

City logistics research report

Richard Hart

INTRODUCTION

Our cities are changing. More and more people are calling urban areas home. Higher density living is demanding more quality public spaces. These trends are as true in Aotearoa New Zealand as in other countries around the world.

Covid reminded us of the importance of streets as places for people. They are living spaces. Places to mingle. To get fresh air. To enjoy. Focus is shifting, street space is being redesigned in our cities to provide more for people rather than cars. We are creating more space for trees, for bike lanes, bus lanes, and more seating. Some streets are having their access heavily restricted or being blocked for vehicles entirely. These changes are important and lead us on the path to creating more liveable cities.

But, and it's a big but, we still need to be able to get goods, services, and people to these places. We still need to allow the pub to get kegs delivered. For plumbers to fix leaks in apartments. For taxis to pick up less mobile patrons of theatre shows. This is the field of city logistics.

City logistics, as I define it for my research, covers the following three areas:

- **Goods delivery and pickup:** primarily the 'last mile' element for couriers, retail, food supply, and office supplies and more.
- **Services:** builders, plumbers, electricians, rubbish removals and more.
- **People pick-up and drop-off:** taxis, rideshare, and general public.

With city logistics vehicles contributing to the traffic, emissions, and air pollution in our cities, it is important that as our street spaces change, so too do city logistics operations. As part of that, the profession needs to know how to implement innovations in city logistics.

WHAT IS THE ISSUE WITH CITY LOGISTICS?

City logistics keeps our cities functioning. However, there is a lot of pressure to adapt in denser urban environments where we want more spaces for people, public transport and cycling along with better air quality and fewer vehicles. Meanwhile the magnitude of city logistics activities is growing, creating even more tension for street space. Specific issues include:

- Removing on-street parking, narrowing carriageways, and restricting vehicle access are just some of the actions being taken by cities in New Zealand to make more space for people in city environments.
- The city logistics industry – alongside businesses and residents – often pushback on these changes for fear of difficulties future operations.
- The transportation profession needs to better support the city logistics industry as changes are made to cities' streets. This includes supporting the industry to innovate and use new initiatives.

And there is research to back up the issues with city logistics, here are just a few statistics that show the impact of city logistics and transport in general is having on our cities:

- Globally, roughly 6% to 18% of traffic in cities is caused by logistics vehicles.¹
- By 2035, 20% more freight will be moved than today in New Zealand, but the system will have to produce 35% less emissions.²
- Analysis in the Health and air pollution in New Zealand 2016 (HAPINZ 3.0) report, it was revealed that transport pollution to be a far greater contributor to loss of life and poor health in NZ than previously thought—accounting for more than two-thirds of the social costs of air pollution.³

These issues with city logistics and the impacts it is having on our cities provides the basis for investigating what can be done to improve city logistics practices.

WHAT DID I LOOK INTO?

While it is a relatively emerging field in New Zealand, the field of city logistics commands significantly more attention overseas. Research for Waka Kotahi⁴ has shown that other cities are making use of a range of tools, including urban consolidation centres and cargo bikes, to improve city logistics operations while also reducing VKT, improving air quality and creating more space for people.

In 2023 I received the New Zealand Transportation Group Study Award to investigate what other cities around the world are doing to improve city logistics practices. Both the innovations and the levers that have been pulled to enable innovation in this space.

With the support from the study award, I visited 8 international cities and met with experts in the field of city logistics to learn more about city logistics.

The places I visited are:

- Melbourne
- Sydney
- London
- Paris
- Amsterdam
- Brussels
- Barcelona
- Bordeaux

These cities were chosen for their similarity in form – in the case of Melbourne and Sydney – and for their innovations in city logistics practices – in the case of the European cities. By learning from a range of cities with different environmental, social and cultural contexts I have been able to compare and contrast practices across cities to better understand what we can apply in New Zealand.

¹ Ros-McDonell, L, MV de-la-Fuente-Aragon, D Ros-McDonell and M Cardos (2018) Analysis of freight distribution flows in an urban functional area.

² Thorwaldson, L., Thomas, F., & Carran-Fletcher, A. (2021). Evaluating the greenhouse gas emission reduction benefits from land transport mode shift programmes and projects (Waka Kotahi NZ Transport Agency research note 004).

³ <https://blogs.otago.ac.nz/pubhealthexpert/air-pollution-in-aotearoa-nz-five-key-ways-to-reduce-the-massive-health-and-social-costs/#:~:text=This%20annual%20harm%20includes%20the,was%20estimated%20at%20%2415.6%20billion.>

⁴ Thomas, F, A Carran-Fletcher, C Joseph and S Philbin (2020) Travel demand management – strategies and outcomes. NZ Transport Agency research report 661. 188pp.

Along my journey, I attended two conferences. In Amsterdam, I attended the 2-day Micromobility Europe Conference to learn about what role small electric vehicles can have in addressing city logistics issues. In Bordeaux, I attended the 3-day 12th International Conference on City Logistics to hear from leading global researchers working in the city logistics space. Both conferences allowed me to connect with a wide range of professionals from even more corners of the world.

Appendix A contains a non-exhaustive list of the professionals I met with on my travels. Many more were met, in a lesser capacity, through the two conferences.

I am acutely aware that what works in Melbourne, or London, or Barcelona, won't automatically work in Auckland, Nelson or Invercargill. But through understanding the foundations of the innovations in city logistics we have the opportunity to set our own course for making positive change in the city logistics industry here. It is about building a toolkit of interventions that can be used if and when the circumstances become right.

Note: all photos in the report were taken by Richard unless otherwise specified.

WHAT ARE OTHER CITIES DOING ABOUT IT?

A wide range of innovations exist in the city logistics space that can lessen emissions, reduce VKT, and improve air quality. In this report, I present a selection of innovations that could prove useful in the New Zealand context. To help frame the ideas, we can use the Sustainable Transport Framework of Avoid-Shift-Improve which has been adopted by the New Zealand Transport Agency in its long-term planning work, Arataki⁵. Each of the innovations can be categorised into one of these three areas.

- **Avoid:** Avoid the need to travel or reduce the number of trips
- **Shift:** Shift to lower emissions modes or less busy times of the day
- **Improve:** Improve the efficiency of vehicles, technology or processes

Each of these three areas is expanded upon in the remainder of this section with specific examples of each type that were observed or discussed through my study tour.

AVOID

Often avoiding trips is not front of mind for innovation in city logistics. Avoiding the need to travel or reducing the number of trips should remain the first priority for change to the city logistics industry to support lower emissions, VKT reduction, and air quality improvements. As the industry is dominated by profit-driven organisations, there is an incentive for businesses to provide more and more service to extract more revenue from the market. While avoiding trips could be harder to convince the city logistics industry to do, the greatest benefits could be found here. . Some ways that city logistics trips can be avoided include:

- Carpooling for rideshare
 - Carpooling is a common travel demand management tool typically for office workers commuting to the city. However, tradespeople or construction workers working on sites in the city can benefit from carpooling too while reducing the pressure on city centre streets.

⁵ <https://www.nzta.govt.nz/assets/planning-and-investment/arataki/docs/national-summary-august-2020.pdf>

- Crowd shipping of parcel deliveries
 - Crowdshipping uses a network of individuals to deliver packages as part of their everyday movements routes using digital platforms.
 - In one study, VKT and air pollution were estimated to reduce by 17% and delivery costs decreased by 29% per parcel.⁶
- Ensuring delivery vehicles are full before leaving the depot
- Using public transport for the delivery of goods or for tradespeople
 - In New York City, the subway is used to collect rubbish from train stations across the city with dedicated garbage collection services saving on additional on-street vehicle movements.⁷
 - Note: this could also fit under shift, however, the idea is that the public transport vehicles are already operating so additional dedicated trips are not required.
- Consolidating services to fewer companies

Case Study: Waste collection

Waste collection is a regular service that needs to be carried out in cities. It is typically administered by a mixture of the local authority and private arrangements. On rubbish collection days, rubbish bins and bags can end up scattered across footpaths, kerbside spaces or in bike lines. This can create obstacles and barriers for pedestrians, cyclists and people trying to park. In addition, the rubbish collection vehicles themselves are often loud and are slow moving through city streets and they stop frequently to collect the rubbish. At times several different companies are responsible for rubbish collections in relatively small areas leading to multiple trips by rubbish trucks, or in the case of public rubbish collection, sometimes collections are needed multiple times a day.

Bond Street London

London's Bond Street is known for its high-end retail and sits in the busy central area of London between Piccadilly in the south and Oxford Street in the north. In 2018, the local Westminster Council in partnership with the New West End Company (NWECC) and others set out to reduce the number of rubbish vehicle movements along to reduce vehicle congestion and decrease air pollution. Through a collaboration with 321 businesses, the area was able to reduce the number of waste operators on the street from 47 to five in a single year. This was achieved by recommending that businesses use one of two preferred suppliers.⁸ In total, the number of rubbish vehicle movements per day dropped from 144 to just nine per day. This has also led to a 76% reduction in carbon dioxide equivalent (CO₂e) and nitrogen oxides (NO_x) and 74% reduction in particulate matter (PM₁₀). In addition, there is also 67% less waste on the street at inappropriate times of the day i.e. outside of collection hours.⁹

⁶ Zhang, M., Cheah, L., & Courcoubetis, C. (2023). Exploring the Potential Impact of Crowdshipping Using Public Transport in Singapore. *Transportation Research Record*, 2677(2), 173-189. <https://doi.org/10.1177/03611981221123246>

⁷ <https://aqtr.com/association/actualites/freight-transit-new-concept-city-logistics>

⁸ <https://content.tfl.gov.uk/wasteconsolidation.pdf>

⁹ <https://fitzroviapartnership.com/wp-content/uploads/2021/05/6.-bond-street-case-study-new.pdf>



Rubbish collection truck near Bond Street in London

SHIFT

Shifting mode choice for city logistic activities, or simply altering the time of day or where in the week deliveries are made can be small but effective changes. Switching mode from cumbersome lorries to more nimble cargo bikes, for example is another way to support with the function of the kerbside in the city. Some ways that city logistics trips can be shifted include:

- **Nighttime deliveries**
 - By delivering goods at nighttime, the most congested periods of the day can be avoided to speed up deliveries. Estimates suggest nighttime deliveries can reduce congestion by 15% in some cities.¹⁰
- **Bookable loading zones**
 - Loading zones can be booked in advance. This guarantees the space is free upon arrival for loading and servicing activities. Reducing the amount of circling drivers might do looking for a space, and allows authorities to charge for the booking to encourage higher-value activities to use the spaces.

¹⁰ <https://www.weforum.org/press/2020/01/urban-deliveries-expected-to-add-11-minutes-to-daily-commute-and-increase-carbon-emissions-by-30-until-2030-without-effective-intervention-e3141b32fa/>

- **Urban consolidation centres**
 - Goods can be delivered to micro logistics hubs near the city centre by truck or van, be consolidated by geographical location for efficient routing, and delivered by cargo bikes or smaller electric vehicles for the last mile.
- **Cargo cycles**
 - Cargo cycles come in a range of forms, hence ‘cycles’ rather than ‘bicycles’, as some have three or four wheels instead of just two.
 - Estimates from Transport for London suggest that in central London 17% of van delivery travel could be replaced by cargo cycles by 2030.¹¹
- **Parcel lockers**
 - Parcel lockers are secure storage spaces where you can pick up or send items conveniently, bypassing the need for home delivery.
 - In Poland, approximately 59% of people live within a 7-minute walking distance of a parcel locker. Estimates from InPost Poland suggest a 66% reduction in CO₂ emissions for deliveries with parcel lockers compared to direct home delivery.¹²

Case Study: Nighttime deliveries

New York City has pioneered a successful off-hours delivery programme aimed at optimising freight transportation within the congested city. Through subsidies, the programme encourages businesses to schedule deliveries during late-night hours rather than peak daytime periods. These subsidies might cover the labour costs of having someone present at the location to accept deliveries outside of business hours, or to facilitate unstaffed deliveries with separated delivery areas at the location. By delivering at the less congested times of the day it reduces delivery times and improves local traffic flow and air quality. It also places less pressure on kerbside space, and could reduce the number of trucks double parking, or parking in cycle lanes during the day time. Businesses participating in the programme have reported significant economic benefits, with potential annual savings estimated at over \$193 million if adopted citywide.¹³ One main downside is the noise of trucks carrying out deliveries at night, but much of this issue can be addressed with quieter electric trucks.

Recently, due to the success of the off-hour delivery programme, New York City's Department of Transportation (NY DOT) allocated an additional \$6 million to expand its off-hours delivery programme. This investment is intended to increase participation from 1,120 current locations to 5,000 by 2040.¹⁴ The programme aims to alleviate issues such as parking shortages, carbon emissions, and pedestrian safety risks caused by daytime freight activities.

Through this programme, two key lessons have been learned¹³:

1. **Focus on the receivers:** Typically the delivery companies themselves don't have much of a say as to when they pick up and deliver goods to stores. That decision is driven by the needs of the store. So by working with these stores, the NY DOT program has been able to incentivise stores to shift their delivery and pickup times.

¹¹ <https://content.tfl.gov.uk/tfl-cargo-bike-action-plan-2023-acc.pdf>

¹² <https://inpost.eu/sustainability/environmental>

¹³ <https://www.bloomberg.com/news/articles/2015-03-11/new-york-s-hugely-successful-late-night-freight-and-delivery-truck-program-is-heading-to-d-c>

¹⁴ <https://brooklyn.news12.com/dot-adds-6-million-to-boost-overnight-and-evening-deliveries-over-peak-hours>

- 2. Unassisted deliveries are best:** When receiving goods at night, stores will generally either employ staff to be present at the store to receive the goods, or the store will provide unsupervised access to the store for the delivery company. Employing staff to cover that nighttime delivery means extra costs, and unusual working hours. Instead the unassisted deliveries can be facilitated with special delivery areas locked off from the rest of the building or potentially via electronic lockers.

Case Study: Logistics hubs

Logistics hubs or consolidation centres are the green giants of the supply chain, quietly working behind the scenes to reduce our environmental impact. Typically, trucks and vans will be driven across a city making countless stops for individual packages. Consolidation centres can help put a stop to that. Logistics hubs or consolidation centres are warehouses generally located on the edges of busy urban areas where goods can be delivered by larger delivery vehicles, stored, and delivered to their final destinations by smaller, quieter, low-emissions vehicles that take up less space. Instead of numerous trips by larger vehicles, a more appropriately sized vehicle like a cargo bike or small delivery vehicle can be used to navigate the busy city centre streets.

These logistics hubs can be managed in several ways with varying complexity. Firstly, they can be many-to-one i.e. different companies deliver to the hub, with a single company completing the last mile delivery, they can be many-to-many i.e. each company delivering to the hub organises the last mile delivery for their goods, or one-to-one i.e. one company controls the delivery to and from the hub.

Fewer trucks on the road translates to cleaner air, less traffic congestion, and a smaller carbon footprint for the entire supply chain. Some private car parking companies are finding that due to the shift to more working from home their car parking buildings are less utilised. As one way to combat the loss in revenue, new approaches are being introduced such as Europe's longest established car parking management company, APCOA, who are turning prime underutilised city locations into logistics hubs as a way to recover some of that lost revenue.

However, consolidation centres do have downsides. The process itself adds an additional step to the journey, potentially delaying deliveries slightly and costing more time and resources to organise. It can also be challenging to find the right location, balancing being close enough to major roads to make it easy to access for trucks and vans, while not being too far from the key destinations for the last mile deliveries.

Despite these minor drawbacks, the environmental benefits of logistics consolidation centres are undeniable. By optimizing transportation and reducing the number of vehicles on the road, these clever hubs are paving the way for a greener future.

Camden Consolidation Hub

In London, the Borough of Camden Council has been operating a consolidation centre in partnership with Islington Council since 2014. Vans and trucks deliver to the consolidation centre where there is a storage room for goods before they are delivered to their final destination by cycle courier. Critical to the ongoing success of the consolidation centre is the annual funding provided by the councils which covers the delivery of goods for council centres in the area. Library books are moved between libraries via the consolidation centre, supplies for local schools are stored for when they are needed, and maintenance goods for council housing passes through the centre too. This provides a base level of activity that keeps the centre operating.

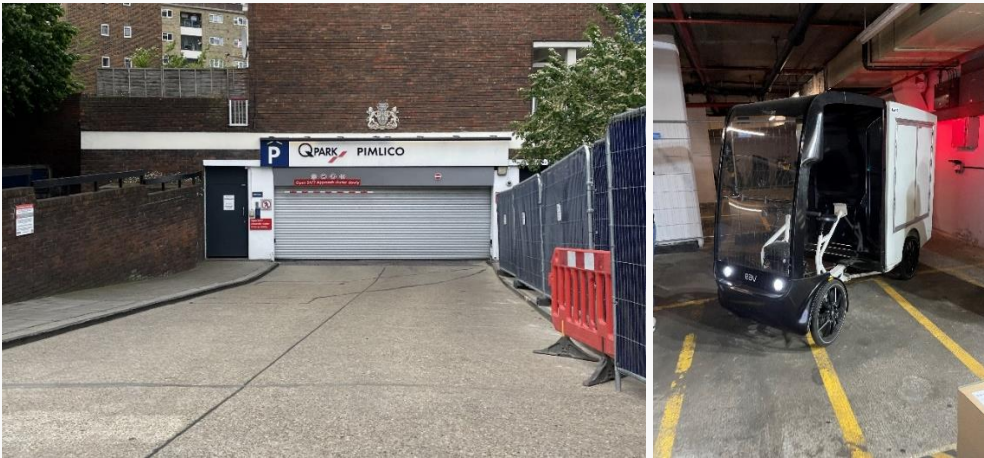
On top of that some private businesses also choose to deliver their goods via the consolidation centre. Only non-urgent goods can be accepted, delivery timeframes are generally 2-3 days after arriving at the centre, however some urgent deliveries can be prioritised. To maximise the potential of the centre dedicated marketing is required to sell the services of the local area. The consolidation centre is still working through issues, one of which is resourcing. A dedicated staff member who is able to raise awareness of the hub by working with businesses in the borough would be a logical next step to widening the reach of this local resource, and ensuring its ongoing success. Currently, there is low usage of the hub by private businesses despite being located just outside a busy local centre.



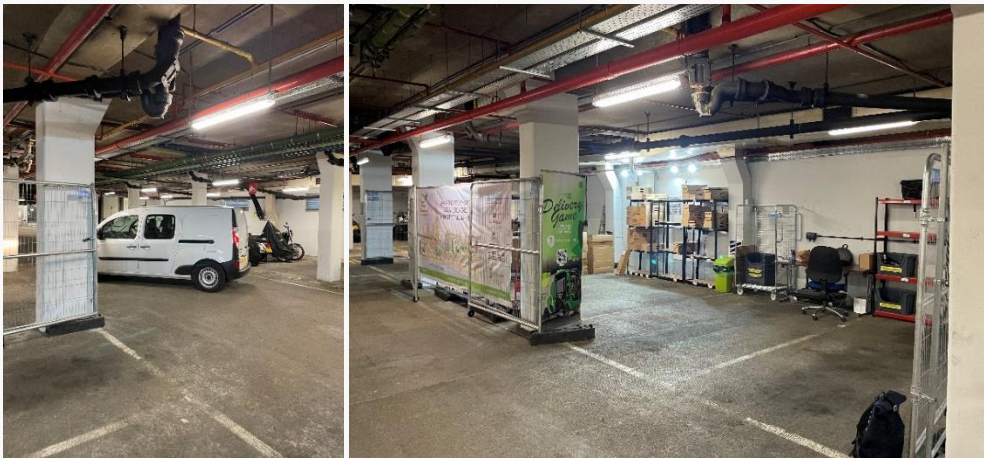
Camden Consolidation Hub and cargo bike

Pimlico micro logistics hub, London¹⁵

In April 2023, a new micro logistics hub was launched in an underground car park in the inner London suburb of Pimlico. Operated as a partnership between Westminster City Council, Q-Park Pimlico (car park owners in the locality), and the Cross River Partnership the hub started as a 6-month trial. The initial trial was paid for by a mix of the Mayor of London's Air Quality Fund, Westminster Council and Q-Park themselves. The hub itself is operated by Delivery Mates, goods are delivered to the hub with a small electric van, where they are then sorted by post code, and stored for final delivery. Final delivery takes place with a light electric vehicle, an Electric Assisted Vehicle (EAV). The hub handles five main types of goods – parcels, laundry shipments, food, fresh flowers and battery swaps for shared electric scooters. In the initial trial period, an average of 431 deliveries each day were carried out, reducing air and noise pollution to the local neighbourhood and reducing VKT of vans in this dense part of London. After 8 months of operation, Delivery Mates had reached their break-even point, showing that the hub can make financial sense as well as being better for the environment. Due to its ongoing success, the trial has continued to be extended, with the latest extension being another 12-months from December 2023.



Entrance to the Pimlico hub and EAV



Delivery van and storage area

Case Study: Cargo cycles

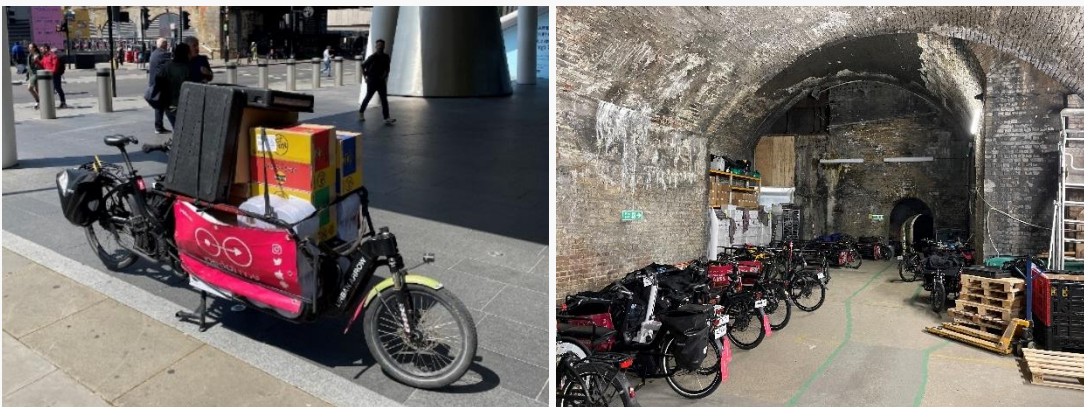
Cargo cycles are cycle devices built for the purpose of carrying cargo – including people – and come in a variety of types. Cargo cycles can be as basic as a normal bike rigged up with more carrying capacity for food delivery services, they can be purpose-built bikes with trays at the front or back for carrying larger loads, or even with four wheels and large containers to carry bigger loads. Electric motors support with topographical challenges, such as hills, whilst supporting the rider to conserve some energy.

As cargo cycles are smaller than trucks and vans they can use cycle lanes where available to avoid traffic (depending on their size), they are low or zero emissions, take up less space when parked, and are cheaper to operate. However, there are downsides too including less capacity, less range than trucks and vans, and goods can be less secure when parked. They are also not suitable for carrying all types of cargo.

So, while they may not replace all delivery trips, they can replace a good number of types of trips as well as reducing emissions from deliveries and reducing the number of vehicles on the road.

PedalMe

PedalMe is a cargo bike delivery company based in London that is providing low emission deliveries across the UK capital. As well as reducing delivery emissions by 90% when compared with diesel vans, they have also found that delivery speeds are up 60%. Where their cargo bikes were delivering 10 parcels an hour, a diesel van was only delivering 6 an hour.¹⁶ When compared to electric vans cargo bikes emit fewer carbon emissions. As well as having lower operating emissions, the manufacture of cargo bikes is less carbon intensive than for electric vans. Even larger cargo bikes like the EAV would be less carbon intensive than electric vans and have lower operating emissions¹⁷. Interestingly, the main factor which contributes to the emissions of cargo bikes is the diet of the rider¹⁸. But there are factors that can influence the uptake of cargo cycles in cities for deliveries.



PedalMe cargo bike and storage area beneath railway arches

¹⁵ <https://crossriverpartnership.org/wp-content/uploads/2024/04/SGL-Unpacked-Pimlico-Micro-Logistics-Hub-Trial.pdf>

¹⁶ <https://theloadstar.com/e-cargo-bikers-pedal-in-with-a-last-mile-revolution-from-diesel/>

¹⁷ <https://brc.org.uk/media/680927/final-mile-fv.pdf>

¹⁸ <https://pedalme.co.uk/pedal-me-sustainability-report/work-with-us>

Case Study: Parcel lockers

Parcel lockers are secure electronic storage spaces for picking up or sending items. Instead of having a package delivered to your home address, you can get it delivered to a local parcel locker where it will be waiting to be picked up by you at a convenient time. Or if you are wanting to send a package you can book a locker to drop your parcel in where it will be later picked up from for delivery.

Parcel lockers can be beneficial for both customers and businesses alike. They allow customers more flexibility in when they receive goods – not having to make sure they will be home to receive a package. Some lockers are open 24 hours a day! Lockers are typically located in places that people will visit as part of their other weekly movements making pick-up convenient – such as along their commute in a train station, at a supermarket, or even at a laundromat. They offer security for parcels – reducing the hassle for both consumers and delivery companies of packages getting stolen on doorsteps or in letter boxes. They also can provide efficiencies for delivery companies as they can drop packages for one suburb all in one location, instead of going door-to-door saving time and money. And they can provide a back-up option when an address cannot be found or a customer is not home to receive the parcel as expected. They can also help reduce the emissions and kilometres travelled by delivery vehicles because as always it's not a simple story.



Parcel lockers in Sydney at the Newtown train station, in Paris at a laundromat, and in Amsterdam at a grocers

There are some downsides too. Parcel lockers generally cannot be used for sending perishable items like food as they cannot be guaranteed to keep the food safe for consumption. And they are not suitable for sending very large or awkwardly shaped parcels – so they cannot fully replace traditional courier services. There is also a tension between having these parcel lockers conveniently located for customers versus having them located conveniently for pick-up and drop-off by courier workers. For example, being located on the concourse of a train station is very convenient for a commuter, but less so for a courier worker as they might have to walk some distance up and down stairs or struggle to find a place to park nearby. Other downsides include risk of the lockers being broken into or malfunctioning lockers which prevent you from accessing your parcels – however the risk of these issues can be minimised with good security measures and regular maintenance.

Paris

In 2021, the Paris transport authority (RATP) put out an open tender to roll out parcel lockers inside train stations across the region. The tender included installing and operating 50 parcel collection lockers across the underground and regional train stations in Paris. The successful tenderer, Pickup, now has parcel lockers located in easy reach of people's day-to-day journeys. This allows people to pick up parcels along their commute, so they do not have to go out of their way to get parcels or risk having them delivered to their empty apartment. Similar deals have been reached with other parcel locker suppliers across the wider range of train stations within Paris showing the demand for these convenient parcel lockers.



Parcel lockers at train stations in Paris

IMPROVE

Improve is about increasing the efficiency of vehicles, technology or processes related to city logistics activities. By doing these things, activities can be carried out faster, reducing the impact on other street users, with less pollution or with greater sharing of public or private space. Improving existing practices can be the easiest way to reduce the impact of city logistics activities, however, the benefits may not be as high. Some ways that city logistics trips can be improved include:

- Electrification of vehicles
 - Electric vans and trucks can be used to reduce emissions, air pollution and noise pollution in dense urban areas.
- Using autonomous delivery vehicles
- Sharing of loading docks
- Containerisation of last mile deliveries



Electric delivery vehicle in Barcelona, and an electric rubbish truck in London

Case Study: Containerisation

Similar to what happened with large freight in the 1950s, containerisation is emerging for last mile deliveries too. Containerisation means goods are transported using standard sized containers across different companies and legs in the supply chain. In doing this, efficiencies across the last mile supply chain can be achieved. These efficiencies include the ability to stack and store goods from different suppliers efficiently, ease of intermodal transportation with vehicles designed to handle the standard container types, and can enable more automation in the supply chain process.

In the 1950s this was achieved with shipping containers allowing goods to be readily transported around the world by ship and put on trains and trucks for delivery on land. This standardised cargo delivery the world over. The same could be achieved with last mile deliveries through the introduction of a common cargo box that can be taken from trucks and vans and placed onto cargo bikes for last mile delivery. Currently, individual cargo bike companies use different sized and shaped cargo containers that are generally fixed to the bike itself so goods have to be unpacked and repacked when shifted from van or truck to the cargo bike. Instead, if a common cargo bike box was developed, instead of needing to repack the goods onto the cargo bike, the whole box could be removed from the van or truck and placed onto the cargo bike.

Despite these clear benefits, containerisation of last mile deliveries is not common practice and to achieve it would require large investment for an industry that often runs on small margins. Several

companies and organisations are exploring the containerisation of last mile freight. The organisation Urban Logistics as an On-Demand Service (ULaaS) is planning to trial the use of standardised delivery boxes for deliveries¹⁹ and Vevolve is already using standardised delivery boxes for their work²⁰. These delivery boxes can have wheels and electric motors for rolling to the final destination such as the Trace e-cart by BrightDrop (a subsidiary of General Motors)²¹.



Vevolve cargo box (Source: Vevolve)

¹⁹ <https://ulaads.eu/containerised-urban-last-mile-delivery/>

²⁰ <https://www.velove.se/electric-cargo-bike>

²¹ <https://gmauthority.com/blog/2022/08/heres-how-the-brightdrop-trace-works-video/>

HOW CAN WE MAKE IT HAPPEN?

If these options are currently available for improving city logistics, why are they not widespread with high uptake already? In some cases the regulations will not allow certain innovations, in others it is because the innovations are seen as too expensive. There is a role for Government and local authorities to help support and encourage innovation in the city logistics space. There are six key actions that can be taken to make change happen:

- Subsidies
- Enforcement
- Communication
- Regulations
- Trials
- Data collection

These six action areas are pushing innovation overseas, as identified in the Case Studies, and could be replicated in New Zealand with similar positive results. In the remainder of this section, I cover each of these six areas providing some thoughts and sharing examples from my study tour.

SUBSIDIES

We can subsidise the activities we want to see more of to help encourage private industry to adopt new ways of working. When thinking about who pays, we should be considering where the benefits fall. Whilst some government agencies may balk at the thought of subsidising mode shift for private businesses, the overarching goal of emissions reduction and focusing on streets as living spaces for people might mean that investment in these types of solutions is significant. Subsidies can support the purchase of new vehicles or devices, encourage new ways of operating, or to provide physical space for operations.



Delivery bike in London, hand-pulled electric cart for rubbish collection in London, and construction materials being delivered to site in Barcelona by shopping trolley

E-cycle subsidies

E-bike subsidies are a popular form of subsidy for encouraging their use for last mile deliveries. These subsidies can apply at a national level, regional level, or even city level and sometimes can be combined. Across the United States and Europe these subsidies are especially popular. The exact way in which they work differs from place to place. In Brussels individuals and businesses can claim up to €4000 for the purchase of an electric cargo bike, in the UK up to 40% of the cost, in Paris up to €1200 and even in The Netherlands up to 62% tax break of the purchase price. In 2020, when Hamburg offered €700,000 for a 33% discount on cargo bikes the funding was successfully allocated to business in less than 30 minutes.²² In Denver Colorado, each time the city has released e-bike vouchers they are oversubscribed shortly after being made available.²³



E-cargo bikes in Paris and Barcelona

ENFORCEMENT

Enforcement is critical to ensure efficient use of kerbside space and that spaces are being used as intended. If enforcement is lacking we don't get a clear picture of the issues. In addition the true costs of operating aren't being passed on. When loading zones are reserved for goods and service vehicles only, but general public use them, this makes work for deliveries and services more difficult. Strong enforcement is potentially a low-cost intervention, or it can even be revenue positive, that should be part of business-as-usual operations for cities. Use of cameras, bollards and remote ticketing can support on-ground human enforcement for effective management of kerbside spaces. It is important to make enforcement easy and restrictions simple to understand so that enforcement can be carried out quickly, and ideally minimised over time as users understand the restrictions.

²² <https://www.bbc.com/news/business-59430501>

²³ <https://grist.org/cities/denver-ebike-rebate-program/>

Ticketed Loading Zones – Sydney

In Sydney, in high activity areas, ticketed loading zones are used to ensure spaces are not used for longer than permitted. Spaces are still free, but users need to get a ticket from a kiosk and display it on their vehicle. They get 30 mins total, and only vehicles that have “been built to carry goods” can use these spaces. In comparison, in New Zealand loading zones can be used for as long as desired in total as long as the user is not away from their vehicle at any one time for more than the time stated on the loading zone sign. For example, if the loading zone is signed as a P15 loading zone, someone could park in that space all day if they were never away from their car for more than 15 minutes at any one time. This makes it challenging to enforce loading zones in New Zealand as a parking warden needs to watch the loading zone for the permitted period to see if the vehicle is left unattended for all that time .

In Sydney, the fines for overstaying are much higher than in New Zealand. The fine for using one of these spaces for too long, or for not having a permitted vehicle, is \$227 Australian dollars.²⁴ In comparison in Auckland, the fine is \$40.²⁵



Ticket loading zone sign in Sydney, the ticketing machine, and a ticket displayed in the window of a vehicle

²⁴ <https://www.nsw.gov.au/sites/default/files/2021-09/demerits-parking.pdf>

²⁵ <https://at.govt.nz/infringements-fines/vehicle-infringements>

Bollards

Bollards are an exceptionally efficient way of enforcing the use of city streets as they physically prevent vehicles from using a space. Bollards can be used to protect footpath space, they can be used to filter certain types or permitted vehicles through retractable bollards, and they can come in various shapes and sizes potentially servicing multiple purposes. Bollards while requiring an upfront capital cost, can reduce operating costs of enforcement over a long period of time potentially saving money in the long run. Bollards are heavily employed across Europe, especially where streets are narrow and there is a risk that parked vehicles could other block footpaths.



Bollards with pot plants in Paris, a retractable bollard on a pedestrian street in Bordeaux, and a wooden cart being used as a traffic restriction in London.



Bollards protecting the footpath adjacent to a loading zone in Paris, docks for the London public shared bikes being used as a modal filter, and swinging gates being used to close off a road in Paris.

COMMUNICATION

Communication is a vital piece of the puzzle that is often overlooked and underappreciated for its ability to support change. Communication is about keeping everyone – business owners, residents, tradespeople, couriers - informed on how city logistics can operate in a city and to allow collaboration between the city and stakeholders. Communication is especially important during roadworks or disruption!

Toolkits are an important lever for communicating how the city sees these activities taking place. Toolkits are documents produced by a municipality that outline the vision for city logistics or a particular activity of city logistics and also explain the practical ways in which these activities can be carried out in the municipality. One of the main challenges with city logistics activities is that they are not controlled by a public institution (in general – there are some exceptions). Often the control that councils have over these activities is one step removed and comes into play through contracts. What this means is that unlike, public transport where the council can control most aspects of this, with city logistics they have to resort to using what levers they have to influence these activities. They are an important communication piece between the city and industry.

Last Mile Freight Toolkit, Sydney

Sydney developed a Last Mile Freight Toolkit which outlines how city logistics activities are managed in the city. As part of the toolkit there is a website that is regularly updated with changes that are happening in the city centre that could affect city logistics, and provides contact information for relevant city officials. The toolkit and the accompanying website provide useful case studies and information to the industry as to new ways of carrying out activities and how restrictions work.

Also in Sydney they have a dedicated urban logistics manager at Transport for New South Wales. They are responsible for managing freight activities in the city centre and corresponding with the industry. They act as an important link between private business and the planning functions of the city. They can be an advocate for businesses and city logistics activities at the planning table.



Front cover of the Sydney toolkit.

REGULATION

Regulations are a two-way street – we can tighten regulations in some places to get more control, or relax restrictions to enable more innovation. Regulations can affect city logistics in a wide variety of ways, including:

- **Health and safety requirements** for those making deliveries should be considered. This includes registration or standardised training for those making deliveries by cargo cycle.
- **Power output regulations** for cargo bikes which could prevent the use of bikes with the necessary power to tackle hills in some cities.
- **Flexibility of on-street restrictions** at different times of day or certain days of the week to reflect how city activities change over the day and week.
- Clarity regarding the **classification of new city logistics vehicles** and where they can be used i.e. in cycle lanes, shared space streets or pedestrian malls.
- **Permit schemes** that allow exemptions to vehicle access restrictions for certain activities such as mobility parking or local residents.
- **Regulations of new apartment developments** and whether they have appropriate space off street for their loading and servicing needs.

It's important that levers are continually interrogated, and regulations reviewed to understand if we have the right regulations in place to allow innovative new vehicles and new ways to carrying out city logistic activities. Conversely, shared e-scooter companies in New Zealand have faced a lot of uncertainty around regulations and operating conditions causing many to leave the market. While it is natural that regulations develop overtime, especially with emerging technologies, we want to work collaboratively with industry to be an enabler rather than a hinderance. Ideally, by looking to what is happening overseas, New Zealand can work to pin our regulations of new devices to those of larger markets so that we do not require bespoke solutions which end up costing more or are unavailable.



Delivery devices/vehicles in Barcelona, Amsterdam, and London respectively.

Cargo cycle power regulations

Regulations can be a barrier for cargo cycle uptake. Many places limit the power output of cargo cycles. For example, in New Zealand, e-cycles are limited to 300W before they are considered mopeds meaning that technically they wouldn't be able to use cycle lanes and would be more limited as to where they can be parked legally. However, due to the hilliness of many places in New Zealand more power is needed to allow for heavier loads to be carried up hills. In Europe, cargo bikes are limited to 250W, so even the larger EAV cargo bike would not be suitable to carrying loads up hills. One option is to regulate based on speed rather than power output so that cargo cycles with heavier payloads would still be able to make it up steeper hills but they would have their speed limited on the flat or downhill.

Cargo cycle rider licensing

PedalMe in London identified the barrier they have to becoming a preferred delivery supplier for businesses. Unlike courier delivery services which have trained drivers in vans or similar, most cargo cyclists are relatively untrained, and are not licensed. When businesses are looking to contract delivery services, it can be easier for legal reasons relating to insurance and liability to choose the type of business that is more regulated, involves training, and some sort of licensing. To attempt to counter this, PedalMe invests in an intensive training program for all their new cycle couriers and is pushing for a standardised registration process to be implemented to make it easier for businesses to choose the services of cargo cyclists.

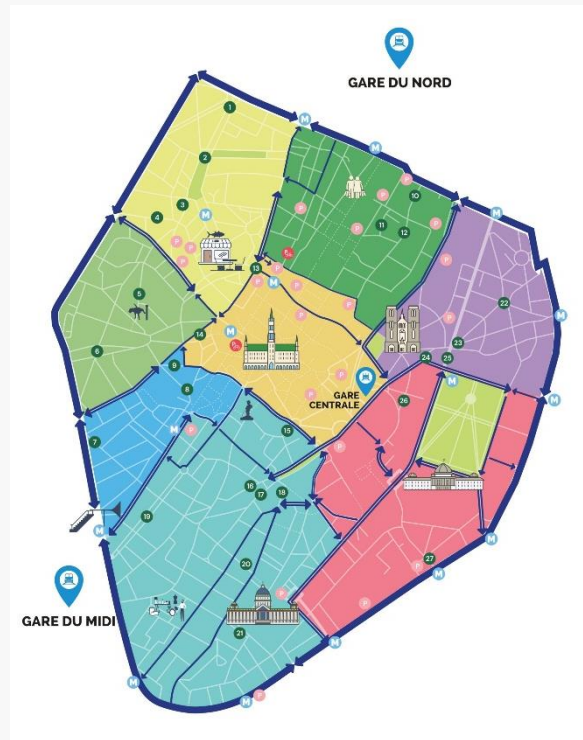
Traffic circulation plans and low emissions zones

Traffic circulation plans and low emission zones are two methods being employed by cities to manage which types of vehicles can go where. Traffic circulation plans use various measures like physical barriers, camera enforcement, or turning restrictions to control vehicle movements. Physical barriers can be used as modal filters to allow smaller vehicles or devices like cargo bikes to pass through while stopping cars, vans and trucks. Camera enforcement can be used to control vehicle access more tightly, using license plate technology to restrict access to specific vehicles or types of vehicles.

Congestion charging or low emissions zones like the ones in London provide a financial incentive for those businesses using cargo bikes which meet the low emissions zones requirements and also are excluded from the congestion charge. This helps with step change, encouraging cargo bikes over diesel and even electric vans and trucks. Instead of paying £15 to enter the Congestion Charge zone in London, a delivery company or tradesperson might be able to switch to a cargo bike instead to avoid the charge.

Brussels

In Brussels, a new vehicle circulation plan was introduced in August 2022. A series of traffic zones were created in the city centre which access between them possible only via the city centre ring road. Access within the city centre is controlled via a network of retractable bollards using automated number plate recognition (ANPR) technology. Access within the bollards is only allowed with a permit for those who are residents, and for deliveries and trades and servicing a permit is required and access only permitted between 4am and 11am²⁶. Some issues with loading and servicing have been felt, but city is working to address, traffic on ring road has stayed virtually the same. The change was met with a lot of resistance initially, but now people are generally very satisfied. One year on, 25% less car traffic and 36% more cycles are present in the inner-city area.²⁷



Traffic circulation zones (Source: City of Brussels).

In London, camera technology and modal filters are commonly used to prioritise certain vehicles in certain areas. For example, in Broadway Market in London Fields through traffic is prevented with the use of a barrier gate across the main entrance between the hours of 6-10am and 4-8pm. For loading and servicing activities access is permitted from a side road to get to the main street. Exemption permits are available for Blue Badge holders (mobility parking permit equivalent) and cyclist and pedestrians who can just go around the gate. Elsewhere in London at The Cut in South Bank only cyclists and loading vehicles are allowed to use the street and this is enforced purely with camera technology. Camera enforcement requires minimal physical works, saving time and costs, and the enforcement is even throughout time rather than depending on periodic human enforcement.

²⁶ <https://www.vrt.be/vrtnws/en/2022/08/16/through-traffic-no-longer-welcome-in-the-centre-of-brussels/>

²⁷ <https://www.eltis.org/in-brief/news/one-year-good-move-brussels-city-25-less-car-traffic-and-36-more-bicycles>



Barrier gate in Broadway Market, London, and camera enforced restrictions on The Cut in South Bank

Coach Parking Amsterdam

In Amsterdam, coaches are only permitted on certain streets through the city centre and are only permitted to unload and load passengers in certain places. The city council of Amsterdam has produced a bus circulation plan that communicates these restrictions. Exemptions can be applied for, which allow coaches above 7.5 tonnes to deviate off the main coach route through the city centre onto the secondary permitted routes. Exemptions can also be applied for if the coach needs to drop passengers directly outside the destination. In these cases a specific exemption is needed and the city needs to test out the route before it can be used. In all cases exemptions cost €27.40 for one day or annual exemptions can be applied for which costs between €200 and €300 depending on if a route test is needed.²⁸²⁹



Bus circulation routes in Amsterdam (Source: Gemeente Amsterdam).

²⁸ <https://www.amsterdam.nl/en/traffic-transport/coaches-tour-buses/summary-new-coach-measures/>

²⁹ file:///Users/richardhart/Documents/City%20Logistics/coaches_and_buses_2024.pdf

TRIALS

Trials support cities to test out ideas, without committing to significant investment with a view to ensure that perfection doesn't get in the way of good. They are experimental, and can be politically challenging to manage. However, the gains are often significant. Trials are about testing out an idea without sinking a huge amount of money into it, it's about not letting perfection get in the way of good. One advantage of trials is that they allow cities and organisations to tweak innovations to tailor them to the specific urban context. By piloting new technologies, cities can assess real-world feasibility and performance, gathering data to inform decision-making. Trials also foster collaboration among stakeholders, including government bodies, businesses, and residents, promoting collective buy-in and support. However, trials may also encounter setbacks, such as unexpected costs, regulatory hurdles, or public resistance, which can delay or complicate implementation. Balancing these factors requires careful planning and flexibility to maximize the long-term benefits of sustainable and efficient urban logistics systems. Trials can be used for a whole range of innovations for city logistics, including cargo bike deliveries, consolidation centres, night-time deliveries and more.

Waltham Forest low-emissions delivery trial^{30,31}

In 2016, the East London borough council of Waltham Forest trialled a cargo bike delivery scheme for the busy Christmas shopping period. The trial provided borough residents with free deliveries by electric van or cargo bike for goods purchased from the local shops. The idea was to test the concept and work out what shops could use cargo bike deliveries in the future. By trialling the concept, local businesses had the opportunity to see how it could work from them without having to commit any money to the scheme. On average the trial delivered 43 parcels a day to residents in the local area, Reducing the number of short car trips to the local area, whilst supporting the shop local campaign.

Following on from the two-week trial, the following year Waltham Forest Council was provided with a £400,000 grant from the Mayor of London's Air Quality Fund to contract a company to continue the trial for a two-year period. The Mayor's Air Quality Fund is a contestable fund for councils to trial innovations that will improve the air quality of London and has been used successfully by councils across London for other city logistics innovation trials. The cargo bike delivery scheme continues to this day through a partnership between Waltham Forest Council and the private delivery company Zedify.³²

³⁰ <https://road.cc/content/news/214233-worlds-first-council-run-cargo-bike-delivery-service-christmas-courier-set>

³¹ <https://www.theguardian.com/environment/bike-blog/2017/nov/10/how-cargo-bikes-can-help-unclog-londons-congested-roads>

³² <https://www.zedify.co.uk/locations/london/>

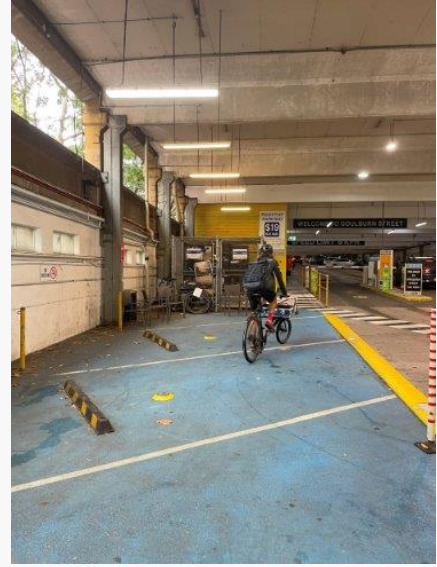
Courier hub, Sydney

In Sydney, Transport for New South Wales (TfNSW) has been trialling a courier hub in an underused car park owned by the transport agency. Ongoing construction disruption in Sydney's city centre from new transport projects had reduced on-street loading zone spaces by 13% since 2015. In 2016, TfNSW decided to reserve a section of the ground floor of its Goulburn Street Car Park near Central Station as a courier hub. Spaces are reserved for courier vans, and lockers and storage cages are provided to securely store parcels. Individual courier companies can use this space and can have lockers and cages reserved for them. For the last mile delivery a team of cycle couriers deliver from the hub to the nearby city centre area. The courier hub has been closely monitored with a good data collection scheme to provide information on its success. According to data from May 2022, the hub was being used for an average of 225 parcels per day – reducing VKT of vans in the city centre, and relieving pressure on the remaining loading zones.

Through this trial, TfNSW has learnt important lessons about what provisions are needed to make a courier hub successful. Aspects such as CCTV cameras, toilets, seating for the cycle couriers, and the lockers and cages are important parts to making this a success. The location of the hub is important. Situated at the edge of the city centre, the hub is easily accessible for courier vans, without them having to go too far in the dense city centre. But it is also close enough to the dense part of the city centre that delivery by bike from the hub is quick and easy.



Entrance to the courier hub and the courier hub lockers.



Secure storage cages, and the reserved parking spaces.

DATA COLLECTION

Data collection is important for understanding the specific needs of city logistics activities in the city, neighbourhood or street where there are issues. Good data about the number of trips, needs of people, and busy times of day can inform the solutions and future planning.

Construction logistics, Amsterdam

In Amsterdam, data collection and analysis has shown that city logistics activities related to the construction industry are the single biggest source of vehicle movements at the moment. In the Dutch capital, 30% of deliveries in the city related to construction³³, compared to 25% for supermarkets, wholesale, and hospitality, 20% for retail, 15% for services, and only 7% for parcel deliveries. This has meant that the city authorities in Amsterdam have focused their immediate attention on improving construction logistics in the city. One issue they have sought to address is the storage of construction materials in the limited street space that there is in Amsterdam. During construction, goods need to be delivered to building sites in the city, however, the exact date the materials are needed can shift from day-to-day as the rate of progress changes or schedules change. However, if goods are coming from out of town there can be less ability to alter the delivery date with short notice. So, with support of the city, a construction consolidation hub has opened on the outskirts of the city. This allows construction materials to be stored until they are needed on site rather than them being stored on the street.

Data collection is helpful when working with the community on city logistics issues. It can keep an objective view of the issues in what can be a contentious space. Data collection is essential when streetscape changes or construction disruption is planned for an area. By collecting data about the city logistics activities that currently occur on that street, suitable mitigations can be found ahead of time.

³³ <https://www.cbreim.com/-/media/project/cbre/bussectors/cbreim/insights/articles/2023-media-folder/urban-logistics-lessons-from-amsterdam/urban-logistics-lessons-from-amsterdam.pdf>

Castlereagh Street, Sydney

Castlereagh Street is a busy north-south street in Sydney's city centre. The street is lined with large office towers some of which have underground parking or off-street loading. Castlereagh Street has two traffic lanes and operates as one-way southbound. It is a main bus corridor with a bus lane operating at peak times, and kerbside parking and loading lining the length of the street. The street caters for many uses, including as the key north-south cycling route through the city centre. Over the years, the kerbside loading zones and parking have given way for a bi-directional cycleway. When City of Sydney planned to plug the final gap in the cycleway in what was likely the busiest part of the street for loading and servicing it was going to require removing all the loading zones from one side of the street. So, TfNSW stepped in and put the project on hold. While there was strong support for the cycleway to be constructed, TfNSW recognised the importance of the loading and servicing function of this section of Castlereagh Street. They organised a survey to be conducted using cameras to capture all the city logistics movements that happened on a day-to-day basis on the street including those accessing off-street loading docks. Once this data was collected, TfNSW could determine what was the likely impact of removing the loading zones on one side of the street. They could determine whether the street was currently at capacity or not, if there were opportunities for the re-timing of some loading and servicing activities, and how many of the current users should not have been there. This allowed TfNSW to front foot conversations with the industry about the changes to the street and provide support and alternatives where possible. In the end, the project was given the green light to go ahead, but this shows how data collection can be used to reduce the barriers of city logistics for making transport changes in our cities.



Artistic render of the Castlereagh Street improvements (Source: City of Sydney)

CONCLUSION

City logistics present both challenges and opportunities for innovation in New Zealand. By adopting sustainable practices and leveraging emerging technologies, we can mitigate environmental impact, alleviate traffic congestion, and enhance urban liveability. This report has explored several key strategies and initiatives that I discovered through my study trip. The innovations are centred around the three areas of the Sustainable Transport Framework, and I have drawn on examples from my trip to show what other places are doing:

- **Avoid:** Avoid the need to travel or reduce the number of trips
- **Shift:** Shift to lower emissions modes or less busy times of the day
- **Improve:** Improve the efficiency of vehicles, technology or processes

Examples from global cities illustrate successful implementations of these strategies. From dedicated courier hubs and low-emission zones to innovative traffic circulation plans, cities worldwide are demonstrating tangible improvements in efficiency and sustainability.

In order to make these changes in the field of city logistics, I have suggested six key areas for focus:

- **Subsidies:** Financial incentives to encourage adoption of sustainable logistics solutions such as e-bikes and electric vehicles.
- **Enforcement:** Effective enforcement of traffic and loading regulations to optimise curb space and ensure fair access for all users.
- **Communication:** Clear communication channels between stakeholders to align city logistics strategies with urban development goals.
- **Regulations:** Balancing regulatory frameworks to enable innovation while ensuring safety and efficiency in logistics operations.
- **Trials:** Pilot projects to test new technologies and operational models, gathering data to inform scalable solutions.
- **Data Collection:** Utilisation of data analytics to understand and address specific challenges in city logistics, like congestion hotspots or environmental impacts.

In conclusion, achieving sustainable city logistics in New Zealand – that is with less emissions, fewer VKT, and less air pollution – requires collaboration between government agencies, businesses, and communities. By embracing technological innovation, implementing supportive policies, conducting trials, and leveraging data, we can improve city logistics practices to ensure city streets are primarily a place for people.

APPENDIX A – CONTACT LIST

Name/Organisation	Organisation/Location
Richard Smithers	City of Melbourne
Prof. Prem Chhetri	RMIT – Melbourne
Michael Stokoe	Transport for New South Wales – Sydney
Fiona Campbell	City of Sydney
Ross Phillips	Cross River Partnership – London
Phyllis McArthur	Camden Consolidation Centre – London
Jacqueline Short	Transport for London
Chris Dixon	PedalMe – London
Alex Castellarnau	BrightDrop – Amsterdam
APCOA	Amsterdam
Mario Eibl	GLEAM – Amsterdam
Walther Ploos van Amstel	Amsterdam University of Applied Sciences
Deudekom Logistics Hub	Amsterdam
Claudia Ribeiro	Polis - Brussels