Street, as identified in the Principal Bicycle Network Plan. By 2021 vulnerable road user volumes had increased at the Collins Street and Molle Street junction to a level that warranted signalised control of the junction to improve safety for all user groups. Signal operation needed to be considered in light of the TNOP.

Step 1 – Identify Road User Hierarchies and Place Value

Review the RUH and Place Value for each approach to the intersection (note that Molle Street is a one-way street).

	Collins Street approaching Molle Street	**Molle Street approaching Collins Street**	**Hobart Rivulet Track / carpark approach**
Walking	Strategic Corridor	Not assigned	Strategic Corridor
Cycling	Strategic Corridor	Connecting Corridor	Strategic Corridor
Bus	Local Corridor	Local Corridor	Not assigned
General Traffic	Not assigned	Connecting Corridor	Not assigned
Freight	Not assigned	Not assigned	Not assigned
Place Value	2	3	2

Step 2 – Determine Target Minimum LOS

Use the RUH and Place value for each approach to the intersection to determine Target Minimum LOS for each mode.

	Collins Street approaching Molle Street	**Molle Street approaching Collins Street**	**Hobart Rivulet Track / carpark approach**
Walking	B	D	B
Cycling	B	C	B
Bus	D	C	D
General Traffic	D	C	D
Freight	D	D	D

Step 3 – Review LOS Descriptions

In this example, we can focus the Type 2 LOS Descriptions, with the traffic signal focus.

The Collins Street and Hobart Rivulet Track approaches both have a Target Minimum LOS B for walking and cycling, while bus, general traffic and freight each have a Target Minimum LOS D.

Target Minimum LOS for Collins Street and Hobart Rivulet approaches	**Type 2 Description - Signal Focus**
Walking LOS B	On average short delay required to cross Occasional conflict from turning traffic
Cycling LOS B	Low delays at intersections, with a moderate proportion of cyclist traffic arriving during the green phase. Minimal delays from pedestrians or opposing traffic, and occasional conflict with vehicles
Bus LOS D	Buses regularly experience significant delays on approach and on departure from an intersection. Frequent delays from traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*
General Traffic LOS D	At signalised intersections, vehicles always join the back of an existing queue and take up to 2 signal cycles to clear the intersection. Frequent downstream blockages preventing vehicles progressing through the intersection. Frequent delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue).
Freight LOS D	At signalised intersections, vehicles always join the back of an existing queue and take up to 2 signal cycles to clear the intersection. Frequent downstream blockages preventing vehicles progressing through the intersection Frequent delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue)

For these approaches, signal operations should focus on minimising delays for walking and cycling, and minimising conflict between these modes and turning traffic.

For the Molle Street approach, Cycling, Bus and General Traffic have a Target Minimum LOS C, with all other modes not assigned in the RUH and targeting a minimum of LOS D.

Target Minimum LOS for Molle Street approach	**Type 2 Description - Signal Focus**
Walking LOS D	On average significant delay required to cross Moderate level of conflict from turning traffic
Cycling LOS C	On average moderate delays at intersections, as cyclists generally have to stop. Some delays from pedestrians or opposing traffic, and some conflict with vehicles
Bus LOS C	Buses generally pass through the intersection within 1 signal cycle and may experience some downstream delays Some delays from traffic waiting to turn *Some delays from pedestrians or other opposing movements*
General Traffic LOS C	At signalised intersections vehicles generally have to stop but clear the intersection in 1 signal cycle Some downstream blockages preventing vehicles progressing through the intersection Some delays to through traffic from traffic turning from the same approach (i.e. turn lanes not present or cannot contain queue) *Some delays from pedestrians or other opposing movements*
Freight LOS D	At signalised intersections, vehicles always join the back of an existing queue and take up to 2 signal cycles to clear the intersection. Frequent delays from downstream blockages or traffic waiting to turn *Frequent delays from pedestrians or other opposing movements*

For general traffic and buses in Molle Street, the target is to have vehicles clear the intersection within 1 signal cycle, and there is scope for vehicles to be delayed by downstream blockages or overflowing turn bays if needed.

Cycling is targeting moderate delays with some conflict with general traffic acceptable.

Step 4 – Develop Operational Strategies or other Interventions

Targeting minimum LOS B for walking and cycling between the Rivulet Track and Collins Street (and vice versa) means minimising delays for these modes crossing Molle Street. In this case, this can be achieved through regularly interrupting general traffic on Molle Street. When Molle Street traffic volumes are low the Target Minimum LOS C can still be achieved for buses and general traffic if traffic is regularly stopped but clears the intersection within 1 cycle. However, when traffic volumes are higher, there is the chance that traffic will not clear the intersection within 1 cycle, and furthermore there is the risk of queuing affecting the operation of Macquarie Street, which has a high strategic importance in the overall network for multiple road user groups. With Molle Street traffic volumes highest in the morning peak period, a different approach is required for that time of day than would be suitable at other times.

Another consideration is the ability to detect the presence of cyclists in Collins Street, wanting to proceed into the intersection. While pedestrians have the ability to press a call button, it is not feasible for a cyclist riding on the road to use a similar facility. Neither can cyclists be reliably detected through in-ground detectors such as are used to detect the presence of a car So to achieve the minimal delays required for Target Minimum LOS B for cyclists, the decision has been made to make the signal phase used by the Collins Street approach as the "resting phase", which is only terminated when called by a vehicle or pedestrian detector calling up another phase. To minimise potential for general traffic impacts on Macquarie Street, this only operates outside the morning peak period.

This approach encourages walking and cycling along the Collins Street / Hobart Rivulet corridor, which is well used for commuting and recreation. Molle Street performs an important traffic function, particularly in the morning peak when it is used to assist in the distribution of traffic accessing the CBD, while roads such as Macquarie Street are under greater pressure. However, when traffic volumes on Macquarie Street are reduced and there is spare capacity on that road, it is appropriate to adjust the priority towards walking and cycling.

In this case, there are no physical works (apart from the overall intersection upgrade, which had been designed and delivered separately) required to deliver this operational strategy, with all proposed interventions able to be implemented through traffic signal programming changes.

Step 5 – Confirm Alignment with Strategic Objectives

Before finalising an operational strategy, it is appropriate to confirm that the strategic objectives for the TNOP are being supported. This provides a rationale for action that considers the whole network, and not just a specific location, or user group, within it.

Strategic Objective	Supported by this action?
A balanced and efficient transport network that enables lively active streets and supports a healthier, connected, and sustainable Greater Hobart	✓
Increase participation in public transport opportunities to reduce reliance on vehicles	n.a.
To promote the safe and efficient movement of people and goods using available resources	✓
Elevate Central Hobart as a desirable and innovative city for living, working, recreation and visitation	✓
Supporting more people to walk, cycle and use micro-mobility solutions to support emissions reduction and healthier communities	✓

Acknowledgements

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City of Hobart	Department of State Growth	TasPorts
Planning Institute of Australia	TasCOSS	Australian Institute of Architects
University of Tasmania	Macquarie Point Development Corporation	Royal Hobart Hospital
Tasmanian Fire Service	Ambulance Tasmania	Tasmania Police
Metro Tasmania	Redline Coaches	Tassielink
O'Driscoll Coaches	Shane Gilbert Coaches	Road Safety Advisory Council
Tourism Tasmania	RACT	National Heavy Vehicle Regulator
Tasmanian Transport Association	Tasmanian Taxi Council	Motorcycle Riders Association
Tasmanian Chamber of Commerce and Industry	Tasmanian Small Business Council	Bicycle Network Tasmania
Cycling South	Heart Foundation	Disability Voices
Tasmanian Council on the Aging	VisAbility	Tasmanian Property Council

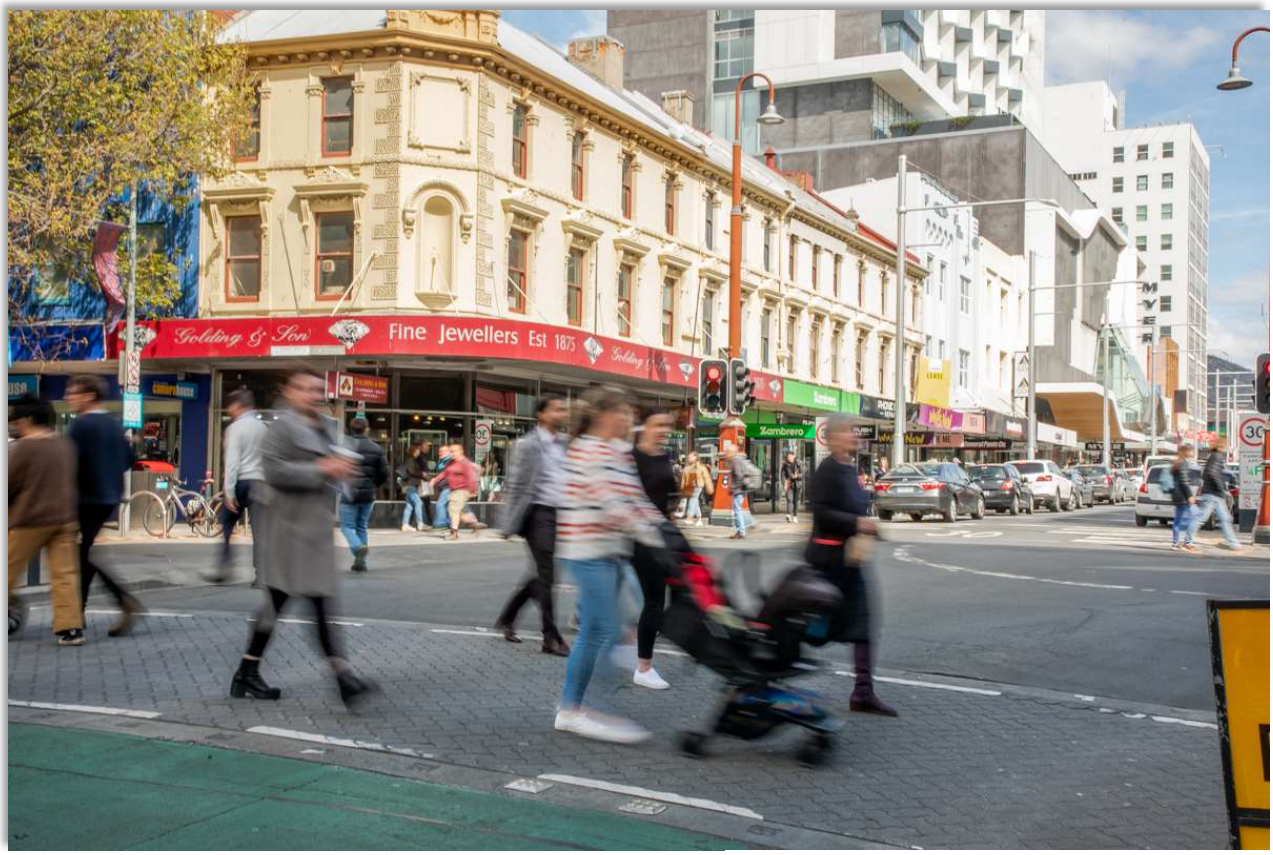

Photo: Natasha Mulhall

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