



# Freight and Servicing Last Mile Toolkit

A guide to planning the urban freight task



## Summary

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This document is a summary of the Freight and Servicing Last Mile Toolkit Master Document. Both documents are available at [www.transport.nsw.gov.au/last-mile-toolkit](http://www.transport.nsw.gov.au/last-mile-toolkit)

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# Freight and Servicing

**Our cities are changing in many ways. Rapid growth is seeing global cities offer more diverse options for working, living, shopping and socialising. A key focus for urban planners is to build better connections between city functions as well as to create places which inspire people to live, socialise, shop and interact within the city environment. All these activities create demand for goods and services.**

## Last Mile Toolkit

As our cities change and grow, more space is being allocated to placemaking initiatives such as pedestrian spaces, public transport infrastructure and active corridors like cycleways. While contributing to creating more liveable and dynamic urban centres, these initiatives can have a direct impact on accessibility and efficiency for the delivery of goods and services which are essential support functions for cities.

Recognising the need for specialist information and resources to better plan for last mile deliveries and servicing in urban environments, the Last Mile Toolkit has been developed and is available on our website. [www.mysydney.nsw.gov.au/lastmilefreight](http://www.mysydney.nsw.gov.au/lastmilefreight)

The Toolkit is intended to assist urban planners, developers and government to give greater consideration to freight and servicing demands for new buildings and precincts as part of the planning process. At the same time, building managers and freight and servicing operators will find helpful information on managing loading docks and servicing demands as well as ideas about more efficient ways of consolidating and distributing freight.

This document is a summary of the Last Mile Toolkit which serves as a starting point for understanding the Toolkit's key messages and considerations for creating more efficient last mile freight and servicing.

The Last Mile Toolkit includes:

**Guiding Principles** – consider placemaking outcomes and broader benefits of efficient freight and servicing movement.

**Measurement and Forecasting Tools** – quantify future freight and servicing tasks accurately.

**Design and Management Solutions** – facilitate efficient freight and servicing practices.

**Future Approaches** – draw on best practices from split urban environments around the world.



## Placemaking

Well planned and managed freight and servicing activities enable good place outcomes. A key objective for urban planners is to create successful places (rather than design great places) which inspire people to live, socialise, shop and interact within the city environment as well as contributing to people's health and well-being. This aspiration is commonly referred to as placemaking.

Successful placemaking generates freight and servicing activities, such as food and beverage deliveries, waste services and utility maintenance. A successful place is also one that is sustainable – commercially, operationally and environmentally. A key factor is ensuring freight and servicing activity does not affect amenity including others uses such as pedestrians and cyclists. The task must be designed and planned for so that it is efficient yet discrete and unobtrusive. This can only occur if these activities are quantified and incorporated into plans with appropriate facilities provided.

Providing attractive commercial and residential real estate, generating retail activity and improving the public domain are generally the focus of planning for new urban developments. All too often, however, this planning process does not consider the facilities needed to support these land use objectives. This results in inadequate facilities for the freight and servicing activity generated and the inability to adapt to future changing land uses or activity levels.

## Last mile freight

Goods are transported through national and international supply chains from their point of manufacture to the customer who will buy or consume them. How this occurs can involve many modes of transport over vast distances. The final delivery to the consumer or store is commonly referred to as the “last mile”.

Last mile freight and servicing often needs to be conducted in congested urban areas which further negatively impacts these spaces. When planners and developers do not incorporate serviceability into a building or precinct’s design, building managers, tenants and freight operators have to rely on less logistically efficient approaches to the last mile.



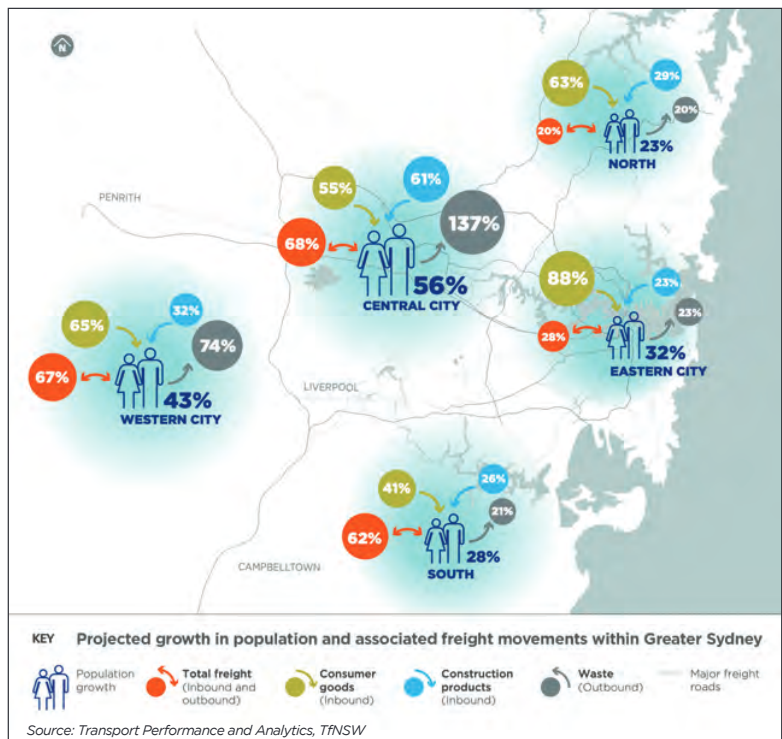
## Increasing consumer demand

Freight comes in many shapes and forms. Different businesses require a multitude of products for their day to day operations to meet their customers’ demands. Customers’ preference for choice is also increasing the number of different suppliers needing to deliver their products.

The emergence of e-Commerce has allowed consumers to order online and have products delivered directly to homes and workplaces. With this comes the rising expectation to receive deliveries quickly, even within hours of placing an order

As the freight task grows and evolves, so too do urban planning objectives. There are many challenges urban planners need to resolve to accommodate the freight task while the freight industry must also respond to the changing urban environment.

**Consider:** Emerging consumer trends are dramatically increasing demand for deliveries and challenging traditional delivery methods. This has implications for building and urban design.

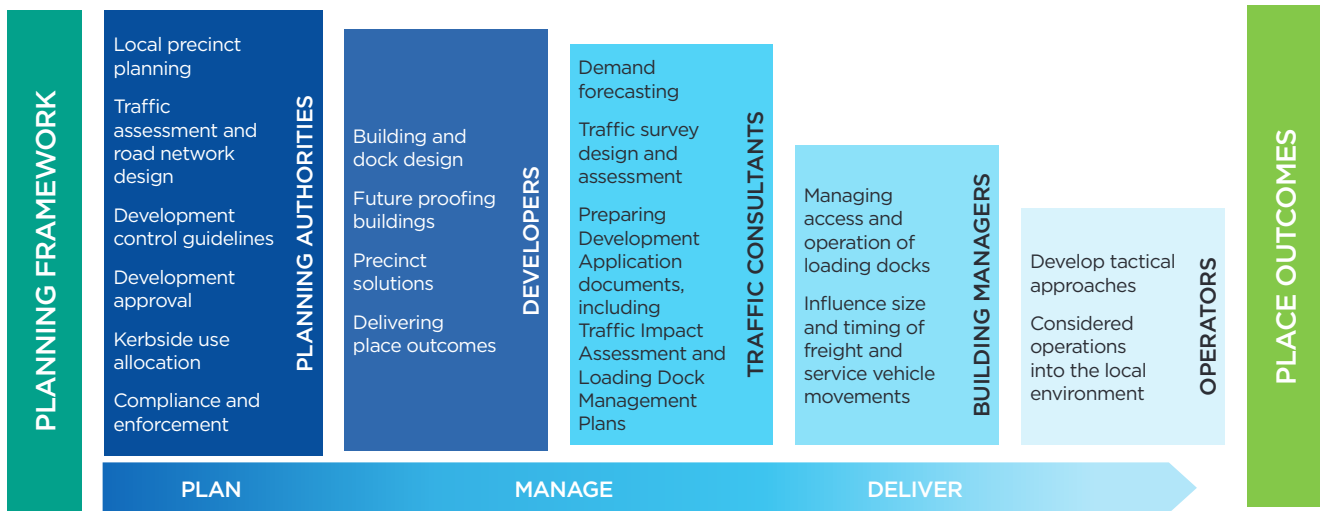


Greater Sydney population growth and changes in freight demand to 2036

## How the Last Mile Toolkit can assist users

Freight and servicing activity is essential to the economy. A more detailed understanding of the tasks which support our cities can help planners, developers and traffic consultants make better planning, development and management decisions for high density urban areas. This includes incorporating building serviceability into urban design.

Building managers can control loading dock access and operation through influencing the timing of movements while freight and servicing operators are encouraged to develop tactical approaches tailored to the local environment. The result is improved placemaking outcomes and more efficient business solutions.

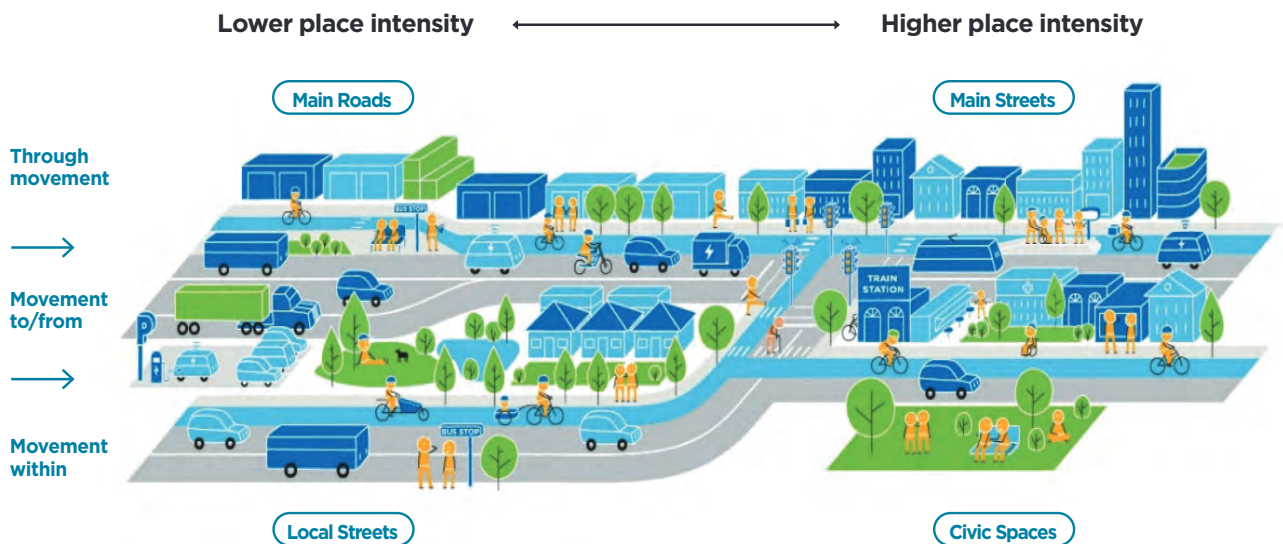


### The roles of different stakeholders in a successful freight planning process

#### Changing planning priorities - a vision for place

TfNSW is not just focused on planning transport assets and services. A key priority is how these assets and services will work to support a successful city. All types of movements play a role in placemaking and must be planned accordingly.

Large vehicles move greater quantities of freight efficiently between trade gateways and warehouses however these vehicles are unsuitable for navigating narrow city streets and making multiple deliveries in dense urban centres. To do this, many small vehicles are needed to make deliveries from warehouses at the urban fringe to customers in the city, contributing to congestion on motorways and movement corridors.



TfNSW's Movement and Place Continuum

## Servicing competing demands

As our urban centres become denser, how we service all the needs of our cities, their buildings and their people becomes more complex. Alongside the need for freight, servicing and maintaining the city is also a considerable task.

Freight and servicing vehicles typically share on or off street parking spaces. Trade and service providers, waste collection operators and removalists, for example, are all essential for the day to day life of a city, however they can be overlooked in planning for urban environments.

Vehicle movements generated by servicing activities increase the pressure on the road network and parking locations in the CBD. Servicing activities must be planned for as part of the functioning of a building or precinct.

It is important to understand that each activity has its own operating characteristics which must be assessed and accommodated to reduce impacts on amenity and other road users.

While the same type of vehicle may be used for both delivery and servicing tasks, it is best to consider trade and service vehicle movements independently of freight movements, and plan for them as such. There are two reasons for this:

- Dwell times – trade and servicing vehicles dwell times are typically longer and subject to a greater variability depending on the nature of the work being performed. As a result, these vehicle movements can have a disproportionate effect on loading bay capacity on the ability of other freight and servicing vehicles to plan and schedule their movements
- Vehicle size – as trade and servicing vehicles are typically smaller than freight vehicles, they can more easily access general parking areas with lower clearances and restricted manoeuvrability, and are more efficiently accommodated in lower-cost parking areas than larger freight vehicles.

## Trades and services

Every building and precinct will create a demand for trades and services such as plumbing, electrical work, lock smithing, glazier services, indoor plant maintenance, cleaning and general maintenance. On nearly all occasions, tradespeople will require a vehicle to carry tools and equipment to site, and longer dwell times.



# Guiding Principles

The following information is a summary of Section 3 of the Last Mile Toolkit

**There are five key guiding principles for planning freight and servicing activity in urban centres with high density land uses. These principles balance the needs of freight and servicing movements against placemaking objectives.**

## Commercial activity and derived demand

There is no direct demand for the transport service itself, rather the demand is for the good or service being transported. This means planners designing buildings and precincts must be aware of the demand for the vehicle movements these developments are likely to generate. In the past, plans for new developments and precincts have not always taken this into account.

## Delivering economic, social and environmental benefits

Freight and servicing movements generated by buildings and precincts affect the efficiency of the broader transport network. While an individual building or precinct's impact may be modest, the cumulative impacts are more significant on the streets and broader network. To secure economic, social and environmental benefits, ensure freight and servicing movements are well-planned and managed by enabling use of the most efficient vehicle types; minimising vehicle movements; facilitating consolidation to reduce total journeys; encouraging out-of-peak movements and providing alternative last mile delivery options.



## Promoting self sufficient building and precincts

Every building or precinct generates private and commercial vehicle trips. The number and type of these trips will depend on the land use and placemaking objectives. As vehicles travel to and from buildings or precincts and dwell at kerbsides, they generate direct costs due to road wear, and externality costs due to congestion and pollution. The solution is to ensure buildings and precincts have enough on-site, off-street capacity to accommodate the freight and servicing movements their demand generates and effectively become self-sufficient.

## Balancing amenity, transport and building efficiency

An effective planning framework balances the needs of all users. It is key that planners and developers incorporate freight and servicing considerations into their designs for both new and existing buildings and precincts. However, it is equally important they ensure that the design of freight and servicing facilities is not done in isolation or in a way that detracts from amenity or place outcomes.

## Enabling placemaking objectives

Freight and servicing movements are often regarded as a risk to safety, amenity and placemaking objectives due to shared spaces with other users such as pedestrians and cyclists as well as visual, noise and air pollution. This can be exacerbated by planning and management approaches developed after the key design parameters have been decided. Properly understanding and planning for the transport task is the most effective way to ensure it enables good place and amenity outcomes.



# Measurement and Forecasting Tools

The following information is a summary of Sections 4 and 5 of the Last Mile Toolkit

**Each type of building generates freight and servicing tasks. Every weekday, approximately one commercial vehicle travels into Sydney CBD for every 20 people living or working inside the city.**

## Understanding the task

In order for urban planners, developers and government to create places for people to live, socialise, shop and interact within the city environment, there needs to be an understanding of the freight task and its role in enabling this environment.

Businesses and customers generate a diversity of freight and servicing transport movements that occur every day. Each type of movement requires different operating characteristics. These need to be understood when planning loading and servicing facilities in buildings and precincts.

## Freight profiling

When developing a profile it is important to ensure all movements are captured, whether they are via a loading dock or from the kerb, by a cyclist or a walker and from vehicles parked legally or illegally.

There are a number of ways to measure the activity of freight and servicing vehicles. These include the measurement of on-street and off-street activity as well as profiling expected demand by usage type through data collection, surveys and analysis.

## Characteristics of freight and servicing movements

Detailed information on methodologies for analysing on-street and off-street freight demand and kerbside activity are included in the Last Mile Toolkit. These include loading zone ticket or sensor data, ethnographic research, manual surveys and video assessment.







## Forecasting demand

Similar to identifying the type of freight and servicing demands, the quantity and profiling of these activities must also be considered. Based on freight and servicing measurement practices and the development of building profiles, it is possible to envisage and plan for anticipated future demand.

**Consider:** Urban loading facilities designed to accommodate the differing characteristics of freight and servicing vehicle movements will optimise operational efficiencies and, by doing so, minimise potential road network and kerbside impacts.



Courier movements are numerous and service nearly all building types in urban centres every day.



Supermarket deliveries are typically considered at distribution centres on the urban fringe. The largest vehicles are used with timing and access restrictions at some locations.



Fresh produce is procured in the early hours of the morning. Small refrigerated vans and trucks then make deliveries to businesses such as cafés and restaurants.



Fashion and larger retail deliveries require bigger vehicles to transport larger quantities of goods.



Waste collection is required by every building and precinct with waste operators preferring large trucks as these are generally the most efficient vehicles for the task.



Construction activity in a city is a major contributor to economic activity. Large construction tasks can require thousands of concrete deliveries to complete the job.



Online purchases and home deliveries are rapidly increasing with multiple deliveries possible to the same street or building each day.



Every building and precinct creates a demand for trades and services such as plumbing, electrical work, cleaning, security and general maintenance.



Beer kegs weigh up to 70kg and are difficult to move over longer distances. Pubs and hotels are typically located on street corners, which are often busy.



Cash-in-transit refers to the movement of currency and other high value items to and from banks, financial institutions and other major points of exchange.



Flowers and other small goods are delivered around the city by bike couriers, a fast way to deliver goods and avoid delays caused by congestion.



There are approximately 35,000 commercial vehicle trips per day made into Sydney CBD. Vehicle sizes vary from courier vans to larger rigid and articulated trucks.

# Design and Management Solutions

The following information is a summary of Sections 6, 7 and 8 of the Last Mile Toolkit

**To achieve optimal place outcomes in our cities that align to the vision of urban designers, it is necessary to challenge traditional freight and servicing approaches and adopt better ways of operating in our evolving urban environments.**

## Profile of a typical commercial building

Every building generates its own freight and servicing tasks. A variety of commercial vehicles are used to fulfill these tasks throughout the day, forming distinct patterns of activity.

Today, a typical large commercial building in Sydney CBD measuring 50,000 square metres contains multiple tenants and is likely to generate between 130 to 180 commercial vehicle movements a day.

Everyday freight and servicing activity will include:

- postal deliveries
- courier deliveries and collections
- stationery and office equipment deliveries
- routine and emergency maintenance services
- office fit-out services
- food and beverage deliveries
- deliveries to co-located retail spaces
- e-commerce deliveries
- different types of waste collection
- removalist services.

## Self-sufficient buildings and precincts

Informed planning for urban freight and servicing creates many benefits for a city and its service providers. These include better placemaking outcomes, improved economic and commercial outcomes and reduced impacts on transport networks and the environment. Conversely, when freight and servicing tasks are not adequately identified or planned for and inadequate facilities are provided, these activities are forced onto nearby streets, causing congestion and increased emissions while negatively impacting placemaking objectives.

While precinct wide approaches consider freight and servicing at the master planning phase, implementing small incremental changes to kerbside and off-street facilities management can contribute to the wider goals of improving efficiency and reducing urban congestion.

These approaches include:

- planning for kerbside freight activity
- planning and management of off-street freight and servicing activity.
- precinct approaches to freight and servicing activity.



## Kerbside freight and servicing

Kerbside management is a complex task involving road design, safety considerations and balancing the needs of different users.

The Last Mile Toolkit provides guidance to authorities on allocating space between freight and servicing activities and other uses and includes:

- maximising kerbside use
- kerbside challenges
- maximising kerbside provision in different urban centres.

**Consider:** The optimal use of kerbside space may change multiple times across the day to support different parking and transit priorities. When available as loading zones, the space is highly contested particularly in areas with a vibrant local economy.



### Off-street freight and servicing

The Last Mile Toolkit provides planners, developers, building managers and other stakeholders with the tools they need to effectively manage off-street freight and logistics activity.

The approaches outlined in the toolkit can apply both to existing and planned loading docks in buildings and precincts and include:

- logistics solutions and management strategies
- freight consolidation and consolidation centre models
- enabling alternative urban logistics facilities remodelling.

**Consider:** Good loading dock facilities contribute to the value of a building or precinct development and enhance the amenity of the local area by enabling efficient operations by service providers.



### Precinct approaches

A centralised and planned infrastructure and management approach to logistics between multiple customers in the same precinct can deliver improved place outcomes and more efficient freight activity.

The Last Mile Toolkit examines:

- best practice in precinct planning
- enhancing a precinct's amenity
- harnessing innovation to drive efficiency.

**Consider:** The design and management of loading and servicing facilities should directly reflect the land use and placemaking objectives of a building or precinct. This requires involvement from local authorities and developers and also expertise from logistics operators.

# Future Approaches

The following information is a summary of Section 9 of the Last Mile Toolkit

**Drawing on the best practices from urban environments around the world, there are many examples of novel ideas and emerging approaches that can be applied to the growing transport task to achieve broad economic, social and environmental benefits.**

Creating a sense of place and providing integrated transport solutions in a precinct is best achieved when urban planners, developers and government design, construct and manage loading facilities that are self-sufficient and appropriate for the task they need to accommodate.

At the same time, building managers and freight and servicing operators can adopt improved logistics management strategies to increase efficiency, including using more sustainable vehicles such as electric vehicles and exploring automation.

## Evolving solutions

The Last Mile Toolkit highlights 10 key evolving approaches to freight and servicing in urban centres.



**Placemaking** either preserves or enhances the character of public spaces making them more accessible, attractive, comfortable and safe. A well planned, discreet freight and servicing task can be an effective lever to achieving these outcomes, while also making places efficient to service.



**Improved transport planning** focuses on integrating land use and transport network planning to fundamentally change planning for freight and servicing activity. Central to this is TfNSW's Future Transport 2056 strategy which sets the 40 year vision, directions and outcomes framework for customer mobility in NSW, guiding transport investment over the longer term.



**Precinct approaches** such as that developed in Barangaroo, Sydney generate successful place outcomes. The busy commercial, retail and shopping precinct generates large amounts of freight and servicing activities while the well managed off-street facilities keep these activities inconspicuous and enhance amenity.



**Connected and automated vehicles** could bring substantial changes to city transport networks. While connected and automated vehicles may be useful to the freight industry as a whole, there are still challenges preventing their use in last mile deliveries: people still need to unload the freight, obtain proof of delivery and resolve any other issues.



**Improve logistics management** through innovative strategies to meet the challenges of increased demand and congestion in urban centres. These include consolidation solutions such as managing buildings deliveries using city consolidation centres outside the city centre, as well as operational approaches including incorporating real time traffic data.



**Crowd sourced logistics** is an emerging business model that is disrupting traditional delivery methods and can reduce congestion if a driver can complete a delivery as part of an existing trip. There is also a risk that crowd sourced logistics can have the opposite effect if consolidated deliveries are split between a number of drivers who would not otherwise have made that trip.



**Rethinking the transport task and redesigning vehicles** is an approach that examines the key constraints and opportunities in the urban environment and the particular task that needs to be done and adapts the practices or the vehicles accordingly. Examples include small electric vehicles and cargo bikes for use in constrained areas where traditional large freight vehicles cannot operate.



**Freight task growth** is driven by factors including location, societal change and new services. Urban areas with new high density office and residential buildings attract retail and hospitality activity and lead to significant year on year growth in the freight task. Online shopping has also seen rapid growth, generating additional freight vehicle movements.



**New logistics structures** address the distance between origin and destination points for last mile deliveries. With logistics providers previously located in outer metropolitan areas due to reduced property cost, as the sizes of consignments get smaller and consumers expect their deliveries faster, logistics facilities are being moved back into urban centres to meet customer demand.



**Global predictions** such as the 2020 World Economic Forum Report identifies 24 different interventions to support future freight and servicing activities in urban centres. These interventions can foster collaboration between public and private sectors to implement solutions including electric vehicles, night time and adjacent time deliveries and multi-brand parcel lockers.



## Best practice

The Last Mile Toolkit examines emerging approaches in more detail as possible solutions which can be applied to urban transport tasks. Below are some examples of the rethinking the transport task and redesigning vehicles approach.



(IMAGE: Ringman 2018)

Couriers in Dublin (Ireland), Seattle (United States), Hamburg (Germany) and other cities use cargo bikes to complete some freight tasks. Sydney already has a reasonably sized courier bike fleet operating from some small depots in and around the CBD. This fleet is likely to expand as logistics businesses become more interested in bikes with greater cargo capacity. However, parking for cargo bikes is less flexible than for two-wheeled courier bikes.



(IMAGE: Adams 2018)

In Utrecht (Netherlands) and Gothenburg (Sweden) small electric vehicles are used to deliver consolidated freight into the heart of the densely populated CBDs, which have limited capacity to support traditional large freight vehicles.

These cities' use of these vehicles has led to reductions in emissions, noise and freight traffic, and has increased residents' safety and quality of life.



(IMAGE: SmartCitiesWorld 2019)

Vehicle management systems and routing optimisation systems are likely to connect to kerbside management systems in the future. These systems will work together to automatically make decisions throughout the day that continually re-optimize vehicles' delivery and collection operations.



(IMAGE: WEF 2020, p.15)

Drones have the potential to be used in the freight task however in the short term, the use of drones for deliveries in high-density urban centres is likely to be challenging. So far, drone delivery tests have only been carried out in sparsely populated areas. The roll-out of 5G mobile networks may resolve some of the issues surrounding the urban use of drones, but security risks could remain.

## CASE STUDY

### Smart Loading Zone pilot - Omaha, Nebraska

The city of Omaha, Nebraska, is piloting the use of smart loading zones. The pilot will allow drivers to reserve a loading zone, and will include dynamic pricing and integration with enforcement systems.

The pilot is intended to reduce illegal parking, congestion and conflicts between road users.

Ken Smith, Omaha's parking and mobility manager, said of the pilot that "there's an obvious benefit for drivers that also benefits non-drivers; there's less circling the block, which means less conflicts with other road users ... if cities don't do this, we're just going to see more and more of these vehicles blocking the way" (Wilson 2020).

## CASE STUDY

### Remoding - biking, walking and public transport

As demand grows, congestion on the roads becomes a point of failure in supply chains. But there are various alternatives to the traditional freight approach of dispatching trucks.

Since Amazon launched its Prime Now one-hour delivery service, its employees in New York, USA, make most of their one-hour deliveries to Manhattan using the subway. An Amazon spokesperson noted that

*"In Manhattan, our folks bike, walk or use public transportation. They only drive if the item is large like a flat-screen TV."* (Lumb 2015)

In late 2019, in response to the high volumes of parcels being delivered each day into New York, the city's Mayor announced a program to encourage the use of cargo bikes as an alternative to trucks. The program allows cargo bikes to use commercial loading areas typically reserved for trucks free of charge (Haag & Hu 2019b).



(IMAGE: Sturla 2019)

## CASE STUDY

### A Swedish arena for transport efficiency

The CLOSER Organisation in Sweden is working with several cities, business organisations and industries to develop sustainable freight transport and urban logistics solutions that will improve living conditions in Swedish cities. It has developed several methods to meet the urban transport challenge, such as:

- integrating freight transport considerations into urban planning
- creating smart solutions for more efficient use of infrastructure
- developing and testing new types of services and business models
- developing and testing new vehicle solutions
- identifying challenges in existing rules and regulations, and working to standardise approaches to transport management.

(CLOSER 2020)

## CASE STUDY

### Goulburn Street Courier Hub



The Goulburn Street Courier Hub trial, developed collaboratively between TfNSW and City of Sydney, has been operating since 2016, and has delivered significant economic and environmental benefits relative to its size. Importantly, it has demonstrated a proof of concept in Sydney and beyond for a hub and deconsolidation logistics model utilising walking and cycling couriers for last mile pick-ups and deliveries in a CBD environment.

The concept was developed in response to rapid changes to the urban environment leading to challenges of increasing demand for on-street loading zone space and traffic congestion which reduces driver productivity.

The Courier Hub is a small operational space but it is unique in Australia as an open access, multi user hub facility aimed at delivering environmental benefits, time savings for couriers and reduced congestion.

It is achieving its objective of demonstrating easy and alternative ways to deliver into congested CBD areas. There are frequent requests from other jurisdictions about how to replicate it.

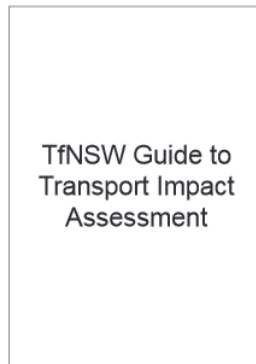
#### Daily benefits for seven carriers using the Courier Hub from 2019



**Consider:** Every urban environment presents its own unique challenges. Utilising freight and servicing guiding principles and measuring and forecasting tasks enables stakeholders to consider design and management options which contribute to good economic, social and environmental outcomes.

#### Guiding Plans and Strategies

The Last Mile Toolkit has been developed to support **TfNSW's Future Transport 2056 Strategy** and the **NSW Freight and Ports Plan 2018-2023**. The Toolkit also refers to key transport planning documents including the **TfNSW Guide to Transport Impact Assessment** and **Government Architect NSW's Practitioner's Guide to Movement and Place**.





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