Urban Freight program and iMove projects

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Developing Challenges of a Global City
Ways the freight task is changing

Accessibility for Urban Logistics

Access and space for freight is a key issue

- Cities grow and land is more intensively developed. The freight task is greater and more condensed. The road space and kerbside space for vehicles is reducing

    - Since 2015 Sydney CBD loading zone provision has shrunk by 20%

    - Developers are typically reluctant to build full sized compliant loading docks, instead assuming they can rely on kerbside parking

- DAs for new buildings rarely exhibit a good understanding of freight - unlike other transport modes

- …Then COVID has spatially changed demand patterns for goods and services, and hence freight activity

The journey and travel time reliability to the destination

On arrival, where will the vehicle park?

Improving Urban Freight Outcomes

- From an economic, social and environmental perspective

- From a freight efficiency perspective

- Last mile freight is a derived demand from peoples consumption of goods and services. It typically manifests itself as a fleet of road vehicles

- In the era of a place-making focus, we want to highlight that freight needs to be planned for and also ensure it is conducted efficiently

- We want to explore the best outcomes possible that are efficient, use infrastructure wisely and are socially and environmentally acceptable

Guiding Principles

Commercial activity and derived demand

Promoting self sufficient buildings and precincts

Delivering economic, social and environmental benefits

Balancing amenity and transport efficiency

Enabling placemaking objectives

Alignment of iMove projects to Urban Freight Work Program

The projects undertaken with iMOVE support our work program to promoting better outcomes for urban freight

Aims

- Approaches will enable **efficient freight** outcomes

- **Test approaches that have broader application;** developed from our work since 2014

- Last mile freight is a critical component of economic and societal activity and **a growing challenge** requiring consideration
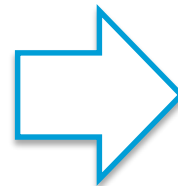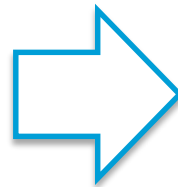
Outcomes

- Improved internal consideration for freight

- Improved facilities for freight

- Actions and policies taken by key operators

- We're leading the way and demonstrating innovation

Contributing to successful places in Sydney CBD and beyond

TfNSW Freight projects undertaken so far with iMove

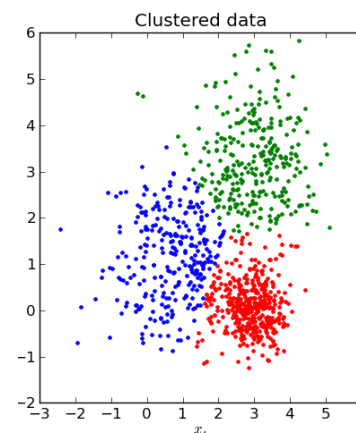| iMove project No.	Title	Partner	Status / finish date	Project value
2-010	Urban freight task forecasting and loading dock provision in new buildings*	University of Melbourne	Complete Apr '21	$90k
2-003	Investigating the Feasibility of Adopting Co-Modality in Sydney	University of Sydney	Complete May '21	$175k
2-007	Last Mile activity in Metropolitan Sydney influenced by COVID-19**	University of Melbourne	Dec '22	$300k

Official project titles in iMove System
*Developing procedures to evaluate loading dock capacity provision
**Changing profile of freight logistics in Metropolitan Sydney due to the Covid-19 pandemic: Last-Mile Scenarios and Possible Public Policy Interventions

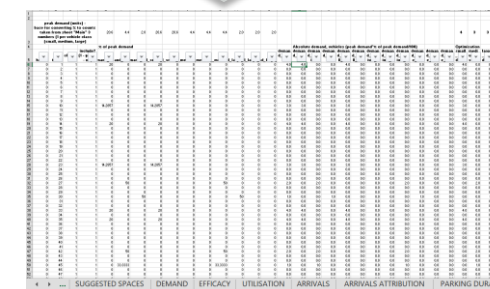# 2-010: Building's freight forecasting and loading dock provision

- TfNSW, freight data from building assessments
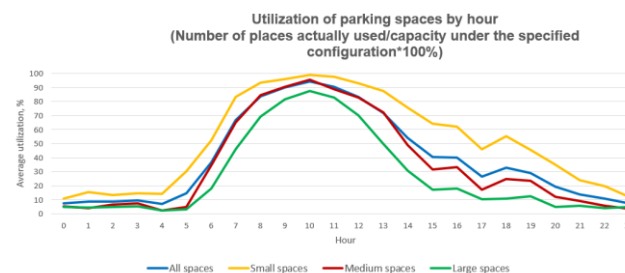- 30+ sites of mixed land use, sizes and locations (not just Sydney CBD).

Clustered data

Detailed coefficients	
Small Service	
Small Delivery/Pickup	
Medium Service	
Medium Delivery/Pickup	
Medium Waste	
Large Service	
Large Delivery/Pickup	
Large Waste	
Small Total	
Medium Total	
Large Total	
Service Total	
Delivery/Pickup Total	
Waste Total	
Grand Total	

Linear regression analysis to generate predictors of freight and coefficients.

OPTIMAL SOLUTION	
SIZE	OPTIMAL NUMBER
SMALL	5
MEDIUM	1
LARGE	0
SOLUTION'S CHARACTERISTICS	
Total spaces	6
Average accomodated vehicles	2.0
Average demand	2.4
EFFICACY (average % of vehicles to be accomodated during the day)	82.4
TOTAL PARKING AREA, m²	114.5

Utilization of parking spaces by hour
(Number of places actually used/capacity under the specified configuration*100%)

Recommendations generated for number of spaces based on minimum efficacy. Decision support tool.

Forecast freight task calculated. Dashboards support with details

Simulated demand (Monte-Carlo). Primarily used for variability and high/med/low forecasts.

2-010: Building freight forecasting, Current projects: Metro West

- Estimation of total freight demands and loading dock requirements for Over Station Developments
- Assessment of all station developments between Sydney and Parramatta CBDs
- Testing "*what if*" capabilities of different dock configurations against the same levels of demand generated by floor space regression analysis

Distribution of parking space demand by hours of the day for each vehicle class-visit type combination

Legend: Small Service, Small Delivery/Pickup, Medium Service, Medium Delivery/Pickup, Medium Waste, Large Service, Large Delivery/Pickup, Large Waste
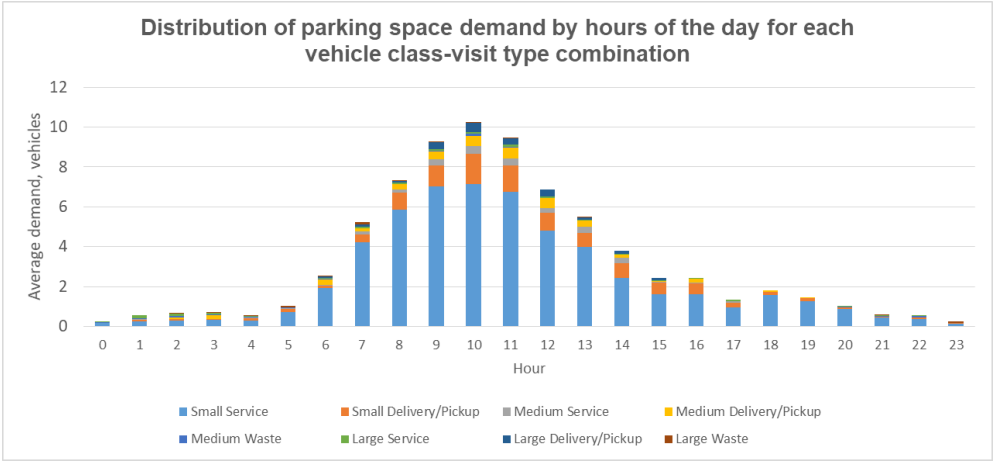
DOCK CONFIGURATION	
Small spaces	7
Medium spaces	2
Large spaces	1
Average efficacy, %	92.8
Total rejected vehicles	7

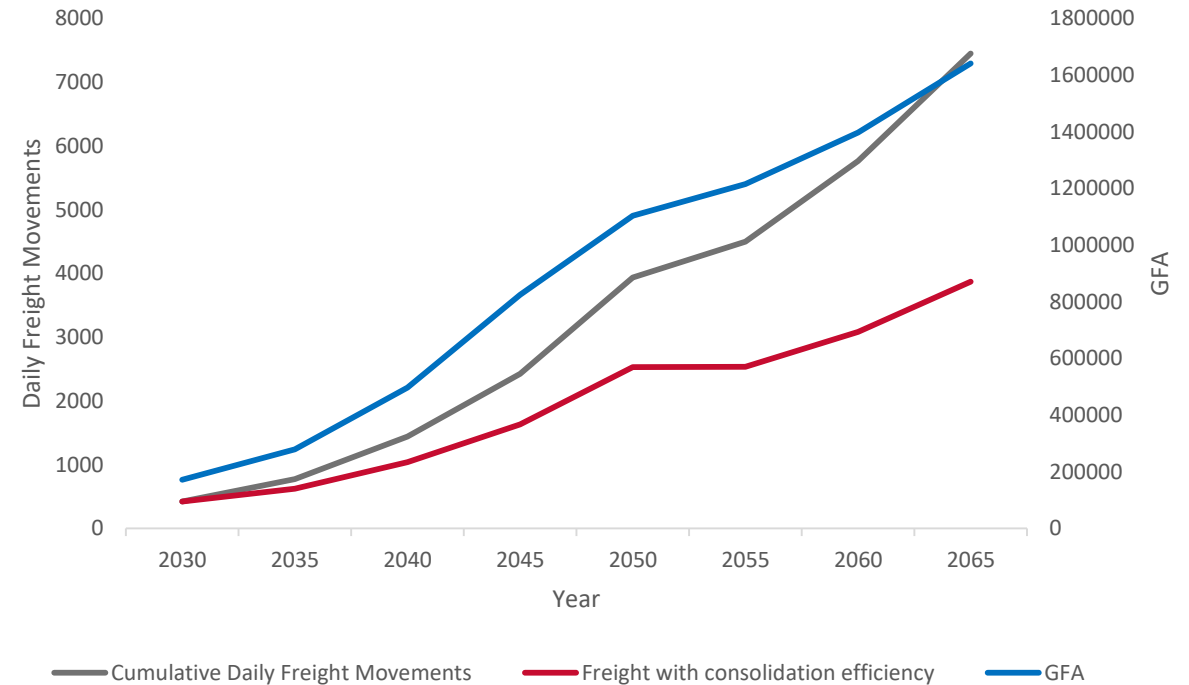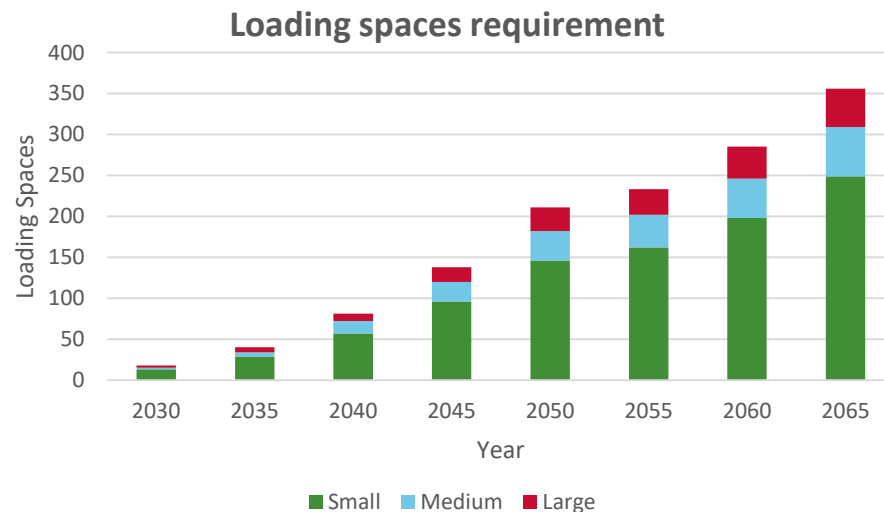| DOCK CONFIGURATION	
Small spaces	5
Medium spaces	2
Large spaces	1
Average efficacy, %	86.3
Total rejected vehicles	14

Hour	Van/Ute	SRV	MRV/LRV	Service	Delivery/Pickup	Waste	Total
0	0.32	0.26	0.05	0.21	0.21	0.17	0.60
1	0.32	0.52	0.10	0.27	0.42	0.22	0.90
2	0.80	0.47	0.15	0.32	0.85	0.22	1.38
3	1.01	0.47	0.25	0.32	1.11	0.26	1.69
4	1.54	0.26	0.15	0.69	1.06	0.17	1.92
5	2.70	0.42	0.36	2.07	0.90	0.43	3.41
6	5.30	1.30	0.25	4.57	2.06	0.22	6.85
7	7.84	1.20	0.87	5.64	3.75	0.48	9.87
8	10.18	1.93	0.56	5.85	6.66	0.17	12.69
9	15.11	2.87	1.83	7.50	12.11	0.26	19.87
10	15.00	2.82	2.04	6.38	13.32	0.22	19.92
11	12.77	2.30	1.63	5.96	10.68	0.13	16.77
12	9.81	2.24	1.32	4.15	9.20	0.09	13.43
13	7.84	1.15	0.76	4.10	5.66	0.04	9.80
14	7.53	0.78	0.41	3.14	5.60	0.00	8.74
15	6.10	0.26	0.51	2.29	4.60	0.00	6.89
16	5.30	0.42	0.10	1.76	4.07	0.00	5.83
17	2.86	0.10	0.00	1.06	1.90	0.00	2.97
18	2.33	0.26	0.00	1.44	1.16	0.00	2.60
19	2.07	0.00	0.00	0.80	1.27	0.00	2.07
20	1.48	0.05	0.05	0.37	1.16	0.04	1.58
21	0.80	0.00	0.05	0.16	0.63	0.04	0.84
22	0.48	0.05	0.00	0.16	0.32	0.04	0.52
23	0.21	0.10	0.25	0.11	0.21	0.22	0.53
Total	119.68	20.25	11.71	59.31	88.92	3.41	151.64

(Columns: Vehicle class — Van/Ute, SRV, MRV/LRV; Activity type — Service, Delivery/Pickup, Waste; Total)

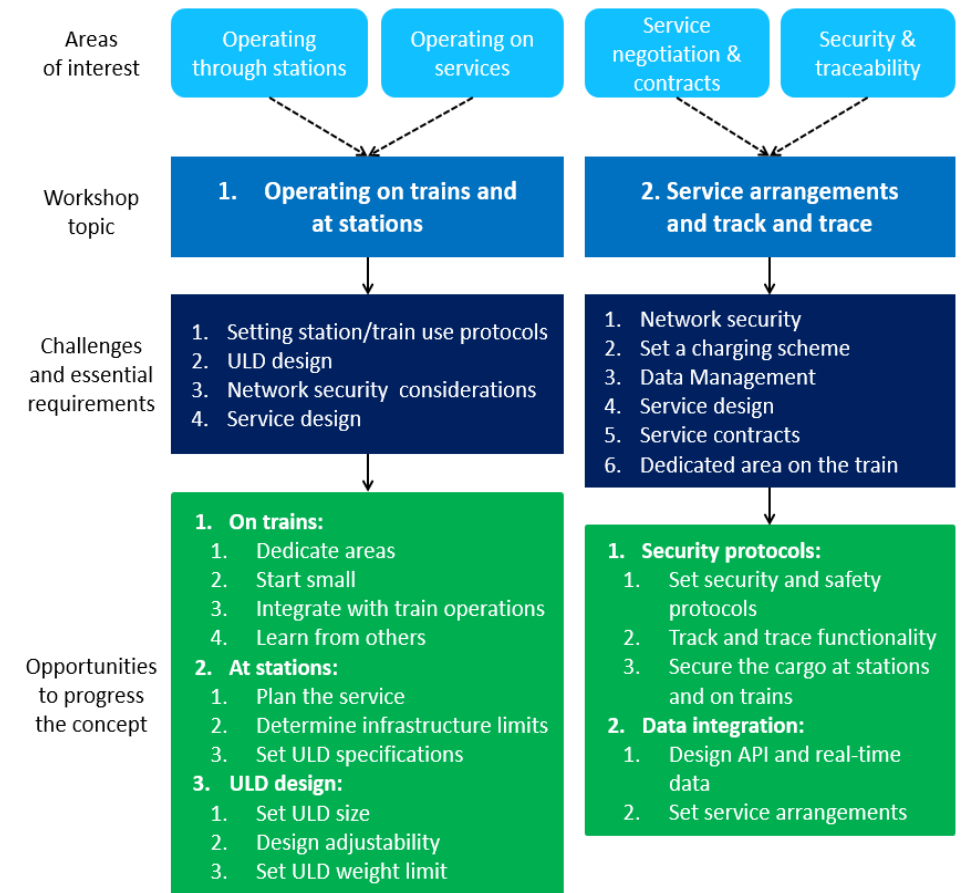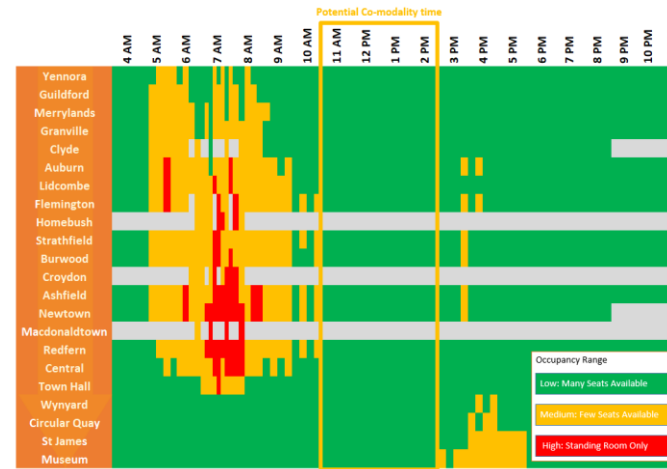# 2-010: Urban freight forecasting, Current projects: Bradfield (Aerotropolis) Core

- Scaled up approach of building tool to forecast at a precinct level

- Providing a forecast on freight numbers and parking spaces to support the new CBD (1.6m^2 GFA)

Loading spaces requirement

(Small, Medium, Large)

Cumulative Daily Freight Movements — Freight with consolidation efficiency — GFA

2-003: Co-modality

- Investigation to use latent capacity on public transport network to support freight movement into urban centres
- Aims of application to:
  - Reduce congestion on roads
  - Using inherent latent capacity to generate additional revenue on trains
- Workshopping with key stakeholders and Industry to identify issues and solutions
- Identifying key challenges

Train capacity analysis Yennora to CBD

Areas of interest	Operating through stations	Operating on services		Service negotiation & contracts	Security & traceability

Workshop topic	1. Operating on trains and at stations	2. Service arrangements and track and trace

Challenges and essential requirements

1. Operating on trains and at stations	2. Service arrangements and track and trace
1. Setting station/train use protocols 2. ULD design 3. Network security considerations 4. Service design	1. Network security 2. Set a charging scheme 3. Data Management 4. Service design 5. Service contracts 6. Dedicated area on the train

Opportunities to progress the concept

1. On trains:
  1. Dedicate areas
  2. Start small
  3. Integrate with train operations
  4. Learn from others
2. At stations:
  1. Plan the service
  2. Determine infrastructure limits
  3. Set ULD specifications
3. ULD design:
  1. Set ULD size
  2. Design adjustability
  3. Set ULD weight limit
	1. Security protocols:
	  1. Set security and safety protocols
	  2. Track and trace functionality
	  3. Secure the cargo at stations and on trains
	2. Data integration:
	  1. Design API and real-time data
	  2. Set service arrangements

Workshop investigations with Stakeholders and industry participants

2-003: - Co-modality – current global application

Sagawa cargo containers, regional trains, Japan

Pre 2020, ~85% of airfreight entering Australia arrived as belly-hold on passenger aircraft.


Sydney trains, 2019

Greyhound coaches, Australia

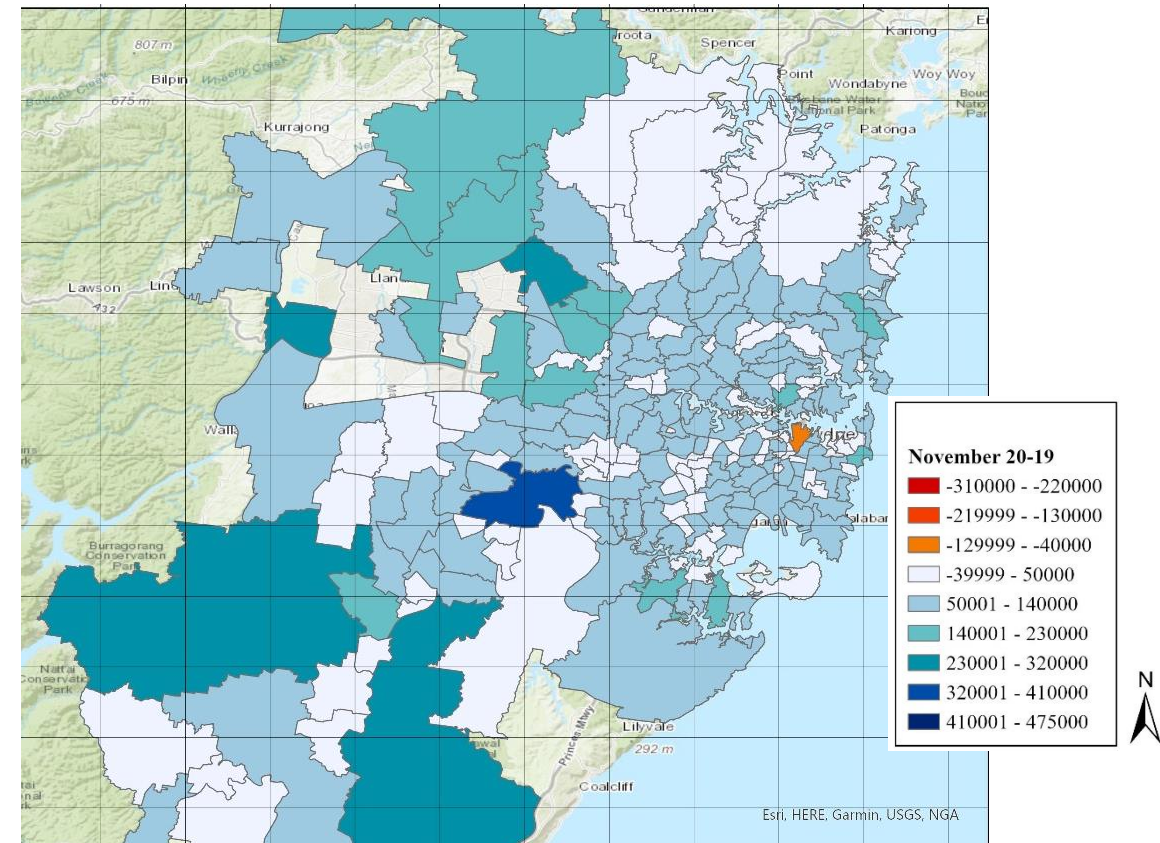# 2-003: - What might Co-Modality look like in Sydney?

- There is latent capacity in the transport service network

- The best role of co-modality is in the 'middle mile': From Suburban areas to CBDs

- Unaccompanied co-modality offers potential operational cost savings

- Growing market size of same day service expectations offers an opportunity that

  - Can meet industry service expectations

  - Generate revenue for trains

  - Whilst reducing various impacts of on-road congestion

- New market capabilities for same day freight: Central station at 2:32 pm >> local delivery in Newcastle after 5:10 pm.
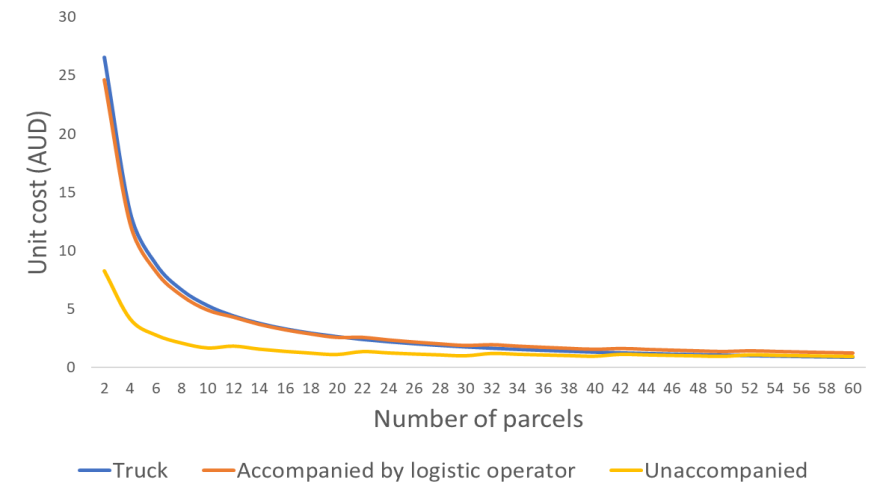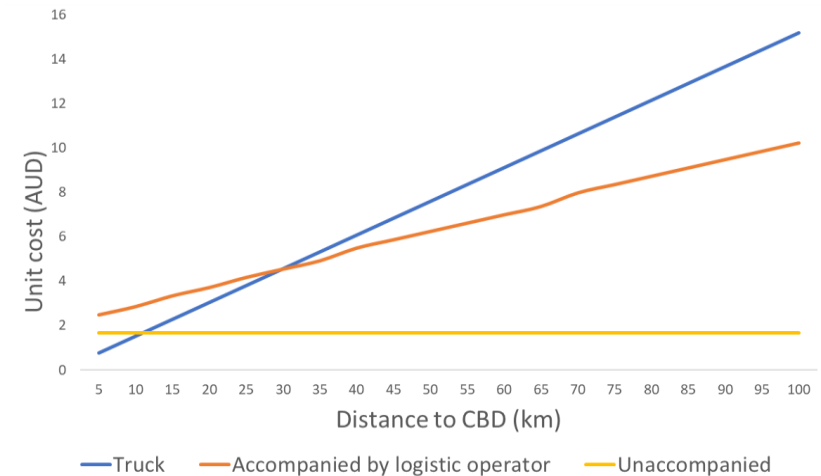
2-007: Last Mile activity in Metropolitan Sydney influenced by COVID-19 *Work in progress…*

- Traditional urban freight generation is associated with the location and intensity of non-residential land-use as well as employment numbers.

- The post COVID environment has dramatically changed economic and social behaviour, spatial demand patterns and hence freight activity
  - The CBD has experienced a decline in freight activity to 2019 levels
  - Many suburbs have experience strong growth of freight activity

- *Goods follow people, last mile freight goes where the people are*

- The project seeks to understand what this means for the organisation of freight activity across Metropolitan Sydney

- What government action might be necessary for efficient freight if this pattern of activity were to endure?

- Project will run until Dec 2022. Phase 1 report is currently under review.

Major B2C and B2B couriers delivery change in Sydney post v pre COVID

November 20-19

Range
-310000 - -220000
-219999 - -130000
-129999 - -40000
-39999 - 50000
50001 - 140000
140001 - 230000
230001 - 320000
320001 - 410000
410001 - 475000

Summary

- TfNSW Urban freight, iMove and Academic partners have successfully completed two projects to date. A third one is in progress.
  - In all cases, pre-conceived ideas of the conclusion have been improved through rigorous research.
- There is potentially national application for all projects, regardless of whether they look like they are only about Sydney.

iMove project No.	Title
2-010	Urban freight task forecasting and loading dock provision in new buildings
2-003	Investigating the Feasibility of Adopting Co-Modality in Sydney
2-007	Last Mile activity in Metropolitan Sydney influenced by COVID-19