

PLACE AND MOBILITY

Future Ready Kerbside

wsp FUTURE READY™



Table of Contents

1	Executive Summary	1	5	Exploring the Future of Kerbside	23
2	Shared Mobility Principles	4		Scenario Testing	24
3	Why Kerbsides Matter	5		Ride sharing	25
	What is the Kerbside?	5		Electric Vehicles	25
	Challenges of the Kerbside	5		Automated Vehicles	26
	Legacy of Cities Designed for Cars	5		Movement and Place Framework for New Mobility	27
	Changing Mobility Options	6		Kerbside Movement and Place Design Features for New Mobility	27
	Governance and Demand	6		Street Design for New Mobility	29
	Kerbside Pricing	6		Brought Together – Key Design Ideas	30
	Measuring Kerbside Productivity	7		6 Anchoring Analysis in Place: Future Ready Kerbside	33
	Kerbside Supports Movement and Place	8		Crown Street, Surry Hills, Sydney - Future Ready Kerbside	33
4	Civic Spaces	10		Crown Street Future Kerbside Allocation	36
	Sydney Case Study	10		Onehunga Mall, Onehunga, Auckland - Future Ready Kerbside	41
	Kerbside Allocation	13		Onehunga Mall Future Kerbside Allocation	44
	Key Findings	15		7 Recommendations for City Leaders	48
	Auckland Case Study	16		Recommendations for City Strategy and Process	49
	Kerbside Allocation	20		Recommendations for Street Design Outcomes	52
	Key Findings	21		<i>The Team</i>	56
	Summary	22		<i>WSP Future Ready™</i>	57
				<i>References</i>	58



Joint Foreword

Productive kerbsides are a prerequisite to achieving our vision for our local places. They can free up space for shade, seating, wider footpaths, transit, new mobility options, walking and cycling. All together enabling better access for people of all ages and abilities.

We are currently failing our local places through a legacy of static management and allocation of the kerbside. This makes it harder and not easier for people to access local businesses and engage with their communities.

WSP was commissioned by Uber to explore the future ready kerbside that supports places for people. Our white paper introduces new analytical techniques to explore what the future may hold, building on the Shared Mobility Principles for Liveable Cities.

We need to act now.

But this is easier said than done.

It requires governments, businesses and the community working together towards a shared and co-designed vision. This white paper sets out ten recommendations that city leaders can make today.

Uber and WSP want to start a conversation about how we can make our kerbsides work harder and start delivering more effectively for our people and places.



Ashleigh Cormack
Future Cities Lead
Australia and New Zealand
UBER



Graham Pointer
Future Ready Lead Australia
WSP



1 Executive Summary

MAKING THE KERBSIDE WORK HARDER IS CRITICAL TO CREATING LIVEABLE CITIES

Cities across Australia and New Zealand are growing and changing. Populations are rising. Settlement patterns are changing. Technology is evolving and influencing all parts of our lives. All the while, people's expectations for liveability and what they want from their local public spaces are increasing. As the world around us and our role in it changes, we depend upon our local places even more - for connection to our communities, for a bite to eat, for important services and to earn our livelihoods.

The kerbside is an aspect of our local places that is often overlooked by city leaders but its management and allocation is crucial to achieve our vision for those places. How we manage and allocate the kerbside dictates who can access the place, when and by what method. Treating the kerbside as a passive infrastructure asset is failing our local places.

Dynamically managing and allocating the kerbside can help to pour more people into local shops or to free up space to be allocated to seating. It is a public asset that must be optimised to realise our vision for our local places now and into the future.

KERBSIDE MANAGEMENT AND ALLOCATION IS STATIC IN OUR CITIES

The management and allocation of the kerbside is currently suboptimal. Decade-old decisions by officials are invariably held constant regardless of the changing character of our local streets. This leads to perverse outcomes where the kerbside management and allocation is working against the ambitions of local businesses and local communities. A common kerbside management issue is the large amount of public space unquestionably dedicated to parked private cars. In terms of kerbside allocation, a key issue is whether space should be repurposed from vehicles towards other uses like seating and alfresco dining.

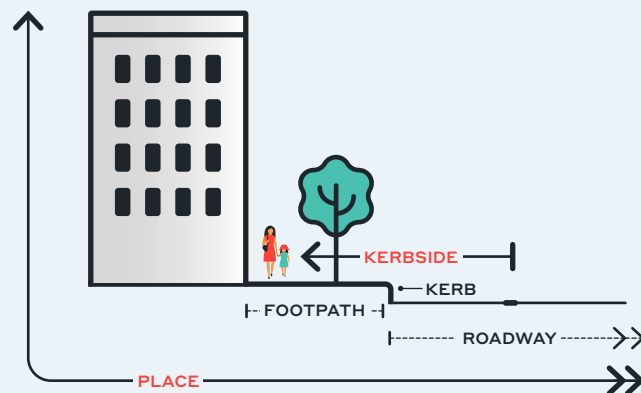
COMMUNITIES AND WHAT THEY NEED FROM THE KERBSIDE IS CHANGING

Our growing population is creating greater demand for accessing places, while at the same time new technology is changing the way we move and access services. Greater use of ride sharing and shared mobility services has led to debates around kerbside utilisation and how to make it more efficient. The increase in online shopping and subsequent small package and food deliveries has seen a rise in trips by small vans and e-bikes. An ageing population brings forward design considerations to ensure equity of access.

Societal and technological changes are altering what people want from kerbsides in the context of accessing places. At the same time we are considering the opportunities brought by new forms of mobility. New micro-mobility modes are emerging with technology enhancements in e-bikes, scooters and skateboards. Personal ownership of vehicles has the potential to gradually be swapped for shared services such as ride sharing, car sharing, and carpooling. New mobility options with different business models are coming, as are technologies that will enable us to dynamically manage kerbside uses. It is incumbent upon us to be ready with a shared vision for people and places that new technologies can help to enable.

ACTION IS NEEDED NOW FROM CITY LEADERS IN PARTNERSHIP BETWEEN COMMUNITIES, BUSINESSES AND GOVERNMENTS

To ensure our cities are planned and managed for all, city leaders across the public and private sectors must start with co-designing our vision for places with local communities and businesses. It is only then that we can understand the implications for managing competing demands at the kerbside. Their decisions should ensure our cities' places remain, or will become, attractive, safe and accessible. This means taking a people and place first approach towards managing the kerbside.



In practical terms, the kerbside is the road lane and area of the footpath either side of the kerb.

City leaders are increasingly moving towards a ‘vision and validate’ approach to city planning, however the conversation is too often strategic and theoretical. They need to influence how the kerbside is used in the context of realising a co-designed place vision. The kerbside is a finite resource—in the past its space has been arbitrarily managed and allocated. It needs to be better managed to draw on technologies and efficient ways to move people that are selected and allocated to deliver the vision for the place that the kerbside serves. It may also be the case that the amount of kerbside is reduced to realise that place vision.

The Shared Mobility Principles for Liveable Cities has been endorsed by cities, NGOs, academic institutions and companies around the world. They set a clear direction for improving the liveability of our places through taking a holistic view of mobility. These ten Principles set a guiding framework for the potential of the kerbside into the future.

UNDERSTANDING THE LOCAL PLACE MATCHED WITH WHAT THE FUTURE MAY HOLD TRANSLATES TO FUTURE READY KERBSIDES

A key consideration when determining how a street and kerbside should operate is its local context. What are the place characteristics and what do we want them to be in the future? How does this fit with the wider city context and urban policy outcomes?

What role does transit play in providing access to the place? Is it a mass transit or local service corridor? Can kerbside be reallocated to a place function like outdoor seating or trees for shade?

This paper seeks to operationalise the Shared Mobility Principles through a place lens to imagine the future of kerbside:

- We apply a Movement and Place Framework to understand the balance of placemaking, local access and movement objectives both now and in 2050 with new mobility – investigating what this means for the kerbside.

- We use the WSP Systems Dynamics Tool to explore future new mobility scenarios and then explore the key design decisions this reveals for the kerbside.

To illustrate this we explore two case study locations We look at Crown Street in Sydney, Australia and Onehunga Mall in Auckland, New Zealand. Through examining these places now, and exploring what new mobility and achieving the Shared Mobility Principles might look like into the future, we are presenting what is possible through effectively managing our kerbsides.

DISRUPTIONS DUE TO THE COVID-19 PANDEMIC MAKES ACTION ON KERBSIDES EVEN MORE IMPORTANT

The impact of the COVID-19 pandemic on how people move around and access places and services has been significant. The short-term impacts have been dramatic as shelter in place orders have been observed with cities around the world reporting a decrease in transit passengers of 80% and ride sharing dropping by 70% in the hardest hit cities. We have also seen increases in smaller deliveries and cycling which we can expect to continue into the long-term. The long-term impacts of the pandemic on our cities has the potential to be detrimental if, for example, we see private car use and ownership reinforced with people fearing a return to public transport. In addition, if people start to buy new private cars, there is a high lock-in risk of another 10-15 years of urban congestion and pollution. Many cities are responding to this by prioritising kerbside uses that promote safe, shared transport and socially distanced activities such as pop-up cycleways and outdoor dining.

The pandemic has also reinforced the importance of high quality public spaces close to home. Many local cafes and high streets are experiencing a renaissance as people visit during their day when working from home. How the kerbside is managed and allocated is an important enabler for people to access these local places.

This white paper sets out to answer three key questions:

1. To create great civic spaces by achieving the Shared Mobility Principles, what would the kerbside look like and how will it be used in 2050 given new mobility options?
2. What are some new approaches and tools city leaders can use to evaluate the management and allocation of the kerbside to ensure it is delivering the best outcomes for our people and places?
3. What actions do city leaders need to take now to enable a vision for great civic spaces?

THE TIME FOR ACTION IS NOW

This white paper is a call for action to our city leaders to proactively focus on what the community wants from their places and to consider how mobility best enables that vision, rather than mobility defining place.

It calls for city leaders, both public and private to take steps today to ensure the streetscape and kerbside of tomorrow delivers on the community's visions for our places. We recognise that the fast pace of change and innovation can be overwhelming, however inaction will certainly fail our people and places.



RECOMMENDATIONS FOR CITY LEADERS

CITY STRATEGY AND PROCESS

1
Co-design the vision for places in partnership with the community, businesses and governments.

2
Take a people-and-place first approach so that new mobility is an enabler and not a detractor to realising the co-designed vision.

3
Multi-modal approach is needed to plan for people and places that is focussed on sustainable and efficient journeys.

4
Road and street network plans must meaningfully reflect place functions, as well as movement, so that fine-grained planning is possible at the local scale.

5
Street design guidelines must get ahead of new mobility and proactively focus on the best possible outcomes for people and places.

STREET DESIGN

6
Dynamically manage and allocate the kerbside to use it more productively and achieve the vision for the place.

7
Move from general parking to pick-up / drop-off for people and goods to improve kerbside productivity and access to local places.

8
Reallocate kerbside and road space in our places towards activities such as seating, shade and play that attract people to local businesses.

9
Prioritise walking to access local places, along with transit and micro-mobility, supported by funding for local infrastructure.

10
Always design and continually upgrade local infrastructure for safe use and access, for people of all ages and abilities.

2 Shared Mobility Principles

The *Shared Mobility Principles for Liveable Cities* are designed to guide urban decision-makers and stakeholders towards improving liveability for all people. They were launched at the 2017 Ecomobility World Festival in Kaohsiung, Taiwan, where they were reflected in ICLEI's Kaohsiung Strategies for the Future of Urban Mobility. Signatories to the principles include global NGOs, academic institutions, governments, the Waka Kotahi New Zealand Transport Agency, and companies such as Uber.

We believe that the Shared Mobility Principles aim city leaders towards making better decisions for people. If our cities and places are planned and designed to embrace shared mobility they will be better for all people. The ten Principles have been categorised by WSP into three groups: *Process, City Strategy and Goals* and; *Street Design Outcomes* that are directly related to our streets.

The implementation of the Principles across our urban environments guide changes to existing operations, management or physical aspects. They can also guide wholesale redesign in streetscapes to rebalance movement and placemaking activities. The scale of our actions will be very different depending on the ambition of our vision. As such, understanding the mobility and place context – both now and in the future – is imperative to applying the Shared Mobility Principles for Liveable Cities to achieve the best possible outcomes for people in our public spaces.

The ten Shared Mobility Principles can be considered in three groups:

- **Process principles:** describe the methods that best deliver place-based mobility projects
- **City Strategy and Goals:** aligns shared mobility with environmental, social and economic goals
- **Street Design Outcomes:** highlights how shared mobility enables streetscapes that deliver better journeys and experiences in our public places

PROCESS How we deliver shared mobility projects

1. Plan cities and mobility together



4. Engage stakeholders in decision making

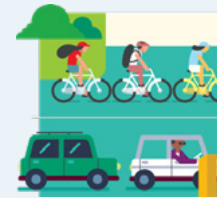


CITY STRATEGY AND GOALS How shared mobility supports environmental, social and economic outcomes

6. Transition toward zero emissions



7. Seek fair user fees



8. Deliver public benefits via open data



10. Automated vehicles must be shared

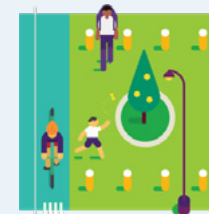


STREET DESIGN OUTCOMES How shared mobility creates design outcomes

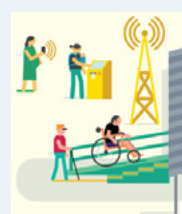
2. Focus on moving people, not cars



3. Encourage efficient use of space and assets



5. Design for equitable access



9. Promote integration and seamless connectivity



Figure 1 Shared Mobility Principles

Source Adapted from *Shared Mobility Principles* (www.sharedmobilityprinciples.org)



3 Why Kerbsides Matter

WHAT IS THE KERBSIDE?

All trips involve the kerbside in some way, whether we are walking, riding or driving. In practical terms, the kerbside is the road lane and area of the footpath either side of the kerb. The function and design features of the kerbside are a subset of the overall function and design of the road, and should be a product of the surrounding land uses. It also provides a visual and physical delineation between the movement, local access and placemaking functions of the public space we call the street or road.

The kerbside is a particularly contested space with the convergence of many public and private owners or interests, and a large number of movement and place functions – usually all in one place. The how, when and what of utilising kerbside is integral to achieving a successful place.

As we consider the role new mobility – such as ride sharing, e-mobility, automated vehicles and electric vehicles – can potentially play into the future, the importance of effectively managing and allocating the kerbside becomes greater, not less. By way of an example, we need to design to capitalise on the potential benefits of increased ride sharing and introduction of automated vehicles through making

it easier for people to access activities and to transit, while minimising circulating traffic or substituting public transit, walking or cycling for local trips.

The kerbside in Australian and New Zealand streets is designed and managed by a broad group of stakeholders, operators and different levels of government. Each will provide guidance for elements of street design and operation, but there is no single Australian or New Zealand framework which effectively considers all aspects of design to create liveable cities.

Cities are reconsidering and reconfiguring their streetscapes to rebalance this contested space. Recognising the importance of streets in public life, Waka Kotahi NZ Transport Agency announced a new Innovating Streets for People programme in September 2019². The programme aims to make it faster and easier for councils and communities to transition streets into safer and more liveable spaces by removing barriers to innovation and raising capability in street design. The programme includes case studies and a draft best-practice guide which the Agency plans to finalise in 2020 after some live council case studies of street innovation have been tested³. The NSW Government announced a similar scheme – Streets as Shared Spaces - in May 2020⁴.

Also, the International Transport Forum and National Association of City Transportation Officials have

established forums and processes to allow development of principles, guidance and strategy that can be taken through to deployment.

Effective kerbside management and allocation is the catalyst to support the rebalancing of street functions to better account for place, and essential if we are to achieve the Shared Mobility Principles.

CHALLENGES OF THE KERBSIDE

There is a strong legacy that tilts kerbside management and allocation towards fulfilling transport network goals, at the expense of placemaking. The application of the Movement and Place Framework helps us to reorient a balanced approach to kerbside management and allocation and the Shared Mobility Principles outline how to achieve them. There are however a number of challenges to work through.

Legacy of Cities Designed for Cars

Our streets are characterised by a legacy of cities designed for cars over people. From the early 20th century, space allocated for other transportation modes has gradually been reallocated to the private motor vehicle. Not only were vast highway systems built, but space for people to walk, linger or for leisure activities has been relegated to whatever is left over or into private spaces.



Changing Mobility Options

New technology is leading to greater diversity in transportation modes. Connectivity, automation, sharing and electric propulsion are enabling seismic change across all aspects of mobility – from the way we commute to how we plan and develop infrastructure for the cities of today and the future. WSP explored this in the publication *New Mobility Now*⁵.

There has also been a change in the freight task. The surge in people using online shopping has been a key contributor to this, resulting in more small parcel deliveries. The popularity of online food delivery services such as Uber Eats is seeing a significant increase in the use of e-bikes in many Australian and international cities. The increase in these types of deliveries has increased pressure on the kerbside and increased demand for cycling infrastructure. This change in the freight task has accelerated with the impact of the COVID-19 pandemic with some of this increase likely to persist.

Aerial and ground-based drones are starting to be used for last-mile small parcel deliveries in some locations around the world. Consolidation centres in urban areas are serviced by automated vans and ground-based drones - aerial drones are generally much more in the development and testing stage. These can bring issues to work through in terms of compatibility with achieving desired place-based outcomes.

Despite these changes in mobility options and technology, we must recognise the continued importance of traditional transit and the role it plays in providing access to places. Transit is the mobility backbone of our cities but also plays an important place function. Transit acts as ‘people fountains’ supporting access to local services and amenities.

People also need space to walk to access places. All our journeys start and end with a walking trip and with competition for space at a premium, city planners must increasingly prioritise walking access to our places over other methods. Through improved kerbside management, there is opportunity to free up and reallocate roadspace with greater provision for people.

Governance and Demand

Most kerbside in cities is public space but used by public and private users. As competition for space increases, and new mobility increases, we expect to see greater conflict over access to the kerbside.

There are many stakeholders with a role in managing and allocating the kerbside. These include:

- Multiple authorities - councils / road authorities / transit authorities
- Multiple users - residents, workers, businesses, visitors and tourists, shoppers, transport operators, delivery agents – across all age groups and abilities
- Users of multiple modes of transport.

It is only through the effective collaboration across all these groups that we can optimally allocate and manage the kerbside. Of course, some groups have more influence than others with the government and transport authorities playing a significant role closely followed by local business and community groups. It is the role of public authorities to regulate kerbside use taking different user needs into account.

How effective these arrangements are in managing and allocating kerbside is seen through how effectively and efficiently the street and kerbside is accessed in a way that delivers on the local vision for the place. Of course, in doing so we must recognise that the needs and influence of these stakeholders changes over the course of a day and by the day of the week as how and why people use the space changes.

Measuring the productivity of different users of the kerbside is a good way to assist with prioritisation and allocation. However, currently there is little evidence of authorities prioritising kerbside uses based on productivity. Many operate an ‘set and target’ approach while a common experience in many cities is for changes to kerbside allocation being resisted by some users despite evidence of the benefits. However, data and metrics are rarely used for measuring and monitoring kerbside use. There is opportunity to build on a data-led approach for greater use of price signals to drive demand towards the most desirable and productive uses.

Kerbside Pricing

Kerbside space is valuable real estate in any urban environment. Revenue for this space is generated from short term parking fees and residential parking permits; and occasionally from parklet and outdoor dining rates. In Australian and New Zealand cities, this revenue is generally collected by local government authorities.

There is no reason for pricing signals to be constrained to short-term and residential parking. As technologies evolve pricing can be applied to all forms of kerbside use, including people in vehicles picking up freight or other people. Pricing is an important tool available to authorities to effectively ration a public good in high demand to best achieve our vision for the place. The local parking strategy must consider the price sensitivity of different types of uses when setting its policy to ensure the right outcomes. A recent London study⁶ demonstrated that the value of kerbside for residential parking was one-tenth of the commercial rate for parking in the same location.



MEASURING KERBSIDE PRODUCTIVITY

One approach to understanding how the kerbside is used is through a kerbside utilisation study. These generally rely on analysing the comings and goings along a kerbside for long periods of time. Ideally this would have been a feature of this paper, however due to altered travel patterns during the COVID-19 lockdown it was not appropriate to do so. It is however a method worth recognising. By example, Uber commissioned a study with Fehr & Peers Transportation Consultants that analysed a combination of rideshare pick-up and drop-off activity data, traffic count data, and video and photo content to develop broad design strategies which can be used to measure the productivity of the kerbsides for local access. Case studies were undertaken in San Francisco in 2018 and Cincinnati in 2019.

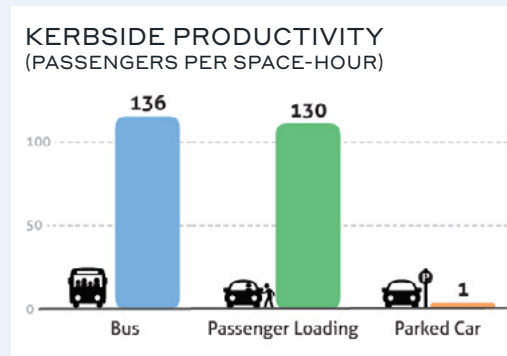


Figure 2 Kerbside Productivity Index for a Commercial Corridor: Hayes Street, San Francisco

Source *San Francisco Curb Study*, Fehr and Peers (2018)

Note *Passenger loading includes taxis, ride sharing and private vehicles*

These studies were interesting and showed how our cities often dedicate the kerbside to least productive uses, by prioritising private vehicle parking which has lower passenger movements than pick-up/drop-off zones or transit. The studies identified three strategies for improving kerbside productivity:

- **Relocate** kerb spaces to better utilise kerb zones
- **Convert** kerb spaces to different uses to better utilise the kerb zone
- Convert kerb spaces to **flexible time of day zones** to meet demand-based uses throughout the day.

In both the Cincinnati and San Francisco case studies, productivity was a raw measure of how many people could access the kerbside in a time period. This provides a lead indicator of how hard the kerbside is working. Building on this approach, there is the potential to include consideration of place, and achieving the local vision. This means considering whether kerbside use matches the vision for the place. To this end, productivity can be considered in the context of freight access, network movement and to support changing local needs over time.

The classification for a street can change over a day or week or season. A street may be a main road during peak hour but then be a hive of activity both on the kerbside and the road during the middle of the day and a place for people to dwell and enjoy with less through movements on the weekend. The function of the kerbside – and therefore the performance targets we put in place – needs to reflect these changes in street types. Building on this research we explore an approach to doing this in the next section and then apply that to kerbsides in two case studies.



KERBSIDE SUPPORTS MOVEMENT AND PLACE

Movement and Place Frameworks help to explore balancing placemaking, local access and movement objectives for streets and, by extension, the kerbside objectives. The Frameworks illustrate that streets serve two primary roles for people:

1. Facilitating the **movement** of people and goods, or
2. Acting as **civic spaces**.

The scale and proportion of these two roles for different street types can be shown on a matrix – see Figure 3. The Framework reflects how streets meet the needs of the local community, as well as for transport network users. The function of the street – and therefore its position in the matrix – can change during the day and over time such as during peak hour, daytime activity, night-time economy placemaking, and weekend activity⁷.

Street types can be collectively described based on their common location within the matrix. Local vernacular is applied to the groups i.e. streets with high movement and place characteristics are called ‘Main Streets’ in NSW, ‘Main Street Arterials’ in Auckland, and ‘City Hubs’ in Victoria and London. For this paper, we have used the street type descriptions used by Austroads (derived from *Practitioner’s Guide to Movement and Place – Implementing Movement and Place in NSW*, March, 2020), namely:

- **Main Roads** – central to the safe, reliable and efficient movement of people and between regions and strategic centres
- **Civic Spaces** – streets at the heart of our communities with high demand for activities and lower levels of vehicle movement. They create places people enjoy, attract visitors and are places that communities value
- **Local Streets** – are part of the fabric of suburban neighbourhoods and single use land zones are places where we live our lives and facilitate community access. They often have less intense activity levels, however can have significant meaning for people

- **Main Streets** – high demand for movement as well as place with a need to balance different demands within the available road space.

The Movement and Place Framework was identified in the NSW Future Transport Strategy 2056 as a tool to manage the road network in a way that supports safe, efficient and reliable journeys for people and freight while enhancing the liveability and amenity of places. It has been adopted in the development of specific corridor and place plans developed as supporting plans of Future Transport 2056⁸.

Another way of looking at the Movement and Place Framework is to focus on the modes of transport to prioritise in each street type, see Figure 4. This provides a customer-centric basis for the design and operation of the street, with local overlays and network considerations added⁹. This example for the Roads and Streets Framework in New Zealand, shows the consistency with Australian approaches to describing streets based on movement and place factors.

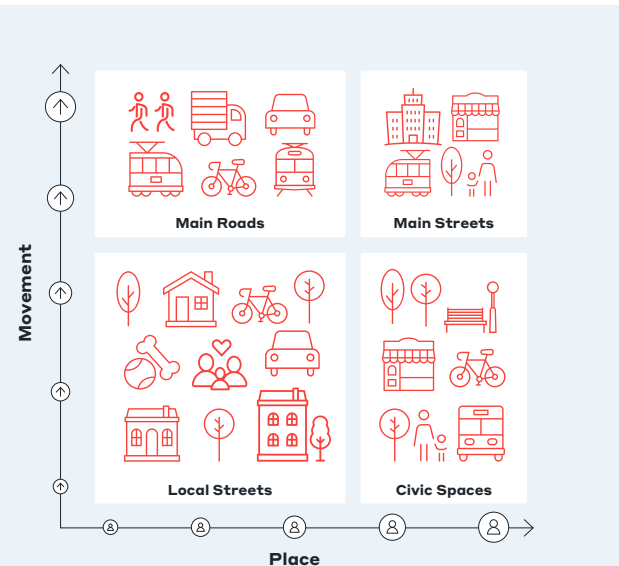


Figure 3 An example of a Movement and Place Framework (based on NSW street types)



We can also use the Framework as a way to zero in on the design and operation of the street and kerbside, in response to its role on the transport network, place where it is and the people using it.

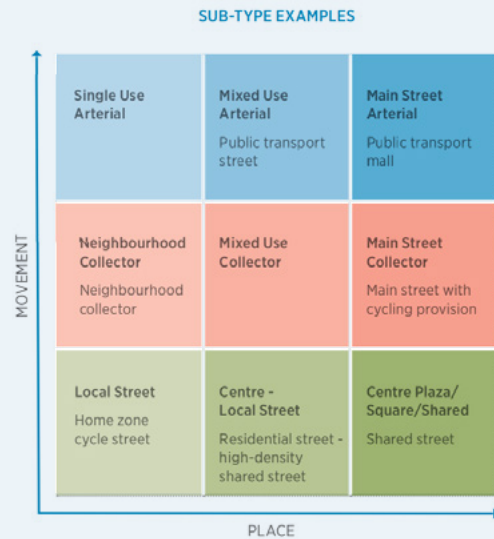


Figure 4 Modal priorities based on Movement and Place street types

Source Page 139, *Urban Street and Road Design Guide*, 2020, Auckland Transport

Table 1 illustrates that the Movement and Place street classification guides the objectives for that street, and hence the design response (or features) that the kerbside need to achieve those objectives. Modal priority and kerbside productivity are directly related to the objectives. For example, Main Streets and Civic Spaces need to support a lot of activity in the adjacent land use and footpath – they need to facilitate journey, access and placemaking functions at the kerbside. As such they need very productive kerbsides that enable high access for people and goods.

In Main Streets the kerbside lane has to prioritise high levels of regional through movement as well as supporting access; whilst in Civic Spaces there are predominantly local movements in the kerbside lane and you can allocate more space to access. In comparison, a Main Road has a dominant remit to support journeys on the network (prioritising movement) and does not need to support the same level of placemaking activity. Therefore, the kerbside is not as 'productive' for access as it is in the Main Street and you will prioritise efficient movement in the kerbside lane, including through clearways. Local Streets also do not require high levels of kerbside

productivity and they generally have enough space to enable the access and placemaking activities.

The Movement and Place Framework is a useful tool for planning the design and operation of the street and the kerbside in response to the place where it is and the people using it. It can help to provide a shared language between planners, engineers and the community to form a basis for deciding how to improve our streets to better match expectations on both movement and place functions. This can mean acting together to shift the street's classification to better meet the community's vision.

STREET TYPE	KERBSIDE OBJECTIVES	KERBSIDE LANE FEATURES	FEATURES AT THE KERB
Main Roads	<ul style="list-style-type: none"> - Prioritises movement and minimises stopping except for interchange at network nodes 	<ul style="list-style-type: none"> - Clearways 	<ul style="list-style-type: none"> - Major bus / light rail stops
Local Streets	<ul style="list-style-type: none"> - Supports local access and amenity 	<ul style="list-style-type: none"> - Shared spaces 	<ul style="list-style-type: none"> - Local parking - Local bus stops
Main Streets	<ul style="list-style-type: none"> - Enables transit journeys, local access and placemaking activities 	<ul style="list-style-type: none"> - Bus priority/ light rail lanes - Cycle lanes - Peak hour clearways 	<ul style="list-style-type: none"> - Bus/light rail stops - Pedestrian crossings - Urban realm elements - Loading zones - Accessible parking - Motorbike parking - Passenger set-down/pick-up
Civic Spaces	<ul style="list-style-type: none"> - Facilitates local access and placemaking activities 	<ul style="list-style-type: none"> - Cycle lanes 	<ul style="list-style-type: none"> - Bus/light rail stops - Pedestrian crossings - Urban realm elements - Loading zones - Accessible parking - Short term parking - Motorbike parking - Passenger set-down/pick-up

Table 1 Typical kerbside lane and space design features by street type

4 Civic Spaces

WSP has chosen two locations to examine the role of the kerbside. One place is in Sydney, Australia and the other in Auckland, New Zealand. The place in Sydney is a high street with lots of activity and a reasonably hard working kerbside. The place in Auckland is adjacent to a mobility hub and aspiring high street.

Both places are identified as Civic Spaces in the Movement and Place Framework albeit performing at different levels, particularly with regard to place, and with very different characteristics in terms of urban form. Civic Spaces are generally speaking those streets with low volumes of long distance through journeys, but a high attraction for placemaking activities. They are amongst the most complicated, but cherished, spaces in our urban transport networks.

This section introduces each of the case study locations and then explores the performance of the kerbside.

SYDNEY CASE STUDY

Crown Street, Sydney is a high street in the suburb of Surry Hills and a key transport corridor in Sydney that connects Oxford Street in the north and Cleveland Street in the south. Both local and regional multi-modal journeys occur on Crown Street. Pedestrian and cycle routes connect Crown Street to the Sydney CBD and the Royal Botanic Gardens to the north. It is also directly served from the south by buses and has a light rail service to its north on Devonshire Street.

Crown Street is a vibrant mix of retail, commercial and residential buildings. The segment between Devonshire and Cleveland streets is particularly vibrant with restaurants and specialty stores that are popular in the evenings and weekends. It is a key entertainment area for inner-city Surry Hills.

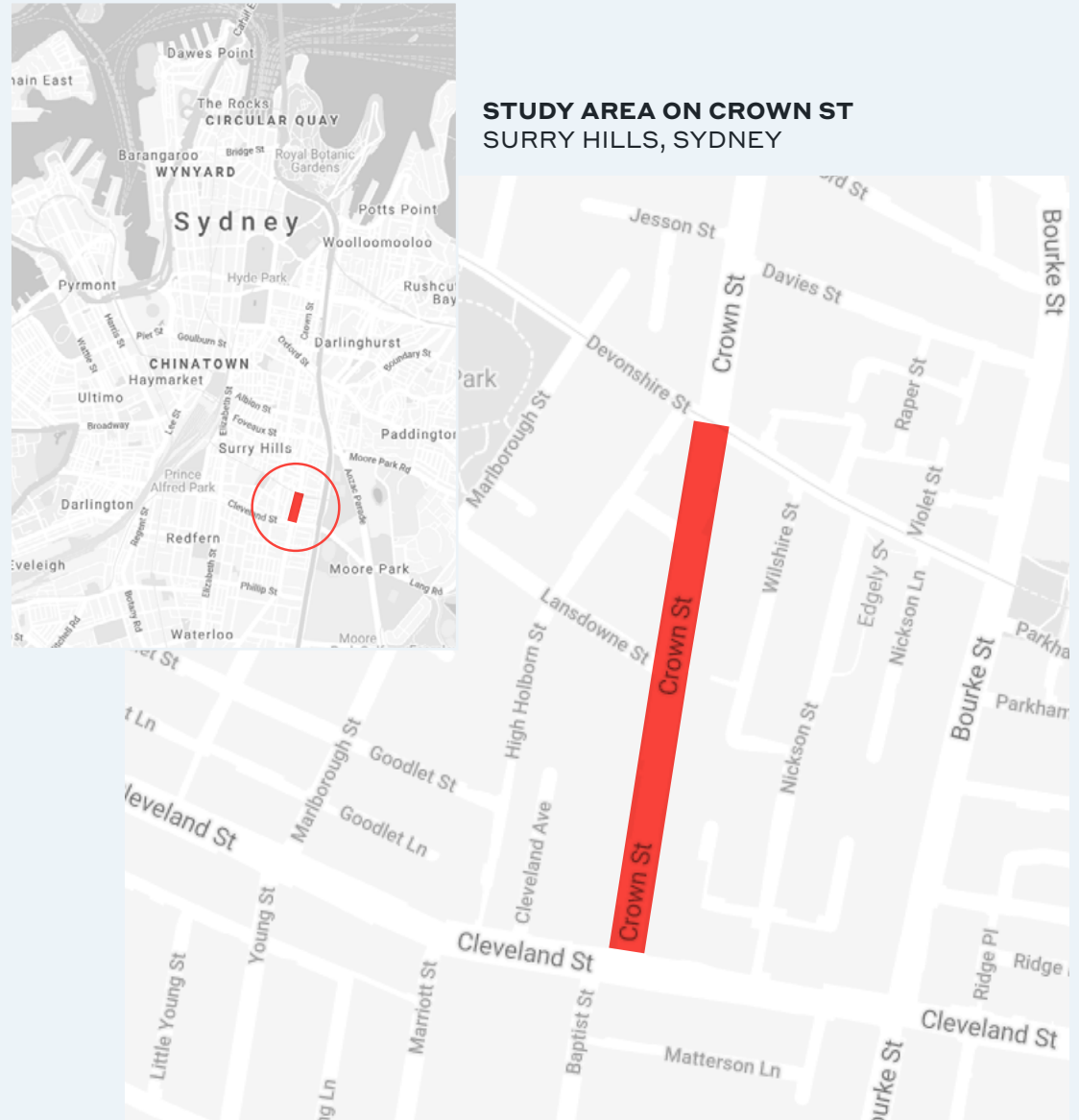


Figure 5 Crown Street, Surry Hills

The existing Movement and Place classification of Crown Street is a Civic Space with a high place function. It has the magnetism to draw people from beyond the local neighbourhood and is considered a destination for cafes and restaurants. Sydneysiders will “go to Crown Street for a coffee” as opposed to meeting at a specific shop or business.







It also has a large residential population within walking distance, primarily living in attached houses and apartments with limited parking.

The increasing demand for cyclist deliveries either as a last mile option or for online food deliveries is not well served within the existing kerbside allocation.

Property frontages are generally active, and people dwell in the street to eat, chat and wait for transport services. There are good pedestrian facilities with wide footpaths featuring street furniture, plants, outdoor dining and good lighting.



Table 2 Movement and Place Classification - Desirable Outcomes and Observations - Crown Street, Surry Hills, Sydney

Mode	 Pedestrian	 Cyclist	 Light rail	 Bus	 Freight	 Private vehicle
MOVEMENT CLASSIFICATION						
Desired Customer Outcomes	<ul style="list-style-type: none"> - Walking comfort - Walking accessibility including for disabled - Crossing opportunities - Safety 	<ul style="list-style-type: none"> - Cycling connectivity and flow - Cycling facilities - Ease of cycling 	<ul style="list-style-type: none"> - Light rail travel time - Light rail travel time reliability 	<ul style="list-style-type: none"> - Bus travel time - Bus travel time reliability 	<ul style="list-style-type: none"> - Goods travel time reliability - Easy access for deliveries for all delivery modes 	<ul style="list-style-type: none"> - Vehicle travel time - Vehicle travel time reliability
Crown Street Observations	<ul style="list-style-type: none"> - Key walking corridor travelling north-south near the Sydney CBD - Wide footpath with ramps in all access points - Signalled pedestrian crossing at Cleveland and Devonshire streets and raised pedestrian crossing mid-block near Lansdowne Street and bus stops 	<ul style="list-style-type: none"> - On-road cycling with shared lane marking - potentially limits activity to confident cyclists only - Note that Bourke Street (parallel to the east) is the dedicated cycling corridor with a separated cycle lane 	<ul style="list-style-type: none"> - Close to key light rail corridor connecting Eastern Suburbs and Sydney CBD - Approximately 23 minutes travel time to Circular Quay; 16 minutes to Randwick (L2) and 25 minutes to Kingsgrove (L3) - Relatively reliable travel times - Long span and high frequency helping to serve entertainment precinct 	<ul style="list-style-type: none"> - Regular bus route providing frequent stops between Oxford Street and Cleveland Street - Approximately 14 minutes travel time to Circular Quay and 15 mins to Roseberry (304); 17 mins to Bondi Junction and 27 mins to Marrickville Metro (352) - Travel times vary following traffic 	<ul style="list-style-type: none"> - Last-mile freight route for commercial deliveries on the site - Some interruption to flow associated with intersections and side streets - Limited bike parking for food couriers 	<ul style="list-style-type: none"> - Alternative vehicular route with local access parallel to the Eastern Distributor - Some interruption to flow associated with intersections and side streets
PLACE CLASSIFICATION						
Desired Customer Outcomes	<ul style="list-style-type: none"> - Pedestrian facilities - Pedestrian amenity - Pedestrian security - Safety 	<ul style="list-style-type: none"> - Cycle parking facilities 	<ul style="list-style-type: none"> - Light rail stop facilities 	<ul style="list-style-type: none"> - Bus stop facilities 	<ul style="list-style-type: none"> - Loading provision - Cycle parking facilities 	<ul style="list-style-type: none"> - Pick-up/drop-off - Short-term parking - Motorbike parking
Crown Street Observations	<ul style="list-style-type: none"> - Key entertainment area for Surry Hills - Good pedestrian facilities with wide footpath with street furniture, plants, outdoor dining and good lighting - High pedestrian activity, dwelling opportunities, active frontages 	<ul style="list-style-type: none"> - Adequate cycle parking (loop and inverted "U" shape) on both sides of the road with good availability 	<ul style="list-style-type: none"> - One of key destinations for routes L2, L3 - Good light rail stop facility (on Devonshire Street) with large sheltered waiting area and timetable - Good ability to serve a large number of people within the provided space 	<ul style="list-style-type: none"> - One of key destinations for routes 304, 372 - Good bus stop facilities with dedicated bus zone, sheltered waiting areas, flags, timetables, rubbish bins and cycle parking - Good ability to serve a large number of people within the provided space 	<ul style="list-style-type: none"> - A lot of loading zones (a third of kerbside) that operate Monday-Friday 8 am - 6 pm and Saturday-Sunday 8 am - 10 am or ticketed 4P outside these hours - Good ability to serve regular deliveries commercial sites but likely limited capacity to accommodate the more-frequent food delivery services and e-commerce 	<ul style="list-style-type: none"> - A lot of on-street short-term paid parking spaces, including dedicated car-share only parking and wheelchair parking - Limited ability to serve a large number of people - Only 3m of pick-up/drop-off space during off-peak restricting access

Kerbside Allocation 8am - 6pm

We have developed a snapshot of the kerbside allocation for the section of Crown Street between Cleveland and Lansdowne streets. Figure 6 shows the daytime (8am-6pm) allocation in plan while Figure 7 summarises the proportion of allocation.

In summary, more than 60 per cent of the kerbside is taken up by car parking and loading zones. There is limited provision for vehicle drop-off other than a single bus stop and a single no-parking space. There are three spaces for short-term (15min) parking. Less than 15 per cent of kerb buildouts for trees but not additional pedestrian space. For a Civic Space it is dominated by storage for vehicles and provision of space for delivery goods.

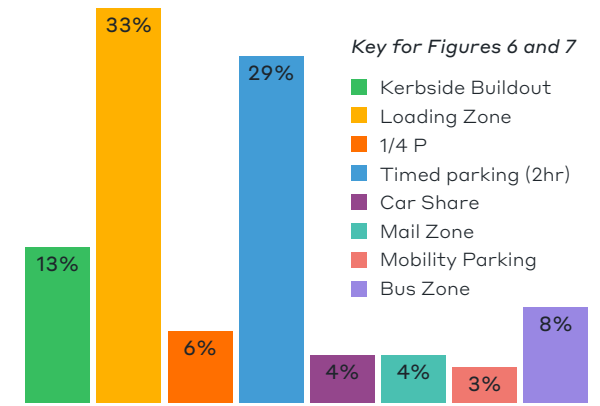


Figure 7 Crown Street kerbside share today (8am-6pm)
Excludes 'no stopping' near Cleveland Street intersection

TODAY: 8AM - 6PM



Figure 6 Crown Street existing kerbside allocation, 8am-6pm

Kerbside Allocation
Early morning and evening

Figure 8 shows the early morning and evening allocation in plan while Figure 9 summarises the proportion of allocation.

In summary, almost three quarters of the kerbside is taken up by car parking. There is no allocation for loading zones. As for peak periods, the only provision for vehicle drop-off is a single bus stop and a single no-parking space. There is no short-term parking with all of the parking long term (4 hours). There is no additional space for pedestrians to reflect the night time economy. For a Civic Space it is dominated by storage for vehicles and provision of space for goods.

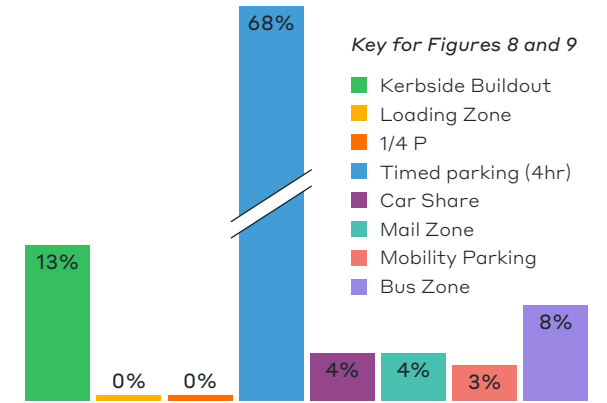


Figure 9 Crown Street kerbside share today (early mornings and evenings)
Excludes 'no stopping' near Cleveland Street intersection

TODAY: EARLY MORNING AND EVENING



Figure 8 Crown Street existing kerbside allocations, early morning and evening

Key Findings

Our key finding is that the kerbside currently supports access for a variety of users, although this is dominated by the private vehicle. There is some flexibility in terms of providing longer stay parking during the evenings to reflect changing uses at different times of the day. This is likely aimed at helping to support the night-time economy, although people travelling by active and transit modes are likely to generate more revenue for local businesses than those visiting by car.

There is no flexibility in terms of providing for more efficient pick-up and drop-off from vehicles. Despite being a Civic Space, located in a vibrant and pedestrian-dominated precinct, much of the allocation of space on the kerbside supports the storage of cars (often for extended periods) and delivery of goods. There is almost no provision of space for drop-off and pick-up by ride share or taxis and the dedication of the kerbside for greater pedestrian activity is modest.

The kerb could work harder to support increased access through: more pick-up/drop-off locations potentially at the expense of general parking; enabling freight deliveries overnight; enabling the parking and access of cyclist couriers; and dynamic kerb management to shift uses quickly to respond to local conditions such as increasing pick-up/drop-off to supply cafes and restaurants during the COVID-19 restrictions. There is opportunity to reallocate road space from inefficient parking to greater provision for pedestrians.

ELEMENT	COMMENT
Parking	<p>Over a third of the kerbside is allocated to parking during the day – this extends to two thirds in the early mornings and evenings. Short stay parking supports private vehicle access to restaurants / retail activities, however at the expense of more efficient access in the form of transit, cycling and walking. These modes also are likely to serve a much greater share of customers.</p> <p>A large proportion is allocated as Loading Zones supporting access to local businesses – however, this is only during the day thereafter reverting to parking. Reverting to parking in evenings is likely aimed at supporting local restaurants and bars. A further change for an overnight loading zone could support out-of-hours deliveries.</p> <p>The parking allocation supports storage of cars for long periods, and low turnover; and there's effectively no provision for drop-off and pick-up in an area where there is likely to be high demand. There is also no allocation for motorbikes.</p>
Urban realm	<p>Trees planted within the footpath buildouts have a 13% share of the kerbside allocation which help to support the local amenity for pedestrians in particular, in line with Civic Spaces. However, there is limited space for pedestrians to dwell or for outside seating.</p>
Pedestrians	<p>Pedestrian crossing supporting local access by foot. Limited space for pedestrians to dwell or for outside seating.</p>
Bus	<p>The bus zone is appropriate for the volume of buses serving this bus stop. It is aimed at supporting local access rather than fast, high volume movements, such as would be expected on Main Streets where greater priority in the form of bus lanes may be expected.</p>
Mail Zone	<p>Likely only accessed a limited number of times a day, inconsistent with the permanent kerbside provision.</p>
Taxi	<p>No rank for taxis – less opportunity for people pick-up/drop-off.</p>
Ride share	<p>No allocation for ride share – less opportunity for people pick-up/drop-off.</p>
Cycling	<p>No cycling lanes but it is clearly marked as a cycling route which is appropriate for the street type. Dedicated bicycle facility on parallel Bourke Street.</p>
Clearways	<p>No clearways – which are generally used for Main Streets or Main Roads. This is in line with the lower volumes of traffic and greater emphasis on access and place.</p>

Table 3 Kerbside Allocation - Crown Street, Surry Hills, Sydney

AUCKLAND CASE STUDY

Onehunga Mall is the local town centre in the suburb of Onehunga, 12km south of Auckland City.

It is an arterial road that connects into the regional road network, attracting local and longer distance movements by private vehicle. The Onehunga train station provides connectivity to the rail network (supported by park-and-ride), while the Onehunga Transport Centre (bus interchange) on Upper Municipal Place (located approximately 200m north of the station) is a major hub for Auckland's bus network. As the bus interchange and the train station are not co-located, Onehunga Mall also plays an important connectivity function for transferring passengers.



**STUDY AREA ON ONEHUNGA MALL,
PEARCE ST, UPPER MUNICIPAL PL
ONEHUNGA, AUCKLAND**

Figure 10 Onehunga Mall

Onehunga Mall has evolved considerably over the years, changing from a road to a pedestrian mall and back again – with more change to come as part of future plans for Onehunga.

Onehunga Mall is typical of many suburban town centres in Auckland with general traffic lanes (one in each direction), parking on both sides and a footpath with some shop front activity, seating, cycle parking and rubbish bins.

Currently the Town Centre has an underutilised kerbside, but Onehunga is planned to go through significant transformation over the next 25 years. Zoning changes will enable significant uplift in land use.

Onehunga Mall lacks a sense of place in its current state. It has easy access to transit, but the town centre is somewhat disjointed given the off-centre Dress Smart activity.

The existing Movement and Place classification of Onehunga Mall is a Civic Space although it currently has a greater emphasis on movement (particularly of private vehicles) than it does on place. This area of Onehunga Mall is currently largely industrial/commercial with car parking provision both on- and off-street, and little residential.

It is an area in transition with aspirations to enhance the place function.

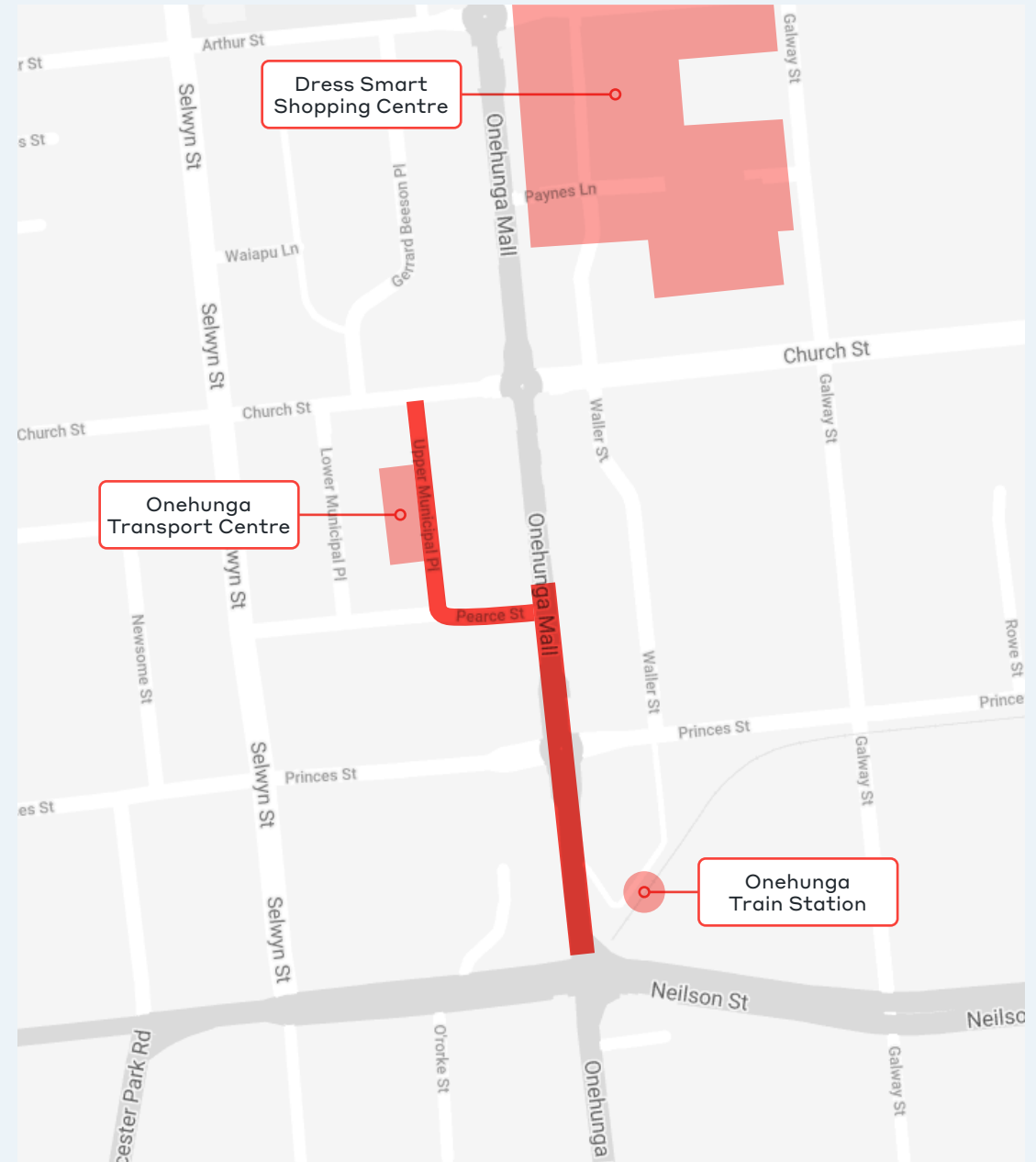


Figure 11 Onehunga Mall local context

Table 4 Movement Classification - Desirable Outcomes and Observations - Onehunga Mall, Auckland













Mode	 Pedestrian	 Cyclist	 Rail	 Bus	 Freight	 Private vehicle
MOVEMENT CLASSIFICATION						
Desired Customer Outcomes	<ul style="list-style-type: none"> - Walking comfort - Walking accessibility including for disabled - Crossing opportunities 	<ul style="list-style-type: none"> - Cycling connectivity and flow - Cycling facilities - Cycling difficulty 	<ul style="list-style-type: none"> - Rail travel time - Rail travel time reliability 	<ul style="list-style-type: none"> - Bus travel time - Bus travel time reliability 	<ul style="list-style-type: none"> - Goods travel time - Goods travel time reliability - Easy access for deliveries for all delivery modes 	<ul style="list-style-type: none"> - Vehicle travel time - Vehicle travel time reliability
Onehunga Mall Observations	<ul style="list-style-type: none"> - Key walking corridor through the town centre - Key connection between the bus interchange and train station - Zebra crossing north of the junction between Onehunga Mall and Pearce Street - Raised platform at the entrance to Pearce Street from Onehunga Mall 	<ul style="list-style-type: none"> - Cycling activity limited with no cycling provision - Classified as a connector as part of the Auckland Cycle Network 	<ul style="list-style-type: none"> - Rail station terminal immediately adjacent Onehunga Mall, provides access to Auckland CBD. - Approximately 30 minutes travel time to Britomart, Auckland CBD. - 30 minute frequency throughout day and week. 	<ul style="list-style-type: none"> - Bus services operating only between Neilson Street and Princes Street on the Onehunga Mall - Connector services 309 and 313; Frequent bus services 30 and 380 - Approximately 1 hour 8 minutes travel time to Manukau bus station (313); 28 minutes to Mangere Town Centre (380); 53 minutes to CBD (30) - Travel times vary depending on traffic 	<ul style="list-style-type: none"> - Not part of the strategic freight network - Last-mile freight route for commercial deliveries on the site - High volume of truck movements to the south to and from the Port via Neilson Street - Limited bike parking for food couriers 	<ul style="list-style-type: none"> - Arterial Road and provides access to the Motorway on-ramp - Some interruption to flow associated with intersections and side streets
Pearce St and Upper Municipal Place Observations	<ul style="list-style-type: none"> - Key walking corridor travelling between bus interchange and train station - Pedestrian refuge island at the northern end of Upper Municipal Place 	<ul style="list-style-type: none"> - Cycling activity limited with no cycling provision - Not part of the Auckland Cycle Network 	<ul style="list-style-type: none"> - Not applicable 	<ul style="list-style-type: none"> - Connector services 309 and 313; local service 298 - Approximately 1 hour 8 minutes travel time to Manukau bus station (313) - Approximately 35 minutes to Sylvia Park (298) 	<ul style="list-style-type: none"> - Not part of the strategic freight network 	<ul style="list-style-type: none"> - Mainly used as a thoroughfare to get to local attractions - The only taxi stand within the study area

Table 5 Place Classification - Desirable Outcomes and Observations - Onehunga Mall, Auckland

Mode	 Pedestrian	 Cyclist	 Rail	 Bus	 Loading and servicing	 Private vehicle
PLACE CLASSIFICATION						
Desired Customer Outcomes	<ul style="list-style-type: none"> - Pedestrian facilities - Pedestrian environment - Pedestrian security 	<ul style="list-style-type: none"> - Cycle parking facilities 	<ul style="list-style-type: none"> - Rail stop facilities 	<ul style="list-style-type: none"> - Bus stop facilities 	<ul style="list-style-type: none"> - Loading provision 	<ul style="list-style-type: none"> - Parking provision
Onehunga Mall Observations	<ul style="list-style-type: none"> - Wide footpath but inadequate amenities for pedestrians with very limited street furniture, plants, outdoor dining or good lighting - Low-medium pedestrian activity and lack of active shop frontages. Offset concentration of Dress Smart activity causes decentralisation. 	<ul style="list-style-type: none"> - Some cycle parking (loop and inverted "U" shape) on either side of the road 	<ul style="list-style-type: none"> - End of Onehunga line - Good facility with sheltered waiting area and a park-and-ride - No dedicated space for taxi or ride share services 	<ul style="list-style-type: none"> - Good bus stop facilities on eastern side of Onehunga Mall, south of roundabout with Princes Street (including dedicated bus zone, sheltered waiting area, timetables and rubbish bins); inadequate bus stop infrastructure on the western side 	<ul style="list-style-type: none"> - Two 5-minute loading spaces on western side of Onehunga Mall - Good ability to serve regular deliveries to commercial sites but likely limited capacity to accommodate the more-frequent food delivery services. These are likely served by service lanes at the back. 	<ul style="list-style-type: none"> - Park-and-Ride facility near Onehunga station - Ample on-street parking spaces on Onehunga Mall north of roundabout with Princes Street - Majority of Onehunga Mall south of roundabout with Princes Street do not allow for parking, with the exception of 40m of 60-minute parking available on the western side (approximately 6 spaces) - There is a large parking lot associated with the Dress Smart north of the study area.
Pearce St and Upper Municipal Place Observations	<ul style="list-style-type: none"> - Pearce Street provides connectivity to the bus interchange, the local library and other local attractions. No real place function, no shop frontages or places to linger except for the bus interchange. 	<ul style="list-style-type: none"> - No cycle parking (loop and inverted "U" shape) on either side of the road 	<ul style="list-style-type: none"> - Not applicable 	<ul style="list-style-type: none"> - Upper Municipal Place is a key destination for 309, 313 and 380 - Good bus stop facilities with dedicated bus zone, sheltered waiting areas, flags, timetables, rubbish bins 	<ul style="list-style-type: none"> - One space for loading zone on western side of Upper Municipal Place 	<ul style="list-style-type: none"> - Limited parking on Upper Municipal Place; 30-minute on-street parking spaces available on both sides of Pearce Street - There is a large parking lot associated with the Dress Smart north of the study area.

Kerbside Allocation

Figures 12 and 13 provide a snapshot of the kerbside allocation on Onehunga Mall between Neilson and Princes streets. We have focused on this section of Onehunga Mall to provide a point of difference to the Crown Street, Sydney case study in terms of land use characteristics, and to concentrate around a key transport node – Onehunga train station. It is also an area slated for significant change in coming years.

The kerbside arrangements are fixed; that is, they do not change at different times of the day. Also, they do not cater for many different uses. The eastern kerb has no parking, other than a single bus stop, although there is access to a large park-and-ride facility. A large share of the kerbside is allocated as no stopping to provide throughput for traffic.

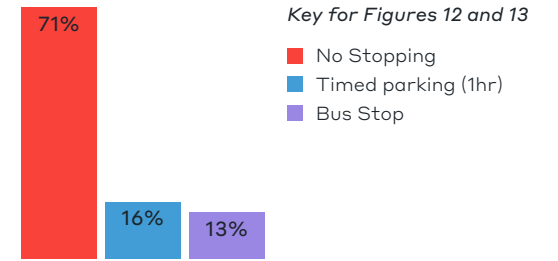


Figure 13 Onehunga Mall - kerbside share

TODAY

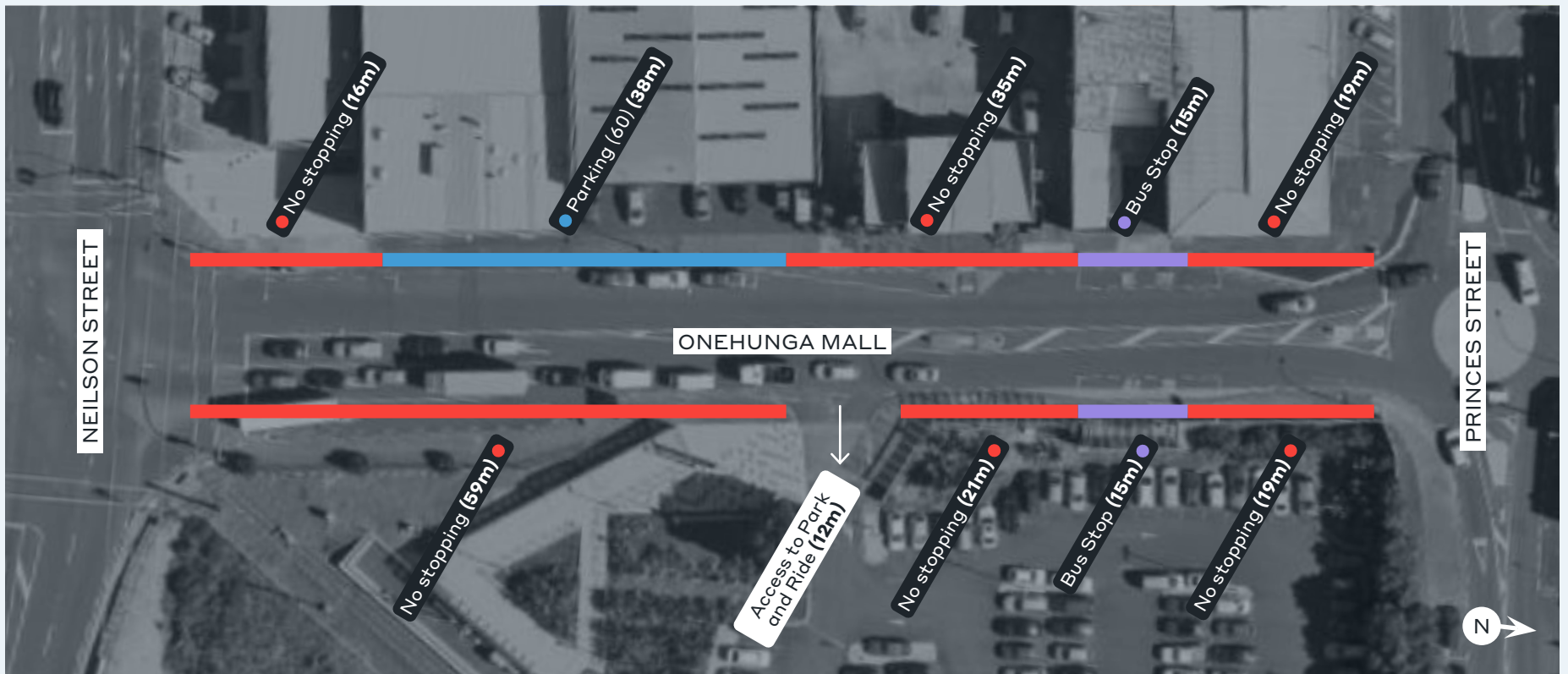


Figure 12 Onehunga Mall - existing kerbside allocation

Key Findings

Our key finding is that the kerbside currently supports movement over place, with limited provision for place elements at the moment. This end of Onehunga Mall does not meet expectations of a kerbside supporting a Civic Space. As this end of the town centre undergoes revitalisation, the function of the street will need to perform much more of a Civic Spaces role which will require a reallocation of the kerbside towards more pick-up/drop-off and enhancing the urban realm to make it a more comfortable place to dwell and accessible to people of all ages and abilities. There will also be a greater need for multi-modal access to the station and to local businesses and residences, to evolve Onehunga into a mobility hub that supports the local community.



ELEMENT	COMMENT
Parking	Some short stay parking supporting local businesses. No Loading Zone allocation although this is provided via rear laneway access. Large supply of car parking in the area.
Urban realm	Kerb buildouts help to improve safety and amenity, although these are only at intersections. There is an absence of greenery and seating.
Pedestrians	Limited pedestrian crossing opportunity – a refuge at the bus stop and Princes Street and signalised crossing at Neilson Street
Buses	Bus stop provision on each side provides interchange opportunity with trains. There are no other bus stops provided on Onehunga Mall to the north - buses travel between the bus interchange and the train station via Selwyn Street and Princes Street
Cycling	No cycling lanes – missed opportunity to support local access to / from town centre and train station
Taxi	No Taxi Zone or designated pick-up/drop-off location results in fewer opportunities for people to transfer or access local businesses.
Ride share	No designated pick-up/drop-off locations.
Movement	A lot of No Stopping zones are supporting the greater movement function at the southern end of Onehunga Mall – allowing for multiple traffic lanes to cater for high volumes, vehicle flows and speed, and diverse movements at Neilson Street as well as access to the park-and-ride facility adjacent to the station. As a result, the movement function dominates the place function on Onehunga Mall.

Table 6 Kerbside Allocation - Onehunga Mall, Auckland

SUMMARY

Both case study locations are identified as Civic Spaces. Crown Street performs well in supporting access and place functions. The kerbside services both local and regional trips. However, whilst it supports access to a variety of destinations which change across the day, the kerbside is still dominated by car storage which is not the most efficient way of getting people to and from the place. The flexibility in terms of switching between car parking and loading across the day does not go far enough. It is still car-focused and is an inefficient use of the kerbside. There are limited opportunities for passenger pick-up/drop-off; activities at the kerbside such as outdoor dining, events, and recreation; or space for cycling couriers or deliveries to park or pick-up from local cafes and restaurants.

Whilst most of the placemaking characteristics of Onehunga Mall are at the northern end of the corridor, there is little in the way of amenity at the southern end for pedestrians or to attract people to stay. The southern end of Onehunga Mall, where our kerbside allocation snapshot was taken, is more of a transition

point between a Civic Space and a Main Road (on Neilson Street). It is still an important arterial road with high traffic volumes. The park-and-ride provides access to train services to destinations such as Auckland CBD from more regional origins. That said, there is significant scope for more active street frontages and improved amenity to revitalise the Onehunga town centre. The development of this end of the corridor presents an opportunity to improve the place function and support the vision for a Civic Space.

Both case studies demonstrate that kerbside allocation does not effectively reflect demand. The private car is only one of the modes that people use to access an area, but it dominates the kerbside. Passenger pick-up and drop-off by transit or ride share, walking and cycling are key modes for people to access these places but are not as well provided for. Demand for ride sharing is growing, yet neither location has designated space to enable pick-up and drop-off. It is an example of how current methods of managing and prioritising access to the kerbside are failing our cities and not

keeping pace with peoples' changing preferences and the ambitions of the local community and of local businesses.

These case studies show that there continue to be opportunities to improve prioritisation and management of the kerbside to better support people and place - currently it does not do this. Now is the time to intervene to achieve better use of the kerb so that we anchor the new mobility conversation into achieving our vision for streets and places, rather than being reactive. What do we want our streets and places to look like? How do we want them to function? How do we ensure they are Future Ready? This helps us to realise Shared Mobility Principle #2 to focus on moving people not cars. Looking forward, street design for both case studies will need to change to maximise the benefits of changes in technology and influence travel behaviours in a positive way. It is important that these changes are made early to enable the places to live up to their potential for people.



5 Exploring the Future of Kerbside

Future trends towards a hotter and drier climate, more extreme weather events, an increasing population, greater density, new technologies and disruptive services will influence people's expectations and values of the transport network and street environment into the future. This will increasingly impact the way in which we live, work and experience public life, which converges at the kerbside.

This section introduces two methods to help inform our understanding of what a street in 2050 could look like if we adhere to the Shared Mobility Principles:

- WSP's System Dynamics Tool demonstrates what the potential make-up of the vehicle fleet in 2050 could be – including electric vehicles, automated vehicles and ride sharing – if the Shared Mobility Principles were followed
- The people-centric design approach of the Movement and Place Framework updated to reflect the role of new mobility in different street types as we introduce WSP's New Mobility Update for the Movement and Place Framework.

The latter also presents a logic for deciding the functional and operational objectives of future streets and kerbside priorities, that are place context and policy sensitive. This is essential to enable decision-making right now by city leaders to enable our vision for our kerbsides in the context of emerging mobility technologies. We can harness these mobility and technology benefits to help us achieve better places in our cities.



SCENARIO TESTING

System Dynamics

Systems dynamics is an established technique used to model and understand the non-linear behaviour of complex systems over time. It allows collaborative exploration of how different causal factors can shape the behaviour and development of systems, and importantly what decisions can result in better outcomes. Systems dynamics is a particularly useful tool to inform planning decisions where there are high levels of disruption, such as the future of the kerbside.

We used WSP's System Dynamics Tool to better understand the implications for electric vehicles, automated vehicles and ride sharing on the future of the kerbside if we adhere to the Shared Mobility Principles.

We developed and tested a series of scenarios based on different factors associated with the Shared Mobility Principles over a 30-year horizon, consistent with scenario planning principles. Table 7 outlines the different model input variables, and how these align to the Shared Mobility Principles. The scenario used in this paper is the one which best represents living the Shared Mobility Principles, which is compared to a baseline scenario.

This analysis reveals insights into what achieving the Shared Mobility Principles could mean for the mix of ride sharing, electric vehicles and automated vehicles on our streets around the year 2050. We then rely on our transport and place planning leaders to interpret what key design decisions might be taken for places and our case study locations.

	SHARED MOBILITY PRINCIPLE	MODEL VARIABLE
Process	#1. Plan cities and mobility together	<ul style="list-style-type: none"> - Access to Electric Vehicle chargers at home and work (%) - Public charger availability (%) - Transit price index (%) - CO2 tax rate - Electric Vehicle purchase subsidy (%)
	#4. Engage stakeholders in decision making	<ul style="list-style-type: none"> - Global marketing campaign timings for Electric Vehicles - Global marketing campaign timings for Automated Vehicles
City Strategy and Goals	#6. Transition Towards Zero Emissions	<ul style="list-style-type: none"> - Electric Vehicle purchase subsidy (%) - CO2 tax rate - Charging availability at home and work (%) - Public charger availability (%) - Electric Vehicle marketing campaign (year)
	#7. Seek Fair User Fees	<ul style="list-style-type: none"> - Ride sharing price index - Transit price index - Initial Automated Vehicle price mark up (%) - Target Automated Vehicle price mark up (%)
	#8. Deliver Public Benefits via Open Data	<ul style="list-style-type: none"> - Not applicable
	#10. Automated Vehicles Must Be Shared	<ul style="list-style-type: none"> - Year of Automated Vehicle introduction - % increase in Automated Vehicle sales from new user groups - Initial price of Automated Vehicle compared to other vehicles (%) - Target Automated Vehicle price compared to other vehicles (%) - Global Automated Vehicle marketing campaigns (year)
Street Design Outcomes	#2. Move people not cars	<ul style="list-style-type: none"> - Transit cost index
	#3. Encourage efficient use of space and assets	<ul style="list-style-type: none"> - Access to Electric Vehicle chargers at home and work (%) - Public charger availability (%) - Percentage of ride railing trips which are shared
	#5. Design for equitable access	<ul style="list-style-type: none"> - Percentage of Automated Vehicle sales which are from new groups (which did not previously own vehicles)
	#9. Promote integration and seamless connectivity	<ul style="list-style-type: none"> - Year of Automated Vehicle introduction - Ride sharing price index - Transit price index - Electric Vehicle charger availability in public and at work (%)

Table 7 Shared Mobility Principles captured within the System Dynamics Tool

Ride sharing

Our scenario applying the Shared Mobility Principles saw an increase in the amount of ride sharing as a share of all trips (see Figure 14). These are generally trips that are arranged through an app-based platform that connects drivers with customers. Notably, this increase was not linked to a decline in transit trips – indicating that ride sharing can support transit journeys, particularly for first-mile and last-mile trips. The tool does not capture relationships with walking or cycling trips.

Following the Shared Mobility Principles means a greater share of trips will be taken by ride sharing. It is important to also consider that at times of day when ride sharing is at its peak, the proportion of rideshare vehicles in areas like Crown Street and Onehunga Mall with evening dining venues is likely to be higher than the average outlined above. However, future provision must also consider our vision for the place and ensuring that the kerbside is prioritised accordingly. A vision guided by the Shared Mobility Principles¹⁰ means prioritising “walking, cycling, public transport and other efficient shared mobility, as well as their interconnectivity. Cities shall discourage the use of cars, single-passenger taxis, and other oversized vehicles transporting one person.”

There is opportunity for inefficient parking spaces to be replaced with greater access provision for walking, cycling, transit and pick-up/drop-off for other shared services.

Electric Vehicles

The Shared Mobility Principles scenario leads to a faster uptake of electric vehicles than the baseline, with over three times more by year 10 and more than double by year 30. This growth accelerates and uptake more than doubles between years 10 and 20. The electric vehicle share of the total vehicle fleet changes relatively slowly due to the average age of Australia and New Zealand’s private vehicle fleet at approximately 10 and 15 years respectively. Electric vehicle uptake rapidly increases in line with price signals around comparisons with non-electric vehicles, any form of CO2 tax and increases in model availability.

A significant proportion of the vehicle fleet is likely to be electric in 30 years’ time under the Shared Mobility Principles scenario. For our case study locations, we need to consider whether charging infrastructure is appropriate in Crown Street and Onehunga Mall or nearby locations, to help encourage people to visit and dwell. It is likely that battery improvements will eventually reduce the need for charging at places like this and will predominately occur at people’s homes and businesses. The uptake of electric vehicles will reduce noise and help to improve air quality.

RIDE SHARING – SHARE OF ALL TRIPS

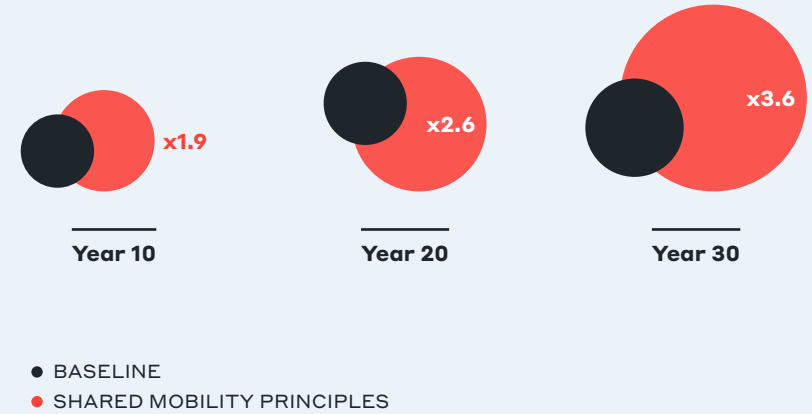


Figure 14 Ride sharing as a share of all trips - relative comparison between Baseline and Shared Mobility Principles Scenarios

ELECTRIC VEHICLE – FLEET SHARE

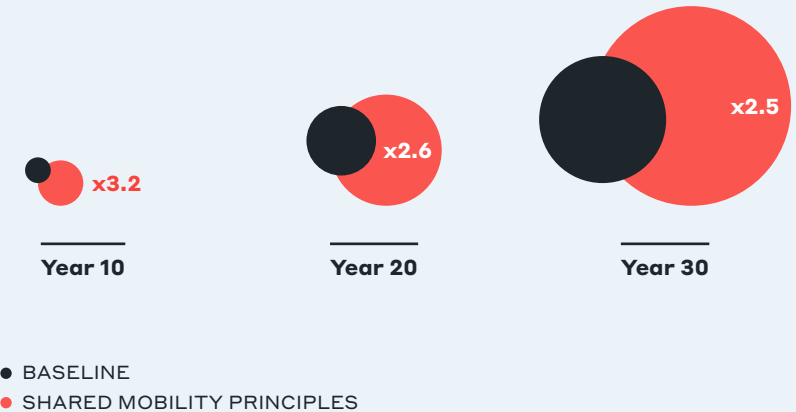


Figure 15 Fleet share of Electric Vehicles - Relative Comparison between Baseline and Shared Mobility Principles Scenarios

Automated Vehicles

The share of automated vehicles in the vehicle fleet is expected to increase rapidly after the technology is proven and accepted to be safe by the community. We assumed that full autonomous, level 5, vehicles are introduced in year 20, quite more advanced than those already in the market today. Professional opinions about timing around this highly uncertain area differ, but automated vehicles could potentially form the majority of the fleet over a 50-year horizon.

The widespread availability of fully automated vehicles supports Shared Mobility Principle # 5 – Design for Equitable Access, by allowing access to personalised and independent motorised transport to a range of new user groups such as teenagers, the elderly and people with disabilities.

Automated vehicle ownership models are a key point of interest for policy makers over recent years. The potential for new user groups reinforces the importance of a fleet model where usage is shared amongst different users on a subscription style basis,

rather than personal ownership. The latter could lead to an increase in congestion from extra distance travelled through vehicles running empty and increased parking requirements.

Within the model, there is an assumed mix of personally owned AVs and those operated by fleet providers, where usage is shared amongst different users on a subscription style basis. This supports Shared Mobility Principle # 10 – Automated Vehicles Must Be Shared in Dense Urban Areas. Without AV sharing there is potential for large increases in distances travelled by vehicles with a knock-on impact on congestion levels. There is a need for governments to take proactive measures to reduce these behaviours.

The uptake of automated vehicles will result in a mixed fleet as we transition from self-drive vehicles over many years to a shared fleet. This will have implications for the streetscape including place outcomes and the kerbside as operational requirements differ. For the case study locations, it is important to respond to this change in technology and fleet

ownership in a manner that creates the best place outcomes. Like ride sharing, provision for automated vehicles should be designed to discourage single-occupant vehicle trips and should not be at the expense of more sustainable modes such as walking, cycling, and transit. There is limited scope to manage occupancy levels at the kerbside – this is more of a policy issue for the wider network operations. However, there is opportunity for supporting shared automated vehicle trips through the removal of parking for more kerbside pick-up/drop-off locations to enable smooth operations of automated vehicles. For spaces such as Civic Spaces or Main Streets, this needs to be well considered. For example, some parking could be diverted to pick-up/drop-off with some reallocated to wider footpaths and greater place outcomes. Any provision for automated vehicles must be at the expense of general parking and if automated vehicles bring a greater level of efficiency to utilising the kerbside, the argument to reallocate roadscape and kerbside for efficient modes such as walking, cycling, and transit and better place amenity becomes stronger.



MOVEMENT AND PLACE FRAMEWORK FOR NEW MOBILITY

Just as the Movement and Place Framework can be used to identify peoples' journey and placemaking priorities in different street types today, it can be used to identify which type of new mobility may be relevant for different types of streets. This means we can start planning now for how we want to make the most of new mobility to achieve our vision for our kerbsides.

We are introducing WSP's New Mobility Update for the Movement and Place Framework to help us to better understand the customer requirements of new mobility options for different street types and plan street environments to support them. Beyond network operation for electric, automated and shared vehicles, this includes consideration of the kerbside management of rideshare, on-demand and smart parking, and placemaking features such as charging, docking, digital information services, trees and seating. It also considers the reallocation of road space to support new mobility outcomes and place goals.

In using the Movement and Place Framework to examine future conditions it is assumed that the overarching design outcomes of different street types does not change in the future. This is saying that Civic Spaces will continue to facilitate local access and placemaking activities, whilst Main Roads would prioritise high volumes of movement and long distance journeys.

Kerbside Movement and Place Design Features for New Mobility

The movement priorities and end-of-trip place elements that people using new mobility modes are likely to prioritise are set out in Table 8. Each new mobility mode has been grouped with its traditional counterpart e.g. car drivers of today with connected, autonomous and electric cars in the future.

New mobility options will broaden journey choices and peoples' expectations of services, operations and infrastructure in the street and at the kerbside. It is important that they also increase a shift to transit – a key principle for vibrant cities. There is a common focus in the discussion of new mobility in industry on the movement needs and the size of these modal groups e.g. will autonomous and connected vehicles reduce or increase traffic congestion? Will bike share schemes increase active travel mode share?

However, from Table 8 it can be seen that the future design objectives for people driving cars or delivering freight – regardless of whether their vehicle is connected, automated, electric or shared – are likely to remain the same. People will still focus on journey time and reliability. However, the place needs will change. Design elements – such as kerbside pick-up/drop-off spaces and on street charging – will need to be considered; especially in street environments such as the Movement and Place Framework classifications Local Streets and Civic Spaces which are characterised by a lot of multimodal access.

Similarly, the design objectives for passengers riding on a bus – regardless of whether they are on an automated shuttle, on-demand bus, or electric bus – will remain the same. Passengers will be focused on journey time and reliability. However, the place needs will change. Bus stop facilities may require charging facilities, whilst on-demand services may require access to the kerbside via pick-up/drop-off spaces instead of the traditional bus stop.

One form of new mobility that bucks this trend will be electric personal mobility vehicles, including e-bikes and e-scooters. These are likely to involve changes to design objectives for both movement and places. Whilst they too will have additional placemaking needs – namely charging at end-of-trip locations, parking and pick-up/drop-off spaces – they can also have different movement design objectives to a regular bicycle due to an increased speed (noting some traditional cyclists travel as fast as an e-scooter or an e-bike). The traditional roadway is designed for vehicular speeds between the kerb and walking speed on footpaths. Bikes and scooters that can travel too fast to interact comfortably with pedestrians, and too slow to safely travel on high speed roads require us to rethink the traditional road cross section. A third, intermediate, movement speed – like segregated cycleways – may be required for street environments where these electric personal mobility vehicles are encouraged – such as Main Streets and Local Streets. They are less appropriate for Civic Spaces where lower speeds and greater mixing of modes are desired.



Table 8 Typical kerbside design features for new mobility

MODE	MOVEMENT	PLACE
CAR	<ul style="list-style-type: none"> - Vehicle travel time - Vehicle travel time reliability 	- General parking provision
Connected Car		
CAR SHARE		- Car Share parking provision
Autonomous Car		<ul style="list-style-type: none"> - General parking provision - Pick-up/drop-off provision
Electric Car		<ul style="list-style-type: none"> - General parking provision - Charging provision
Taxi		- Rank and pick-up/drop-off provision
Ride Share		- Pick-up/drop-off provision
Motorbike		- General parking provision
LIGHT RAIL	<ul style="list-style-type: none"> - Light Rail travel time - Light Rail travel time reliability 	- Light Rail stop facilities
BUS	<ul style="list-style-type: none"> - Bus travel time - Bus travel time reliability 	- Bus stop facilities
Autonomous Shuttle		
On Demand Bus		- Pick-up/drop-off provision
Autonomous on Demand Shuttle		
BIKE	<ul style="list-style-type: none"> - Cycle connectivity and flow - Cycling facilities - Cycling difficulty 	- Cycle parking features
Bike Share		- Shared Cycle facilities
WALKING	<ul style="list-style-type: none"> - Crossing opportunities - Walking comfort - Walking accessibility including for disabled 	<ul style="list-style-type: none"> - Pedestrian facilities - Pedestrian environment - Pedestrian security
Electric Bike Share	<ul style="list-style-type: none"> - Cycle connectivity and flow - Electric Cycling facilities - Electric Cycling difficulty 	<ul style="list-style-type: none"> - Shared Cycle facilities - Charging provision
Shared Electric Scooter	<ul style="list-style-type: none"> - Crossing opportunities - Scooter comfort - Walking accessibility 	<ul style="list-style-type: none"> - Shared Scooter facilities - Charging provision
Mobility Scooter	<ul style="list-style-type: none"> - Crossing opportunities - Scooter comfort - Scooter accessibility 	<ul style="list-style-type: none"> - Accessible pedestrian facilities - Pedestrian movement - Pedestrian security
FREIGHT	<ul style="list-style-type: none"> - Journey Time - Journey Time reliability 	- Loading Zones
Freight Vehicle		
Micro-mobility freight vehicle		<ul style="list-style-type: none"> - Cargo bike facilities - Scooter facilities
Drone delivery		- Drone zones

Street Design for New Mobility

We can update the modal choices used in today's Movement and Place Framework with new mobility as shown in Table 8. When applied to the different street types flowing from the Movement and Place Framework the future street design features can be systematically allocated. Table 9 shows this in practice.

Table 9 illustrates again that our future Main Streets and Civic Spaces will continue to juggle complex journey, access and placemaking functions at the kerbside. As such, a high level of kerbside productivity will continue to be required. This will need to be in conjunction with an emphasis on encouraging the most sustainable access mode consistent with their function. Future ready kerbsides are also likely to require far more flexibility to meet the needs of flexible mobility modes like on-demand buses and more personalised deliveries.

Many of the modes in the table on the previous page have little to no provision or design guidance. Currently, there is a lack of a framework for allocating and prioritising space on the kerbside based on productivity. Also, how do we balance people productivity with servicing productivity (i.e. freight delivery)? These decisions must be guided by the vision for the place.

STREET TYPE	KERBSIDE OBJECTIVES	FUTURE KERBSIDE LANE FEATURES	FUTURE FEATURES AT THE KERB
Main Roads	<ul style="list-style-type: none"> - Prioritises movement and minimises stopping except for interchange at network nodes 	<ul style="list-style-type: none"> - Segregated micro-mobility paths 	<ul style="list-style-type: none"> - E-charging at major bus / light rail stops
Local Streets	<ul style="list-style-type: none"> - Supports local access and amenity 	<ul style="list-style-type: none"> - Shared spaces without kerbside delineation 	<ul style="list-style-type: none"> - E-charging facilities (where they can't be provided off street) - Car share provision - Drone deliveries
Main Streets	<ul style="list-style-type: none"> - Enables transit journeys, local access and placemaking activities 	<ul style="list-style-type: none"> - Micro-mobility paths - Dynamic kerbside lane management 	<ul style="list-style-type: none"> - E-charging facilities - Shared cycle/scooter facilities - Drone deliveries - Pick-up/drop-off zones (people and goods)
Civic Spaces	<ul style="list-style-type: none"> - Facilitates local access and placemaking activities 	<ul style="list-style-type: none"> - Micro-mobility paths 	<ul style="list-style-type: none"> - E-charging facilities - Shared cycle/scooter facilities - Drone deliveries - Pick-up/drop-off zones (people and goods)

Table 9 Typical kerbside lane and place design features by street types for new mobility

BROUGHT TOGETHER – KEY DESIGN IDEAS

The insights from applying WSP's Systems Dynamics Tool and WSP's New Mobility Update for the Movement and Place Framework are now brought together. This brings key design ideas that will help shape our understanding of what applying the Shared Mobility Principles may look like for Crown Street in Sydney and Onehunga Mall in Auckland.



Build flexibility into streets

There is an opportunity for streets to be used more dynamically through applying the intelligence of insightful analytics to manage kerbside use, combined with physical and technology measures to reduce street clutter associated with optimised and dynamic signage, undergrounding utilities and reducing telecommunication assets. This enables streets to be designed for people and activities that change throughout the day, maximising the efficiency of the kerbside to achieve the vision for the place. This includes supporting the reallocation of road space to more productive place uses.



Reallocating road space

Implicit in most of the design ideas offered here is that new mobility will require less space dedicated for movement. We must always be considering whether movement is the best use of each square centimetre of road space. In the case of a Civic Space, underutilised road space may be better served by a tree or seating to support the place function and ensuring the place is accessible to people of all ages and abilities.



Vehicle types

An increase in transit use for peak hour trips in many cities, and cycling growth, and the more recent rise in rideshare. A reduction in private car use for access to cities. Train and bus services will continue to perform a mass transit task.



Third Speed

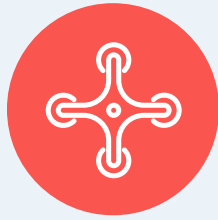
Increasing e-mobility/micro-mobility with electric bicycles, scooters and skateboards forming part of the transport solution. Segregation will likely lead to higher operating speeds. A key design question will be whether to cater specifically for these third speed vehicles. As adoption increases more parking will be required at places where we want to encourage access by micro-mobility, such as local high streets.



Ride share

A greater share of trips will be taken by ride sharing requiring a shift away from conventional car parking towards space for pick-up/drop-off during busier times. This will help to enable local goals by improving access for people to restaurants, cafes and other businesses during peak periods. It also makes it easier for people from a wider catchment to access these places and businesses. However, provision for pick-up/drop-off must be balanced to ensure that it does not detract from the most important modes for retail customers - walking, cycling and transit.

Figure 16 Key street design ideas



Drone-based deliveries

The kerbside may have some role in an aerial drone solution, but only after resolving several other factors around airspace use and public safety. Ground-based drones have also been discussed as an option for last mile freight bringing further safety considerations to work through at the kerbside.

Drone-based deliveries can enable quick service for people outside the delivery catchment of micro-mobility providers giving another opportunity for businesses and consumers.

However, consideration is needed as to how they contribute to place outcomes including the reduced human interaction, noise and safety factors.



Electric Vehicles

Electric vehicles will have an increasing share of the vehicle fleet. This is encouraged as it brings broader environmental benefits such as lower emissions and noise pollution.

Charging infrastructure may be appropriate in certain streets or nearby locations, to help encourage people to visit and dwell. However, consideration needs to be given not to encourage longer stays in high demand kerbside locations for example, on-street charging infrastructure is not appropriate for a civic space. Ideally, at or near home-based charging will become the norm.



Automated Vehicles

Estimates of when highly automated robo-taxis may be on the road in Australian cities vary between 5 and 50 years. However, it is very unlikely to be full-fleet by 2050. There will be a mixed fleet as we transition from self-drive vehicles. The kerbside can be prioritised to incentivise desired modes. For example, kerbside management could include measures to prioritise walking, cycling, pick-up/drop-off from transit and shared vehicles in urban areas in line with the Shared Mobility Principles and to manage the impact of automated vehicles. Automated buses could also be prioritised and are likely to be implemented more rapidly than automated cars.



Freight Consolidation

A substantial increase in small parcels will continue with cities looking for ways to limit vehicle movements. Freight consolidation supported by deliveries through micro-mobility during the day and larger vehicles out-of-hours will become the preferred approach for some centres.

This requires a dynamic approach to managing the kerbside and more space for small, automated delivery vehicles including bikes. There is an urgent need to define the productivity measure/benefit of freight/deliveries/loading space.



Deliveries by micro-mobility

Micro-mobility delivery services are likely to become more and more important for café and restaurant businesses and for last-mile deliveries. This creates greater demand for pick-up/drop-off zones on the kerbside as well as parking and charging locations. It also potentially reduces the demand for kerbside deliveries by vehicle. It taps into the discussion about catering for a third speed.

Figure 16 continued Key street design ideas

To achieve city wide social, economic and environmental goals, the balance of street types we have in our cities now and in the future needs to be considered.

Figure 17 draws on images from the WSP report Making Better Places. The images illustrate how the design elements identified for existing and future street types in the Movement and Place Framework evolve to create new streetscapes.

By way of example, the current Greater Sydney Metropolitan Road Network is comprised of approximately 80% Local Roads and less than 5% Civic Spaces. As trends such as greater densification of our urban areas occurs and the way in which we share our mobility and public spaces increases, the balance of these street types needs to shift. A greater proportion of Main Streets and Civic Spaces will be required on our networks to support increased placemaking and economic activity in our cities.

The combining of insights from WSP's Systems Dynamics Tool and WSP's New Mobility Update to the Movement and Place Framework has illustrated how adhering to the Shared Mobility Principles can facilitate this design shift and achieve city wide goals.

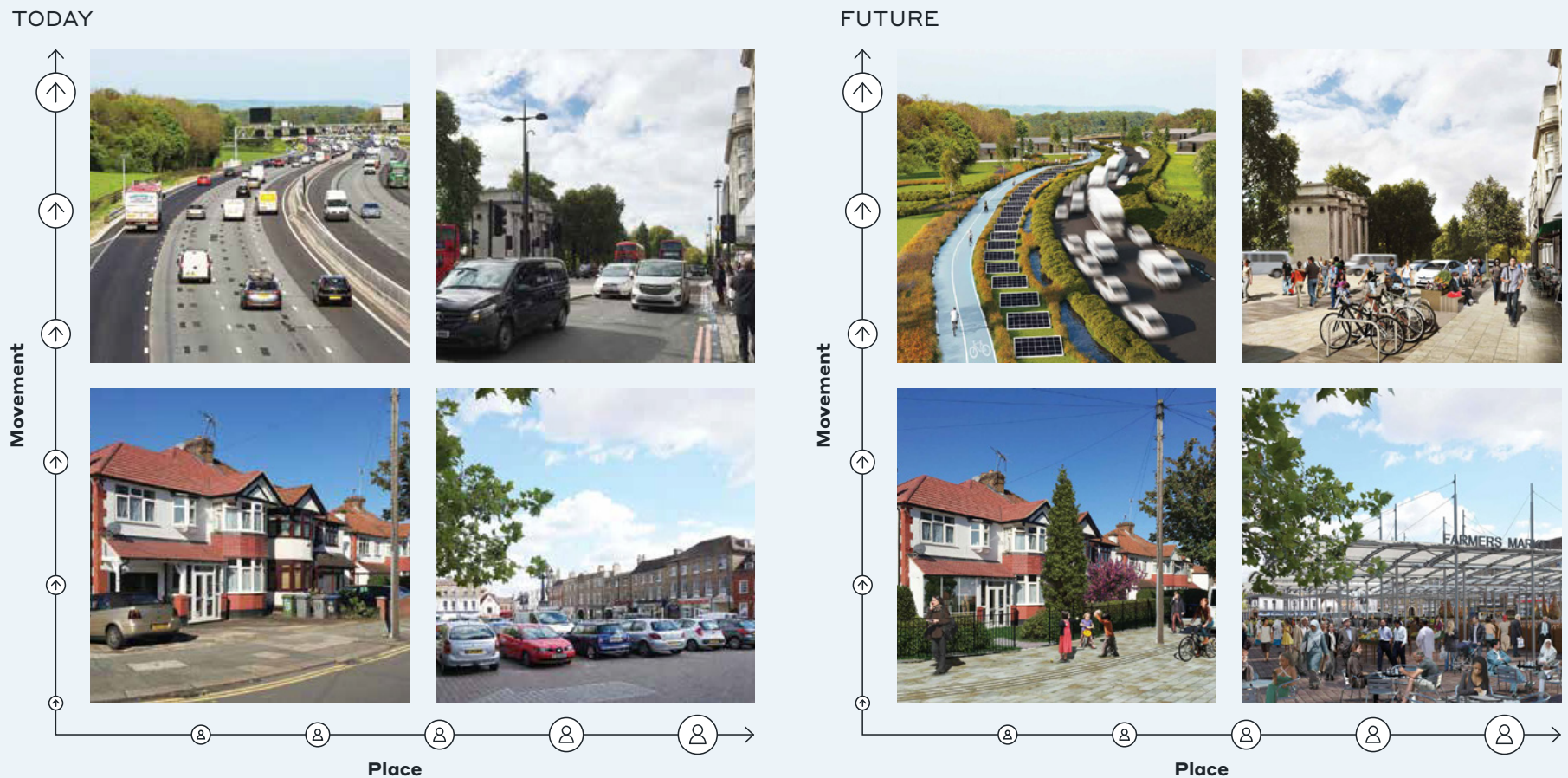


Figure 17 Applying the Movement and Place Framework to future scenarios

Source Adapted from Making Better Places <https://www.wsp.com/-/media/Sector/Global/Document/Making-better-places.pdf>

6 Anchoring Analysis in Place: Future Ready Kerbside

The application of WSP's System Dynamics Tool and the WSP New Mobility Update to the Movement and Place Framework provides some insights to what we might expect of a Civic Space into the future if we embrace the Shared Mobility Principles. This exercise helps to reveal the palette of mobility options for these types of places, as well as expectations for place activities, and the sorts of design decisions that follow. It is clear that we have a long way to go, the time to act is now.

As we move to a future lens, WSP considered what a future Civic Spaces street might look like given the uptake of new mobility whilst achieving the Shared Mobility Principles. This was considered in the context of each case study location.

WSP has developed draft overarching vision statements for what each case study location could look like in the future. This considers the strategic context, achieving the Shared Mobility Principles and the functional requirements a Civic Spaces street type will require as changes in technology and behaviour transpire.

These case studies are intended to provide an insight into the types of outcomes that can be achieved when adopting the Shared Mobility Principles in the context of a location's movement and place objectives. They are not intended to be interpreted as specific design recommendations. They provide food for thought with our learnings flowing through to our recommendations for city leaders in Section 7.

Crown Street, Surry Hills, Sydney – Future Ready Kerbside

Our guiding vision for Crown Street in 2050 is:

“Crown Street will be safe, inviting and accessible for all to experience its thriving culture. A streetscape prioritised for people. This includes people undertaking activities in place such as outside dining at restaurants/cafes, meeting friends, accessing shops or other services or simply recreating in repurposed dedicated shaded, green spaces and community spaces. Walking, cycling, micro-mobility, and transit will be prioritised over private vehicles including shared, electric and automated vehicles for people to access Crown Street.”

Key design features include:

- Flexible kerbside management – a greater proportion of kerbside allocated to more efficient or productive uses such as pick-up/drop-off, less general parking, continued access for buses and an increase in space for micro-mobility helps to reinforce Crown Street as a local destination to meet up with friends and access local services. The kerb is tech-enabled to support rapid changes in use by time of day or in response to major events. There is opportunity for more dynamic allocation of the kerbside through effective ‘sharing’ of zones dependent on the best use for a particular time. This could be managed through a dynamic pricing regime where the most productive uses that support the vision for the place are prioritised.
- Slower speed limits – in recognition that this is a Civic Space in a mixed environment of people, automated vehicles, traditional vehicles and micro-mobility.

- Maintaining two-way traffic lanes – movement is still an important function of Crown Street into the future and supports access by bus, vehicles, micro-mobility and walking.
- More space for people to relax – seating, shade and wider footpaths are a crucial part of this vision for Crown Street to be inviting for people to visit, interact and dwell.
- Narrower traffic lanes – slower speeds and improvements in vehicle technologies enable narrower lane widths and less space devoted to movement, with space reprioritised to people.
- Limited availability of electric charging facilities – there are no vehicle charging stations on street in order to prioritise pick-up/drop-off over parking. This could be provided in an adjacent street. The exception is for micro-mobility with charging facilities encouraging people within the catchment to visit and dwell at Crown Street.
- More greenery – we know that temperatures will be higher in 2050 than they are today. Green walls, planting next to the street along with existing mature trees are important as a part of the green grid through Sydney at improving liveability and addressing the urban heat island effect.
- Welcoming micro-mobility – kerbside space for pick-up/drop-off supports café and restaurant deliveries while charging points encourage locals to visit this Civic Space.
- A shift from car storage to pick-up/drop-off means car spaces can be more productive and fewer of them are needed to support activity - therefore a reduction in space allocated to cars in the future kerbside.
- Greater use of bikes for last mile deliveries means less loading space is required at the kerbside.

TODAY



**CROWN ST
SURRY HILLS,
SYDNEY**

2050



2050

CROWN ST SURRY HILLS, SYDNEY



Crown Street Future Kerbside Allocation

This section delves into some of the detail around kerbside management and how that could change to deliver on the future vision for the place. This analysis is downstream of the insights gained through interrogating WSP's System Dynamics Tool and WSP's New Mobility Update of the Movement and Place Framework and is intended for illustrative purposes rather than engineering design advice.

An illustrative exercise of reallocating parking and road space demonstrates how the Shared Mobility Principles can be applied at the kerbside. It considers the learnings around the uptake of shared vehicles as well as electric and automated vehicles. However, it recognises the different levels of priority appropriate for each mode (existing and future) for a Civic Space on the Movement and Place matrix. For example, the increased popularity of sustainable micro-mobility options such as electric bikes and scooters are accounted for.

Figures 18 and 19 show the kerbside allocation during the daytime (8am-6pm) that exists now and a potential 2050 example. The same is shown for the early morning and evenings in Figures 20 and 21. Meanwhile, table 10 sets out the rationale for each of these design changes.

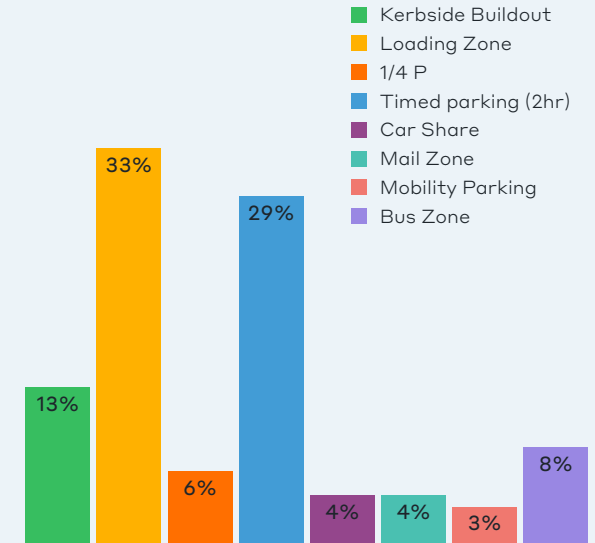
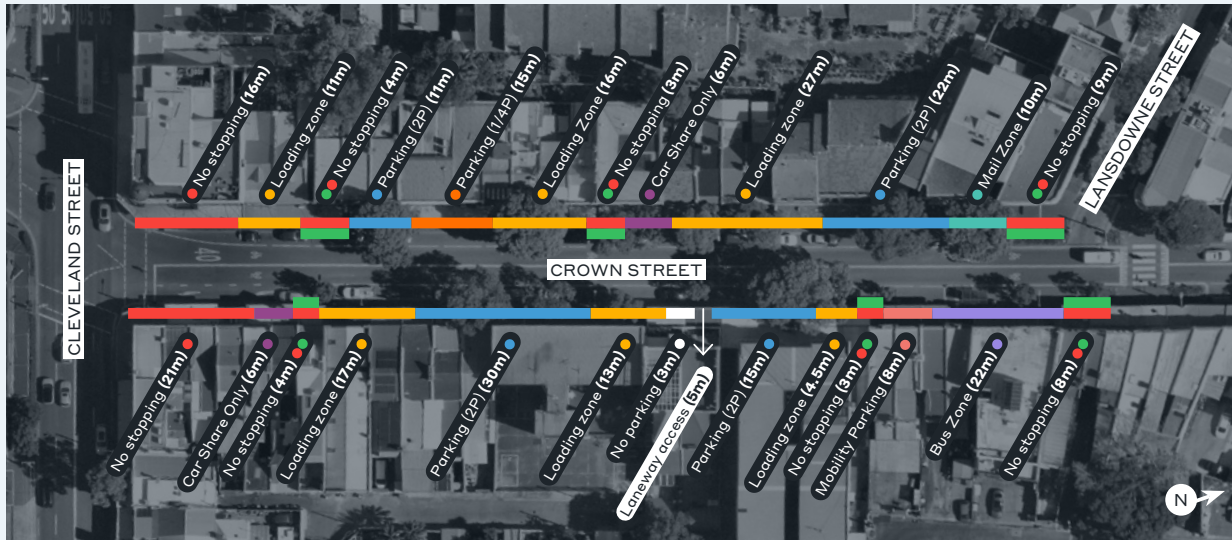
Figure 18 shows, in plan, the daytime allocation of various kerbside elements today compared to a potential 2050 example. Figure 19 presents this as an overall kerbside proportion. Recognising the temporal change in street function and access requirements, Figures 20 and 21 illustrate the flexibility in kerbside allocation that occur across the day by presenting an alternative evening provision.

Provision for loading zones is reduced during the day time, although loading is also possible in pick-up/drop-off zones. Additional loading zone space is now allocated in the evenings. Short term parking (1/4P, 2P and 4P) is predominately replaced with pick-up/drop-off zones which reflects and encourages greater use of shared and automated vehicles which require significantly less parking. Whilst not shown here, loading zones and passenger pick-up/drop-off zones could effectively be combined with dynamic allocation based on prioritising the most productive access mode at a particular time. Bus zones could be used for pick-up/drop-off when not in use by buses. Similarly, with mail zones.

Allocation for micro-freight (either motorbike or electric bikes) are also provided for. This also allows a reduction in space allocated for loading zones.



TODAY



2050

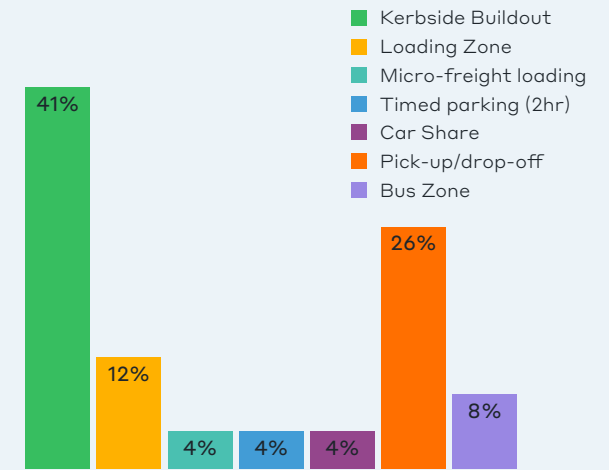
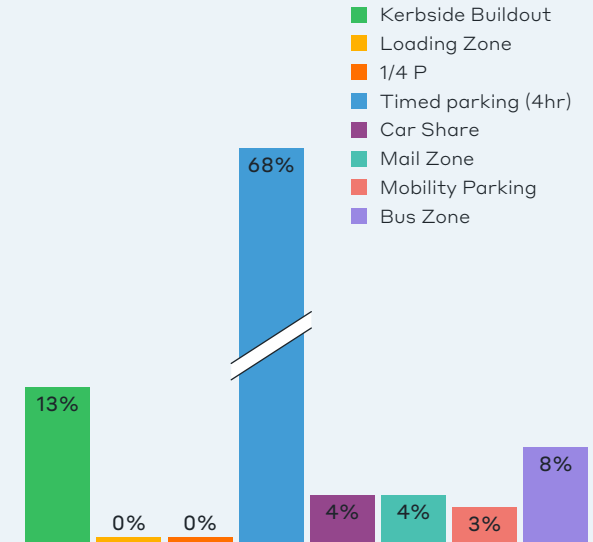


Figure 18 Comparison of existing and future concept kerbside allocation – Crown Street, Surry Hills (8am-6pm)

Figure 19 Proportion of kerbside allocation (existing and future concept) – Crown Street, Surry Hills (8am-6pm)

TODAY



2050

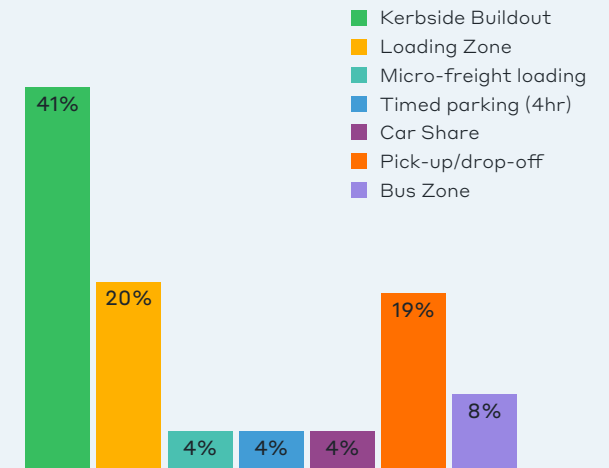


Figure 20 Comparison of existing and future concept kerbside allocation – Crown Street, Surry Hills (early mornings and evenings)

Figure 21 Proportion of kerbside allocation (existing and future concept) – Crown Street, Surry Hills (early mornings and evenings)

Table 10 Conceptual changes from Crown Street to meet the Shared Mobility Principles as a Civic Space

ELEMENT	CHANGE	REASONING
EXISTING KERB USES		
1/4P Parking	<ul style="list-style-type: none"> - Rename as Pick-up/Drop-off Only Zone 	<ul style="list-style-type: none"> - Clearer messaging on the intended kerbside use
2P Parking	<ul style="list-style-type: none"> - Remove from eastern side and replace with widened footpath and dining/greenery/street furniture. - Retain 2 to 3 spaces on western side at southern end. - Replace others with Pick-up/Drop-off Only Zone 	<ul style="list-style-type: none"> - Supports Civic Spaces by creating more space for people to stay and mingle - Increased use of mobility scooters with ageing population require more space on footpath – design for equitable access - More productive use of kerb space - Higher % of shared services and automated vehicles will require less parking - Discouraging long-term parking in favour of uses with greater people movement and access.
Loading Zone	<ul style="list-style-type: none"> - Remove from eastern side and replace with widened footpath and dining/greenery/street furniture. - Rename most western side spaces as Pick-up/Drop-off Only Zone reverting to Loading Zone late in evenings and early morning. - Some Loading Zone spaces retained. 	<ul style="list-style-type: none"> - Supports Civic Spaces by creating more space for people to stay and mingle - Increased use of mobility scooters with ageing population require more space on footpath – design for equitable access - Clearer messaging on the intended kerbside use - Flexible zones to reflect temporal changes in function - Increased demand for delivery using bikes
Mail Zone	<ul style="list-style-type: none"> - Replace with Micro-freight Loading Zone 	<ul style="list-style-type: none"> - For motorbike and bicycle parking (loading only) - More diverse use of kerb space - Freight and mail consolidation happening at other locations
Bus Zone	<ul style="list-style-type: none"> - Add real-time information board 	<ul style="list-style-type: none"> - Bus stops still needed to serve longer journeys - Promote integration and seamless connectivity
Car share	<ul style="list-style-type: none"> - Retained 	<ul style="list-style-type: none"> - Supports notion of shared mobility - Only minimal provision and could be phased out as vehicle fleet become predominately shared and automated
Mobility Parking	<ul style="list-style-type: none"> - Enabled through pick-up/drop-off spaces 	<ul style="list-style-type: none"> - To be replaced with automated vehicles and served by Pick-up/Drop-off Only Zone
Kerbside buildouts	<ul style="list-style-type: none"> - Retain or replaced with widened footpath with further greening, fountain, outdoor dining. 	<ul style="list-style-type: none"> - Supports Civic Spaces by creating more space for people to stay and mingle - Focus on moving people not cars - Increased use of mobility scooters with ageing population require more space on footpath – design for equitable access
Bike parking	<ul style="list-style-type: none"> - Provide more spaces on footpath (out of way of pedestrians) 	<ul style="list-style-type: none"> - Increased cycling - Improved accessibility
Traffic lane	<ul style="list-style-type: none"> - Narrow lanes with lower speed signage, cyclists on the road 	<ul style="list-style-type: none"> - Safer shared street - Civic Spaces

Table 10 continued Conceptual changes from Crown Street to meet the Shared Mobility Principles as a Civic Space

ELEMENT	CHANGE	REASONING
FUTURE MOBILITY PROVISIONS		
Separated Bike / Scooter Lane	- No	<ul style="list-style-type: none"> - No provision of third speed lane for e-bikes and e-scooters to discourage high-speed through movements in a Civic Space - Separated lane already exists on parallel Bourke Street
Shared Bike / Scooter Parking Zones	- Yes, provide parking facility near bus stop	<ul style="list-style-type: none"> - Increased use of shared bikes and scooters - Avoid shared bikes and scooters blocking footpath - Promote integration with buses and seamless connectivity – supports first mile/last mile trips
E-bike / E-scooter Charger	- Yes, provide chargers at Shared Bike / Scooter Parking Zones	<ul style="list-style-type: none"> - Increased use of e-bike and e-scooter following EV trends - Minimising informal parking and street clutter
EV Charger	- No	<ul style="list-style-type: none"> - Kerbside in Civic Spaces should not be used for charging due to increased street clutter and encouraging long stay in high demand locations.
Land use	- Retain	<ul style="list-style-type: none"> - The existing uses support day and night time visitation and activity, this is to be strengthened and celebrated.

Onehunga Mall, Onehunga, Auckland – Future Ready Kerbside

Our guiding vision for Onehunga Mall in 2050 is:

“Onehunga is a town centre transformed. The streetscape has evolved to attract more people eating outside at restaurants and cafes, meeting friends, visiting shops or other services and interchanging to transit. It is safe, inviting and accessible for all to experience its history and culture.

The interchange function of Onehunga has strengthened with more people moving to the area (especially south towards the train station), the industrial and commercial activity has strengthened and the main street starts to attract businesses with active frontages. This has resulted in greater priority for cycling, walking and micro-mobility and pick-up/drop-off for vehicles.”

There are grand plans for Onehunga town centre being led by Auckland Council. This covers the blocks north of Neilson Street, including the block we have focused on for our review of kerbside allocation. Part of this revitalisation is to spread the existing buzz of the mall into the rest of the town centre. There are various plans for improvements to transport including a new integrated transport services interchange, increased heavy rail services, an extension of the heavy rail line to Manukau or a new light rail line to Auckland Airport. This white paper does not aim to align or differ from any of these. It is conceptual only and provides an example of what can be done on the kerbside. That said, it does not necessarily preclude any options.

It is acknowledged that today, relatively large traffic volumes use this part of Onehunga Mall to access the motorway. This conceptual look at this section of the Mall makes broad assumptions that in 30 years' time this traffic, as part of the town centre revitalisation, has been diverted around the southern end of the town centre. Obviously, further detailed studies would be required to confirm this. One reason we chose Onehunga as a case study is because it is quite similar to other town centres; it is not just the characteristics of Onehunga but also the applicability to other areas within Auckland and other cities in Australia and New Zealand.

The following images show what revitalisation of this area of the town centre could look like in 2050. Movement through the street can still be maintained, although with greater mode choice, while at the same time providing for local businesses and greater street activation.

Key design features include:

- A redeveloped transport interchange – the existing park-and-ride facility replaced with a multi-modal transport hub that supports pedestrian, cyclist, scooter, bus and electric vehicle access. Buses would no longer stop on the street in this section of road but rather access the mobility hub to interchange or access the local services, and continue to stop on-street beyond the interchange. It is assumed that the existing bus interchange to the north on Upper Macquarie Place would be relocated within this mobility hub. The hub would also include a drop-off and pick-up zone. The role of buses as a primary method for feeding this interchange and part of the town centre will be reinforced by this design and into the future.
- Maintaining two-way traffic lanes – movement is still an important function of Onehunga Mall into the future and supports access by bus, vehicles, micro-mobility and walking. However, less capacity is provided as through traffic is largely assumed to be diverted away from this section of Onehunga Mall.

- Less road space allocated to cars – excess lane width allocated to a widened footpath and bi-directional protected bike lane that provides easier and safer access to the interchange for cyclists. The bike lanes could revert to uni-directional on each side of the road beyond this block outside the interchange. Narrower traffic lanes encourage slower speeds while improvements in vehicle technologies require less space devoted to movement, with space reprioritised to people.
- Multi-functional kerbside – parking and ‘no stopping’ on one side replaced with loading zone, car share and pick-up and drop-off in-line with appropriate priority for Civic Spaces.
- Pick-up and drop-off provided on western side for northbound trips and within the interchange for southbound trips.
- A new pedestrian crossing – enabled by lower traffic speeds, provides greater pedestrian access to the transport hub as well as to other new land uses.
- More space for people to relax – seating, shade and wider footpaths are a crucial part of this vision for Onehunga Mall to be inviting for people to visit, interact and dwell.
- A change in land use – retail, commercial and residential integrated within new development above transport interchange and on opposite side of the road. These help to activate the street making it more lively, safe and an attractive place to spend time.
- Welcoming micro-mobility – kerbside space for pick-up/drop-off supports café and restaurant deliveries while charging points encourage locals to visit this Civic Space.

TODAY



ONEHUNGA MALL
ONEHUNGA,
AUCKLAND

2050



ONEHUNGA MALL ONEHUNGA, AUCKLAND

2050



Onehunga Mall Future Kerbside Allocation

Figure 22 shows, in plan, the allocation of various kerbside elements today compared to a potential 2050 example. Figure 23 presents this as an overall kerbside proportion. Given the existence of the transport hub and the less dynamic nature of this end of Onehunga Mall, the arrangements are 'all day', however, there could easily be scope for the allocation to change throughout the day into the evening and weekends.

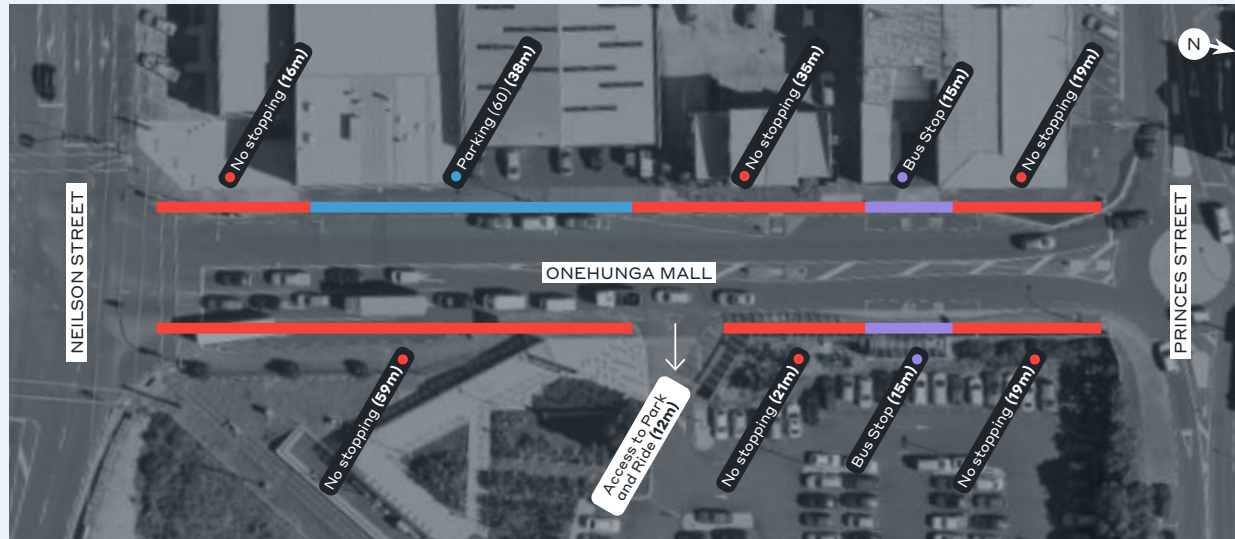
The pedestrian amenity is poor and does not yet represent the aspirations for a Civic Space. There is limited space for people to dwell or for restaurants or cafés to provide outside dining. The traffic lanes are wide and designed for higher speeds. The 2050 version shows that by adopting the Shared Mobility Principles and applying appropriate priority based on the Movement and Place street function (Civic Space), the allocation of the kerbside uses can be more productive.

The 2050 version shows that with some narrowing of lanes, there is potential for significantly more of the kerbside to be allocated for pedestrians and for activities such as outside dining as well as providing for alternative modes such as bikes and scooters. Moving the bus stops into the interchange also enables the footpath widening. Parking and 'no stopping' is replaced with a variety of access opportunities in the form of loading zones, car share and importantly, pick-up/drop-off provision. These support the variety of new land uses as well as access to the transport hub.

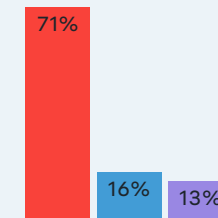
Figures 22 and 23 show the kerbside allocation that exists now and that which is proposed for 2050. Meanwhile, table 11 sets out the rationale for each of these design changes.



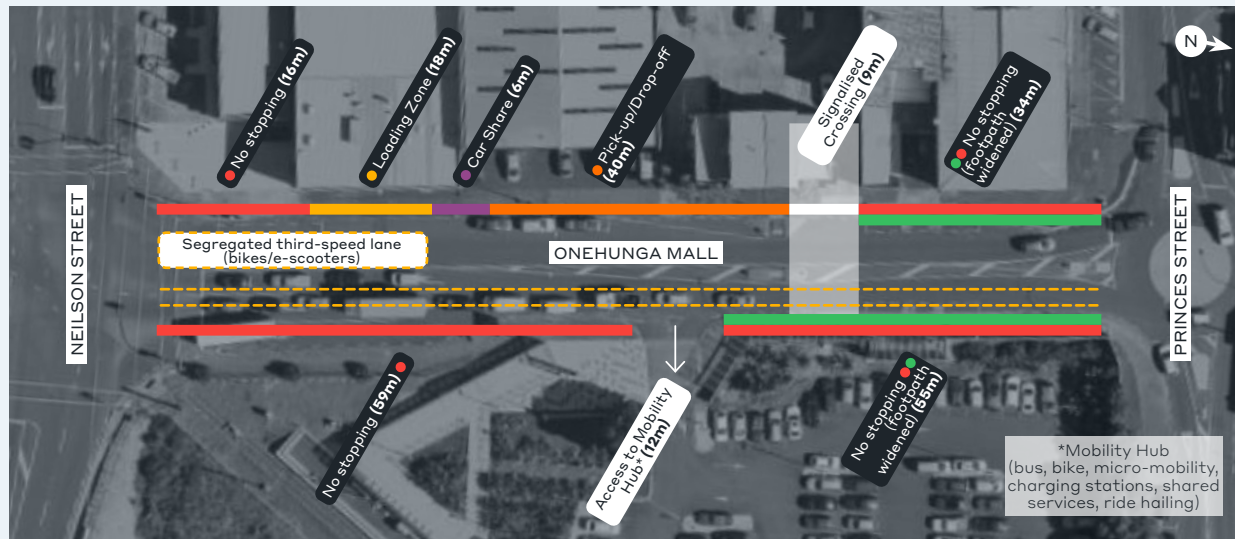
TODAY



- No Stopping
- Timed parking (1hr)
- Bus Stop



2050



- No Stopping
- Loading Zone
- Car Share
- Pick-up/drop-off
- Pedestrian Crossing
- No Stopping (widened footpath)

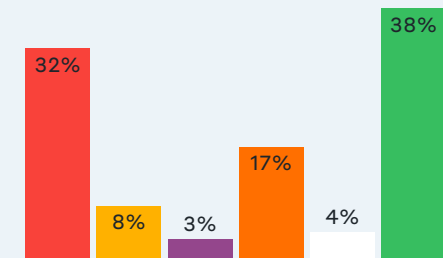


Figure 23 Proportion of kerbside allocation (existing and future concept) – Onehunga Mall, Onehunga

Figure 22 Comparison of existing and future concept kerbside allocation – Onehunga Mall, Onehunga

Table 11 Conceptual changes for Onehunga Mall to meet the Shared Mobility Principles as a Civic Space

ELEMENT	CHANGE	REASONING
EXISTING KERB USES		
Parking 1hr	- Convert to Car Share spaces, Pick-up/Drop-off Only Zone and Loading Zone.	- Responds to change in private car ownership and increase in ride sharing. - Greater provision of pick-up/drop-off zone in daytime could be possible, with some reverting to loading zone late in evenings and early morning. These flexible zones would reflect temporal changes in function
Park and ride	- Convert to Mobility Hub with signage showing provisions	- Potential retail/commercial/residential development on park-and-ride. - Allows for greater integration between modes and seamless connectivity. - Parking largely becomes redundant with greater transit accessibility and other mobility provisions, including micro-mobility, automated vehicles and shared services
No parking	- Remove	- Replaced by bike lane to support Civic Space and improve local accessibility
Bus zone	- Relocate bus interchange to be close to the train station within Mobility Hub	- Potential co-location of bus interchange within the Mobility Hub - Allows for greater integration between modes and seamless connectivity
Kerbside buildouts	- Extend (widen) footpath	- Supports place function (Civic Spaces) with people mingling, dining at café - Increased use of mobility scooters with ageing population require more space on footpath
Traffic lane	- Narrow traffic lanes	- Heavy traffic discouraged in Civic Spaces - Safer
Bike lane	- Add segregated bike lanes with cyclists and e-scooters	- More pedestrian and cycling space in Civic Space, responds to growth in micro-mobility modes
Bike parking	- Provided within Mobility Hub	- Increased cycling - Increased accessibility
Footpath	- Increased lighting	- Improved safety (real and perceived), improved amenity and sense of place

Table 11 continued Conceptual changes for Onehunga Mall to meet the Shared Mobility Principles as a Civic Space

ELEMENT	CHANGE	REASONING
FUTURE MOBILITY PROVISIONS		
Crossing	- New crossing facilities for pedestrians	- Addressing safety concern for pedestrians and improving accessibility including vulnerable road users - Design for equitable access
Land use	- Cafés and mixed use building (retail podium, 5-storey apartment on top)	- Revitalisation of Onehunga and in particular, this southern end of Onehunga Mall - Support day and night time visitation and activity. - Potential redevelopment of park and ride - Transform into a Civic Space
Separated Bike / Scooter Lane	- Yes, provide bi-directional bike lane on eastern side	- Connected to the cycle lanes in northern segments of Onehunga Mall and trails in Manukau Foreshore Walkway. Keeps e-scooters separated from pedestrians when travelling at speed. - Northbound lane on eastern side enables easy access into transport hub.
Shared Bike / Scooter Parking Zone	- Yes, provide parking facility within Mobility Hub	- Increased use of shared bike and scooter as affordable modes of transport - Avoid shared bikes and scooters blocking footpath - Promote integration with train and buses and seamless connectivity - supports first mile/last mile trips
E-bike / E-scooter Charger	- Yes, provide chargers at Shared Bike / Scooter Parking Zones	- Increased use of e-bike and e-scooter as affordable modes of transport following EV trends
EV Charger	- Yes but limited provision. Provide off-street.	- Increased EV adoption requires public chargers - Provision to encourage environmentally sustainable travel options but limited to discourage driving and reduce kerbside clutter

7 Recommendations for City Leaders

Decisions need to be made now for future ready kerbsides that serve our people and places. City leaders should consider the Shared Mobility Principles for Liveable Cities to guide how we adopt new mobility for the benefit of people and places. This is even more timely as we bounce back from the disruption caused by the COVID-19 pandemic and look again at our public spaces, such as streets, and consider how well they are working for people.

The Shared Mobility Principles present a guiding light to ensure that decision-making by city leaders is focussed on people. As we set a shared vision for our places we must consider how new mobility can help enable that vision supported by inclusive governance arrangements and design decisions. New ways of prioritising and managing the kerbside are needed to improve efficiency and flexibility to better achieve the vision for the place.

WSP's New Mobility Update of the Movement and Place Framework, supported by scenarios developed through WSP's System Dynamics Tool, demonstrate what the future may bring in 30 years. We have shown what 2050 could look like for two locations in Sydney, Australia and Auckland, New Zealand. Achieving these visions will not happen by chance. It requires collaboration and a focussed effort by city leaders, both public and private.

Our aim is for these recommendations to be embraced by city leaders to drive co-design between communities, businesses and governments for a shared vision for places. How our kerbsides are managed and allocated is a key enabler to achieve the vision. Current practice is patchy with a number of areas for improvement. This is particularly important in the context of new mobility and ensuring that it contributes to achieving our vision for places, rather than detracts from it.

We have grouped the Shared Mobility Principles into system-wide aspects to get right - City Strategy, Process - and the tangible changes needed at the local scale - Street Design Outcomes. These are actions city leaders in governments, communities and businesses can take now.



RECOMMENDATIONS FOR CITY STRATEGY AND PROCESS

1

CO-DESIGN the vision for places in partnership with the community, businesses and governments. Having a shared vision amongst all stakeholders is a crucial first step and requires active partnership working between local communities, local businesses and governments.

- i. Governments must ratchet up their meaningful engagement with local communities and businesses to co-design the vision for local places and explore what that means for the kerbside. This means sharing control of the outcome at a granular scale.
- ii. Local communities and businesses must not accept transaction-style engagement and demand a seat-at-the-table for effective and meaningful co-design. Decisions on kerbside management and allocation need to be evidence-based and tied to current and future land uses for the place as captured by the co-designed vision.
- iii. Success will come if local communities and businesses are open to challenging the status quo of kerbside management. A part of this is all parties considering the evidence and how reducing static car parking in favour of place-focussed uses like outdoor seating can lead to greater footfall for local businesses. Share successful case studies to raise awareness and understanding and undertake tactical interventions to rapidly test ideas.
- iv. Putting in place governance arrangements with clearly defined roles and responsibilities for the different levels of governments, local community and businesses to co-design the vision in partnership.

2

TAKE A PEOPLE-AND-PLACE FIRST APPROACH so that new mobility is an enabler and not a detractor to realising the co-designed vision. Too often city leaders discuss new mobility as a threat to our places or frame it as wondering what the future may hold. The conversation needs to be flipped to consider what we want from our places and then how can new mobility best support that vision.

- i. Moving to a 'vision and validate' approach to city planning, and applying this to new mobility, will ensure that people and places are always considered first. Persisting with 'predict and provide' approaches condemns communities to more-of-the-same and reinforces a legacy of the kerbside and streets being designed for private vehicles and not all modes and people.
- ii. Ensure 'vision and validate' planning approaches are in action for local places. Governments are increasingly comfortable with adopting a vision and validate approach at the strategic city-scale, but less so at the local scale. This is critical to ensuring that new mobility contributes to the vision rather than overriding it.

3

MULTI-MODAL approach is needed to plan for people and places that is focussed on sustainable and efficient journeys. We need to design for how we want people to access places and in a way that supports our vision for the place. This means designing to prioritise the best mode for different trip types through multi-modal planning for the whole of journey.

- i. Prioritise walking and micro-mobility over private vehicles for short trips to local centres. This should guide decision-making around accessibility and the resulting supporting infrastructure requirements such as wider foot paths and bike lanes. The emergence of micro-mobility has fantastic potential to enable access to local places, requiring less reliance on private vehicles for short trips.
- ii. Continue to promote transit - such as train, bus and tram - as the mobility backbone of cities well into the future. It is the most productive way to move large numbers of people and plays a key place function. Transit acts as a people fountain to our civic spaces, which often also perform an interchange function getting people to home, work or study.
- iii. Governments must review their processes and structures to ensure that a mode agnostic approach is being taken to plan our multi-modal transport networks so that they best serve people and not private vehicles only. Seamless interchange between all modes should be balanced with place objectives and incorporated into the design for new transport infrastructure and in the upgrade of our existing infrastructure networks. The Shared Mobility Principles for Liveable Cities provide a useful yardstick.

4

ROAD AND STREET NETWORK PLANS MUST MEANINGFULLY REFLECT PLACE FUNCTIONS, as well as movement, so that fine-grained planning is possible at the local scale. People need both movement and place functions from our roads and streets. However, it is fair to say that over time city leaders have prioritised the movement function in the majority of cases. It is time for the pendulum to swing the other way to ensure that our town centres, local community centres and places of economic activity welcome people to visit and dwell.

- i. Governments must urgently revise Road and Street Network Plans and supporting guidelines, technical directions and performance criteria to meaningfully reflect place functions. These must be an enabler to achieve strategic and local visions set out in land use plans, taking a people-and-place-first approach.
- ii. The role and function of a street in the wider network will influence the kerbside management and allocation for movement and place functions. However, the future network plans should inform and be informed by the future place plans for a particular street. What level of kerbside priority should be provided for public transport services for example will not only depend on what land uses and activities exist at street level but also what function the road fulfils in terms of moving people and by which mode through its network movement function.
- iii. The Shared Mobility Principles as well as the Movement and Place Framework are useful tools to diagnose current use. Examining level of service and operating conditions, such as speed, help to determine the Movement and Place classification as do the place considerations for the street. The same classification frameworks can also be used to point to where we want to go, to define the preferred use as a part of a broad road and street network. These considerations should flow through to updating street design guidance to support place functions.

5

STREET DESIGN GUIDELINES MUST GET AHEAD OF NEW MOBILITY and proactively focus on the best possible outcomes for people and places. Governments must proactively keep pace with emerging mobility technologies and be focussed on the movement and place outcomes that best achieve our vision for our people and places, rather than acquiescing to the design requirements of new mobility, through proactively updating street design guidelines.

- i. Transitioning to a shared and automated vehicle fleet as set out in the Shared Mobility Principles away from privately-owned vehicles can be supported through prioritising access to the kerbside. The rationing of space at the kerbside away from privately owned vehicles to embrace a low emission, shared and automated vehicle fleet is one approach that governments can take to incentivise adoption, where it is in keeping with the vision for the place. This can be achieved through regulation and/or pricing that changes the use of the kerbside to restrict or enhance capacity for different types of vehicles at different times, or in response to changing demand. It can also look at dynamically changing the use of the kerbside between modes to maximise productivity.
- ii. Prioritising shared vehicles yields a more productive use of the kerbside through pick-up / drop-off, when compared to private cars in general parking – making the kerbside work harder. It is also important to support the cultural transition to shared transport as the successful transition to automated vehicles relies on them being operated in shared fleets to avoid worsening congestion.
- iii. Increasing demand for charging facilities will continue as the proportion of electric vehicles in the fleet rises. The increase in electric vehicles should be encouraged as it brings broader environmental benefits and place benefits such as lower local emissions and noise pollution. However, access to on-street charging infrastructure for electric vehicles should not be the same across all street types. For example, it is not appropriate for Civic Spaces as it encourages less intensive use of the kerbside, which in turn could limit the opportunity for more people to access the place with a knock-on impact to local businesses. It may be more appropriate in Local Streets or at home. To encourage at home charging, governments should ensure EV-ready building codes and supporting policies are in place.
- iv. Charging facilities for electric micro-mobility may be appropriate in Civic Spaces and around public transport hubs, to encourage interchange between modes, bring people to local places and avoid informal parking and street clutter.



RECOMMENDATIONS FOR STREET DESIGN OUTCOMES

6

DYNAMICALLY MANAGE AND ALLOCATE THE KERBSIDE to use it more productively and achieve the vision for the place. Existing kerbside uses are often a legacy of decisions made by governments in previous decades. Static approaches to kerbside allocation are failing our people and places. Making better use of kerbside makes it easier to reallocate space to other uses such as seating and shade.

- i. Dynamically shifting the use of the kerbside to match the changing needs of the place at different times of day and during the week is essential to realise the potential of our local places. Let's get the kerbside working hard to best support local communities and businesses. A proactive approach by governments that has been co-designed with the local community and businesses is required to move quickly on altering kerbside uses.
- ii. Emerging technology can be harnessed to better manage the kerbside. Dynamic signage to signal and prioritise kerbside can play a role. These kerbside use changes can be communicated to in-vehicle displays in real time and apps to help people accessing the place. However, technology is meaningless without establishing and using a kerbside management framework backed up by necessary regulation and policy.
- iii. Dynamic allocation of the kerbside is also relevant in response to short, sharp shocks such as during the COVID-19 lockdown. At this time, it would have made sense for kerbsides outside cafes and restaurants to be dynamically changed to pick-up / drop-off spaces during peak food delivery times for example.
- iv. Pricing access to the kerbside is a long-standing practice that can be harnessed through technology to dynamically manage and price the kerbside in a way to best deliver on the place vision. The addition of productivity metrics will ensure that the kerbside is working hard to achieve the place vision. It may also free up kerbside to be allocated to other place functions such as parklets or seating.

7

MOVE FROM GENERAL PARKING TO PICK-UP / DROP-OFF for people and goods to improve kerbside productivity and access to local places. We need the kerbside to work harder to enable more people to access local businesses and services, and for businesses to send and receive deliveries. This means restricting the use of general parking, such as two- and four-hour parking zones, in preference for pick-up / drop-off zones.

- i. The kerbside requirements of people and of goods are blurring. In most cases an area for pick-up / drop-off will satisfy both types of access to our Civic Spaces. This includes micro-mobility with people accessing their local shopping street as well as people making deliveries.
- ii. Rising volumes of e-commerce and food delivery are increasing the urban freight task. Moving these smaller deliveries around our cities has resulted in a greater requirement for pick-up / drop-off by micro-mobility as well as by vans and trucks. We noticed a rapid increase in smaller deliveries as people adapted to life under lockdown during the COVID-19 pandemic. This behaviour is set to continue.
- iii. Servicing businesses with large deliveries will endure. These can occur overnight or at the fringes of peak place activities, facilitated through dynamic kerbside management. Freight consolidation centres enabling local deliveries by robots/drones and micro-mobility will also be appropriate for some centres, although unlikely to be suitable for most Main Streets and Civic Spaces due to space and safety impacts.
- iv. Pick-up / drop-off will become increasingly important as the vehicle fleet transitions to automated and shared vehicles. The management and allocation of the kerbside will be a tool for prioritising access by shared rather than private vehicles and maintaining equitable access so that vehicles enhance and do not detract from achieving the vision for the place now and into the future.

8

REALLOCATE KERBSIDE AND ROAD SPACE IN OUR PLACES TOWARDS ACTIVITIES such as seating, shade and play that attract people to local businesses. Achieving the vision for our places will mean reallocating the kerbside and road space away from a movement function towards fulfilling place functions.

- i. Reallocating road space to support place functions has the potential to attract more people to local businesses. More trees create shade and combined with seating, encourage people to dwell. Play equipment and sculptures also help to attract people and encourage them to stay and enjoy the place. Increasing the tree canopy and employing water sensitive urban design also helps to reduce the urban heat island effect.
- ii. Reducing clutter on the footpaths, such as signage, contributes to achieving a sense of place and removes obstacles for people enjoying the space. Often utility boxes, parking signs and power poles squeeze out things we want if there is room, like trees, awnings and benches.

53

9

PRIORITISE WALKING TO ACCESS LOCAL PLACES, along with transit and micro-mobility, supported by funding for local infrastructure. Too often our places are considered in isolation. Infrastructure funding decisions and the scope of local plans must encompass local infrastructure like wider footpaths and bike lanes to support people to access their local places.

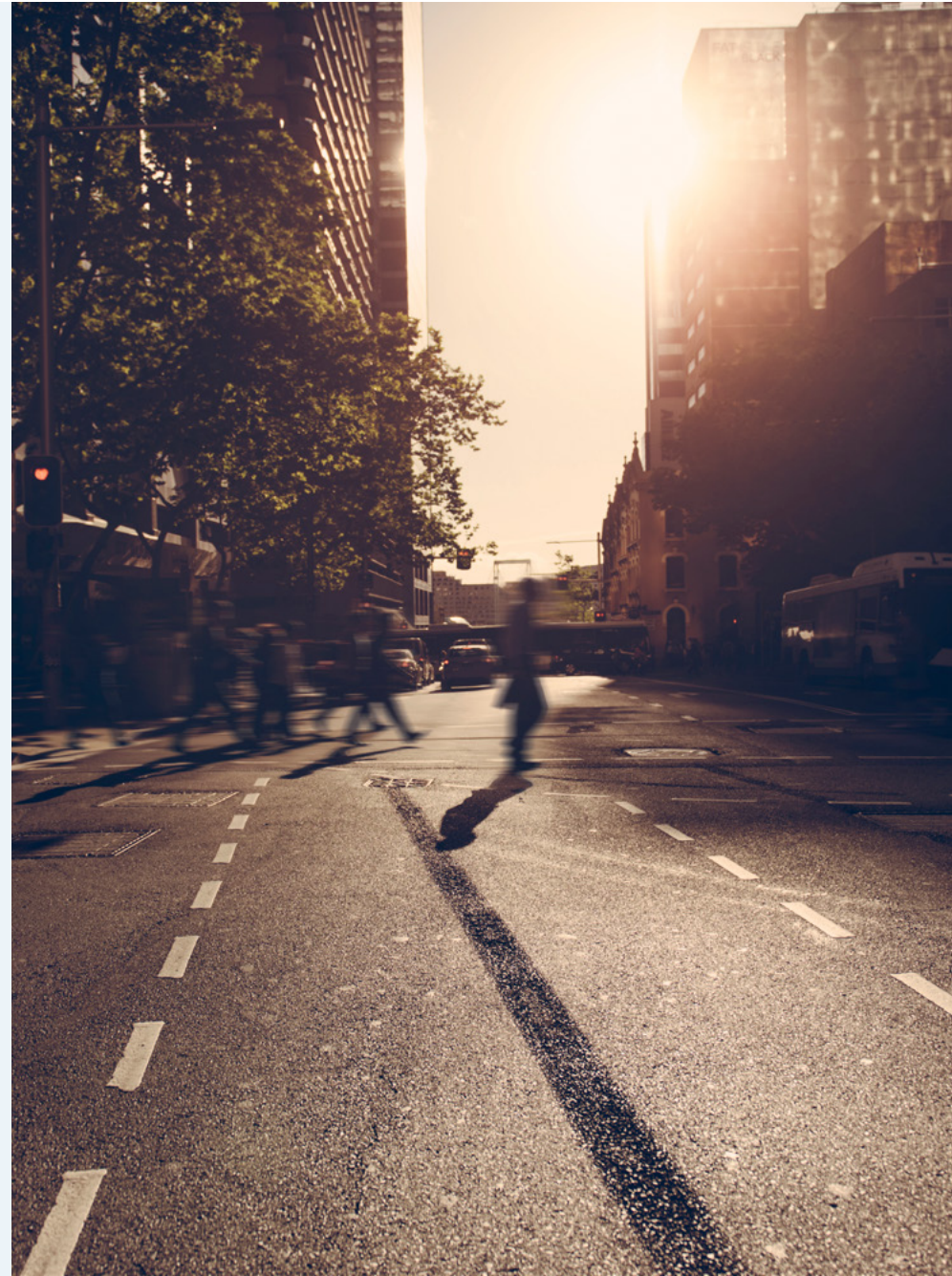
- i. Making it as easy as possible for people to choose to walk to local places. The way we design to enable our key desire lines to local places can have a large bearing on the take up of walking trips. This includes walking directly to local places as well as walking to access transit, such as bus stops, that transports people to their local places. Our planners and designers must adopt a walk-first approach for designing for access by all ages and abilities and with funding support from governments.
- ii. Bicycles and scooters are being joined by e-bikes and e-scooters as forms of micro-mobility that generally support access to places by people from a larger catchment than those walking. Parking and charging infrastructure for e-micro-mobility will become increasingly important in those places where we want people to dwell or to pick up goods such as café and restaurant precincts, and at interchanges to encourage first-mile/last-mile travel.
- iii. Ensuring that people can easily access transit at the start of their journey through paths to bus stops, train stations and tram stops, and with stop locations within our local places. The whole journey must be considered to ensure equity of access.
- iv. Delivering local infrastructure to enable safe access to our places by people of all ages and abilities is crucial to achieving our vision for local places. Governments prioritising, funding and delivering local infrastructure such as kerb buildouts, separated cycle lanes, wider footpaths are essential.

10

ALWAYS DESIGN AND CONTINUALLY UPGRADE LOCAL INFRASTRUCTURE FOR SAFE USE AND ACCESS, for people of all ages and abilities. Cities need to incorporate thoughtful design to ensure there is equal physical, digital and financial access to transport services and places for everyone in our community. Perceived and actual road and interpersonal safety is crucial to bringing people to places and intelligent street and road design can have a big impact for all users.

- i. Adopting an inclusive approach throughout all decision-making to ensure that equity of access is achieved. Stakeholder groups focusing on accessibility must be included in co-designing the shared vision for our places and regularly engaged by city leaders to validate progress.
- ii. Urgently upgrade street, kerbside and public transport infrastructure to ensure our local places are accessible for the young, elderly, people with disabilities and parents walking with prams. Inaction could lead to poor safety outcomes as well as the continued use of the private car by some people who would otherwise walk, cycle or travel by transit. This does not promote great place outcomes, can be financially prohibitive and removes an opportunity for exercise.
- iii. Employ a Safe System approach to road design that takes the kerbside into account. This means taking a holistic approach across all modes, including walking and cycling, to ensure our local places are designed to be safe. Reduced speeds limits in Civic Spaces is one measure.

Acting now to create future ready kerbsides will bring tangible benefits for people and our local places.



ONEHUNGA MALL ONEHUNGA, AUCKLAND

2050



The Team



Graham Pointer
Future Ready Lead, Australia
Graham.Pointer@wsp.com



Camden FitzGerald
*Regional Executive,
Planning and Mobility NSW*
Camden.FitzGerald@wsp.com



Mary Haverland
*Technical Executive,
Planning and Mobility*
Mary.Haverland@wsp.com



Louise Baker
Technical Director Transport
Louise.Baker@wsp.com



Scott Benjamin
*Technical Director, Intelligent
Transport Systems*
Scott.Benjamin@wsp.com



Elly Short
*Senior Principal -
Transport Advisory*
Eleanor.Short@wsp.com



Shifani Sood
*Senior Transportation
Planner*
Shifani.Sood@wsp.com



Alifa Putri
Transport Planner
Alifa.Putri@wsp.com



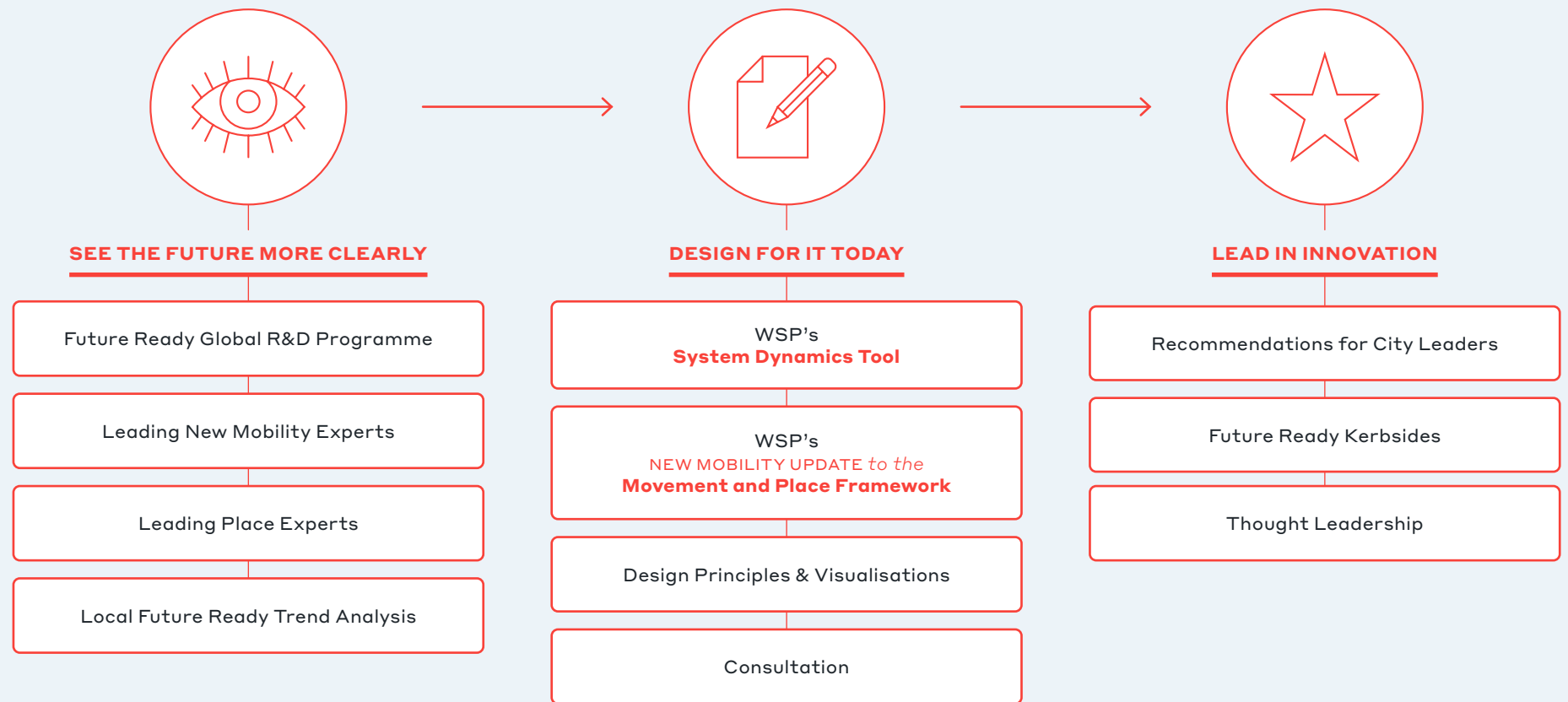
Jay Jayasinghe
Visualisation Consultant
Jay.Jayasinghe@wsp.com



Jessie Milligan
Graphic Designer
Jessie.Milligan@wsp.com

WSP FUTURE READY™

Future Ready is WSP's **innovative approach to thinking beyond the conventional** so that we can plan, design and deliver infrastructure that's ready for today's code and tomorrow's challenges. Being future focused, understanding what the world might look like in the next few decades, and taking action to prepare for this future, is essential to what we do at WSP. **Our clients count on it and our communities thrive because of it.**



References

¹ www.sharedmobilityprinciples.org

² NZTA, 2019a

³ NZTA, 2019b

⁴ NSW Government, Planning Industry & Environment, Streets as Shared Spaces grants - www.dpie.nsw.gov.au/premiers-priorities/great-public-spaces/streets

⁵ *New Mobility Now* - www.wsp.com/en-AU/news/2017/new-mobility-now-is-the-time-to-take-action

⁶ *Reclaim the kerb: The future of parking and kerbside management in London*, Centre for London, March 2020
www.centreforlondon.org/wp-content/uploads/2020/03/Centre_for_London_Future_of_parking.pdf

⁷ Austroads, 2016

⁸ NSW Government, Future Transport Strategy 2056

⁹ *Urban Street and Road Design Guide*, 2020, Auckland Transport

¹⁰ www.sharedmobilityprinciples.org



WSP is one of the world's leading engineering professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, planners, surveyors, environmental specialists, as well as other design, program and construction management professionals. We design lasting Property & Buildings, Transportation & Infrastructure, Resources (including Mining and Industry), Water, Power and Environmental solutions, as well as provide project and program delivery and advisory services. With approximately 50,000 talented people globally, we engineer projects that will help societies grow for lifetimes to come.

WSP Australia
Level 27, 680 George Street
Sydney, NSW
2000 Australia

wsp.com