Port of Melbourne

Port of Melbourne 2020 Container Logistics Chain Study

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Attribution

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We also recognise the work undertaken on the 2009 version of the study by consultants IMIS Integrated Management Systems Pty Ltd and Victoria Univeristy Institute of Logistics and Supply Chain management which has formed the basis for comparison of much of the data in this updated study

Definitions and abbreviations

Term	Definition
3PL	Third Party Logistics providers - provide transport services for cargo owners including the storage, consolidation and de-consolidation of freight
AQIS	Australian Quarantine and Inspection Service
ATFCC	Australian Transport Freight Commodity Classification
B-Double	A road freight vehicle comprising a 20 foot trailer and a 40 foot trailer, capable of carrying a combined total of 3 TEU
Consignee	A business receiving and unpacking an inbound container through the Port of Melbourne. For this Study, equivalent to an importer for international shipping and goods movements
Consignor	A business packing and dispatching an outbound container through the Port of Melbourne. For this study, the equivalent of an exporter for international shipping and goods movements
Container or Shipping Container	ISO standardised steel boxes (containers) used to carry freight (goods). International containers typically measure 20 foot or 40 foot in length and eight foot wide and eight foot six inches or nine foot six inches high. Note: Containers for domestic use include 30, 40, 48 and 53 foot long units
Container ID	Container identification number which acts as a unique identifier
COVID-19	Virus that lead to a global pandemic during the Study period
CY	Calendar Year
De-hire	The process of returning empty containers after unpacking goods to an empty container park by the importer
DoT	Victoria State Government Department of Transport
Dry Container	ISO container used for the carriage of general cargo at ambient temperatures
ECP	Empty Container Park (also sometimes called an Empty Container Depot)
Empty Container Park	A land-based facility to receive (as de-hire or direct supply from the Port of Melbourne), store, clean/inspect and dispatch (for hire or direct return to the Port of Melbourne) empty containers
Export	For the purposes of this Study, an export refers to the dispatch of containers from the Port of Melbourne by ship to an international, Australian mainland coastal, or Tasmanian destination
Exporter	A business operated for the purpose of exporting freight (goods). An exporter is a beneficial cargo-owner
Export Chain	For the purposes of this Study, an export chain is one that originates from an exporter (container pack location) or ECP and arrives at the Port of Melbourne

Term	Definition
Extrapolation	The process of adjusting the Study sample data to obtain complete annualised statistical numbers (i.e. numbers of containers)
Freight Forwarder	A business that arranges the carriage of goods and associated administration on behalf of an importer or exporter
HPFV	High Productivity Freight Vehicle (as defined by VicRoads)
Import	For the purposes of this Study, an import refers to the receipt of containers into the Port of Melbourne by ship from an international, Australian mainland coastal, or Tasmanian origin
Importer	A business operated for the purpose of importing freight. An importer is a beneficial cargo-owner
Import Chain	For the purposes of this Study, an import chain is one that originates from the Port of Melbourne and either arrives at an importer (container unpack location) or ECP
Intermodal Terminal	Land-based infrastructure for the movement of containers where interchanges occur between road and rail transport modes
International movements	The movement of containers by ship to and from overseas countries
Landside movements	The inland road or rail movements once a container is unloaded from a vessel (for imports) or before a container is loaded onto a vessel (for exports)
Logistics Chain	Linked container movements to and from the Port of Melbourne including all landside movements and trips from origin to destination and vice versa
Mainland coastal movements	Movements of containers via an international vessel to and from other mainland ports in Australia
Pack Location	Location where a container is packed with goods
PoM	Port of Melbourne Operations Pty Ltd
Port of Melbourne Catchment	The primary area where freight (including containers) can reasonably be attracted to the Port of Melbourne for import and export activities
PUD	Pick up and delivery – Industry term for the road transfer of containers from customers to end locations. Also used in the context of pick up and delivery locations.
Rail Terminal Operators	Businesses that operate the loading and unloading of freight trains at rail terminal locations (including Intermodal Terminals)
Reefer	Powered container used for chilled and refrigerated cargoes
Sample Period or Sample Survey Period	The period from 1st September to 31st October 2019 being the period for which data was collected from industry participants for the 2020 Container Logistics Chain Study
Sideloader	A trailer designed to carry containers which has a fitted lifting device to independently load or unload a container

Term	Definition
Skel Trailer	Skeleton trailer specially designed for the carrying and transportation of containers. They do not have a tray body or deck, rather they are constructed as a skeleton or trailer frame with specific connections for containers
Staging	For this report, Staging is the breaking of a container journey into two or more trips at a truck depot
Stevedore	A business involved in the loading and unloading of containerships including the storage and handling of containers
Super B-Double	A road freight vehicle comprising two trailers capable of carrying two 40 foot containers
Tasmanian Movements	Containers transported between mainland Australia and Tasmania through the Port of Melbourne. This includes containers with origins and destinations in Tasmania and on the mainland, and trade relating to both domestic and international markets
TEU	Twenty Foot Equivalent Unit (ISO container measure)
Timestamp	A record of entry/exit time at specific nodes on the container logistics chain as recorded in study data
Transhipment	A movement where containers are transferred from one vessel to another at the Port of Melbourne allowing the connection of two shipping services
Transport Depot	A truck operator's depot where containers are often stored or staged during landside movements in the container logistics chain
Transport Operator	A business that provides the transport of containers between landside locations by road
Unpack Location	Location where a container is unpacked of goods

Executive Summary

Background

The 2020 Port of Melbourne Container Logistics Chain Study (the Study) provides information on inland container movements to and from the Port of Melbourne for the 2019 calendar year (CY2019). The Study is an update of the previous 2009 Study, which was widely recognised as providing industry and Government with a valuable resource in understanding container logistics in particular around Metropolitan Melbourne and throughout regional Victoria.

The Study was commissioned by Port of Melbourne Operations Pty Ltd (PoM) and Victoria State Government Department of Transport (DoT) with GHD Advisory (GHD) engaged to gather and analyse industry data on container movements for CY2019.

Broadly, the container logistics chain covers:

- the movement of imported goods from arrival at the Port of Melbourne to importers' container unpacking locations for further distribution or use, and
- the movement of export goods from exporters' container packing locations in urban or rural areas to the Port of Melbourne for loading onto vessels.

The results of this Study provide insights into the current workings of the Port of Melbourne's landside container logistics chain and how this has changed since the previous study in 2009. The ability to understand and measure the landside component of container logistics supports effective policy decision-making and the planning of infrastructure development with alignment to industry needs.

Study approach

Since the previous 2009 Study, there have been vast improvements in the ability to collect, manage and analyse large datasets. The 2020 Study utilised new technologies and algorithms to seamlessly de-identify and combine large datasets supplied by the various stakeholders.

The fundamentals of the 2020 Study relied heavily on the participation of various State and Australian Government agencies, industry operators, and key industry associations for the supply of landside container movements data.

The provision of raw data occurred using a quantitative survey covering all landside container movements over the two-month sample period of September and October 2019. The received sample period data was then extrapolated to estimate the annual movements for CY2019, taking into consideration seasonal factors and other annual characteristics not in the sample period.

The Study area has been split into three high-level regions, metropolitan Melbourne, regional Victoria and interstate catchment areas, as shown in the three figures below. For the Study, these three regions have been further segmented as follows (with postcode boundaries shown in grey outlines):

- Metropolitan Melbourne (Figure 1) has been segmented into five areas - Inner Melbourne, Outer Eastern, Outer Northern, Outer South East and Outer Western;
- Regional Victoria (Figure 2) has been segmented into seven areas based on key transport corridors across the State:
  - South Western Corridor
  - Western Corridor
  - North Western Corridor
  - Goulburn Corridor
  - Hume Corridor (North East)
  - Eastern Corridor

  - Peninsula; and
- The interstate Port of Melbourne catchment area including Southern NSW, Southern South Australia and Tasmania (Figure 3).

Figure 1 - Metropolitan Melbourne

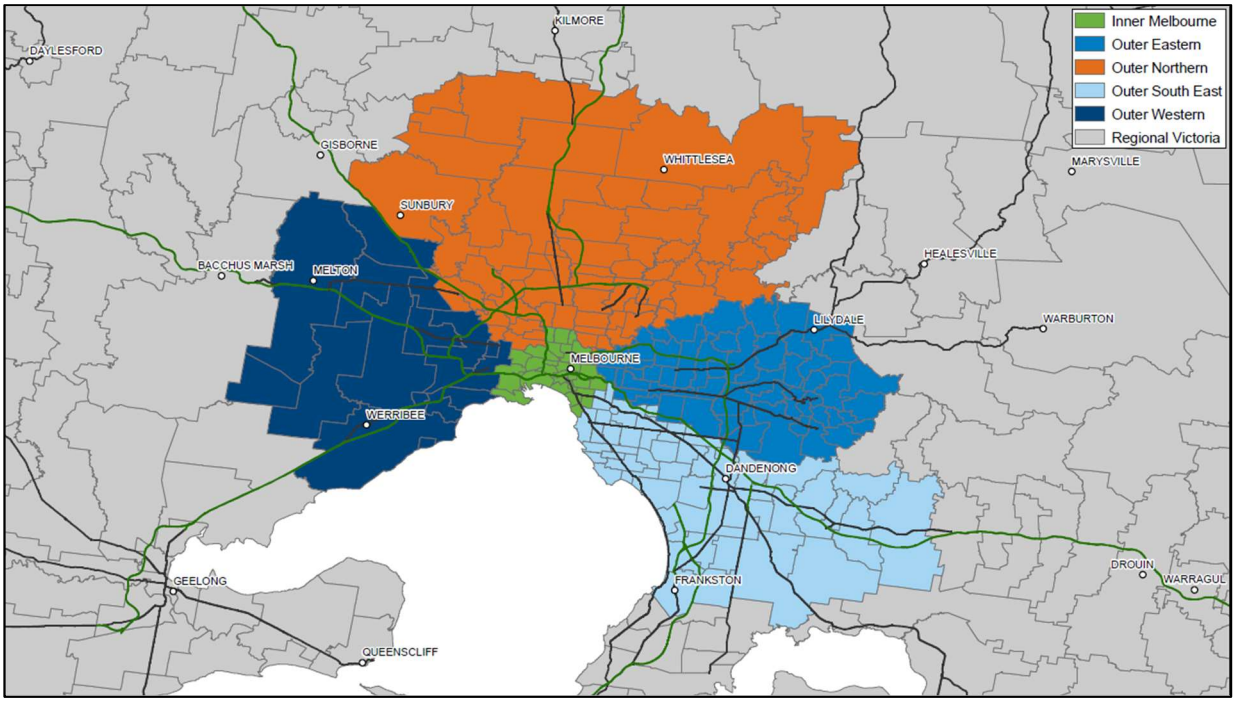


Figure 2 - Regional Victoria

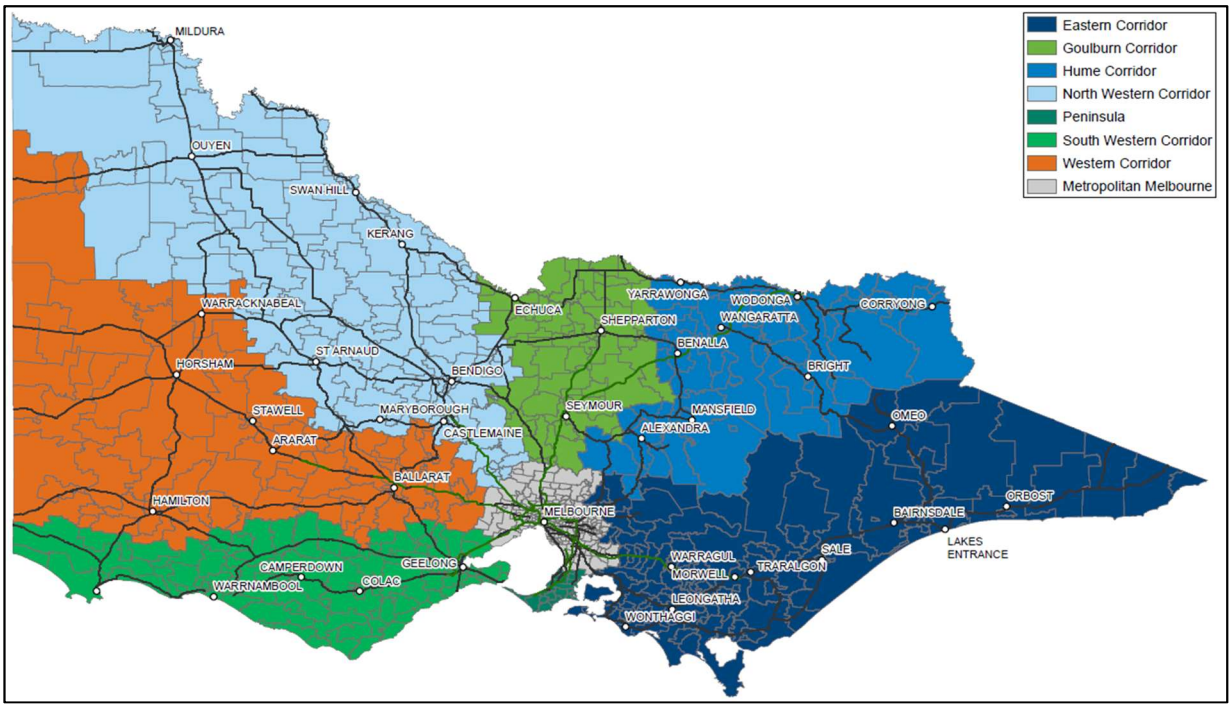
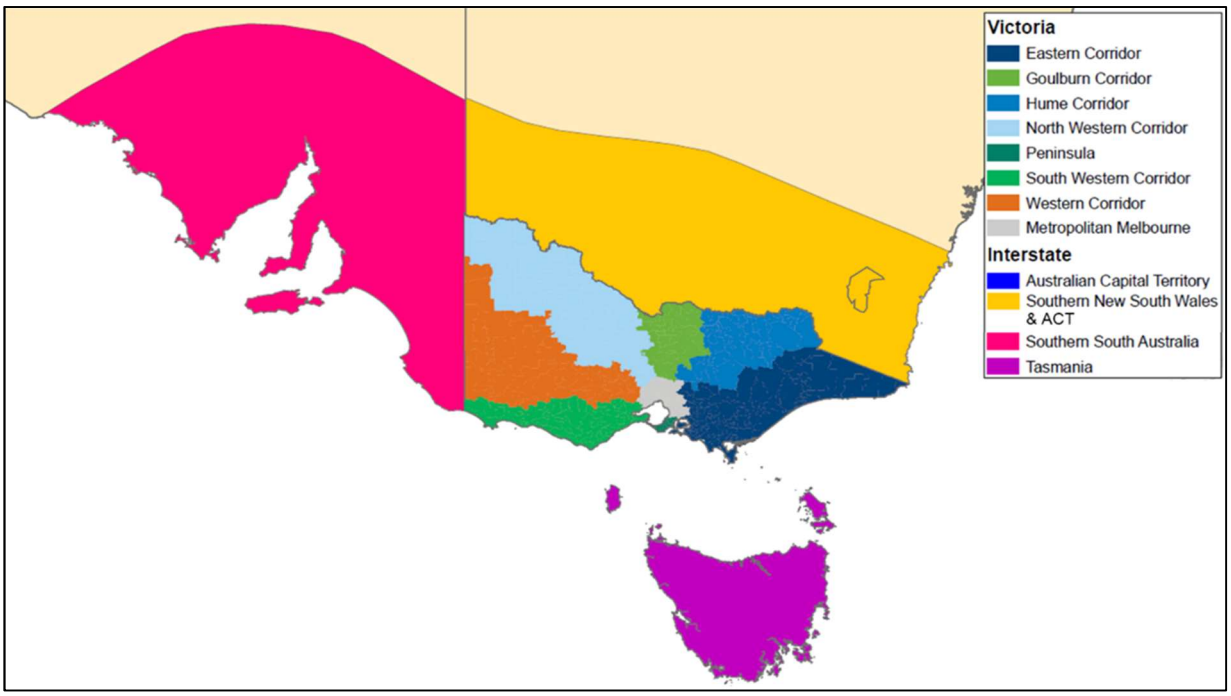


Figure 3 - Port of Melbourne catchment



Key Results

The following data summarises the total full container movements through the Port of Melbourne in CY2019, excluding transhipments and empty containers.

As shown in Table 1 there was a total of 1,204,624 TEU of international and mainland coastal import containers, of which 94.0% were handled and unpacked in metropolitan Melbourne, 3.8% in regional Victoria and 2.2% interstate. There were 685,252 TEU of international and mainland coastal export containers, of which 63.7% were packed in metropolitan Melbourne, 26.9% in regional Victoria and 9.4% interstate.

Table 1 – Port of Melbourne full international and mainland coastal import and export container origins and destinations

Area	Imports		Exports	
	TEU	%	TEU	%
Inner Melbourne	86,194	7.2%	51,134	7.5%
Outer Eastern	89,329	7.4%	24,174	3.5%
Outer Northern	188,178	15.6%	51,210	7.5%
Outer South East	320,256	26.6%	78,774	11.5%
Outer Western	448,904	37.3%	231,521	33.8%
Metropolitan Total	1,132,861	94.0%	436,813	63.7%
Eastern Corridor	6,137	0.5%	24,122	3.5%
Goulburn Corridor	3,366	0.3%	6,940	1.0%
Hume Corridor	6,437	0.5%	2,216	0.3%
North Western Corridor	7,305	0.6%	53,526	7.8%
Peninsula	2,001	0.2%	3,653	0.5%
South Western Corridor	16,739	1.4%	71,708	10.5%
Western Corridor	3,729	0.3%	22,073	3.2%
Regional Victoria Total	45,714	3.8%	184,238	26.9%

Area	Imports		Exports	
	TEU	%	TEU	%
Southern New South Wales & ACT	5,670	0.5%	28,357	4.1%
Remainder of New South Wales	12,371	1.0%	22,147	3.2%
Northern Territory	123	0.0%	-	0.0%
Queensland	2,753	0.2%	752	0.1%
South Australia	4,381	0.4%	9,621	1.4%
Western Australia	751	0.1%	3,324	0.5%
Interstate Total	26,049	2.2%	64,201	9.4%
Grand Total	1,204,624	100%	685,252	100.0%

Table 2 shows the full import mainland destinations for containers shipped from Tasmania and mainland export container origins for containers shipped to Tasmania through the Port of Melbourne. Of the 73,815 TEU Tasmanian full import containers, 92.4% were unpacked in metropolitan Melbourne, 6.9% interstate and 0.7% in regional Victoria. For the 123,651 TEU Tasmanian full export containers, 81.3% were packed in metropolitan Melbourne, 10.7% in regional Victoria and 8.0% interstate.

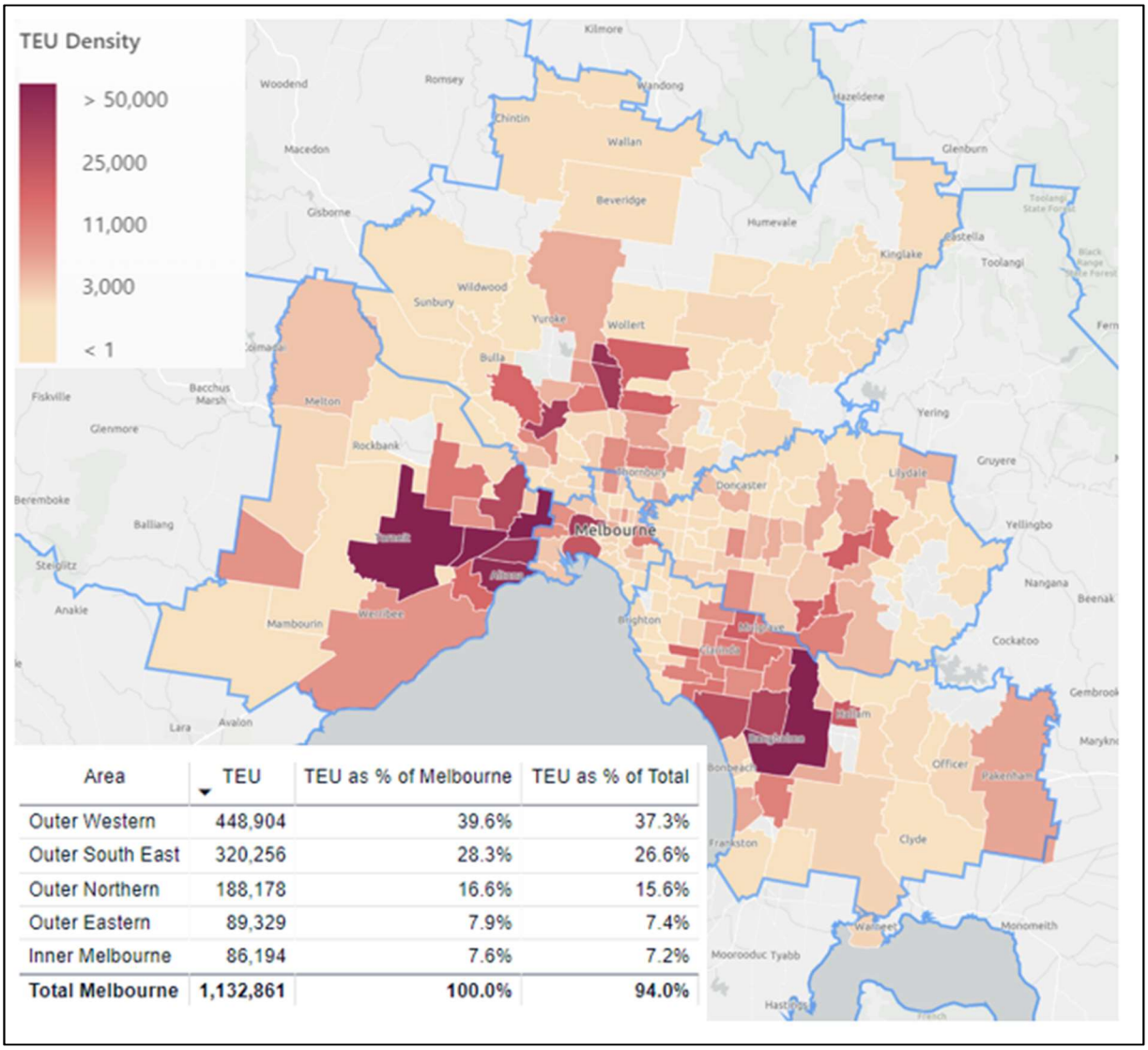
Table 2 – Port of Melbourne Tasmanian full import destinations and export container origins on mainland Australia

Area	Imports		Exports	
	TEU	%	TEU	%
Inner Melbourne	10,795	14.6%	23,277	18.8%
Outer Eastern	211	0.3%	1,350	1.1%
Outer Northern	6,617	9.0%	12,132	9.8%
Outer South East	18,413	24.9%	12,967	10.5%
Outer Western	32,146	43.5%	50,751	41.0%
Metropolitan Total	68,182	92.4%	100,477	81.3%
Eastern Corridor	110	0.1%	80	0.1%
Goulburn Corridor	4	0.0%	670	0.5%
Hume Corridor	7	0.0%	-	0.0%
North Western Corridor	3	0.0%	1,355	1.1%
Peninsula	-	0.0%	25	0.0%
South Western Corridor	379	0.5%	9,799	7.9%
Western Corridor	9	0.0%	1,357	1.1%
Regional Victoria Total	512	0.7%	13,285	10.7%
New South Wales & ACT	3,351	4.5%	3,462	2.8%
Northern Territory	4	0.0%	-	0.0%
Queensland	1,604	2.2%	4,640	3.8%
South Australia	137	0.2%	743	0.6%
Western Australia	26	0.0%	1,044	0.8%
Interstate Total	5,122	6.9%	9,889	8.0%
Grand Total	73,815	100.0%	123,651	100.0%

Destinations – Metropolitan Melbourne

Figure 4 shows the metropolitan Melbourne destinations for full international and mainland coastal containers that were imported through the Port of Melbourne. Of the total number of containers (TEU), 94.0% were delivered within the metropolitan area, with heavy concentrations in the Outer Western (37%), Outer South-East (26.6%) and Outer Northern (15.6%) regions.

Figure 4 – DESTINATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	448,904	39.6%	37.3%
Outer South East	320,256	28.3%	26.6%
Outer Northern	188,178	16.6%	15.6%
Outer Eastern	89,329	7.9%	7.4%
Inner Melbourne	86,194	7.6%	7.2%
Total Melbourne	**1,132,861**	**100.0%**	**94.0%**

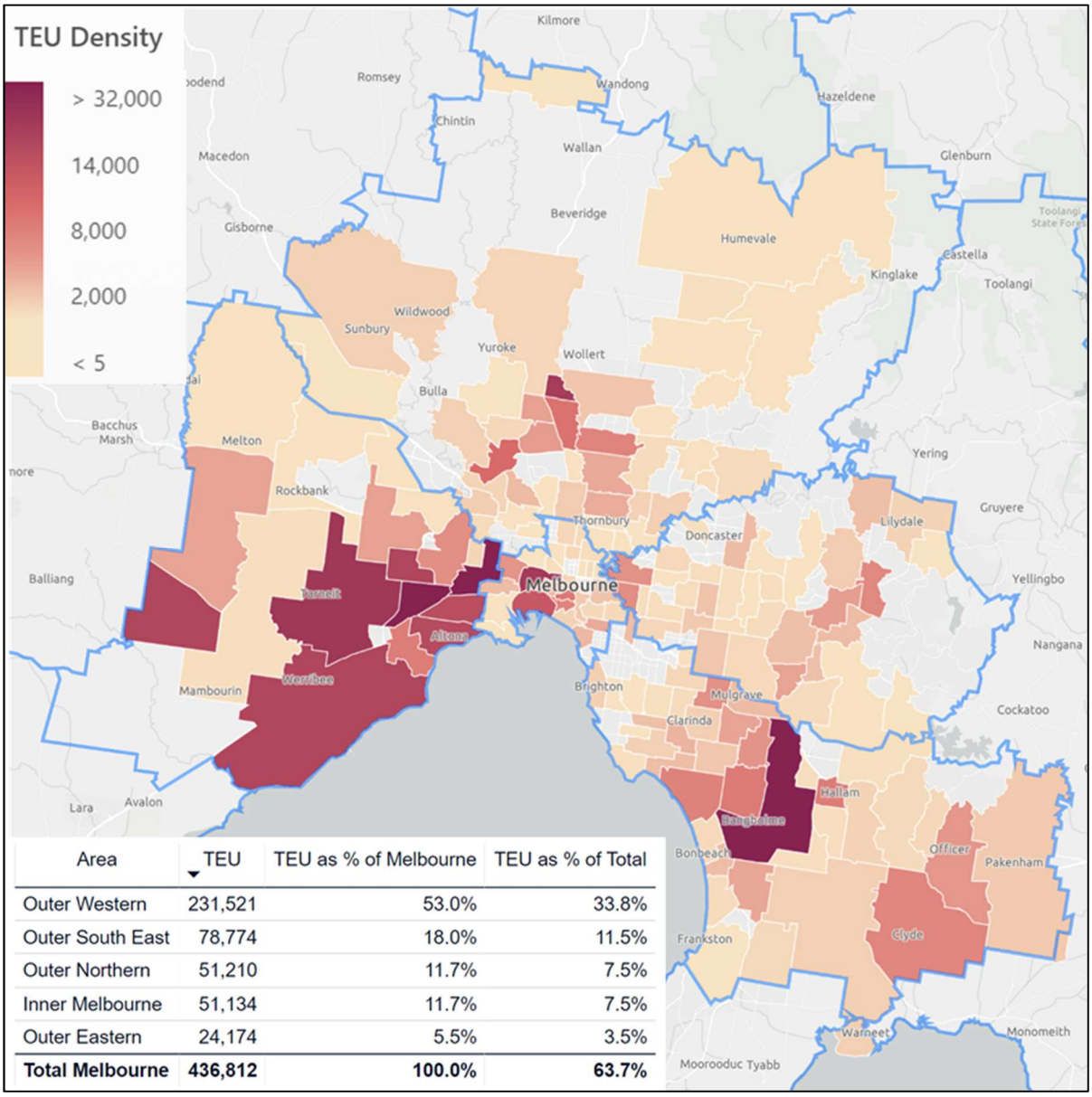
Table 3 – Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3026	Derrimut	142,223
3175	Dandenong South	142,195
3029	Truganina	128,214
3012	Brooklyn	50,319
3018	Altona	43,082

Origins - Metropolitan Melbourne

Figure 5 shows the metropolitan Melbourne origins for full international and mainland coastal containers exported through the Port of Melbourne. Overall, metropolitan Melbourne accounted for 63.7% of all international and mainland coastal export containers, originating primarily in the Outer Western (33.8%) and Outer South East regions (11.5%).

Figure 5 – ORIGINS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	231,521	53.0%	33.8%
Outer South East	78,774	18.0%	11.5%
Outer Northern	51,210	11.7%	7.5%
Inner Melbourne	51,134	11.7%	7.5%
Outer Eastern	24,174	5.5%	3.5%
Total Melbourne	**436,812**	**100.0%**	**63.7%**

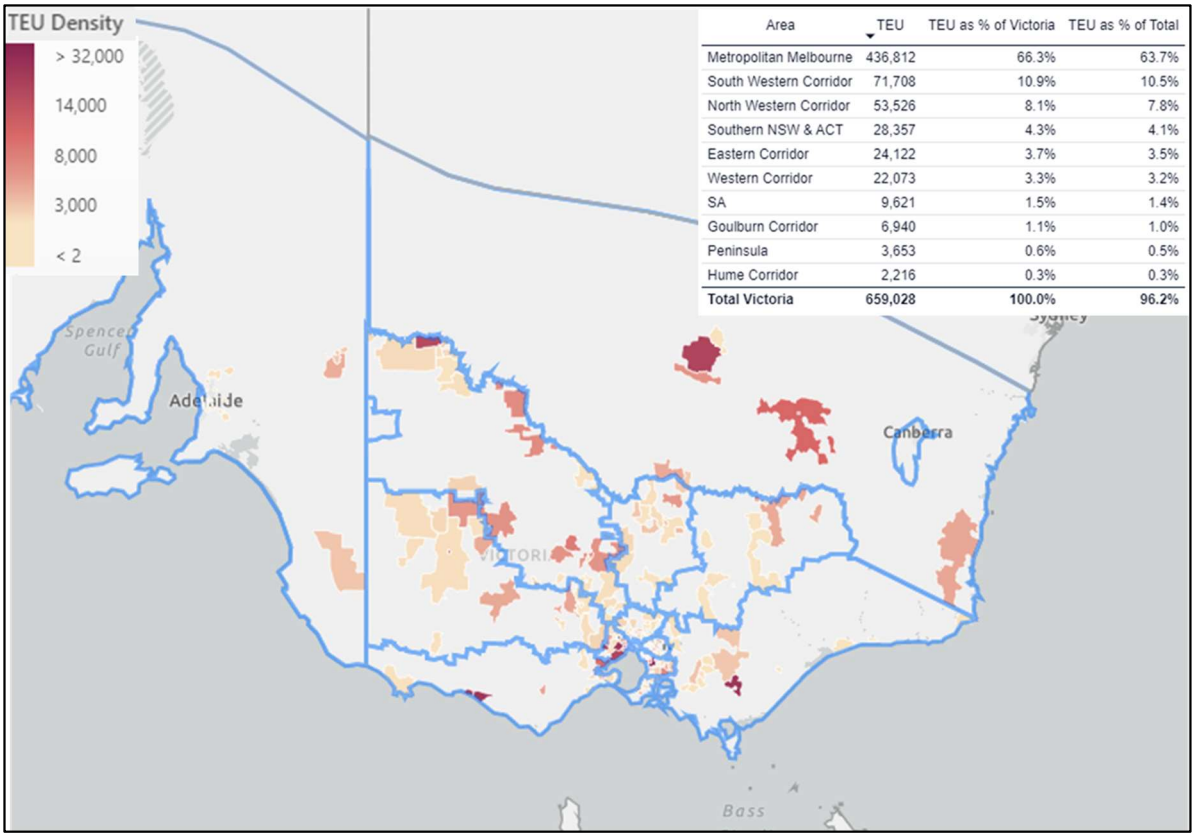
Table 4 - Top 5 ORIGINS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3012	Brooklyn	87,217
3026	Derrimut	71,574
3175	Dandenong South	35,260
3029	Truganina	20,921
3003	West Melbourne	18,989

Origins – Victoria and Port of Melbourne catchment

Figure 6 shows the origins throughout regional Victoria, Southern New South Wales and South Australia of full international and mainland coastal containers exported through the Port of Melbourne. The largest volume of containers originated in the South Western corridor (10.5%), North Western corridor (7.8%) and Eastern corridor (3.5%). In total, 96.2% of all the international and mainland coastal export containers originated in Victoria and the Port of Melbourne catchment.

Figure 6 - ORIGINS of full international and mainland coastal EXPORT containers (Victoria and Port of Melbourne catchment)



Area	TEU	TEU as % of Victoria	TEU as % of Total
Metropolitan Melbourne	436,812	66.3%	63.7%
South Western Corridor	71,708	10.9%	10.5%
North Western Corridor	53,526	8.1%	7.8%
Southern NSW & ACT	28,357	4.3%	4.1%
Eastern Corridor	24,122	3.7%	3.5%
Western Corridor	22,073	3.3%	3.2%
SA	9,621	1.5%	1.4%
Goulburn Corridor	6,940	1.1%	1.0%
Peninsula	3,653	0.6%	0.5%
Hume Corridor	2,216	0.3%	0.3%
Total Victoria	**659,028**	**100.0%**	**96.2%**

Table 5 - Top 5 ORIGINS of full international and mainland coastal EXPORT containers (Victoria and Port of Melbourne catchment)

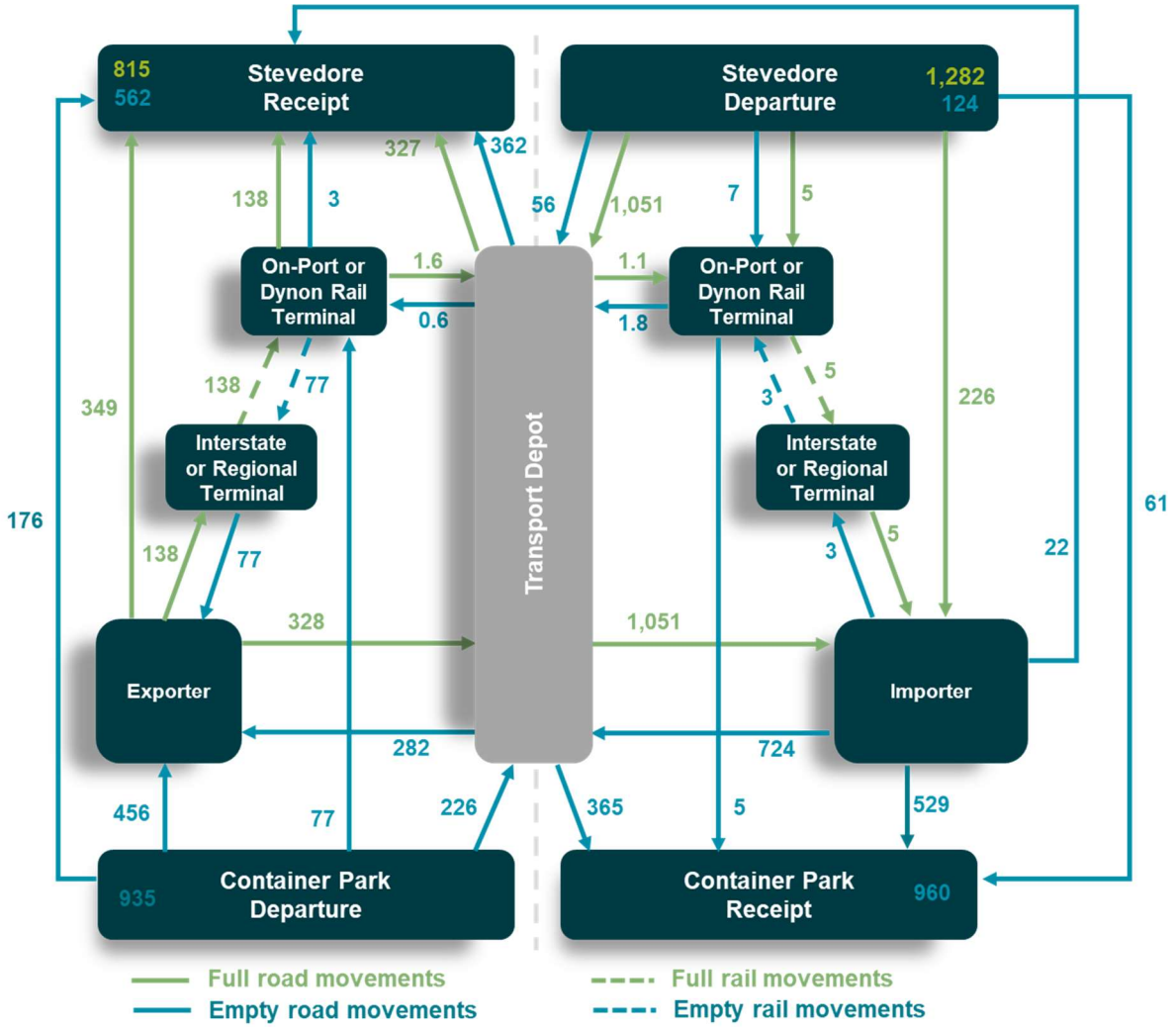
Postcode	Suburb	TEU
3012	Brooklyn	82,217
3026	Derrimut	71,574
3280/3277	Warrnambool/Allansford	38,851
3175	Dandenong South	35,260
3502/3505	Mildura/Merbein	30,028

Land transport

Movement Patterns

The land transport components associated with containerised freight involves several business types which require road and rail transport modes. The flow diagram shown in Figure 7 represents these movements where numbers denote the quantity of TEUs (in thousands) moved between each business type in 2019.

Figure 7 - CY2019 Port of Melbourne container logistics chain movements ('000 TEU) (import and export)[1]



The right-hand side of the figure depicts the ‘import chain’, where it can be observed that full containers are transported from the stevedores to importers directly, or via staging through transport depots and rail terminals.

The left-hand side of the figure depicts the ‘export chain’, where it can be observed that full containers are transported to the stevedore from exporters directly, or via staging through transport depots and rail terminals.

The flow diagram shows that approximately 815,000 TEU of full containers were exported and:

- 349,000 (43%) were delivered direct to the stevedore by road;
- 328,000 (40%) were transported by road to a transport depot before being delivered to a stevedore;

1

- 138,000 (17%) were moved by rail.

The flow diagram shows that approximately 1,282,000 TEU of full containers were imported and:

- 226,000 (18%) were delivered direct to importers from the stevedore by road;
- 5,000 (<1%) were moved by rail.

Table 6 shows container TEU movements between the various business types. All tables in this section exclude sea-to-sea transhipments. The most prevalent movement of full and empty imports involved transport depots, representing approximately 40% of movements from the stevedore. Similarly, for export movements, 42% of the time a transport depot is the preceding node before the stevedore.

Table 6 - CY2019 Port of Melbourne container full and empty movements between business types ('000 TEU)

From \ To	Stevedore	Transport depot	Importer	Exporter	On-Port/Dynon rail terminal	Regional/Interstate terminal	Container park	Total
Stevedore	-	1,107	226	-	12	-	61	1,406
Transport depot	689	-	1,051	282	2	-	365	2,388
Importer	22	724	-	-	-	3	529	1,278
Exporter	349	328	-	-	-	138	-	815
On-Port/Dynon rail terminal	141	3	-	-	-	82	5	232
Regional/Interstate terminal	-	-	5	77	141	-	-	223
Container park	176	226	-	456	77	-	-	935
Total	1,377	2,389	1,282	815	232	223	960	7,277

Transport mode and travel distances

Rail mode share

Rail mode share has reduced from 14% in 2009 to 8% in 2019, which mainly reflects the slower growth of containers in regional Victoria compared with Metropolitan Melbourne, noting that Metropolitan Melbourne movements are 100% dominated by road transportation.

Over the last decade, freight moved on rail has reduced with more containers being moved on road. The absolute volume of containers transported by rail in 2019 compared to 2009 remained relatively unchanged (a slight decrease).

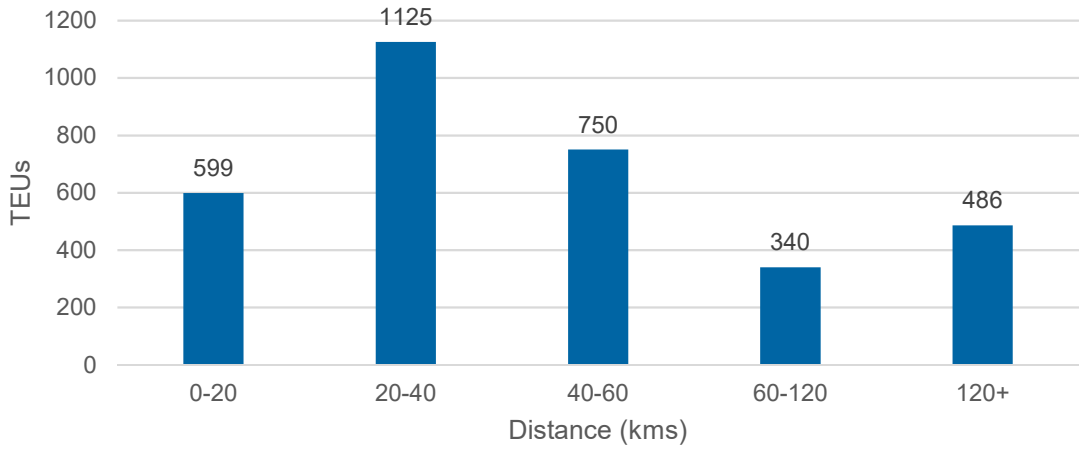
Furthermore, significant improvements have been made to provide broader access across road networks for heavy vehicles with bridge strengthening. This has increased the development and use of Super B-Doubles and A-Double combinations that can carry up to four TEU.

Rail network developments have been limited during the period from 2009 to 2019 although new investments including the Port of Melbourne Rail Transformation Project and the Department of Transport Port Rail Shuttle Project are planned to increase rail mode share.

Road only – Import

Figure 55 shows the volume of international and mainland coastal import containers and the length of their road-based journey on an average day in CY2019 (3,508 full containers (TEU)). The length of the journey is the estimated distance between the Port of Melbourne and the final destination (the importer) and included any travel to and from the transport depots. Figure 55 shows that trucks transporting 74% of full import containers traveled a total distance of less than 60 kilometers to deliver the containers to the importers.

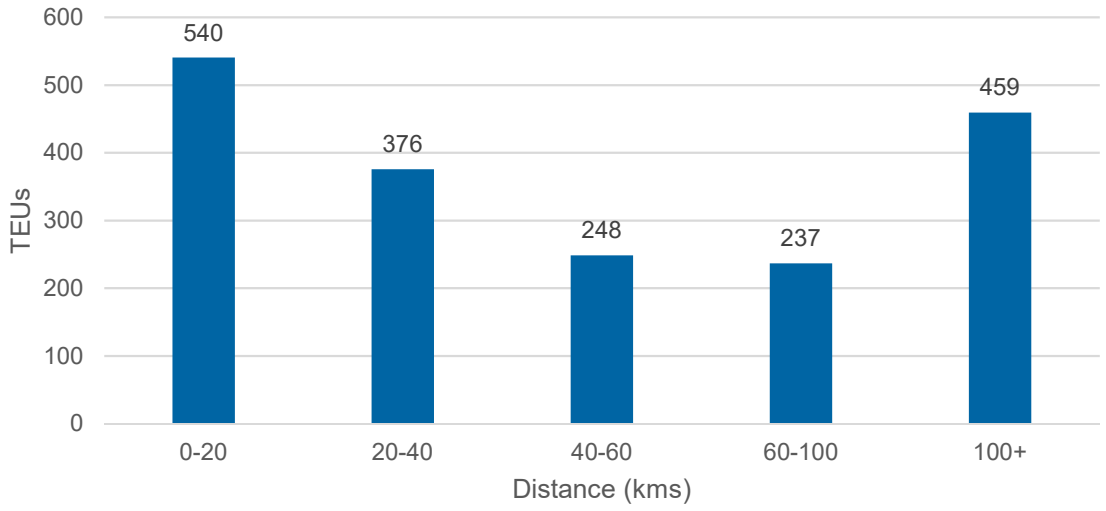
Figure 8 – Full international and mainland coastal IMPORT container distances travelled (road only)



Road only – Export

Figure 56 shows the volume of export containers and the length of their road-based journeys for an average day in CY2019 (1,860 full containers (TEU)). Figure 56 shows that trucks transporting 63% of full export containers traveled a total distance of less than 60 kilometers to deliver the containers to the Port of Melbourne.

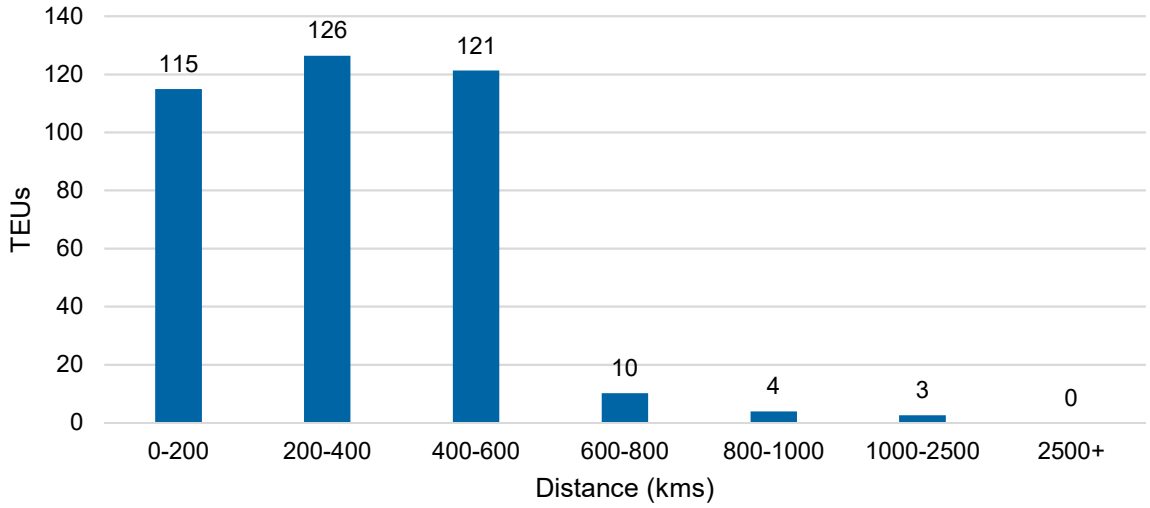
Figure 9 - Full international and mainland coastal EXPORT container distances travelled (road only)



Road and rail – Export

Figure 10 shows the volume of export containers and the length of their combined road and rail-based journeys for an average day in CY2019 (379 full containers (TEU)) and shows that only 4.4% of full export containers travelled in excess of 600 kilometres to move to the Port of Melbourne when a rail leg was involved.

Figure 10 - Full EXPORT container distances travelled (road and rail)



Arrival and departure time of day

Stevedores, transport depots, importers, exporters and empty container parks have specific operating times for containerised freight. Operational activity does vary at each of these locations throughout the day.

International and mainland coastal stevedores

Figure 11 shows the time of day profile for road only import containers departing the Port of Melbourne stevedores. For the Monday to Friday period, 57% of containers departed between 6:00 am and 6:00 pm, while on weekends 62% of containers departed between 6:00 am and 6:00 pm.

Figure 11 - Departure time of day for full IMPORT containers from Port of Melbourne stevedores

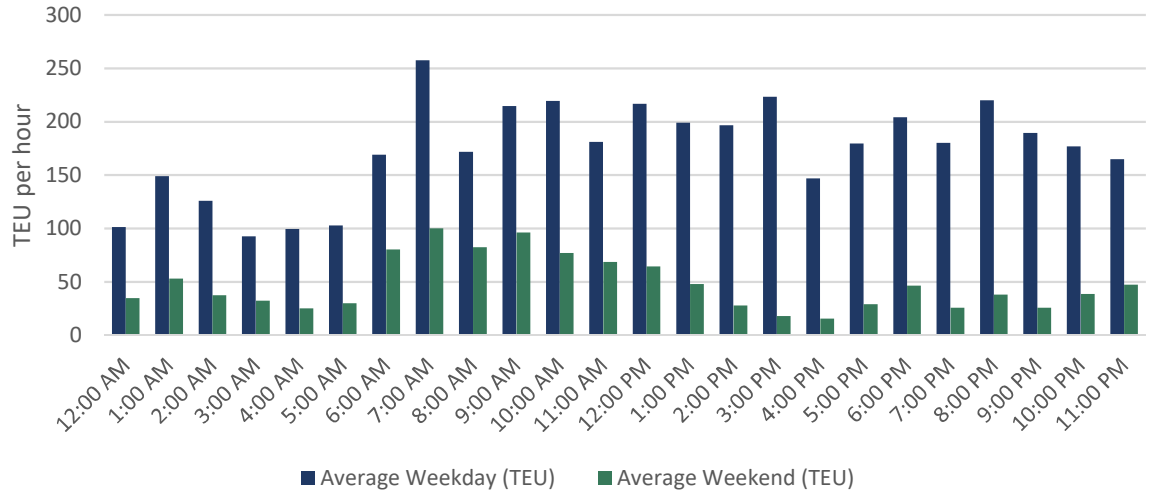
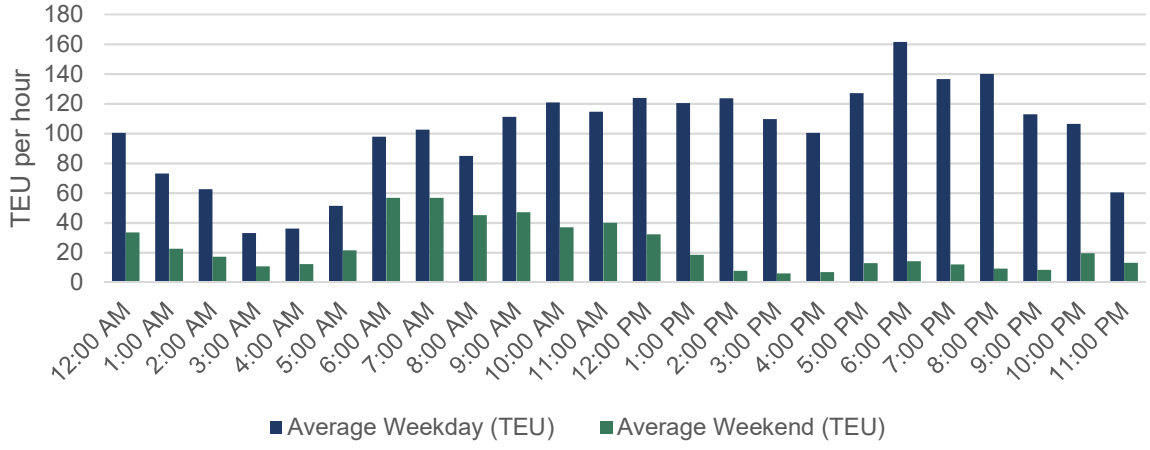


Figure 12 shows the time of day profile for road only export container arrivals at Port of Melbourne stevedores. For the Monday to Friday period, 55% of containers arrived between 6:00 am and 6:00 pm, while on weekends 65% of containers arrived between 6:00 am and 6:00 pm.

Figure 12 - Arrival time of day for full EXPORT containers at Port of Melbourne stevedores



Transport depots

Figure 13 shows the time of day profile for full containers arriving at transport depots. On Monday to Friday, 74% of containers arrived between 6:00 am and 6:00 pm, while on weekends 60% of containers arrived between 6:00 am and 6:00 pm.

Figure 13 - Arrival time of day for full containers to transport depots

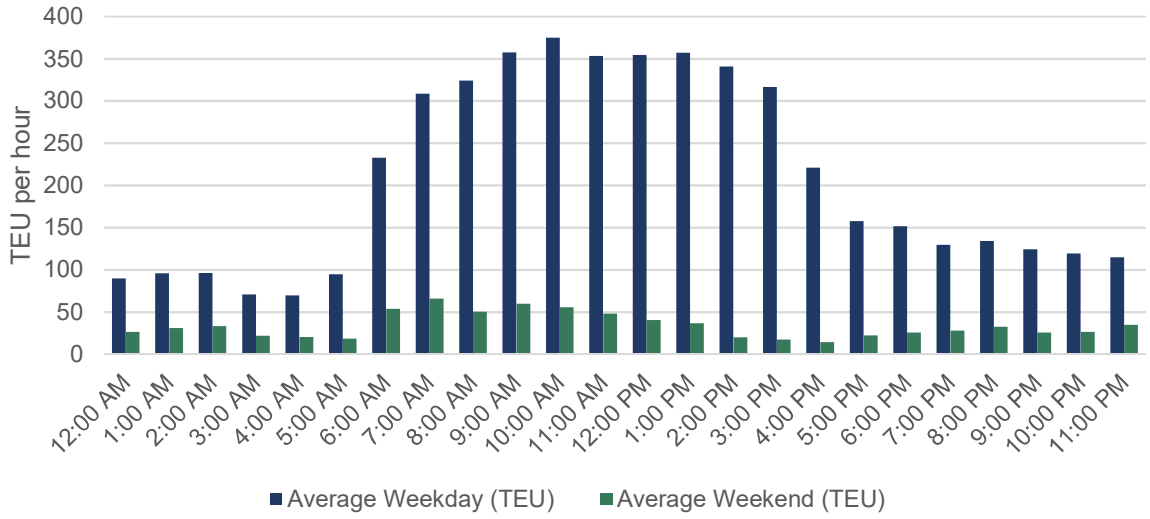
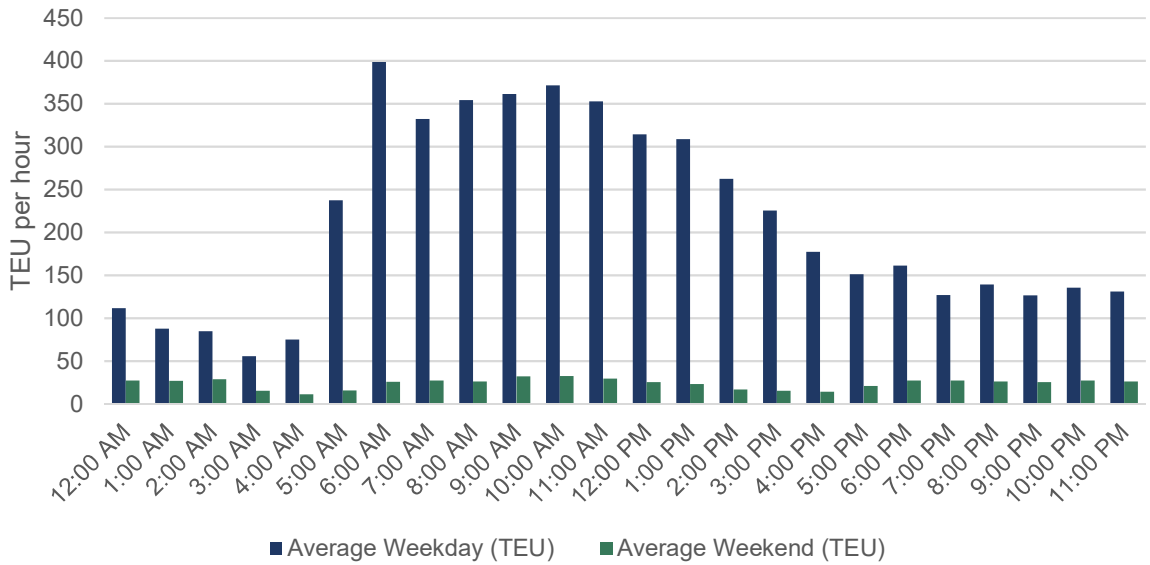


Figure 14 shows the time of day profile for full containers departing at transport depots. On Monday to Friday, 71% of containers departed between 6:00 am and 6:00 pm, while on weekends 50% of containers departed between 6:00 am and 6:00 pm.

Figure 14 - Departure time of day for full containers from transport depots



Exporters/importers

Figure 15 shows the time of day profile for empty container arrivals to exporters. On Monday to Friday 68% of containers arrived between 6:00 am and 6:00 pm, while on weekends 53% of containers arrived between 6:00 am and 6:00 pm.

Figure 15 - Arrival time of day for empty containers to exporters

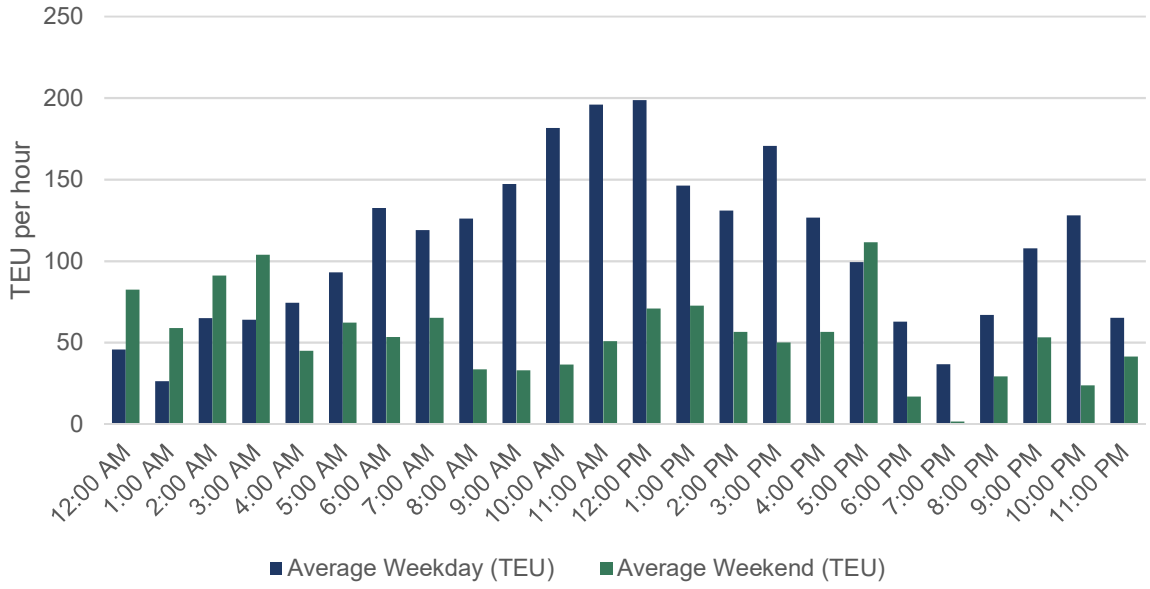


Figure 16 shows the time of day profile for full container arrivals to importers. On Monday to Friday 66% of containers arrived between 6:00 am and 6:00 pm, while on weekends 57% of containers arrived between 6:00 am and 6:00 pm.

Figure 16 - Arrival time of day for full containers to importers

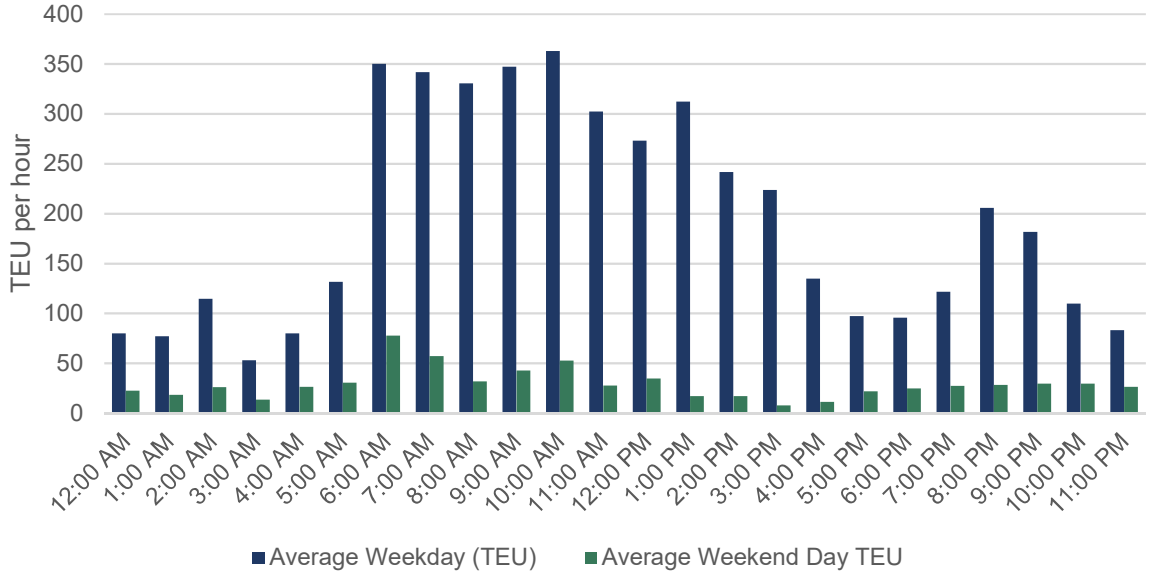


Figure 17 shows the time of day profile for empty container departing from importers. On Monday to Friday, 92% of containers departed between 6:00 am and 6:00 pm, while on weekends 67% of containers departed between 6:00 am and 6:00 pm.

Figure 17 – Departure time of day for empty containers from importers.

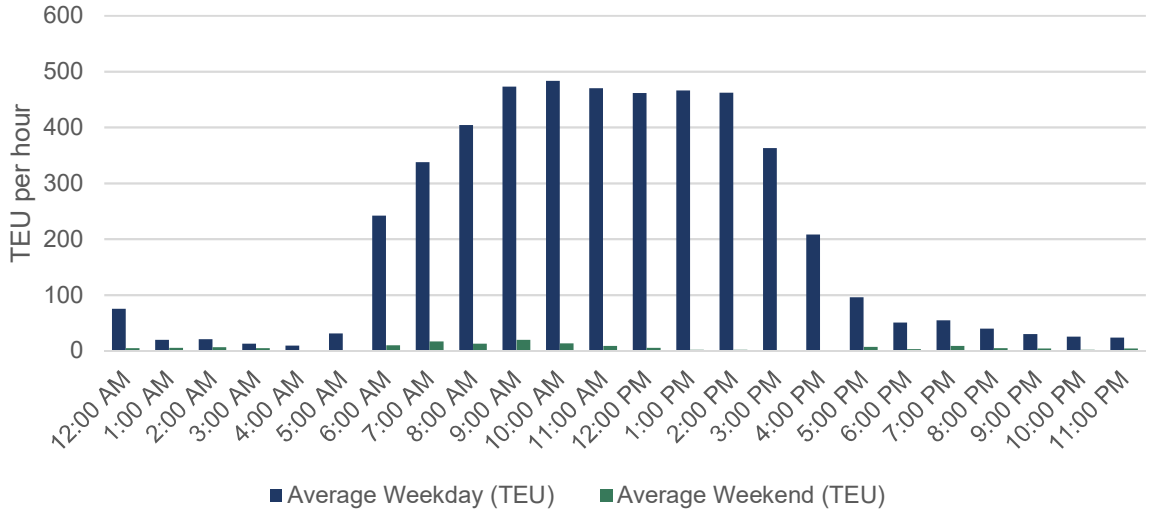
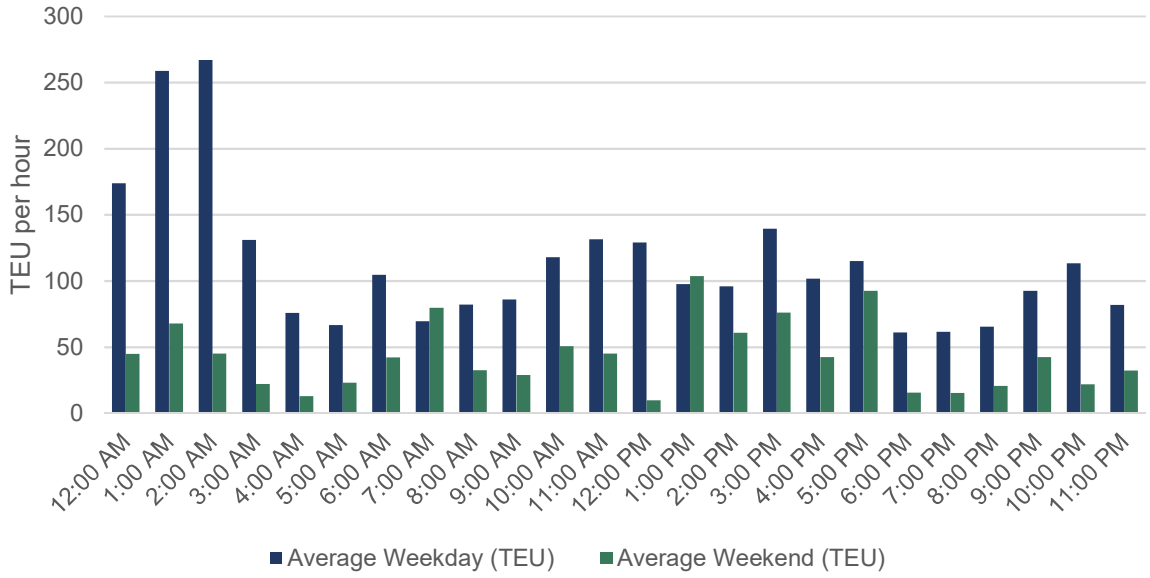


Figure 18 shows the time of day profile for full container departing from exporters. On Monday to Friday 47% of containers departed between 6:00 am and 6:00 pm, while on weekends 65% of containers departed between 6:00 am and 6:00 pm.

Figure 18 - Departure time of day for full containers from exporters



Empty container parks

Figure 19 shows the time of day profile for container arrivals at empty container parks. On Monday to Friday, 94.9% of containers arrived between 6:00 am and 6:00 pm, while on weekends 88.6% of containers arrived between 6:00 am and 2:00 pm.

Figure 19 - Arrival time of day to empty container parks

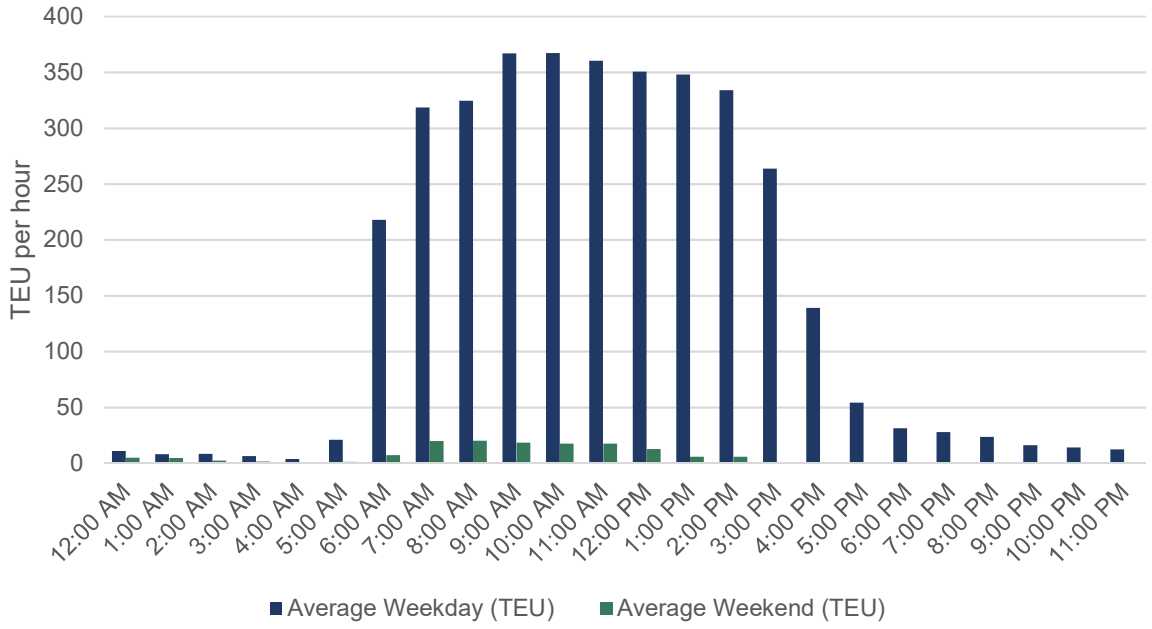
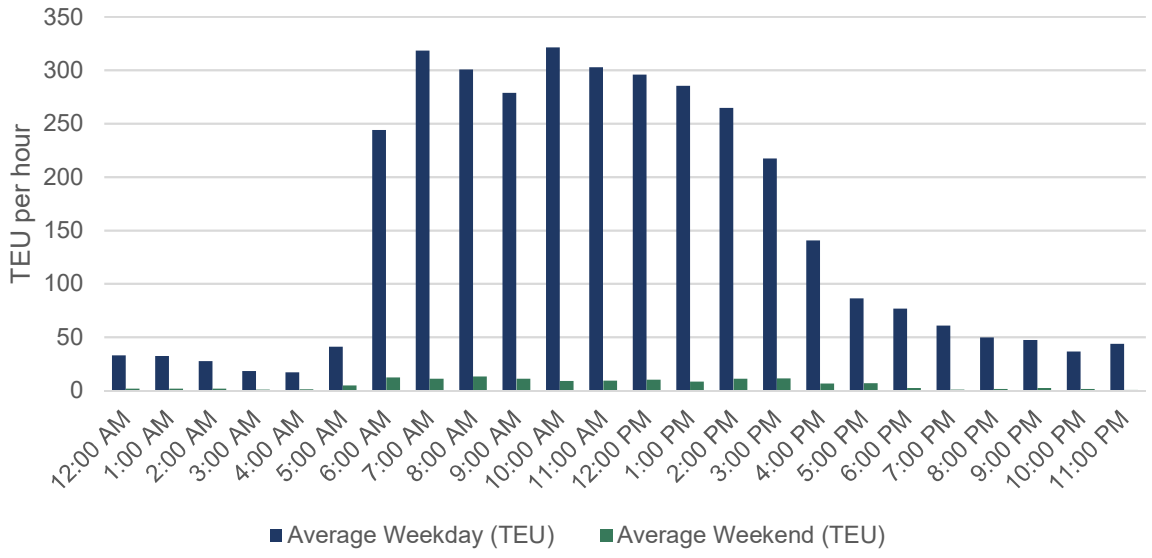


Figure 20 shows the time of day profile for container departures from empty container parks. On Monday to Friday, 88.5% of containers departed between 6:00 am and 6:00 pm, while on weekends 86.2% of containers departed between 6:00 am and 6:00 pm.

Figure 20 - Departure time of day from empty container parks



Key Findings

Over a 100 million data records from over 50 different data sources that related to the Port of Melbourne container logistics chain were analysed. These data records were successfully used to identify and track full and empty container movements within the Port of Melbourne catchment. The Study has identified:

1. 94% of international and mainland coastal import containers were handled and unpacked in metropolitan Melbourne;
2. 63.7% of international and mainland coastal export containers were handled and packed in metropolitan Melbourne;
3. 8% (which includes On-Port, Dynon and Metropolitan volumes) of international and mainland coastal containers were transported on rail. Of the total railed containers (in TEU), 6.8% represented On-Port volumes;
4. Rail is mostly used for the transport of export containers packed more than 200km from the port;
5. Businesses in the container chain operate 24 hours a day Monday to Friday including international and mainland coastal stevedores, transport depots and rail terminals, with the exception of empty container parks;
6. The average dwell time for each container at an empty container park was seven days.

The Study has been assisted by industry participation and data which has allowed an in-depth analysis of container flows and movements across the Port of Melbourne container logistics chain. The outcomes from this Study will assist with port planning, transport network development aligned to demand, and provide industry with information to support the ongoing development of their port-related activities.

Changes in container volumes since 2009

Between 2009 and 2019, there was an increase in the number of international and mainland coastal containers (TEU) across metropolitan Melbourne (import increase of 58.8% and export increase of 46.9%) and regional Victoria (import increase of 94.6%, and export increase of 41.4%). Overall, there was an increase in imports and exports of 47.5% and 23.4% respectively when compared to 2009.

The following changes are also evident when comparing the 2019 results to the 2009 Study:

1. The percentage of international and mainland coastal import containers handled and unpacked in metropolitan Melbourne increased from 87% in 2009 to 94.0% in 2019.
2. The percentage of international and mainland coastal export containers handled and packed in metropolitan Melbourne increased from 54% in 2009 to 63.7% in 2019. Similarly, the number of containers increased from 23% in 2009 to 26.9% in 2019.
3. The percentage of international and mainland coastal export containers that were handled and packed in interstate locations decreased from 23.0% in 2009 to 8.0% in 2019. This is mainly attributed to container movements from South Australia using additional direct shipping services at the Port of Adelaide since 2009.
4. The growth of the logistics and industrial sector in the Outer Western region saw the number of international and mainland coastal import containers being handled and unpacked in this area increase from 26% in 2009 to 37.3% in 2019. Similarly, the number of international and mainland coastal export containers being handled and packed in this region has also increased from 26% in 2009 to 33.8% in 2019.
5. The number of international and mainland coastal import containers that were handled and unpacked in the Outer South Eastern region increased from 25% in 2009 to 26.6% in 2019. Additionally, the number of international and mainland coastal export containers being handled and packed in this region also increased from 6% in 2009 to 11.5% in 2019.

1 Introduction

The 2020 Port of Melbourne Container Logistics Chain Study (the Study) provides information on inland container movements to and from the Port of Melbourne for the 2019 calendar year (CY2019). The Study is an update of the previous 2009 Study, which was widely recognised as providing industry and Government with a valuable resource in understanding container logistics in particular around Metropolitan Melbourne and throughout regional Victoria.

The Study was commissioned by Port of Melbourne Operations Pty Ltd (PoM) and Victoria State Government Department of Transport (DoT) with GHD Advisory (GHD) engaged to gather and analyse industry data on container movements for CY2019.

Broadly, the container logistics chain covers:

- the movement of imported goods from arrival at the Port of Melbourne to importers' container unpacking locations for further distribution or use, and
- the movement of export goods from exporters' container packing locations in urban or rural areas to the Port of Melbourne for loading onto vessels.

In practice, the logistics chain movements through the Port of Melbourne can comprise multiple legs involving staging at transport depots and intermodal terminals dependent on the operations of logistics service providers and the choices of cargo-owners (importers and exporters).

In addition to landside full container movements to/from the Port of Melbourne, the landside empty container movements form the majority of the overall landside logistics chain movements. Empty containers are generally transported between cargo-owners and empty container parks with shipping lines arranging the transport of empty containers between empty container parks and the container terminals operated by stevedores at the Port of Melbourne. There are also instances of empty container movements which by-pass empty container parks.

The Australian Border Force (Customs) and the Australian Government Department of Agriculture, Water and the Environment (Biosecurity) also play a role in the logistics chain with some containers taking additional journeys to/from inspection facilities.

The container logistics chain involves numerous businesses (stakeholders) covering the PoM, shipping lines, stevedores, road and rail transport operators, importers and exporters (cargo-owners), customs, biosecurity, freight forwarders / customs brokers, empty container park operators and intermodal terminal operators. These stakeholders all influence the landside movement of containers to a lesser or greater degree. Many of these businesses were vital to the success of the Study as they provided raw data on the landside movement of containers.

The provision of raw data occurred using a quantitative survey covering all landside container movements over the two-month sample period of September and October 2019. The received sample period data was then extrapolated to estimate the annual movements for CY2019, taking into consideration seasonal factors and other annual characteristics not in the sample period.

The results of this Study provide insights into the current workings of the Port of Melbourne's landside container logistics chain and how this has changed since the previous study in 2009. The ability to understand and measure the landside component of container logistics supports effective policy decision-making and the planning of infrastructure development with alignment to industry needs.

1.1 Tracking containers

The container logistics chain is a series of linked flows or legs involving containers each with individual identifiers (container identification numbers) which lends itself to tracking. Although various techniques and technologies were available, the most appropriate method adopted, given the timeframe and

operating environment, was to source historic individual container-level data directly from the PoM and various stakeholders involved in the Port of Melbourne container trade.

The container identification numbers, together with time stamps associated with each container movement, enabled the Study team to track container movements across different data-sets obtained from the various stakeholders. The extent of the tracking covered the complete landside logistics chain between the Port of Melbourne's container terminals and the numerous container unpack and pack locations extending across Metropolitan Melbourne, regional Victoria and interstate.

Communications with stakeholders formed a key part of the Study including the gathering of data and the opportunity to gain further insights into the reasons for specific container movements. The Study approach is explained in more detail in section 4 below.

1.2 Study key aims and objectives

The key aims and objectives of the Study, as scoped by PoM and DoT, were as follows:

1. Identification of both the staged and initial landside origins and final landside destinations of full and empty containers that pass through the Port of Melbourne;
2. Identification of modes of transport used, types of vehicles used, and average vehicle loadings;
3. Identification of the movements of empty containers to and from empty container parks;
4. Quantification of the elapsed time during each step of the landside logistics chain including at the origin and destination (i.e. timings and dwell times);
5. Identification of the patterns in the days of the week and the times of day when containers were moved in the logistics chains to/from the Port of Melbourne;
6. Determination of the types of freight (i.e. commodities) transported in the containers; and
7. Provision of an understanding of how the Port of Melbourne container logistics chain has changed over time.

2 Study approach

Since the previous 2009 Study, there have been vast improvements in the ability to collect, manage and analyse large datasets. The 2020 Study utilised new technologies and algorithms to seamlessly de-identify and combine large datasets supplied by the various stakeholders.

The fundamentals of the 2020 Study relied heavily on the participation of various State and Australian Government agencies, industry operators, and key industry associations for the supply of landside container movements data.

2.1 Determination of a relevant sample period

The first step in the landside container movements data collection process required the determination of a relevant sample period which would most capture the characteristics of the annualised study period as well as prove practical for suppliers of data. The criteria for the sample period were:

- A common period in which stakeholders were agreeable to supply data;
- A period generally representative for the remainder of CY2019 in terms of commodities traded and moved through the Port of Melbourne (i.e. understanding the impact of seasonal products);
- The capture of the most complex, high activity logistics period (i.e. the peak season for the Port of Melbourne);
- The selection of a duration that covered the typical complete landside container cycle (on shore turnaround) from a full import arrival to departure either as a full or empty container; and
- No significant logistics disruptions during the period (i.e. a typical operating period was used).

As a result of these required criteria, a two-month sample period, from 1st September 2019 to 31st October 2019 (inclusive), was selected. This was significantly longer than the two-week sample period previously used in the 2009 Study.

This selected sample period was based on analysing PoM's monthly container trade and commodity import/export data of the three container trade sectors for CY2018 and CY2019 – namely, the Overseas (International) trade, the Mainland Coastal trade, and the Tasmanian (Bass Strait) trade.

The peak trade period was identified as consistently being September through October driven by full container imports and that this period was also representative of full exports including a consistent commodity composition. The sample period was also found to be consistent and representative for the domestic trades (Mainland Coastal and Tasmania).

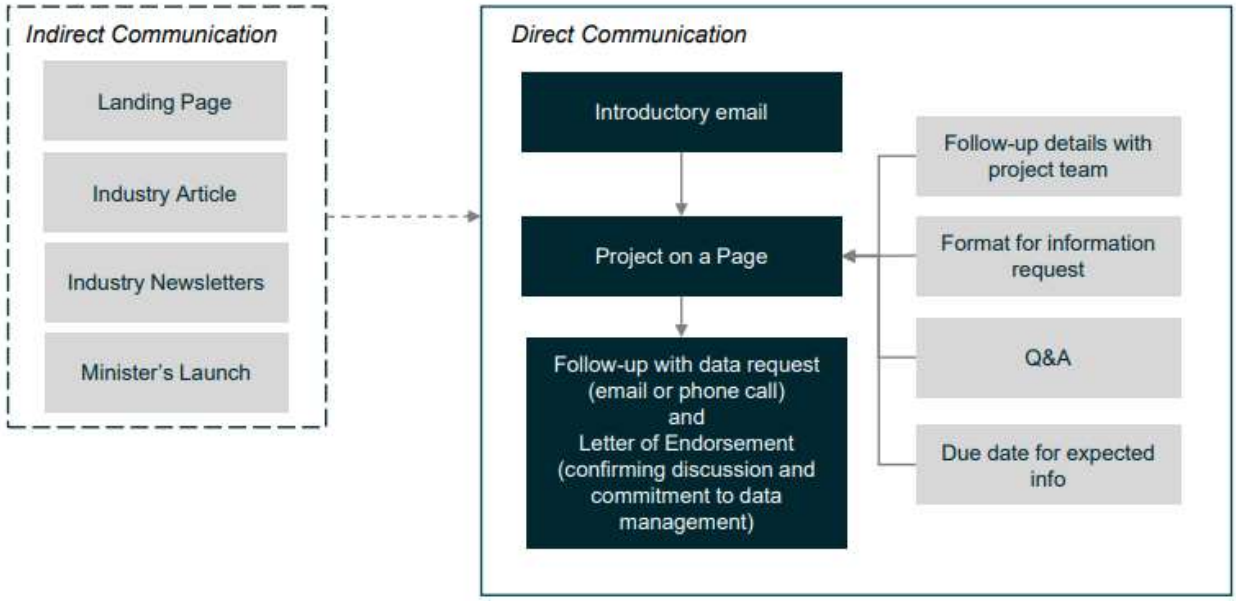
2.2 Stakeholder engagement approach

The Study project team formulated an extensive list of potential participants who were contacted and briefed about providing data for the Study. There were two approaches to assist in notifying stakeholders about the Study and data collection process:

- **Direct engagement** – different businesses at each point of the container logistics chain were identified and contacted to determine their ability to provide data. More than 100 stakeholders across the container logistics chain were contacted either directly or in conjunction with industry associations, with media releases to assist in providing industry data. Stakeholders were initially sent a briefing email to introduce the Study, the aims and benefits and the confidentiality to protect and de-identify commercial information. Subsequently, any questions from stakeholders in relation to the data and formats were addressed. In addition to this, stakeholders, on request, were also presented with a letter of endorsement on behalf of PoM and DoT;
- **Indirect engagement** - several virtual channels were developed to provide additional means of communication, as well as having a centralised point of reference. Platforms such as LinkedIn were utilised to boost stakeholder reach and broaden the stakeholder audience. A landing page

was created to centralise all virtual engagement methods. This site allowed stakeholders to view the previous Study which demonstrated the required output and created the opportunity to either provide data directly or contact the Study project team.

- Additional indirect channels included: a series of articles and newsletters through industry associations and government announcements including an official announcement from the Minister for Ports and Freight.



2.3 Data provision

The success of the Study was underpinned by industry participation, where key government stakeholders and industry businesses and associations were able to supply container movement data. Businesses across the container logistics chain were selected to obtain a representative sample of movements and to ensure completeness.

The following industry associations supported the collection of data and encouraged their members to participate:

- Container Transport Alliance Australia (CTAA);
- Freight and Trade Alliance (FTA);
- Victorian Transport Association (VTA); and
- International Forwarders & Customs Brokers Association of Australia Ltd.

In terms of data provision, the following parties contributed to the Study:

- PoM – supplied data on the annual throughput of containers for each trade sector and by commodity for the years CY2018 and CY2019. Only the CY2019 container data was used as the reference basis for the Study;
- Stevedores – supplied data on truck and container movements through their terminal gates in terms of pickups and deliveries;
- Transport operators – supplied data on container movements to/from stevedores, truck depots for staging, importer (unpack) and exporter (pack) locations, and empty container parks;
- Freight forwarders and cargo-owners (importers and exporters) – supplied data similar to truck operators, but generally at less detailed level;
- Empty container park operators – supplied data on truck and container movements through their facility gates in terms of empty container pickups (hires) and deliveries (de-hires/returns);

- Rail terminal operators – supplied data on container movements through their intermodal terminals linking regional and interstate locations to the Port of Melbourne; and
- Australian Border Force (Customs) – supplied data for international trade import container destinations at the individual container level, which supplemented data supplied by others.

In total, over 100 businesses were contacted through direct or online meetings, with additional emails and calls with a positive response rate. However, some businesses were unable to provide data due to the following reasons:

- Businesses were unable to extract the required data from their computer systems directly and could not afford the time to extract it manually;
- The timing of the Study coincided with several COVID-19 state-wide and local lockdowns which impacted the full operability of the freight and logistics industry. Businesses, therefore, reallocated resources for critical administrative requirements and advised that they were not in a position to respond to the Study.

2.4 Data analytics approach

The Study project team utilised the Microsoft SharePoint system to securely store the data received from industry participants, and the Alteryx analytical tool to create algorithms to cleanse, transform and sequence the data.

The following sections outline the approach undertaken following the receival of data from businesses and the processes used to clean and validate the data provided.

2.4.1 Data governance framework

For the purposes of the Study, data has been defined as any information received from the container logistics chain stakeholders that was used to create the Study dataset. Given that 51 stakeholders provided their proprietary data to inform the Study, it was important and necessary to develop and implement a data governance framework to provide clarity on the following points:

- Decision making structure around data related matters;
- The intended use of the data;
- How the data would be de-identified to protect confidentiality;
- Where the data would be stored; and
- Who will have access to the data.

2.4.2 Data compilation process

The data compilation process consisted of three key steps:

- Data receival and collation – data received underwent an initial validation where it was reviewed for sensibility and high-level completeness. If validated, the data was then logged as received and ready for further cleansing and validation.
- Data cleansing and validation – this process involved validating data for any errors (e.g. misspelling of suburbs names) and invalid values (e.g. postcodes in a suburb field) and standardising the data to ensure consistency in data across the different datasets (e.g. a postcode has the same suburb name).
- Once the data had been cleansed and validated, it was then consolidated by business type (such as truck operator, freight forwarder and rail operator) to enable sequencing of events.
- Data sequencing and aggregation – this process involved developing algorithms to link events/records from the different business types to form container logistics chains. Sequences were established by grouping events pertaining to a container ID and ordering them chronologically by time.

2.4.3 Data extrapolation process

The data extrapolation process involved annualising the sample data captured during the two-month period to estimate container movements for CY2019. The extrapolation process consisted of the following steps:

1. Development of a machine learning based model to interpret the data provided by PoM - the purpose of the machine learning model was to align TEU and container counts for each month during 2019 for each 'dimension combination' of: Trade direction – import or export; Sector – international, mainland coastal or Tasmanian trade; Commodity; Container size – 20ft, 40ft; Container type – general, reefer; Transport mode – rail, road; Workdays and holidays in each month; Number of calendar days in the sample period; Container and TEU totals in the PoM data.
2. Applied a series of adjustment factors to reconcile the sample data received from stakeholders to the same dimension combinations in PoM's data in the sample period.
3. Since the stakeholder data received would not have captured all the dimension combinations in PoM's data, an uplift factor was applied to the adjusted data to reconcile with 100% of the PoM data in the sample period.
4. Applied the machine learning extrapolation model (developed in step 1) to the uplifted sample data, which generated data for each month throughout 2019 and reconciled with 100% of PoM's annual data.
5. The extrapolation method ensured that all trends, variability and seasonality that were observed in the PoM annual data are reflected in the extrapolated data. This included data trends for commodities, sectors and modes. Machine learning enabled both micro and macro trends to be included and would typically not be included by using a non-dynamic (manual) approach.

2.5 Data quality

It emerged that many stakeholders used different systems to collect operational data. As a result, the landside container movements data provided was received in different formats and reporting methods, including some sets of data with some inconsistencies in data definitions and formats. The Study project team undertook significant data sanitising and cleansing processes to validate and clean data to improve the overall quality of the supplied data. This allowed for the sample data to be extrapolated to an annualised CY2019 data-set with a high level of coverage.

Some of the common data quality issues encountered during the cleansing and validation process were:

- Missing time stamps – some stakeholders provided date and time stamps while others only provided dates with no times. This affected the sequencing of container movements particularly when two different providers reported events on the same date;
- Incorrect time stamps – there were several cases where time stamps provided were clearly incorrect, e.g. start and end times for a container movement between two different locations were the same;
- Inconsistencies across data sources - origin or destination postcodes were sometimes inconsistent between data sources, e.g. a truck operator reported a container was delivered to a postcode, while a freight forwarder reported delivery to a different postcode;
- Outdated postcode references – Australia Post made changes to some postcodes for some suburbs (e.g. Derrimut). However, Google Maps maintains the outdated postcode reference which resulted in some operators continuing to utilise the outdated postcode references;
- Data errors – there were instances of spelling errors for suburb names or invalid data types which did not match the field, such as postcodes that appeared in suburb name fields. These were easily identified and corrected. Other examples include invalid container ID numbers e.g. "4 BUNDLES", which were excluded; and

- Data definitions – there were inconsistencies in data field definitions between data providers. For example, some data providers defined a particular location as an empty container park, while others defined it as a depot.

2.6 The Study area

The Study area was split into three high-level regions, metropolitan Melbourne, regional Victoria and interstate catchment areas, as shown in the three figures below. For the Study, these three regions were further segmented as follows (with postcode boundaries shown in grey outlines):

- Metropolitan Melbourne (Figure 21) was segmented into five areas - Inner Melbourne, Outer Eastern, Outer Northern, Outer South East and Outer Western;
- Regional Victoria (Figure 22) was segmented into seven areas based on key transport corridors across the State:
  - South Western Corridor
  - Western Corridor
  - North Western Corridor
  - Goulburn Corridor
  - Hume Corridor (North East)
  - Eastern Corridor
  - Peninsula; and
- Interstate regions (Figure 23) highlight the interstate Port of Melbourne catchment areas and includes Southern NSW, Southern South Australia and Tasmania.

Figure 21 - Metropolitan Melbourne

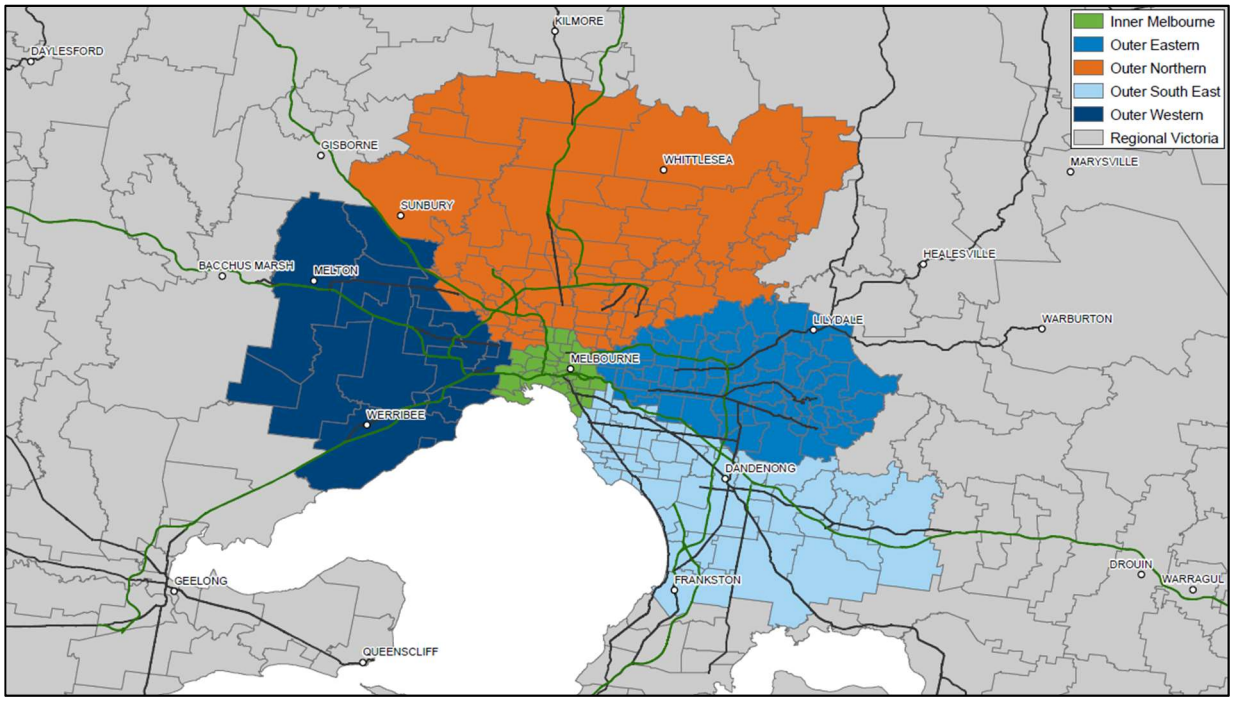


Figure 22 - Regional Victoria

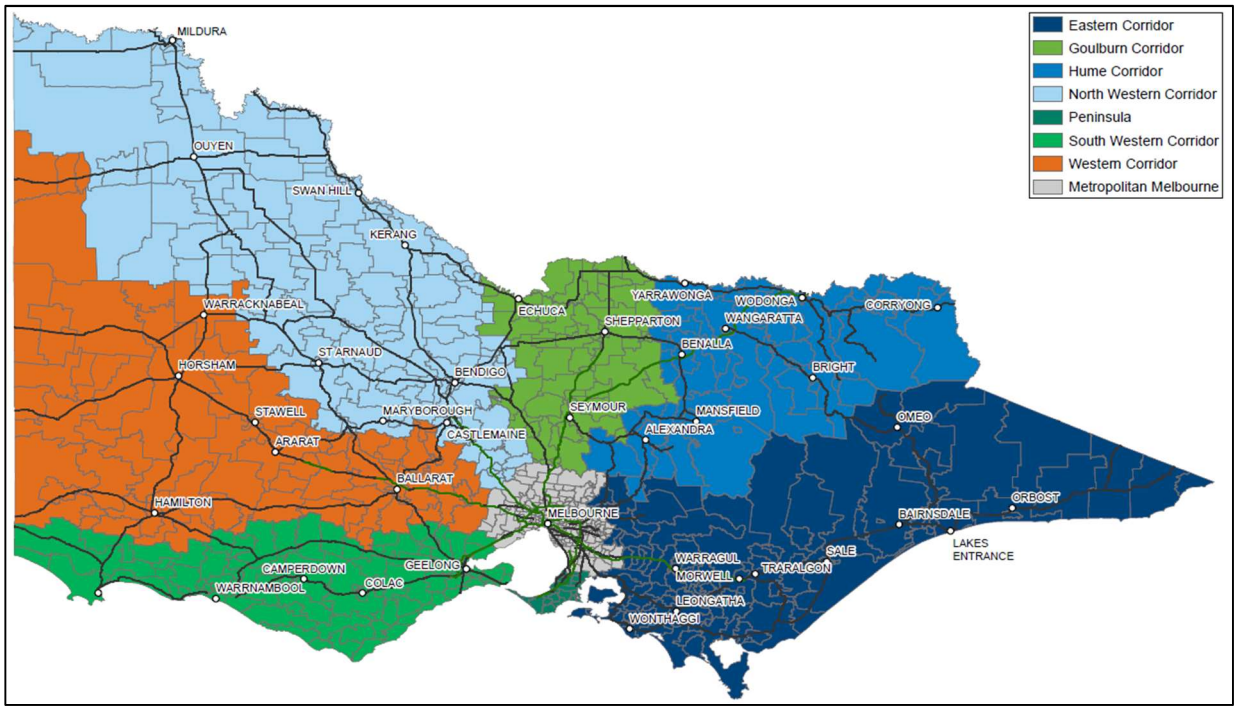
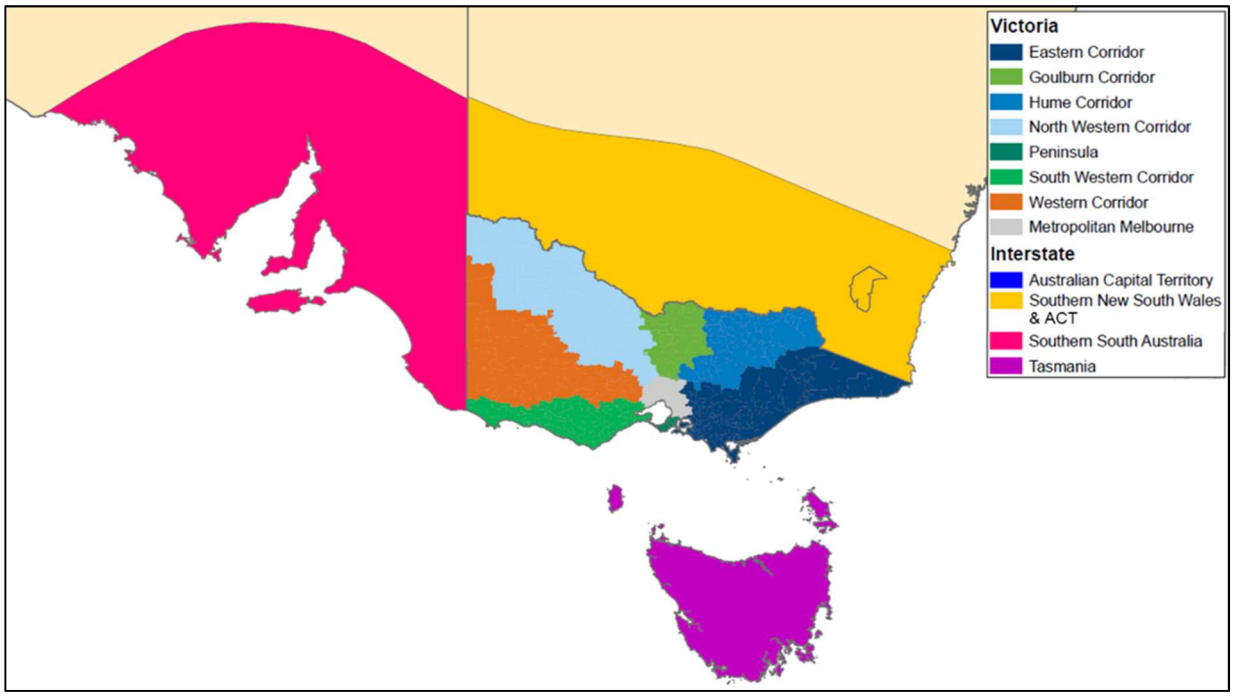


Figure 23 - Interstate port catchment regions

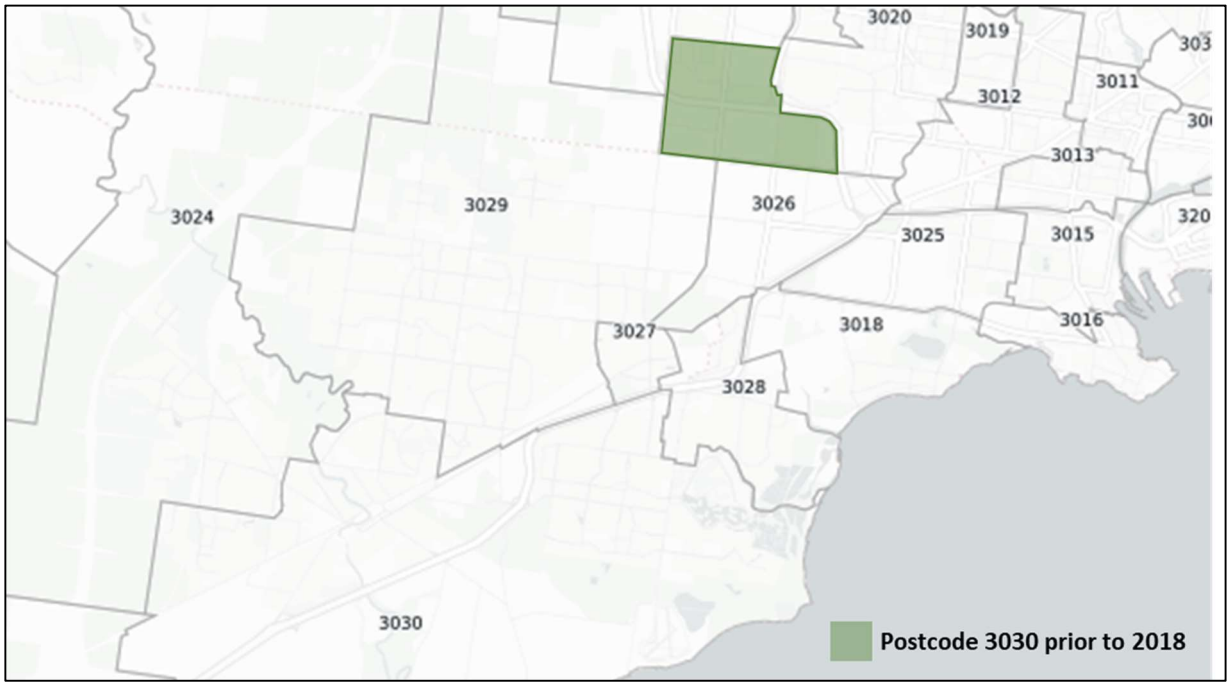


2.6.1 Metropolitan postcode changes

Since 2009, there have been amendments to postcode classifications by Australia Post. In 2018, the suburb Derrimut was reclassified from postcode 3030 to 3026. This transition period is still ongoing as local business addresses in the area are often still listed as 3030. The findings of the Study acknowledge this postcode change. However, mapping resources such as Google have not been updated.

Figure 24 highlights the impacted area that is now classified as postcode 3026.

Figure 24 - Postcode reclassification in year 2018



3 Logistics analysis and findings

This section provides outcomes of the analysis and findings of the Study. The findings include all road and rail movements where the containers are part of international, mainland coastal and Tasmanian logistics chains.

Throughout the report, the references to Tasmanian refer to international and domestic container trade transported between the Port of Melbourne and Tasmania.

3.1 Key findings

The following data summarises the total annual full container movements through the Port of Melbourne (i.e. excluding transhipments and empty containers).

Over CY2019, there were a total of 1,204,624 TEU of international and mainland coastal import containers, of which 94.0% of these were handled and unpacked in metropolitan Melbourne, 3.8% in regional Victoria and 2.2% interstate. There were 685,252 TEU of international and mainland coastal export containers, of which 63.7% of these containers were packed in metropolitan Melbourne, 26.9% in regional Victoria and 9.4% interstate.

Table 7 shows the full international and mainland coastal import and export container origin and destinations through the Port of Melbourne.

Table 7 – Port of Melbourne full international and mainland coastal import and export container origins and destinations (CY2019 annual movements)

Area	Imports		Exports	
	TEU	%	TEU	%
Inner Melbourne	86,194	7.2%	51,134	7.5%
Outer Eastern	89,329	7.4%	24,174	3.5%
Outer Northern	188,178	15.6%	51,210	7.5%
Outer South East	320,256	26.6%	78,774	11.5%
Outer Western	448,904	37.3%	231,521	33.8%
Metropolitan Total	1,132,861	94.0%	436,813	63.7%
Eastern Corridor	6,137	0.5%	24,122	3.5%
Goulburn Corridor	3,366	0.3%	6,940	1.0%
Hume Corridor	6,437	0.5%	2,216	0.3%
North Western Corridor	7,305	0.6%	53,526	7.8%
Peninsula	2,001	0.2%	3,653	0.5%
South Western Corridor	16,739	1.4%	71,708	10.5%
Western Corridor	3,729	0.3%	22,073	3.2%
Regional Victoria Total	45,714	3.8%	184,238	26.9%
Southern New South Wales & ACT	5,670	0.5%	28,357	4.1%
Remainder of New South Wales	12,371	1.0%	22,147	3.2%
Northern Territory	123	0.0%	-	0.0%
Queensland	2,753	0.2%	752	0.1%
South Australia	4,381	0.4%	9,621	1.4%
Western Australia	751	0.1%	3,324	0.5%
Interstate Total	26,049	2.2%	64,201	9.4%
Grand Total	1,204,624	100%	685,252	100.0%

Table 8 summarises the full import mainland destinations for containers shipped from Tasmania and mainland export container origins for containers shipped to Tasmania through the Port of Melbourne. Of the 73,815 TEU Tasmanian full import containers, 92.4% were unpacked in metropolitan Melbourne, 6.9% interstate and 0.7% in regional Victoria. For the 123,651 TEU Tasmanian full export containers, 81.3% were packed in metropolitan Melbourne, 10.7% in regional Victoria and 8.0% interstate.

Table 8 – Port of Melbourne Tasmanian full import destinations and export container origins on mainland Australia (CY2019 annual movements)

Area	Imports		Exports	
	TEU	%	TEU	%
Inner Melbourne	10,795	14.6%	23,277	18.8%
Outer Eastern	211	0.3%	1,350	1.1%
Outer Northern	6,617	9.0%	12,132	9.8%
Outer South East	18,413	24.9%	12,967	10.5%
Outer Western	32,146	43.5%	50,751	41.0%
Metropolitan Total	68,182	92.4%	100,477	81.3%
Eastern Corridor	110	0.1%	80	0.1%
Goulburn Corridor	4	0.0%	670	0.5%
Hume Corridor	7	0.0%	-	0.0%
North Western Corridor	3	0.0%	1,355	1.1%
Peninsula	-	0.0%	25	0.0%
South Western Corridor	379	0.5%	9,799	7.9%
Western Corridor	9	0.0%	1,357	1.1%
Regional Victoria Total	512	0.7%	13,285	10.7%
New South Wales & ACT	3,351	4.5%	3,462	2.8%
Northern Territory	4	0.0%	-	0.0%
Queensland	1,604	2.2%	4,640	3.8%
South Australia	137	0.2%	743	0.6%
Western Australia	26	0.0%	1,044	0.8%
Interstate Total	5,122	6.9%	9,889	8.0%
Grand Total	73,815	100.0%	123,651	100.0%

The key findings of the Port of Melbourne analysis were:

- The majority of staging for international and mainland coastal containers occurred in areas located close to the Port of Melbourne in inner Melbourne and inner western suburbs (refer to Appendix 1 for staging volumes);
- 92% of containers (in TEU) were transported on road and a total of 8% (which includes On-Port, Dynon and Metropolitan volumes) were transported on rail. Of the total railed containers (in TEU), 6.8% represented On-Port volumes;
- 32.2% of container movements (in TEU) were associated with full import containers, with an average of 1.83 moves per container (in TEU) from stevedores to importers;
- 19.5% of container movements were associated with full export containers, with an average of 1.74 moves per container (in TEU) from exporters to stevedores;
- 27.4% of container movements (in TEU) were associated with transportation of empty containers once full import containers were unpacked;
- 17.2% of container movements (TEU) were associated with transportation of empty containers to be packed for export.

- 3.7% of container movements (TEU) were associated with other empty container movements. For example, the movement between container parks.

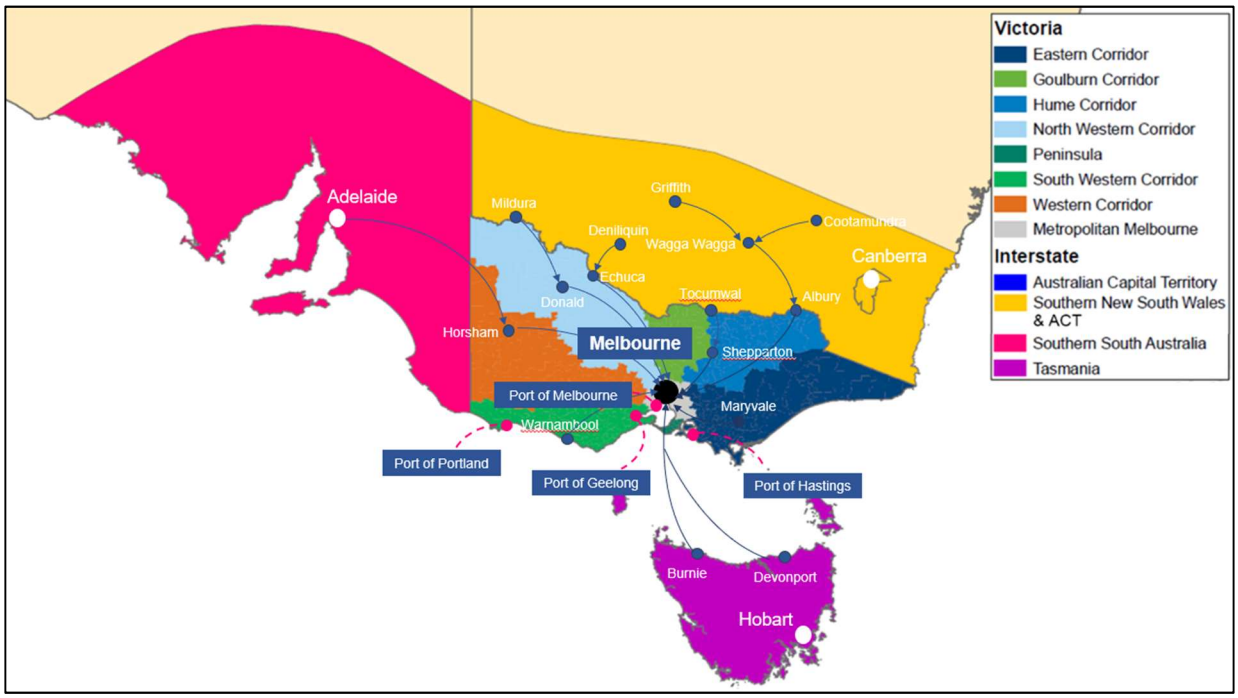
3.2 Port of Melbourne container logistics chains – components and how they work

Port of Melbourne container logistics chains involve the movement of full and empty containers both to and from the port via road, rail and ship. These movements are segmented into international, mainland coastal and Tasmanian trade sectors.

International containers are imported and exported both to and from the Port of Melbourne using international container vessels. On the landside, international containers are transported via road, or a combination of road and rail, between their landside origins/destinations and the Port of Melbourne. Figure 25 highlights the primary regional and interstate logistics chains in the Port of Melbourne's catchment. Metropolitan movements are highlighted in additional detail in this section of the report.

Containers used in Tasmanian logistics chains are currently transported between the Port of Melbourne and Tasmania using specialised roll-on roll-off vessels calling at the Webb Dock port precinct. The two roll-on/roll-off freight shipping services provide the critical link between Tasmania's importers and exporters, and the mainland and international markets. Additionally, other unitised freight (i.e. trailers) is carried between Tasmania and Melbourne by TT-Line's passenger / roll-on roll off service from Station Pier. However, Tasmanian trailer freight was excluded from the Study as the focus of the Study was on the movement of containers.

Figure 25 – Indicative Port of Melbourne regional and interstate logistics chains



The Port of Melbourne has three main containerised freight logistics chains:

1. Import chain – the movement of a container from the stevedore either directly or indirectly to an importer, where it is unpacked. It is then transported directly or indirectly to an empty container park where it is de-hired.
2. Export chain – the movement of a container from an empty container park, where it is hired, to an exporter, where it is packed. It is then transported directly or indirectly to the stevedore for export as a full container.

3. Empty container chain – the movement of containers to and from empty container parks and customers for the packing of exports and return of unpacked import containers. These form part of the import or export movements as described above.

In addition, there are direct movements of empty containers between the port and empty container parks:

- The movement of containers from an empty container park to the stevedore for export as an empty container. This is due to a higher number of full import containers through the port compared with full exports creating an excess of empty containers after supporting the export trade
- There is also a small percentage of empty containers, compared to total throughput, imported direct to container parks to ensure an appropriate supply across relevant specific container types.

In some instances, the function of empty container parks is captured by storage areas in stevedore terminals whereby empty containers are returned after unpacking direct to the container terminal, and similarly the reverse with empty pickups for export packing.

Sea-to-sea transhipments (discussed further in Section 3.7.4) are not associated with any of these landside logistics chains. Transhipments are handled either within a single stevedore's operation, or between two stevedores with a short road leg in between the marine container terminals.

The commencement and completion of import and export supply chains is considered to occur at the stevedore gates or empty container park receival and delivery gates, which is reflected in the analysis. Operational activities within the stevedore and empty container park businesses do not fall within the scope of this Study.

The road and rail based transport components of the Port of Melbourne container logistics chains are illustrated in the figures below. Transport (truck operator) depots are key components of these logistics chains.

Figure 26 - Process Map: Port of Melbourne ROAD transport-based logistics chain (international container trade)

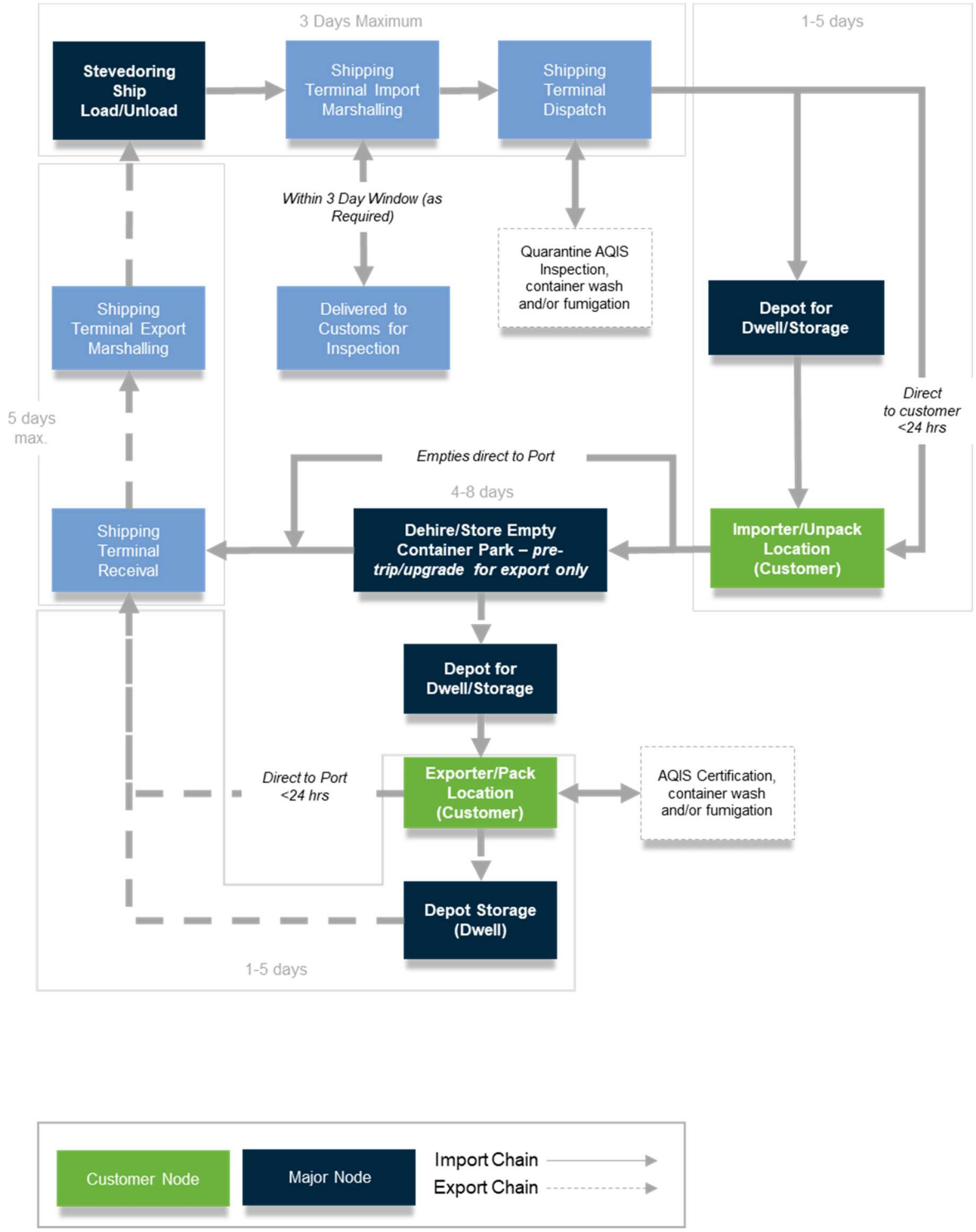
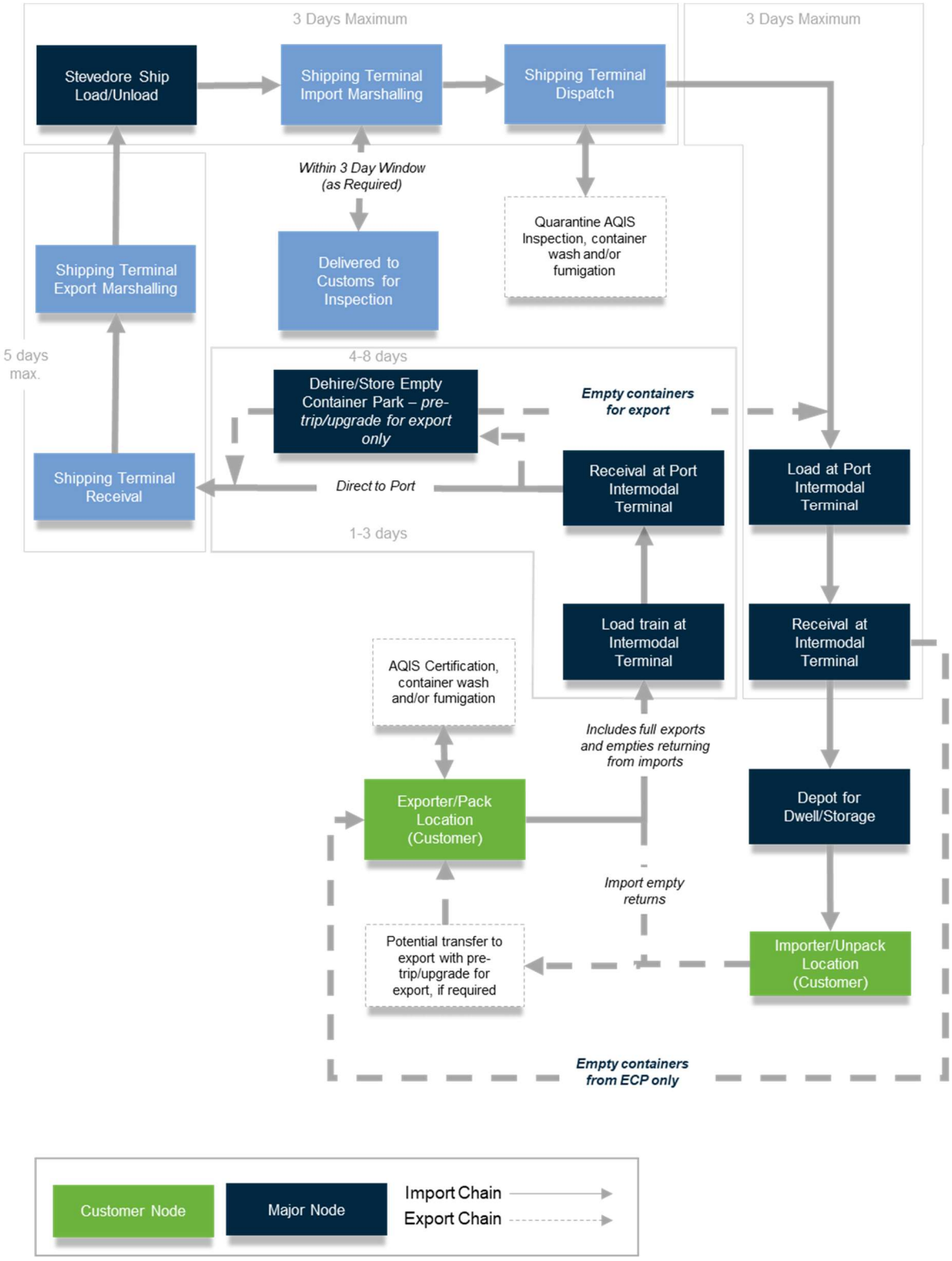


Figure 27 - Process Map: Port of Melbourne ROAD and RAIL based logistics chain (international container trade)



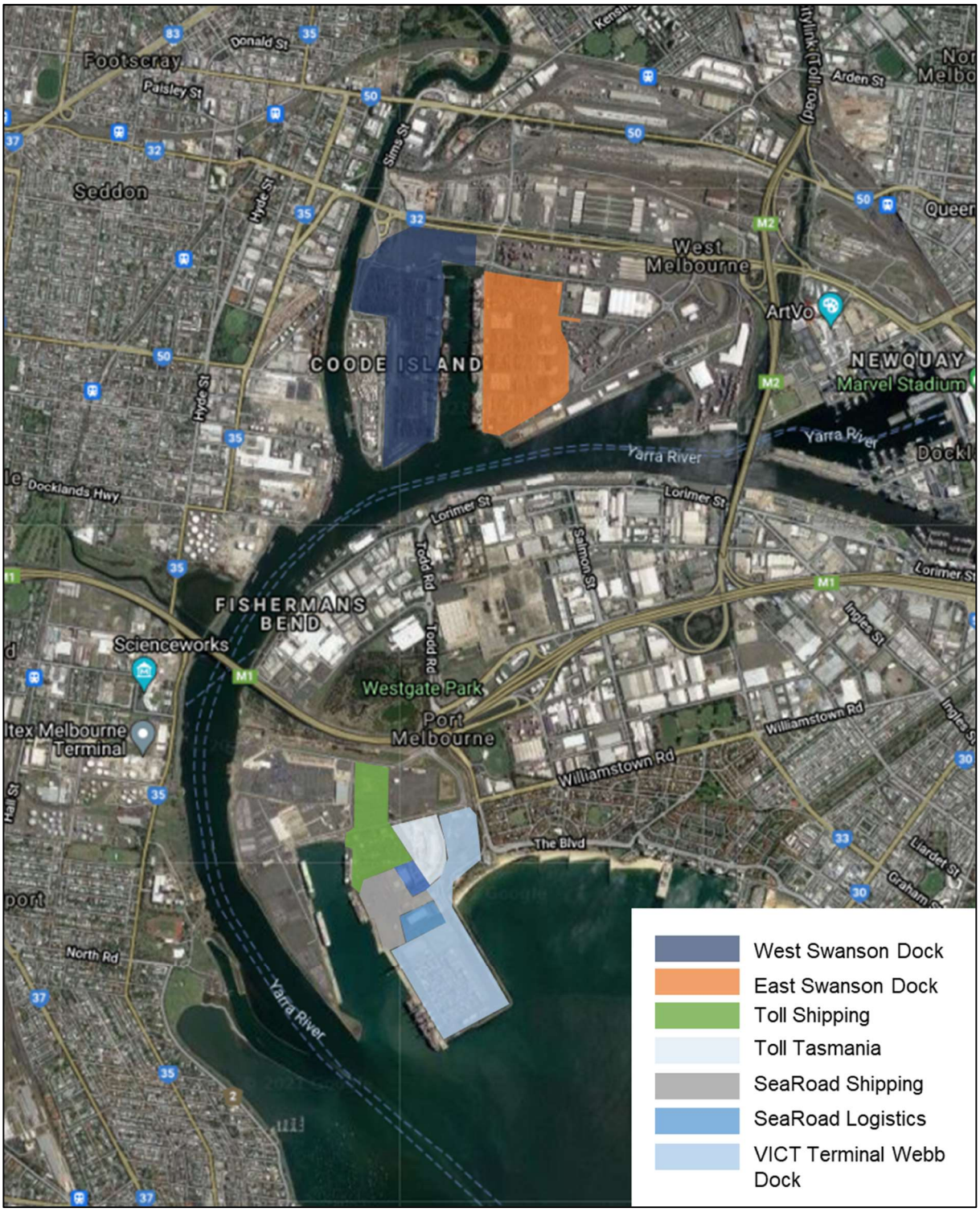
3.3 Port of Melbourne container shipping terminals

PoM's current activities involve a broad scope of trades across multiple berths and precincts. This Study solely relates to containerised freight, which is managed by private operators at the following locations (see Figure 28):

- West Swanson Dock berths - operated by DP World, which is majority owned by DP World Dubai and caters for both international and mainland coastal container shipping trades;
- East Swanson Dock berths - operated by Patrick Terminals (Patrick), which is owned by a consortium of Qube Holdings and Brookfield Infrastructure Partners and caters for both international and mainland coastal container shipping trades;
- Webb Dock East Container Terminal - operated by Victoria International Container Terminal Ltd (VICT), a subsidiary of International Container Terminal Services Incorporated (ICTSI) and caters for both international and mainland coastal container shipping trades;
- Webb Dock 1 East - operated as a roll-on roll-off facility by Toll Shipping (a subsidiary of the Toll Group) and caters solely for the Tasmanian (Bass Strait) sea freight trade; and
- Webb Dock 2 East - operated as a roll-on roll-off facility by SeaRoad Shipping (a subsidiary of SeaRoad Holdings), which caters solely for the Tasmanian (Bass Strait) sea freight trade.

Any other container movements through non-container berths are negligible.

Figure 28 – Port of Melbourne containerised freight shipping terminals



3.4 On-Port and Dynon rail terminals

There are three near-dock rail terminals which operate in the Port of Melbourne precinct south of Footscray Road, and two rail terminals are in operation north of Footscray Road in the 'Dynon Precinct'. These terminals provide links to/from regional and interstate locations for relevant international, mainland coastal, and Tasmanian containers.

The rail terminals are shown spatially in Figure 29 and are summarised below:

1. Appleton Park Rail Terminal (On Port) - operated by ACFS Port Logistics which is a privately owned business and provides links for international containers;
2. Victoria Dock Rail Terminal (On Port) - part of the complex operated by Qube Logistics and provides links for international containers.
3. West Swanson Intermodal Terminal (On Port) - operated by DP World with direct access to the West Swanson Container Terminal and provides links for international containers;
4. South Dynon rail terminal (Near Port) - operated by Pacific National and provides links for domestic and international containers.
5. Dynon rail terminal (T Gate) (Near Port) - operated by Qube Logistics in conjunction with VicTrack (as rail manager) and provides links for domestic and international containers;
6. Appleton Grain Sidings (Near Port) – operated by Emerald Grain. This siding is not further discussed as there are no container operations.

Figure 29 - On Port and Near Port rail terminals

3.5 Transport depots

Transport (truck operator) depots are an integral part of the Port of Melbourne container logistics chain. Their primary functions include:

- Staging of container movements between the Port of Melbourne and importer/exporter locations. This enables transport companies to optimise the use of their fleet. For example, they use their B-doubles and (where access is permitted) Super B-Doubles and A-Doubles to shuttle containers to and from the Port of Melbourne container wharves during off-peak hours and distribute the import containers (often with smaller vehicles for access) during normal working hours. The depots also enable the acceptance and holding of export cargo for a vessel that is not yet receiving at the Port of Melbourne wharf and to collect import containers before storage charges occur; and
- Undertaking inspections of containers or container contents on behalf of biosecurity government agencies (for some approved depots).

The transport depots are owned or leased and operated mostly by 3PL (third-party logistics providers) businesses, providing services to importers, exporters and freight forwarders in the road transportation of containers. Largely, their location is dictated by the availability of industrial zoned land, and a location that provides efficient movement of containers to/from the Port of Melbourne, empty container parks and importers/exporters. Historically, transport depots have been mostly located in the western suburbs of the Inner Melbourne region although some are now located further to the west (Outer Western) and also in the Outer South Eastern region of Melbourne. The Study identified increased staging through depots including potential situations of more than one depot for an individual operator, highlighting efficiency practices and the importance of proximity to their customers.

Transport depot locations and their operations are a function of the transport operators' commercial business decisions and some operators servicing particular locations will choose to locate their depots close to their end customer rather than the Port of Melbourne, sacrificing the distance to the port but gaining better and more efficient customer access. This may attract additional customers in that location.

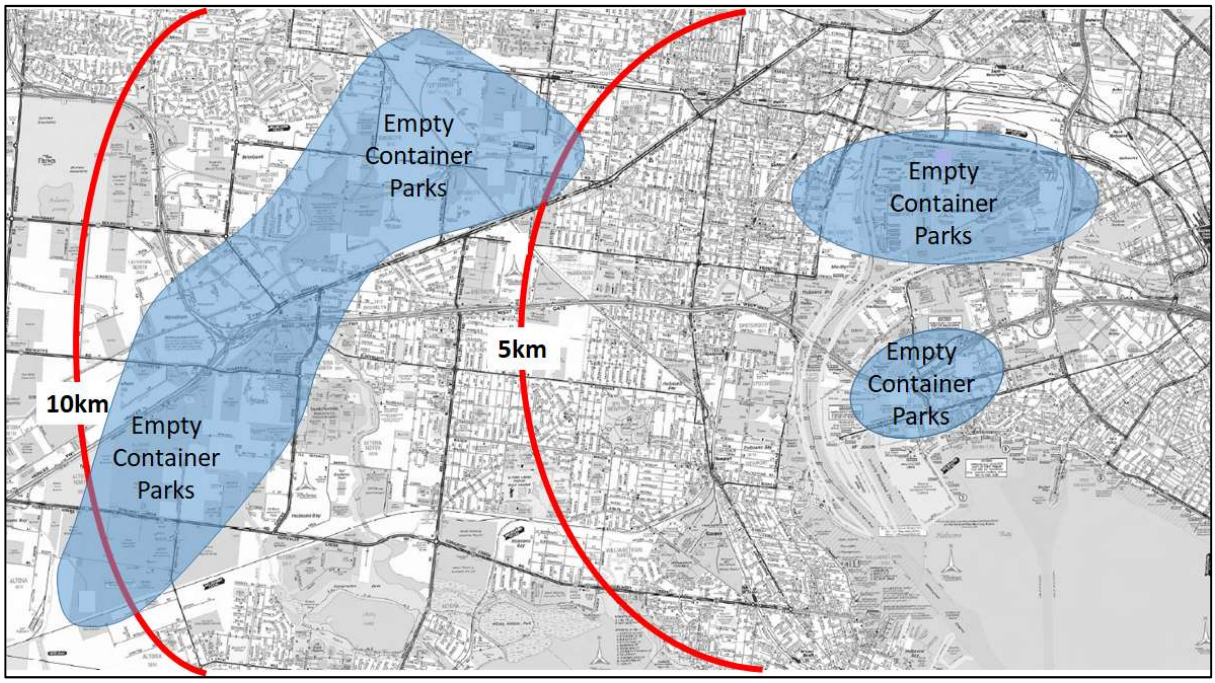
3.6 Empty container parks

Empty container parks are used by shipping lines (who own the containers) to ensure the efficient storage, maintenance, cleaning and as required, the repair of empty containers. These functions take place after the containers have been de-hired by the importer but before they are either re-hired for exports or repositioned by the shipping lines for export through the Port of Melbourne.

Shipping lines pay the empty container park operators for lifts in and out of the parks, storage, cleaning and maintenance/repair of the containers (if applicable), thereby generating income for the empty container parks.

In general, the empty container park locations in Melbourne are determined by the availability of low-cost land or low-cost leases, with satisfactory access to the port, freeways and arterials. Again, suitable locations within the western suburbs of the Inner Melbourne region as shown in Figure 30 are used for this purpose.

Figure 30 - Major empty container park locations



3.7 Shipping trade types

3.7.1 International

International containers are defined for this Study as those imported by sea from international (overseas) origins, or exported by sea to international (overseas) destinations. They make up the majority of the container movements through the Port of Melbourne.

3.7.2 Mainland coastal

Mainland coastal containers are defined for this Study as those imported by sea from Australian mainland origins, or exported by sea to Australian mainland destinations. Mainland coastal containers are carried on international vessels utilising spare on-board capacity. In terms of transportation, these movements are often in direct competition to other land-based movements such as road transport and rail. Mainland coastal movements by sea is also a cost effective way for shipping lines to reposition empty containers along the Australian coast, as well as for connection to/from other shipping services at other Australian ports in the absence of direct shipping service connections at the Port of Melbourne.

3.7.3 Tasmanian

Tasmanian containers, which are also referred to as Bass Strait containers, are defined for this Study as any containers that are shipped between Tasmanian ports and the Port of Melbourne (excluding any containers handled at Station Pier which is no-longer managed by PoM). These containers include both Australian domestic containers and those for transhipment either as imports from or exports to international locations.

Within the following sections, ‘international and mainland coastal’ movements are analysed separately from ‘Tasmanian’ movements, as these two sets of container movements are handled by different stevedores within the Port of Melbourne and have different logistics characteristics.

3.7.4 Transhipments

While the Port of Melbourne operates predominately as a direct 'gateway' port (the majority of imports are bound for local destinations and the majority of exports are from local origins), it also has a significant level of transhipments.

For this Study, the term transhipment is defined as the *discharge* of a container from one vessel within the port and *reloading* of the same container onto another vessel, for example, a sea-to-sea transhipment. The *discharge* and *loading* operations may occur through a single stevedore. However, in many circumstances, transhipment will also involve a road leg between two different stevedores. For example, the transhipment of a Tasmanian container to/from international ports will typically involve a road leg between Webb and Swanson Docks.

Transhipments recorded by PoM are based on the shipping line declaring whether or not a container is an import or export transhipment on its manifest. An imbalance between transhipment imports and exports may arise where the importer/exporter has declared only the import or the export move, rather than both. For the majority of the analysis undertaken in the following sections, sea-to-sea transhipments at the Port of Melbourne are ignored as they do not have a local origin or destination, nor a significant landside movement on which to report.

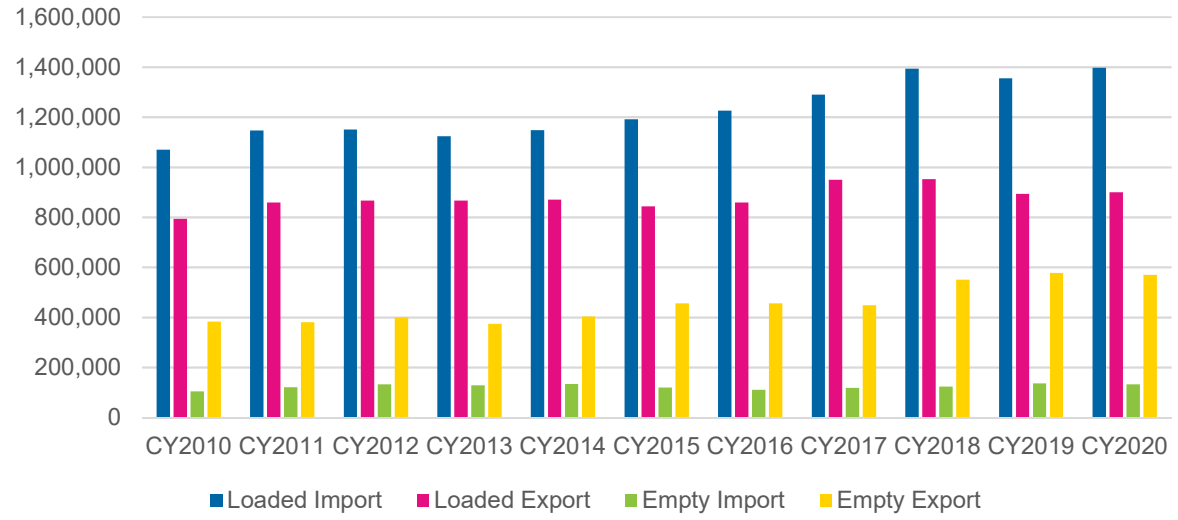
3.8 Port of Melbourne's total container freight task

The Port of Melbourne's total containerised freight task involves the movement of import and export international, mainland coastal and Tasmanian containers. This section contains a historical (2010 to 2019) overview of the Port of Melbourne's total containerised freight task, followed by a detailed analysis of the 2019 data.

3.8.1 Container history (2010 to 2019)

Figure 31 shows the annual imports and export container trade through the Port of Melbourne from 2010 to 2020 including international, mainland coastal, Tasmanian and transhipment containers. There was an overall annual aggregated growth rate over the 10-years of approximately 2.5% p.a.

Figure 31 - Container trade through the Port of Melbourne (2010 to 2020) – source: PoM



3.8.2 Port of Melbourne container trade sectors (CY2019)

Table 9 and Table 10 show the direct and transhipped import and export containers (TEU) through the Port of Melbourne by trade sector.

Table 9 – Port of Melbourne direct container movements (TEU), CY2019

Trade	Imports		Exports	
	Full	Empty	Full	Empty
International	1,200,240	51,998	658,021	499,282
Mainland coastal	4,386	12,406	33,439	33,353
Tasmanian	77,627	59,640	123,939	29,375
Total	1,282,253	124,044	815,399	562,010

Table 10 – Port of Melbourne transhipped container movements (TEU), CY2019

Trade	Imports		Exports	
	Full	Empty	Full	Empty
International	44,594	10,502	35,978	11,951
Mainland coastal	4,555	2,123	34,427	829
Tasmanian	22,946	240	10,416	14
Total	72,095	12,865	80,821	12,794

3.8.3 40 Foot containers (CY 2019)

Table 11 shows the percentage of 40 foot containers for 'direct movement' of containers by trade sector. Full international imports indicate that there is a high usage of these containers, with a corresponding high level of empty international exports.

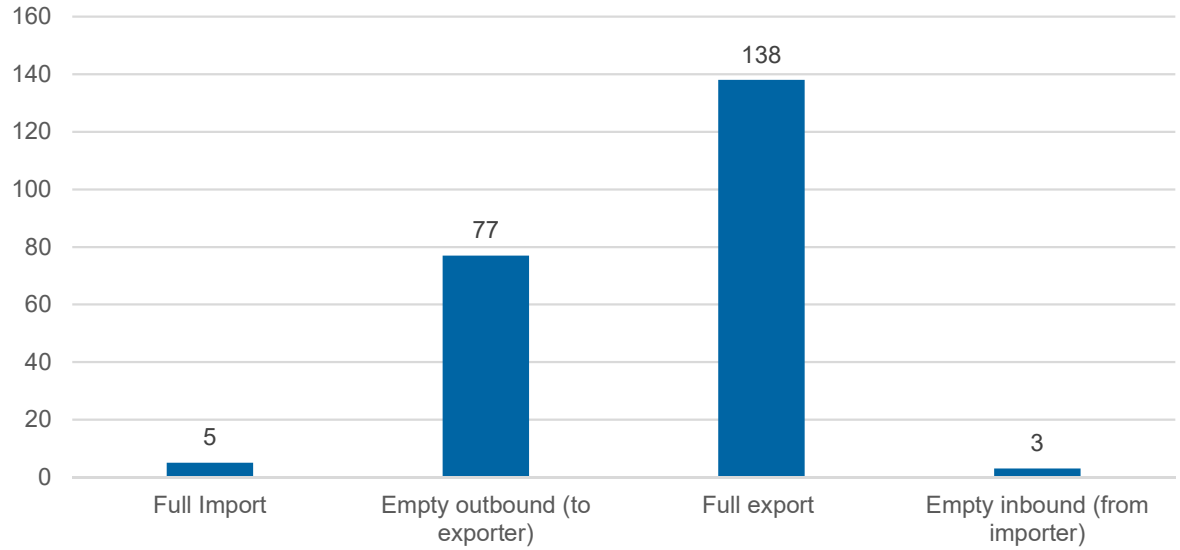
Table 11 - Proportion of 40 foot containers for 'direct' container movements through the Port of Melbourne (CY2019)

Trade	Imports		Exports	
	Full	Empty	Full	Empty
International	57%	37%	53%	61%
Mainland coastal	27%	57%	71%	14%
Tasmanian	13%	22%	19%	20%
Total	**53%**	**31%**	**47%**	**54%**

3.9 Rail freight task

Three on-port rail terminals, two near-port terminals in Dynon, and one metropolitan terminal in Altona, moved containers in and out of the Port of Melbourne in CY2019 as shown in Figure 32. 8% of containers that moved through the Port of Melbourne included a rail leg via one of these rail terminals.

Figure 32 - CY2019 rail movements for Port of Melbourne international, mainland coastal and Tasmanian containers



3.10 Domestic Freight distribution - Dynon rail terminals

The Dynon terminals form part of Port of Melbourne's container logistics chain by moving domestic containers between regional and interstate terminals. Significant container volumes (non-port related) are collected from across Australia and distributed from these terminals to Victorian locations in addition to port-related freight. The pick up and distribution (PUD) locations of these containers align to many key distribution locations for international import and export containers as indicated in Table 12. The table shows the combined inbound and outbound movements to and from each location.

Table 12 - Interstate/Regional domestic container PUD locations (FY2019/20 estimated)

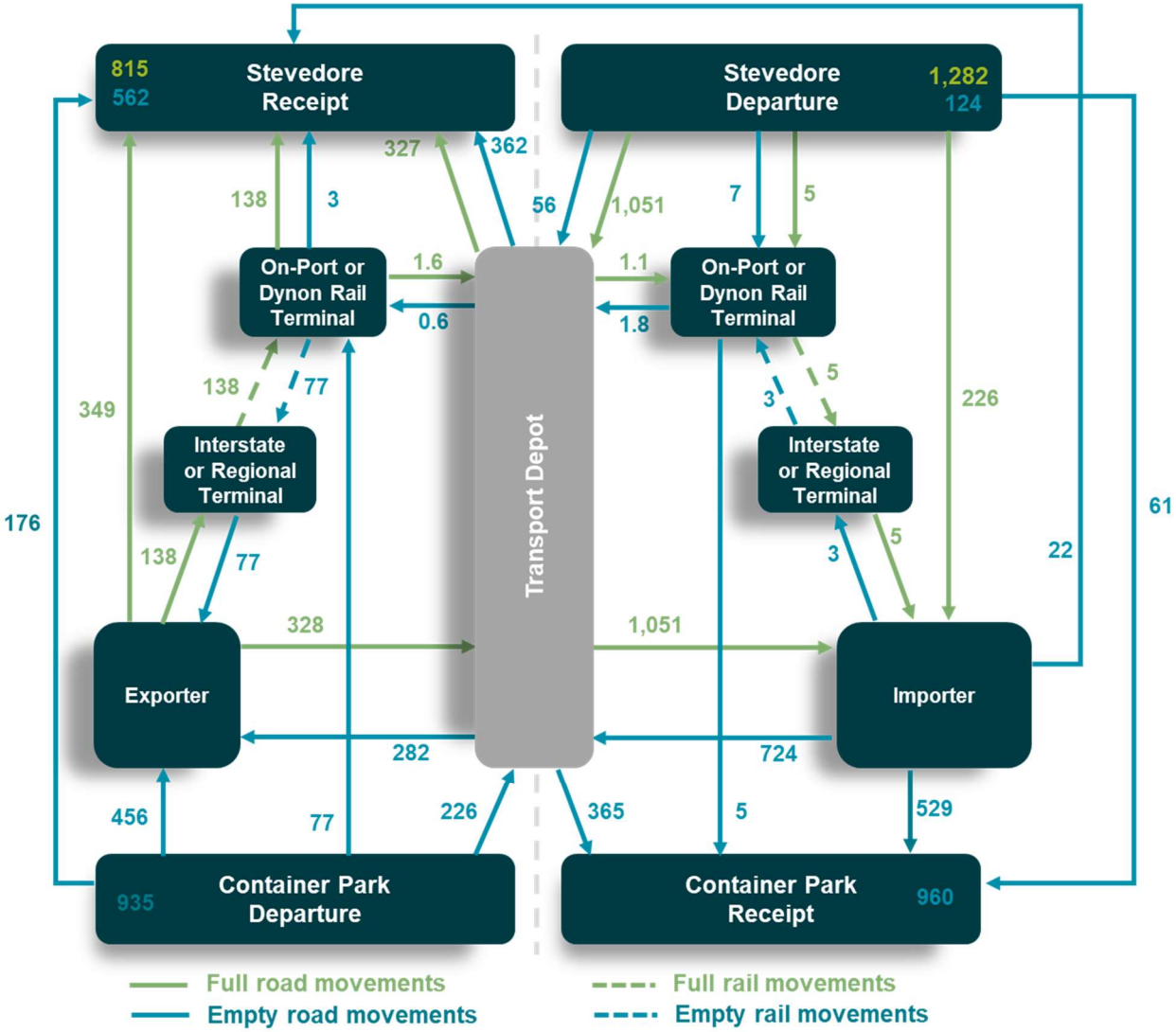
Region	%	Suburb/Town	Postcode	TEU	% of Total
Outer Western Melbourne	67.5%	Truganina	3029	101,400	23.5%
		Altona North	3025	67,000	15.5%
		Laverton North	3026	42,400	9.8%
		Derrimut	3026	38,600	8.9%
		Sunshine West	3020	32,500	7.5%
		Altona	3018	9,300	2.2%
Outer Northern Melbourne	8.4%	Thomastown	3074	1,300	0.3%
		Tullamarine	3043	16,600	3.8%
		Airport	3045	9,600	2.2%
		Somerton	3062	8,600	2.0%
Outer South Eastern Melbourne	14.4%	Dandenong	3175	31,900	7.4%
		Dandenong South	3175	6,100	1.4%
		Mentone	3194	19,600	4.5%
		Cheltenham	3192	700	0.2%
		Braeside	3195	3,800	0.9%
		Knoxfield	3180	300	0.1%
Inner Melbourne	8.8%	Carlton	3053	3,700	0.9%
		West Melbourne	3003	29,800	6.9%
		Abbotsford	3067	4,800	1.1%
Regional	1.0%	Wendouree	3355	3,700	0.9%
	100%	**Total**		431,700	**100%**

3.11 Movement patterns

Figure 33 outlines the movement patterns for direct (non-transhipped) containers (CY2019 annualised) associated with the Port of Melbourne container logistics chain and includes metropolitan, regional and interstate movements.

A container movement is defined as the collection of a container from one location, which could be the stevedore for example, for transportation to another location, such as the importer.

Figure 33 - CY2019 Port of Melbourne container logistics chain movements ('000 TEU) (import and export)



The right-hand side of the figure depicts the ‘import chain’, where it can be observed that full containers are transported from the stevedores to importers directly, or via staging through transport depots and rail terminals.

The left-hand side of the figure depicts the ‘export chain’, where it can be observed that full containers are transported to the stevedore from exporters directly, or via staging through transport depots and rail terminals.

Export containers are also transported by rail to a port rail terminal with direct transfer or a short road journey to stevedore terminals and export. A smaller number of import containers are transported to regional rail terminals mainly carrying agriculture related inputs such as machinery, packaging,

fertiliser and associated products. In either instance, the transport connection to the intermodal terminal is by road

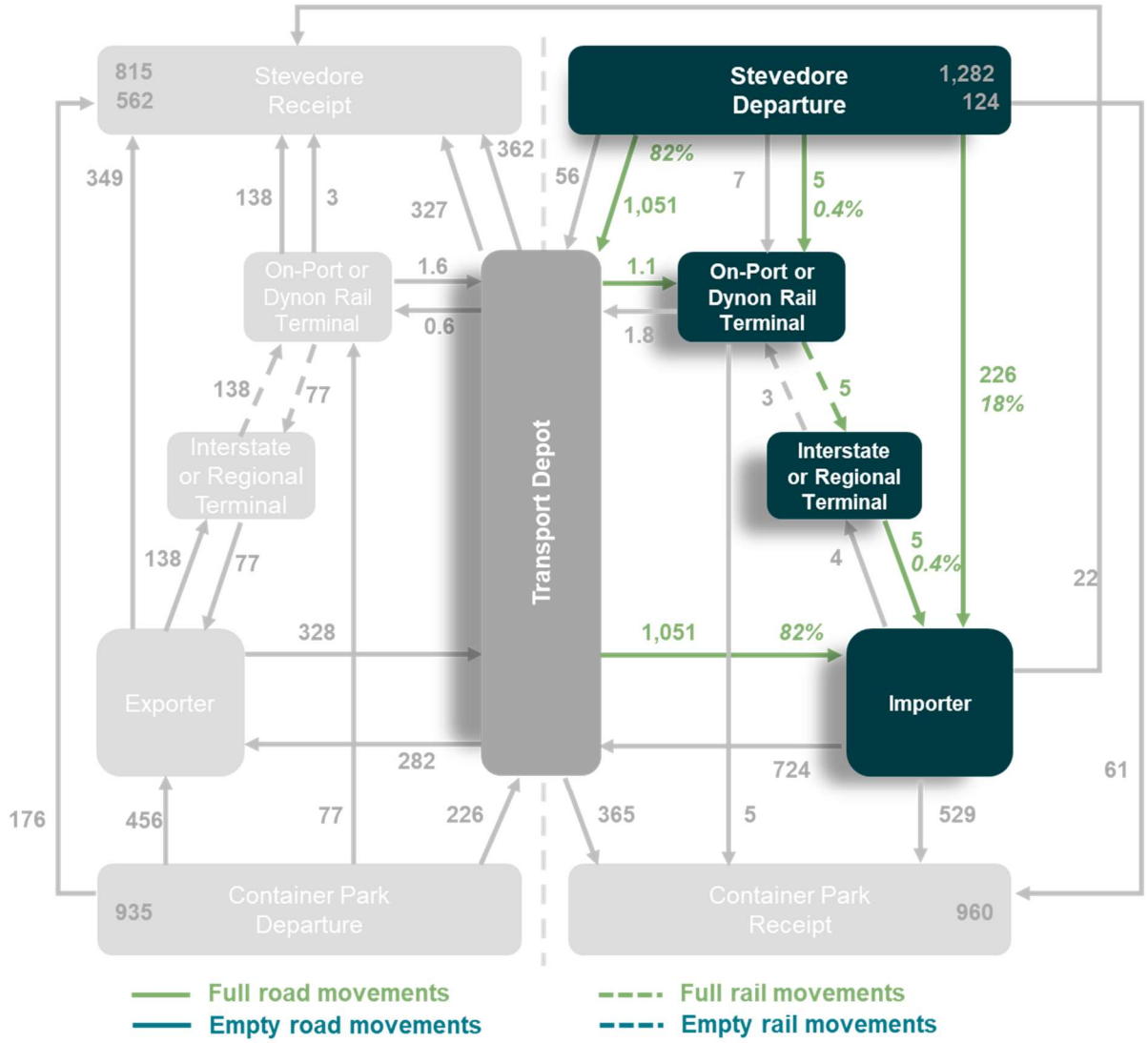
Some containers in regional areas are also packed at intermodal terminals after consolidation and export requirements are met for new markets (for example, some agricultural and viticulture products).

Imbalances of full and empty containers are seen across the logistics chain, potentially through departures from the chain and use within other domestic or interstate logistics chains beyond the extent of this study.

3.11.1 Import chain – Full containers

Figure 34 depicts the movements associated with the full container import chain. The highlighted section of this figure shows the movement of containers from the stevedores, directly by road to the importer (18%), or by road via transport depots (82%), or via rail (0.4%).

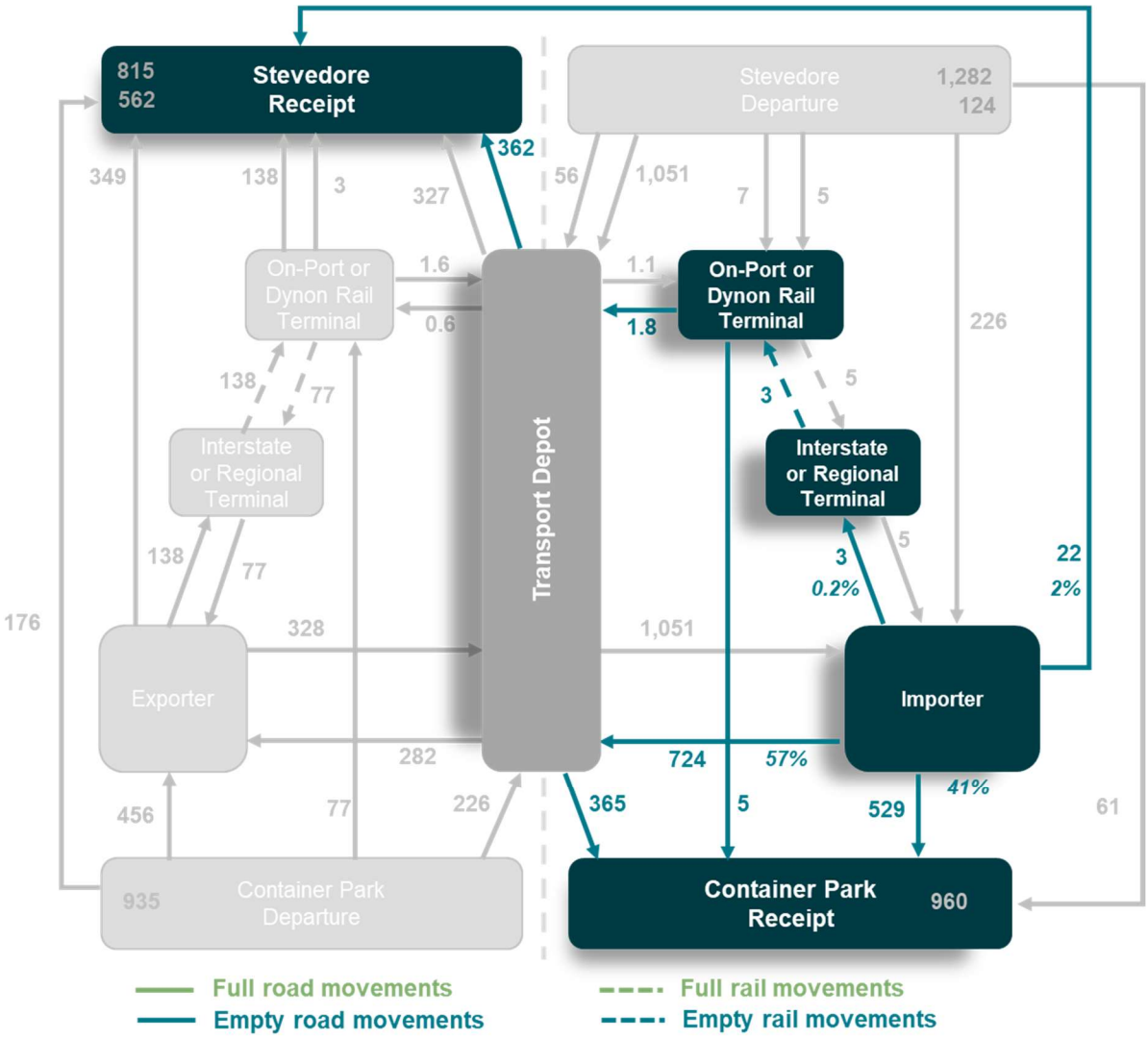
Figure 34 - CY2019 Port of Melbourne logistics chain movements ('000 TEU) (full containers in the import logistics chain)



3.11.2 Import chain – Empty container returns

Following the completion of the unpacking process, empty containers depart from the importers' premises and are transported directly by road to an empty container park for de-hire (41%), to a transport depot (57%), directly to the port (2%) or back to an on-port of Dynon rail terminal by rail (<1%). 28% of empty containers are returned to the port via a transport depot for repatriation.

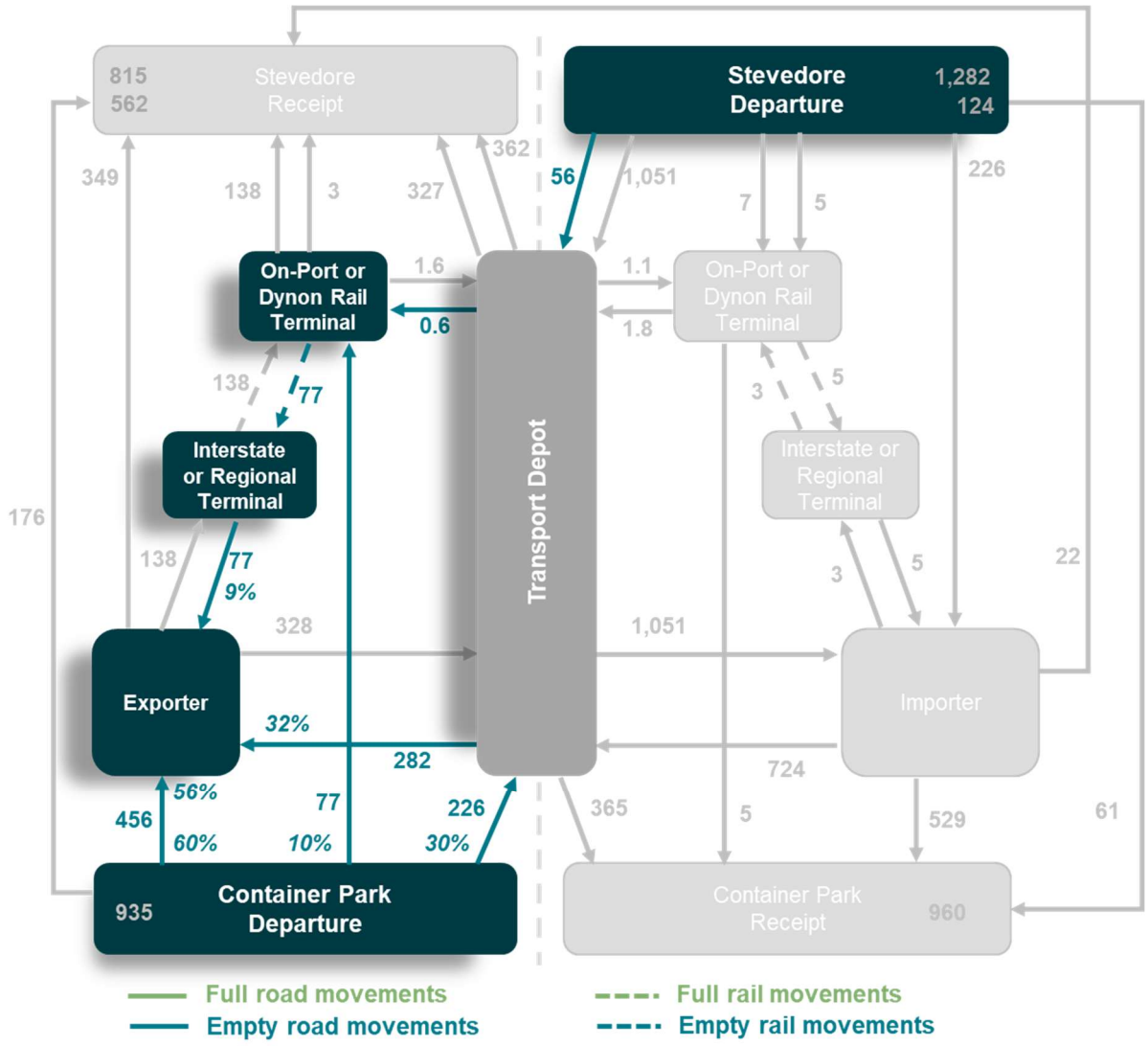
Figure 35 - CY2019 Port of Melbourne logistics chain movements ('000 TEU) (empty containers in the import logistics chain)



3.11.3 Export chain – Empty container supply

Export chain empty container (TEU) movements accounted for 17% of all Port of Melbourne container movements. The handling of empty containers in the export logistics chain followed a comparable, but reverse order of movement to the import chain. As can be seen in Figure 36, exporters typically sourced their empty containers from empty container parks with empties transported to exporter locations either directly by road (60%), or by road via transport staging depots (30%), or via rail (10%).

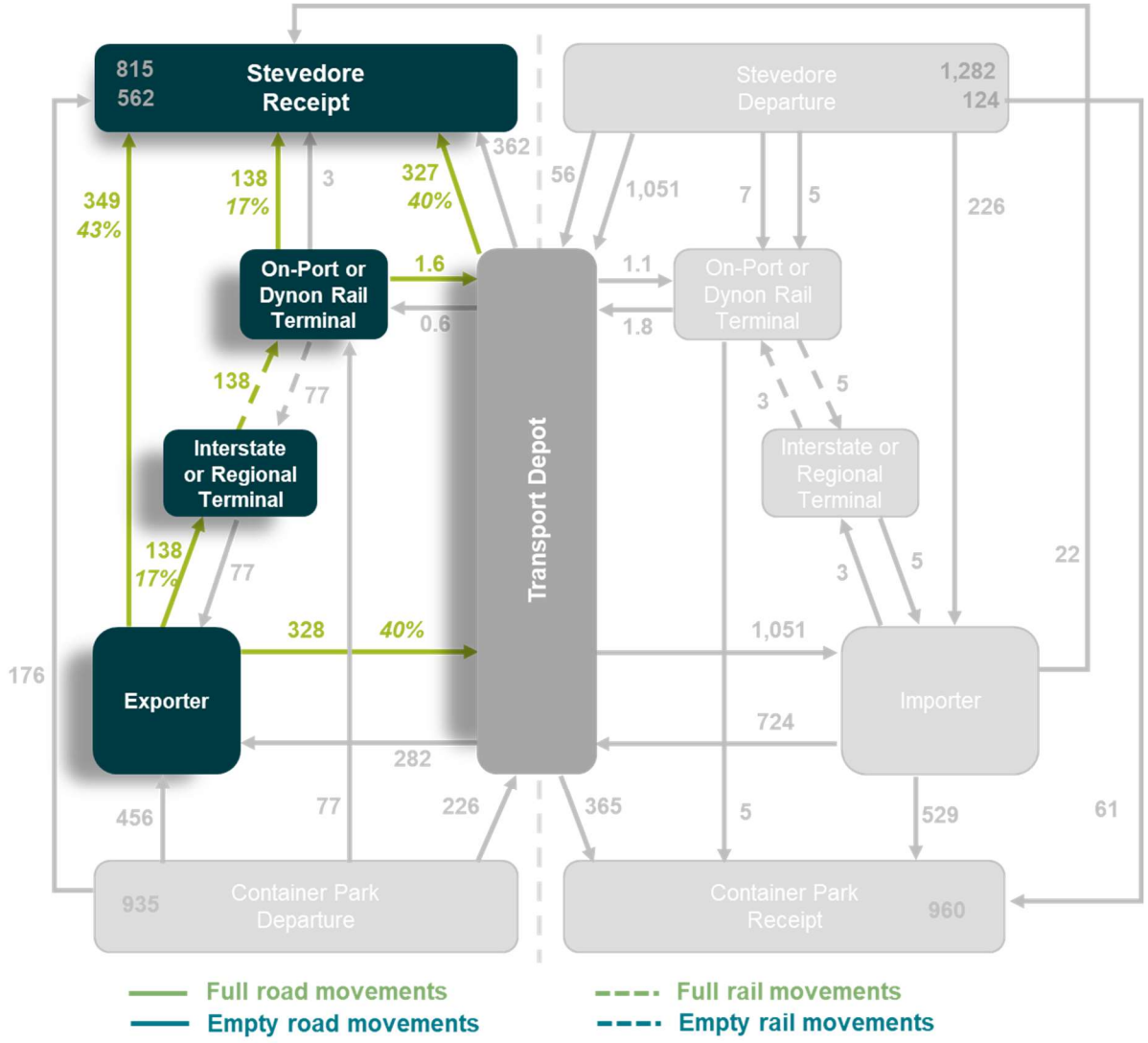
Figure 36 - CY2019 Port of Melbourne logistics chain movements ('000 TEU) (empty containers in the export logistics chain)



3.11.4 Export chain – Full containers

As can be observed in Figure 37, 43% of all full containers leaving the exporter were transported directly to the stevedore by road, 40% by road via transport depots and 17% by rail.

Figure 37 - CY2019 Port of Melbourne logistics chain movements ('000 TEU) (full containers in the export logistics chain)

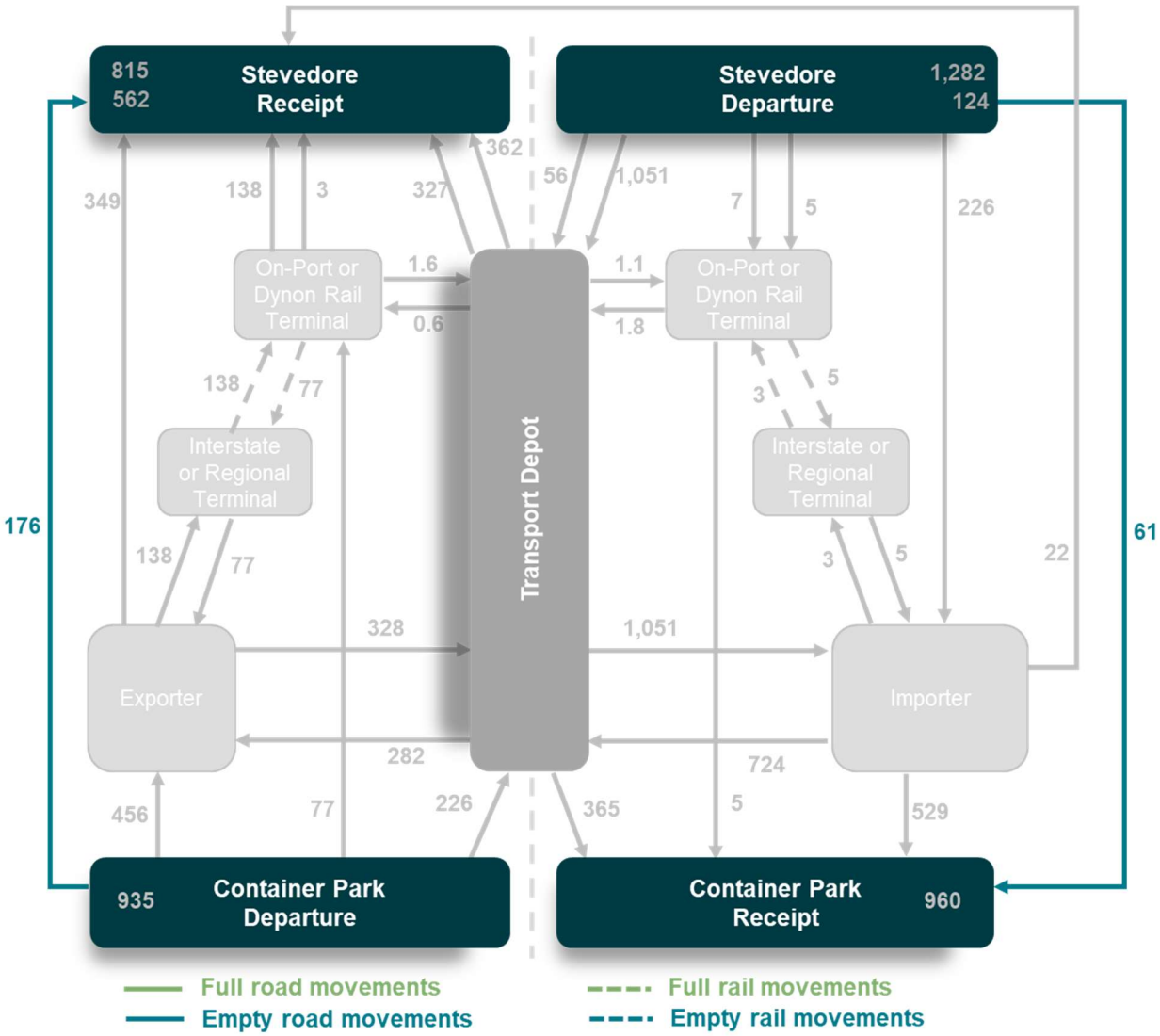


The figure above indicates that 19.5% of all Port of Melbourne container (TEU) moves were associated with full export containers and involved an average of 1.74 moves per container (TEU) from exporter to stevedore.

3.11.5 Other empty container movements

Apart from the previously investigated movement of empty containers from importers (Figure 35) and to exporters (Figure 36), there were additional movements in the container logistics chain that were associated with the transportation or repositioning of containers between the stevedores and empty container parks (Figure 38).

Figure 38 - CY2019 Port of Melbourne logistics chain movements ('000 TEU) (other empty container movements)



In CY2019, analysis showed that 176,000 empty TEU were transported direct to the stevedore from empty container parks including bulk runs for repatriation overseas, and 61,000 empty TEU were transported from stevedores directly to empty container parks.

3.11.6 Business type movements

Table 13 shows container TEU movements between the various business types. All tables in this section exclude sea-to-sea transhipments. The most prevalent movement of full and empty imports involved transport depots, representing approximately 40% of movements from the stevedore. Similarly, for export movements, 42% of the time a transport depot is the preceding node before the stevedore.

Table 13 - CY2019 Port of Melbourne container full and empty movements between business types ('000 TEU)

From \ To	Stevedore	Transport depot	Importer	Exporter	On-Port/Dynon rail terminal	Regional/Interstate terminal	Container park	Total
Stevedore	-	1,107	226	-	12	-	61	**1,406**
Transport depot	689	-	1,051	282	2	-	365	**2,388**
Importer	22	724	-	-	-	3	529	**1,278**
Exporter	349	328	-	-	-	138	-	**815**
On-Port/Dynon rail terminal	141	3	-	-	-	82	5	**232**
Regional/Interstate terminal	-	-	5	77	141	-	-	**223**
Container park	176	226	-	456	77	-	-	**935**
Total	**1,377**	**2,389**	**1,282**	**815**	**232**	**223**	**960**	**7,277**

3.12 International and mainland coastal import containers

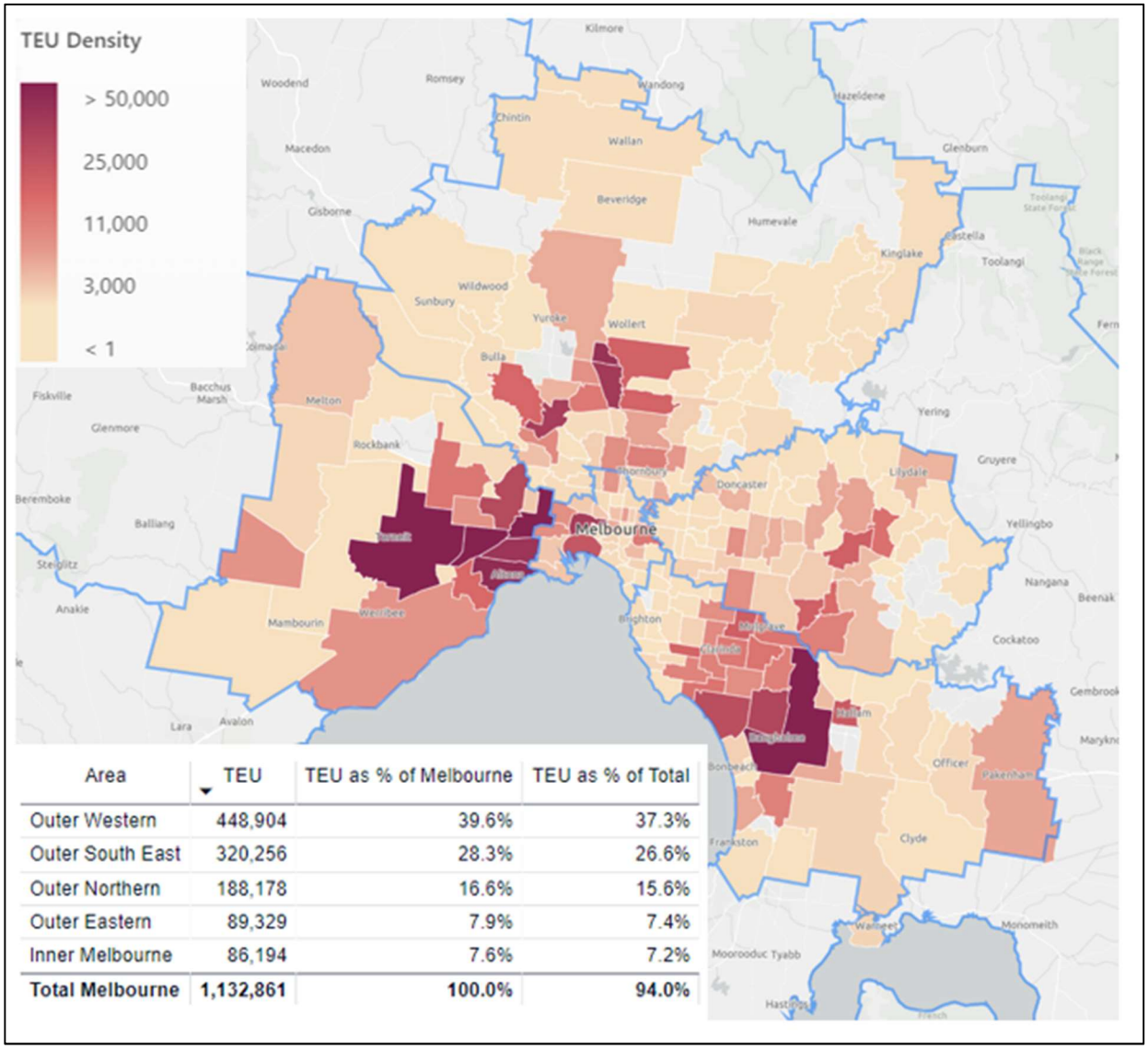
This section identifies both the staged and final destinations for full containers imported through the Port of Melbourne from both international origins and mainland coastal ports in Australia. All plots and tables in this section exclude sea-to-sea transhipments.

Colours at the postcode level are shaded to indicate the density of container (TEU) deliveries to the particular area. The destination regions, which are described in section 4.8, are shaded and summarised at the bottom left of each figure. Where possible, the top five postcodes for each figure are also shown. Often postcodes consist of multiple suburb names, but only the one considered the most significant has been included in each case.

3.12.1 Destinations - Melbourne

Figure 39 shows the metropolitan Melbourne destinations for both full international and mainland coastal containers that are imported through the Port of Melbourne. Of the total number of containers (TEU), 94.0% were delivered within the metropolitan Melbourne, with heavy concentrations in the outer western, south-east and northern suburbs.

Figure 39 – DESTINATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	448,904	39.6%	37.3%
Outer South East	320,256	28.3%	26.6%
Outer Northern	188,178	16.6%	15.6%
Outer Eastern	89,329	7.9%	7.4%
Inner Melbourne	86,194	7.6%	7.2%
Total Melbourne	**1,132,861**	**100.0%**	**94.0%**

Table 14 – Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3026	Derrimut	142,223
3175	Dandenong South	142,195
3029	Truganina	128,214
3012	Brooklyn	50,319
3018	Altona	43,082

Note. A mapping error for Derrimut location exists on the above figure ESRI.

3.12.2 Destinations – Victoria

Figure 40 outlines the destinations in regional Victoria for full international and mainland coastal containers imported through the Port of Melbourne. Metropolitan container volumes are also included in Figure 40 for completeness. Destinations in regional Victoria accounted for 3.8% of the total international and domestic coastal import trade. The distribution pattern is scattered, with some clustering of activity in Central and South Eastern Victoria and on the periphery of metropolitan Melbourne and Geelong. The largest volumes of regional Victoria containers were delivered into the South Western Corridor (1.4%), North Western Corridor (0.6%) and Hume Corridor (0.5%).

Figure 40 – DESTINATIONS for full international and mainland coastal IMPORT containers (Victoria)

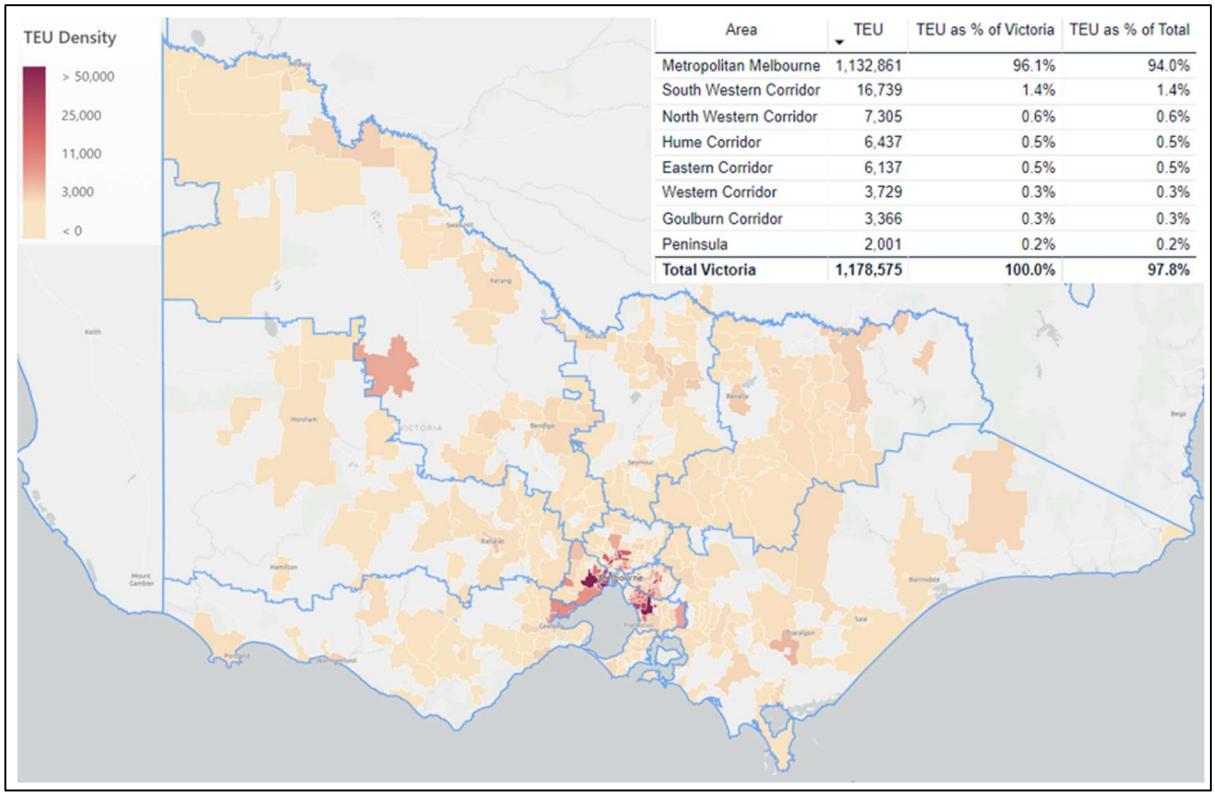


Table 15 - Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (regional Victoria)

Postcode	Suburb/Town	TEU
3212	Lara	4,442
3215	North Geelong	2,845
3214	Corio	2,782
3220	South Geelong	2,024
3840	Morwell	1,808

3.12.3 Destinations – Port of Melbourne catchment excluding Victorian Trade

Figure 41 shows Port of Melbourne catchment destinations for full international and mainland coastal containers imported through the Port of Melbourne excluding Victoria.

Figure 41 - DESTINATIONS for full international and mainland coastal IMPORT containers (Port of Melbourne catchment)

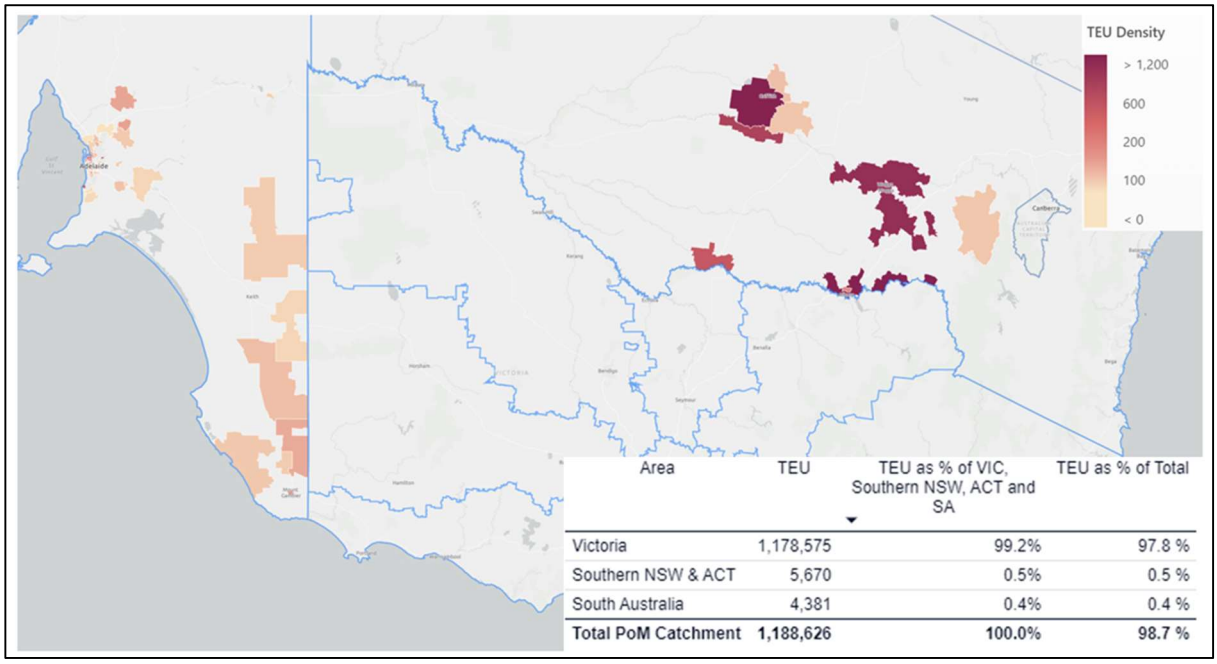


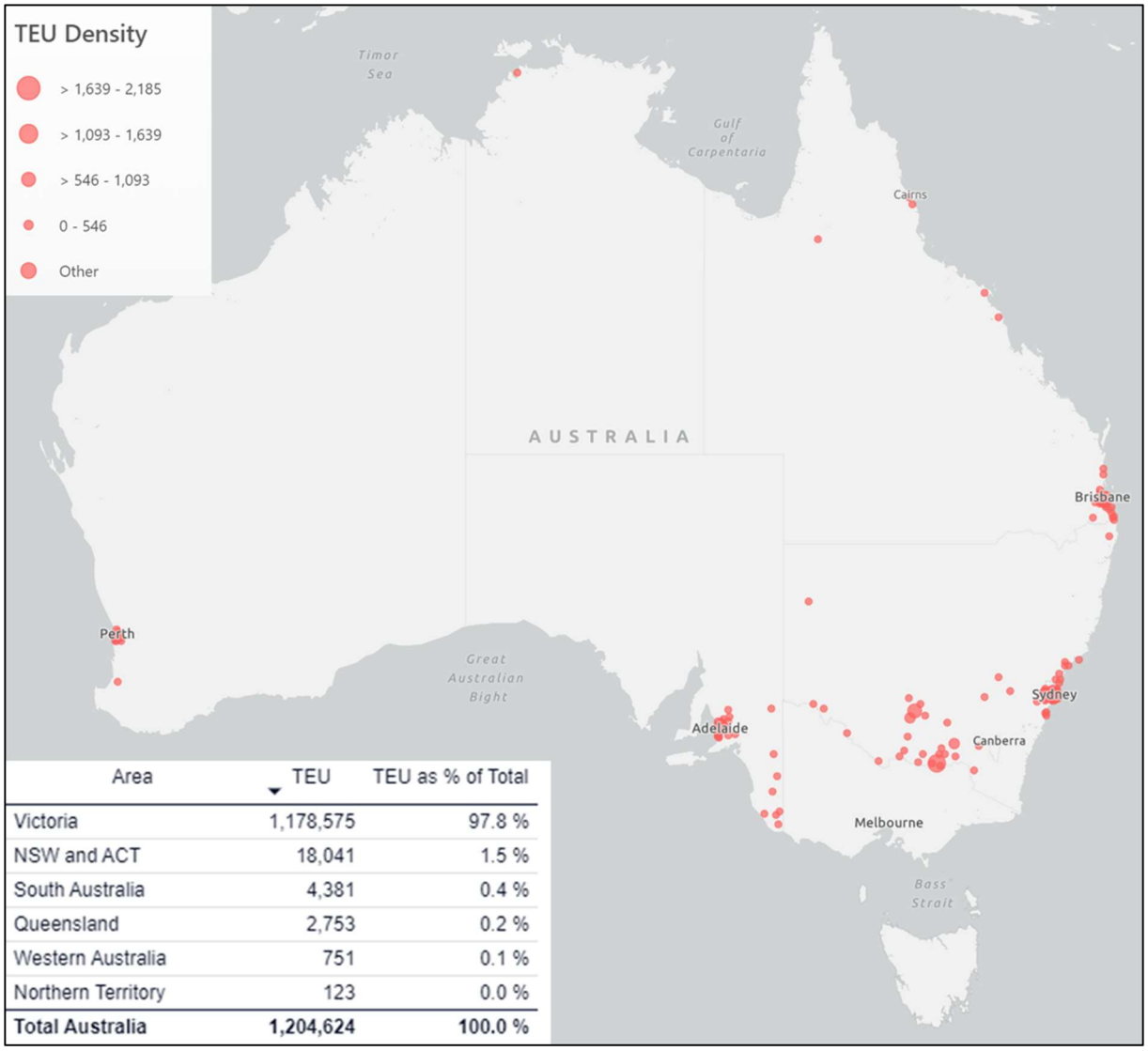
Table 16 - Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (Port of Melbourne catchment – excluding Victoria locations)

Postcode	Suburb	TEU
2640	Albury	2,185
2680	Griffith	1,203
2650	Wagga Wagga	1,001
5090	Hope Valley	988
2706	Darlington Point	642

3.12.4 Destinations – Australia

Figure 42 summarises the final interstate destinations for full international and mainland coastal containers imported through the Port of Melbourne. Of the total, 0.4% were delivered to South Australia, 1.5% to New South Wales and ACT, 0.2% to Queensland and 0.1% to Western Australia.

Figure 42 - DESTINATIONS for full international and mainland coastal IMPORT containers (Australia)



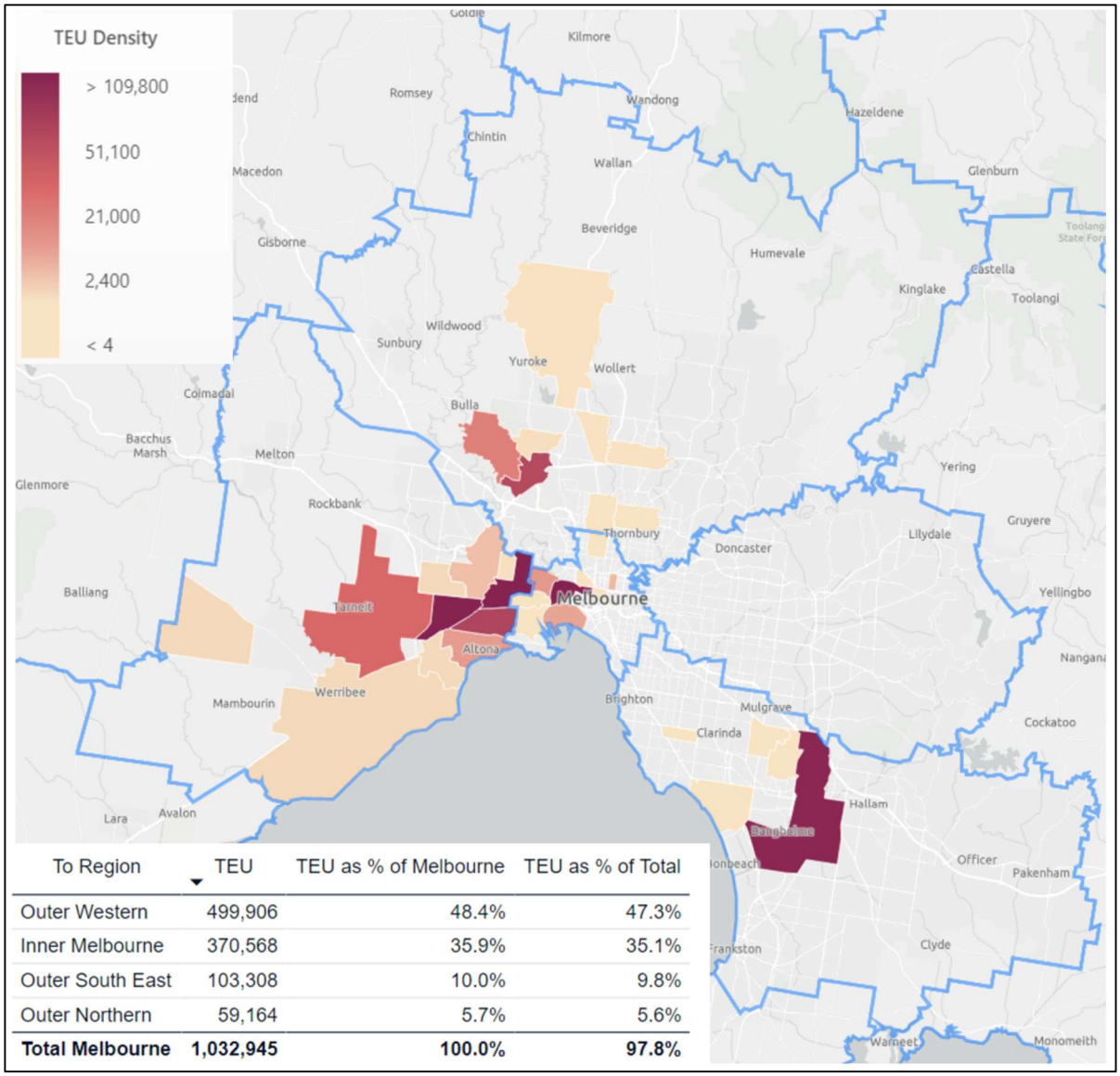
Area	TEU	TEU as % of Total
Victoria	1,178,575	97.8 %
NSW and ACT	18,041	1.5 %
South Australia	4,381	0.4 %
Queensland	2,753	0.2 %
Western Australia	751	0.1 %
Northern Territory	123	0.0 %
Total Australia	**1,204,624**	**100.0 %**

3.12.5 Transport staging depots - All imports (excludes Tasmania)

Figure 43 shows the staging locations for full international and mainland coastal import containers once they departed the Port of Melbourne. In all, 82% of full international and mainland coastal import containers (excluding Tasmania) were staged. Movements to transport operator depots were concentrated in the inner Melbourne areas adjacent to the Port of Melbourne (35.1%) and in the outer western suburbs (47.3%).

97.8% of the transport staging locations were in the metropolitan Melbourne area as shown.

Figure 43 - STAGING LOCATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)



To Region	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	499,906	48.4%	47.3%
Inner Melbourne	370,568	35.9%	35.1%
Outer South East	103,308	10.0%	9.8%
Outer Northern	59,164	5.7%	5.6%
Total Melbourne	**1,032,945**	**100.0%**	**97.8%**

Table 17 - Top 5 STAGING LOCATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3003	West Melbourne	364,834
3012	Tottenham	313,864
3026	Derrimut	109,761
3175	Dandenong South	103,283
3025	Altona North	51,091

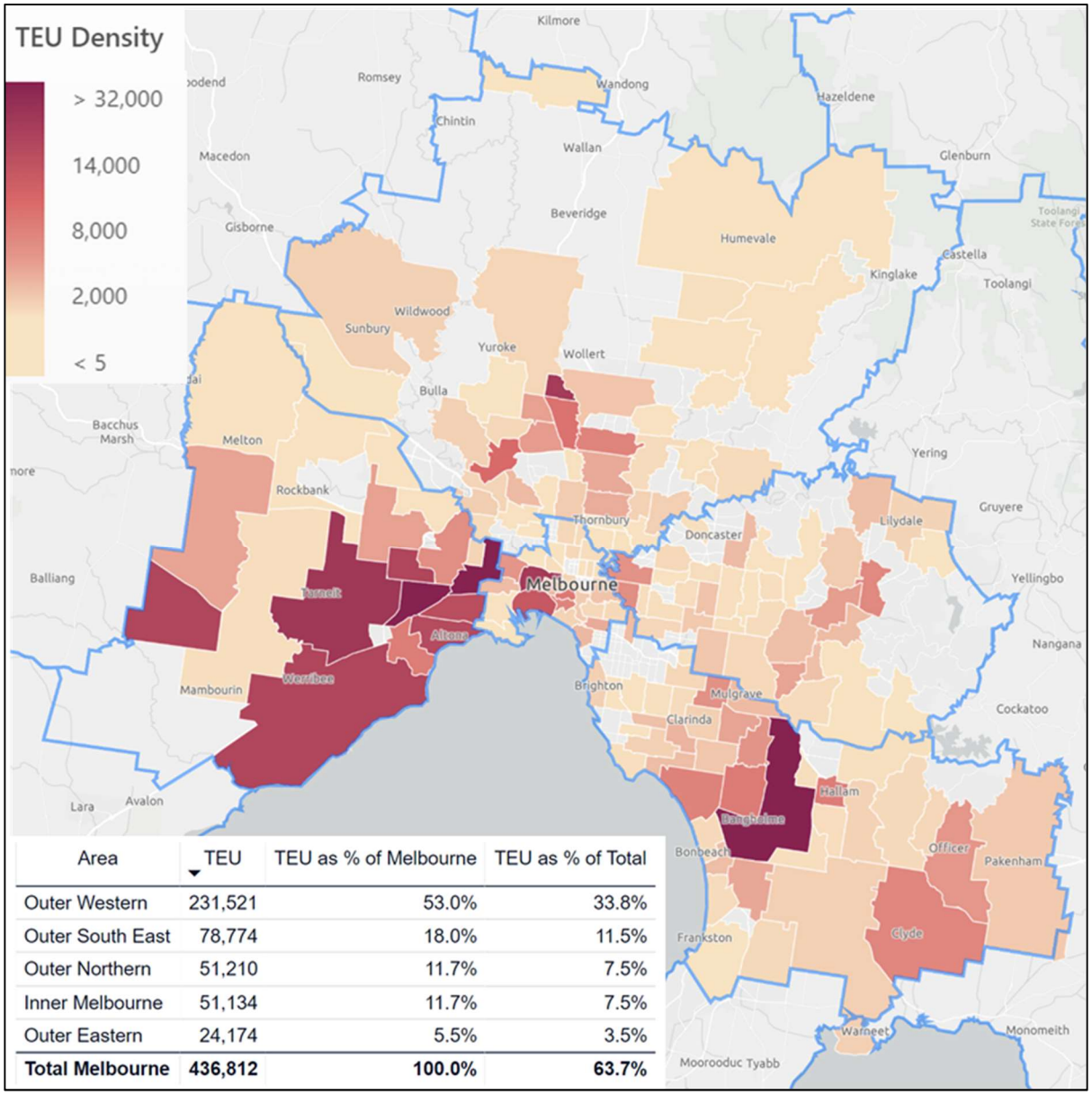
3.13 International and mainland coastal export containers

This section outlines the origins for full containers exported through the Port of Melbourne to consignees in international and mainland coastal markets. All statistics in these sections exclude sea-to-sea transhipments.

3.13.1 Origins - Melbourne

Figure 44 summarises the metropolitan Melbourne origins for full international and mainland coastal containers exported through the Port of Melbourne. Overall, metropolitan Melbourne accounted for 63.7% of all international and mainland coastal export containers, originating primarily in the Outer Western (33.8%) and Outer South East regions (11.5%).

Figure 44 – ORIGINS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	231,521	53.0%	33.8%
Outer South East	78,774	18.0%	11.5%
Outer Northern	51,210	11.7%	7.5%
Inner Melbourne	51,134	11.7%	7.5%
Outer Eastern	24,174	5.5%	3.5%
Total Melbourne	**436,812**	**100.0%**	**63.7%**

Table 18 - Top 5 ORIGINS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3012	Brooklyn	87,217
3026	Derrimut	71,574
3175	Dandenong South	35,260
3029	Truganina	20,921
3003	West Melbourne	18,989

3.13.2 Origins – Victoria

Figure 45 indicates the origins throughout regional Victoria of full international and mainland coastal containers exported through the Port of Melbourne. The largest volume of containers originated in the South Western corridor (10.5%), North Western corridor (7.8%) and Eastern corridor (3.5%). In total, 90.6% of all the international and mainland coastal export containers originated in Victoria. Metropolitan Melbourne containers are included in the Figure for completeness.

Figure 45 - ORIGINS of full international and mainland coastal EXPORT containers (Victoria)

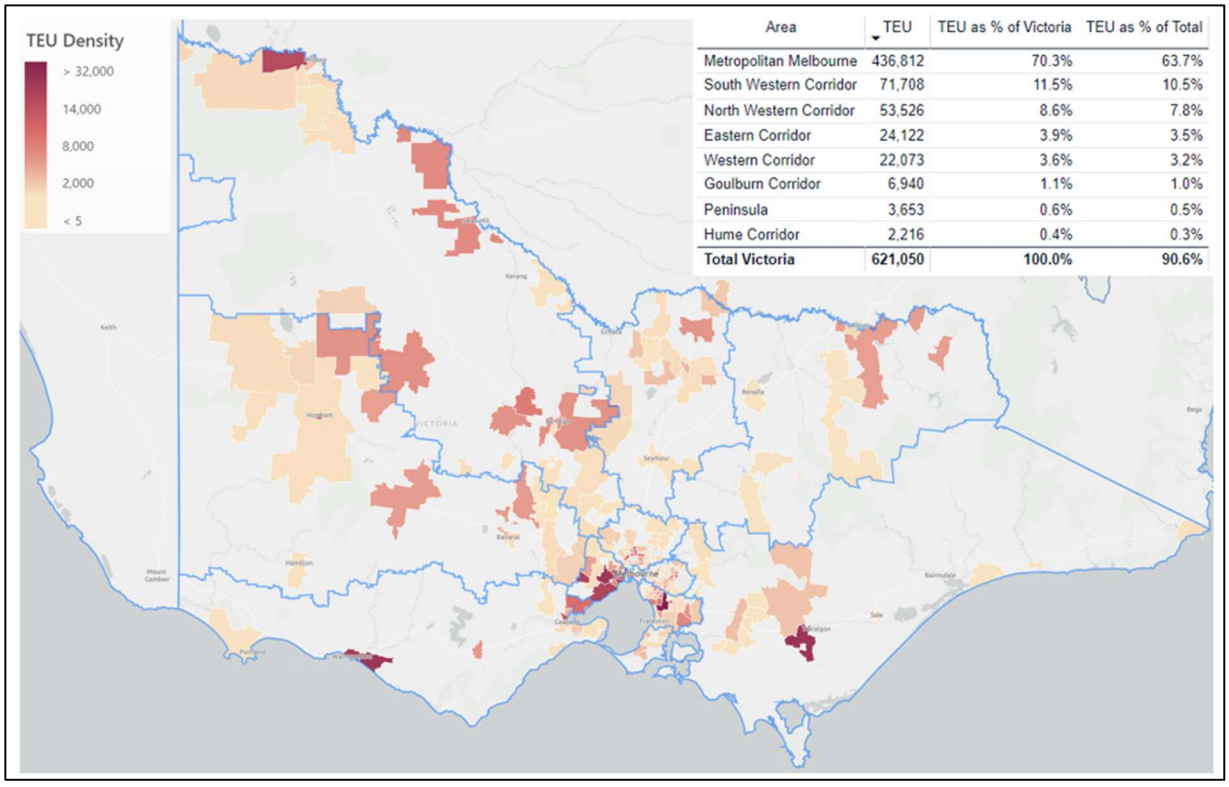


Table 19 - Top 5 ORIGINS of full international and mainland coastal EXPORT containers (Victoria) – excluding metropolitan Melbourne

Postcode	Suburb	TEU
3277/3280	Allansford/Warrnambool	38,851
3502/3505	Mildura/Merbein	30,028
3840	Morwell	21,992
3125	North Geelong	10,939
3400	Horsham	10,793

3.13.3 Origins – Port of Melbourne catchment excluding Victorian Trade

Figure 46 shows the Port of Melbourne catchment origins for full international and mainland coastal containers exported through the Port of Melbourne. Of these containers, 1.4% originated in South Australia and 4.1% originated in southern New South Wales and ACT.

Figure 46 - ORIGINS of full international and mainland coastal EXPORT containers (Port of Melbourne catchment interstate)

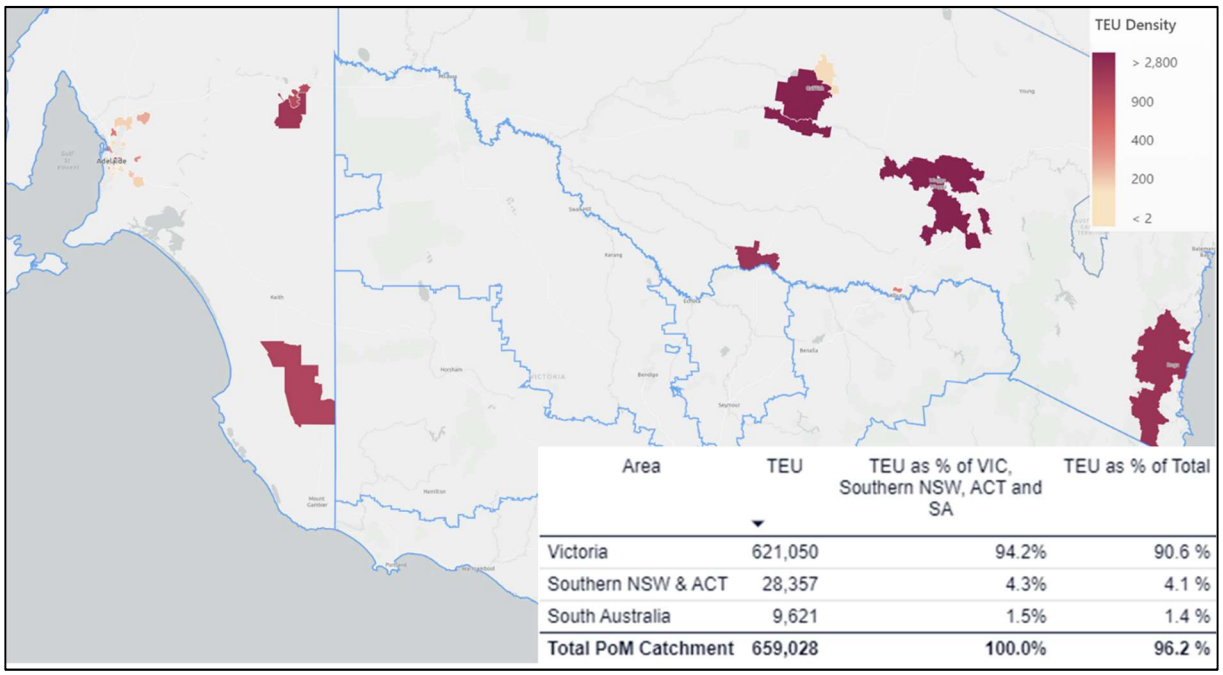


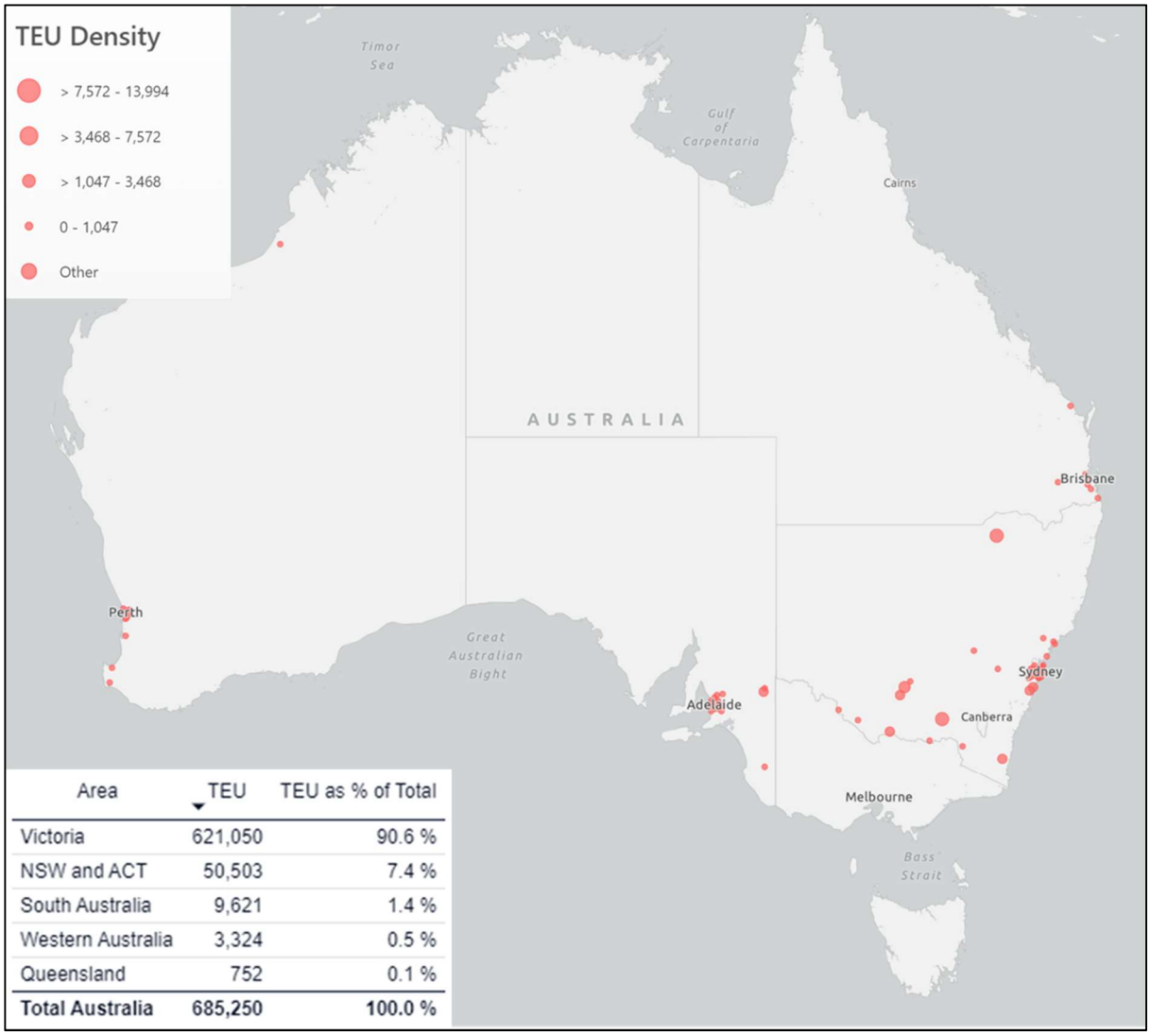
Table 20 - Top 5 ORIGINS of full international and mainland coastal EXPORT containers (Port of Melbourne catchment interstate)

Postcode	Suburb	TEU
2680	Griffith	13,994
2650	Wagga Wagga	7,572
2706	Darlington Point	2,789
2550	Yambulla	1,900
2714	Tocumwal	1,765

3.13.4 Origins – Australia

Figure 47 shows the interstate origins of full international and mainland coastal containers exported through the Port of Melbourne. The exports outside of Victoria originated in New South Wales and ACT (7.4%), South Australia (1.4%), Western Australia (0.5%) and Queensland (0.1%).

Figure 47 - ORIGINS of full international and mainland coastal EXPORT containers (Australia)



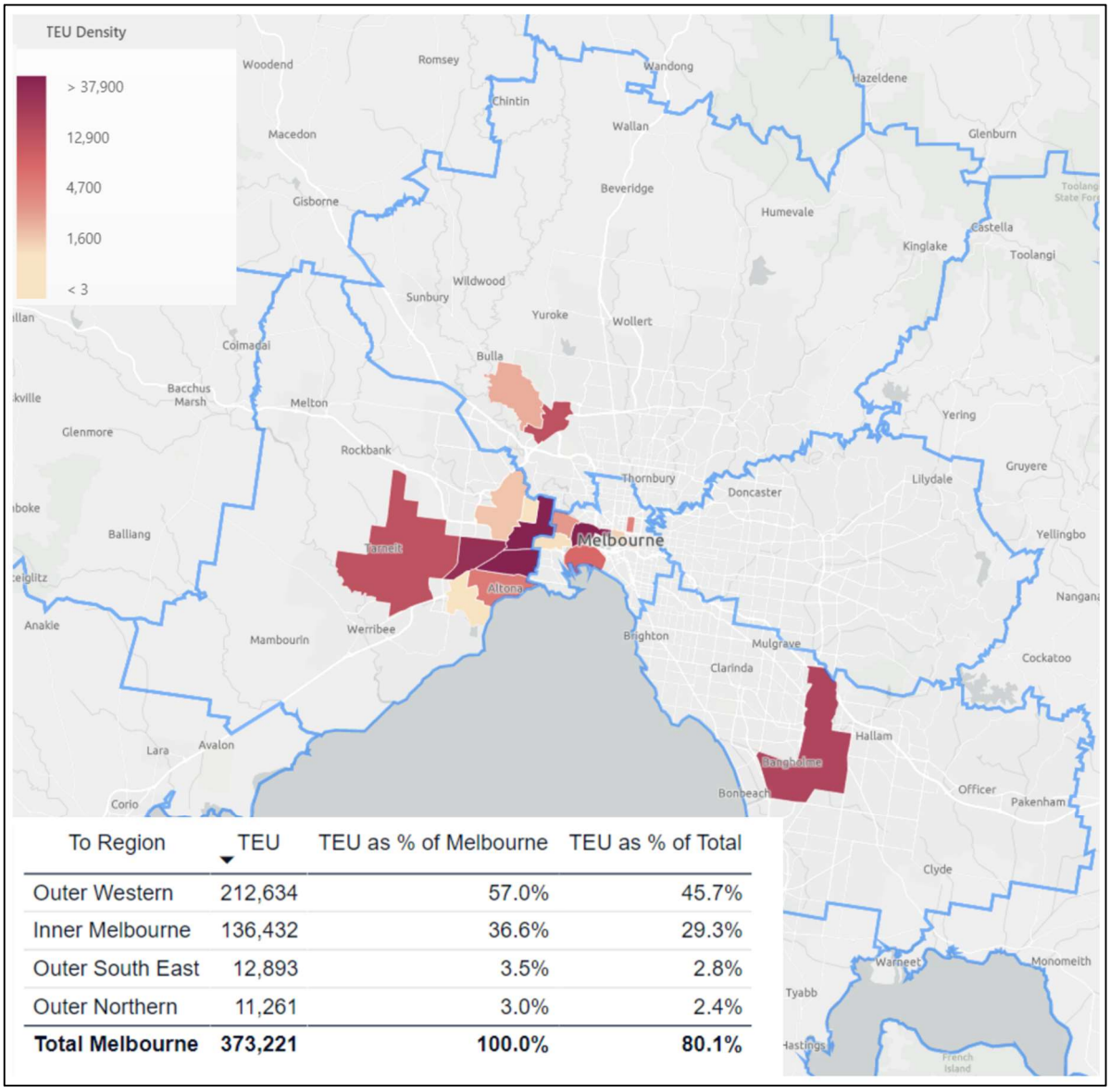
Area	TEU	TEU as % of Total
Victoria	621,050	90.6 %
NSW and ACT	50,503	7.4 %
South Australia	9,621	1.4 %
Western Australia	3,324	0.5 %
Queensland	752	0.1 %
Total Australia	**685,250**	**100.0 %**

3.13.5 Transport staging depots – exports (excludes Tasmania)

Figure 48 outlines the distribution of transport staging depots, which were used for full international containers after they were dispatched by exporters and before they reached the Port of Melbourne. In total, 57% of full export containers were staged prior to delivery to stevedores.

Staging occurred primarily in Outer Western region (45.7%), and Inner Melbourne (29.3%). This aligned with the locations of transport operator depots. In total, 80.1% of staging for full international and mainland coastal export containers occurred in metropolitan Melbourne

Figure 48 - STAGING LOCATIONS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)



To Region	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	212,634	57.0%	45.7%
Inner Melbourne	136,432	36.6%	29.3%
Outer South East	12,893	3.5%	2.8%
Outer Northern	11,261	3.0%	2.4%
Total Melbourne	**373,221**	**100.0%**	**80.1%**

Table 21 - Top 5 STAGING LOCATIONS of full international and mainland coastal EXPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3012	Brooklyn	131,855
3003	West Melbourne	126,761
3025	Altona North	37,893
3026	Derrimut	28,822
3175	Dandenong South	12,893

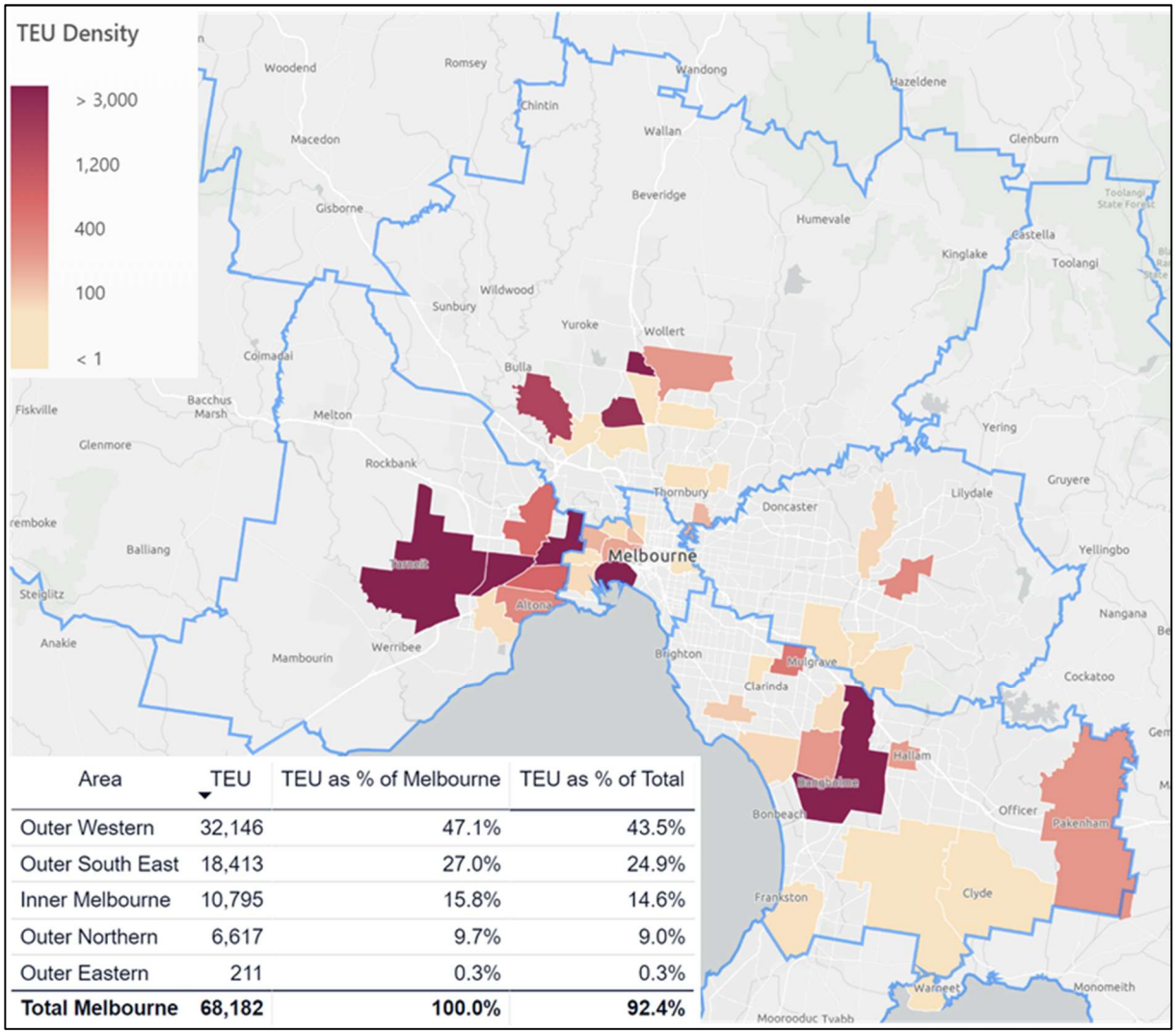
3.14 Tasmanian containerised freight transported to the mainland

This section of the report details the destinations in mainland Australia domestic markets for full containers that were imported from Tasmania through the Port of Melbourne. It should be noted that this analysis excludes Tasmanian containers transhipped through the Port of Melbourne.

3.14.1 Destinations – Melbourne

Figure 49 shows the metropolitan Melbourne destinations for full Tasmanian containers imported through the Port of Melbourne. Of the containers imported from Tasmania, 92.4% were delivered within the metropolitan area.

Figure 49 - DESTINATIONS for full Tasmanian IMPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	32,146	47.1%	43.5%
Outer South East	18,413	27.0%	24.9%
Inner Melbourne	10,795	15.8%	14.6%
Outer Northern	6,617	9.7%	9.0%
Outer Eastern	211	0.3%	0.3%
Total Melbourne	**68,182**	**100.0%**	**92.4%**

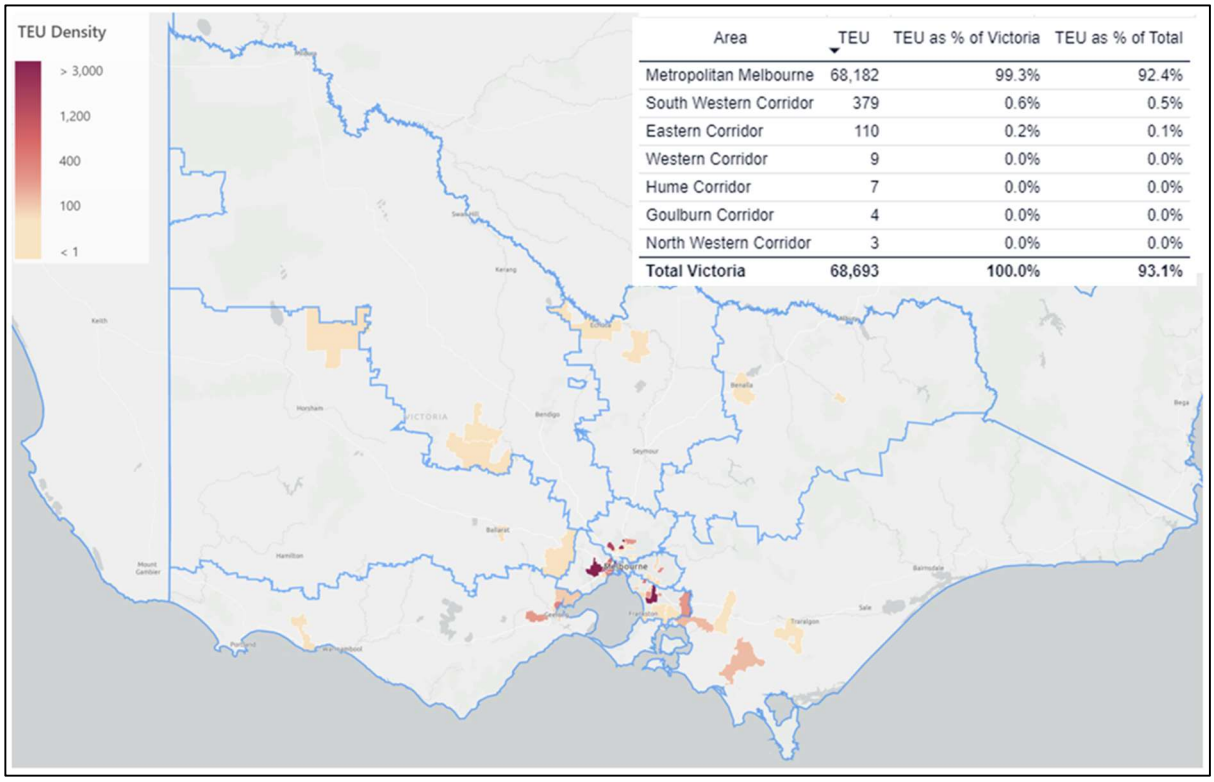
Table 22 - Top 5 DESTINATIONS for full Tasmanian IMPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3175	Dandenong South	17,739
3029	Truganina	13,858
3207	Port Melbourne	10,570
3012	Brooklyn	8,876
3026	Derrimut	8,396

3.14.2 Destinations – Victoria

Figure 50 shows the destinations in regional Victoria for full Tasmanian containers imported through the Port of Melbourne. Regional Victoria accounted for 0.6% of all destinations, with the majority located in the South Western Corridor.

Figure 50 - DESTINATIONS for full Tasmanian IMPORT containers (Victoria)

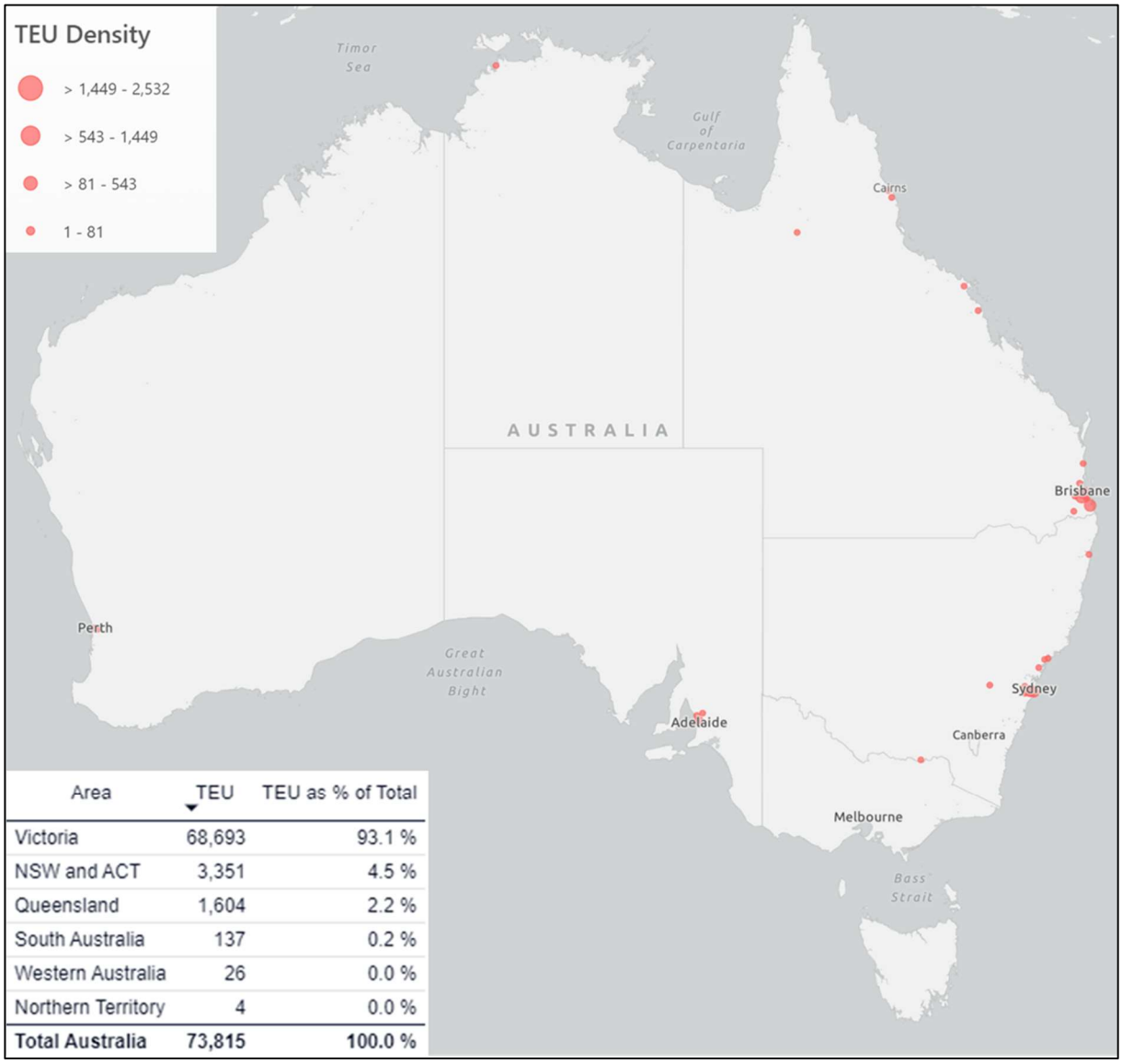


Area	TEU	TEU as % of Victoria	TEU as % of Total
Metropolitan Melbourne	68,182	99.3%	92.4%
South Western Corridor	379	0.6%	0.5%
Eastern Corridor	110	0.2%	0.1%
Western Corridor	9	0.0%	0.0%
Hume Corridor	7	0.0%	0.0%
Goulburn Corridor	4	0.0%	0.0%
North Western Corridor	3	0.0%	0.0%
Total Victoria	**68,693**	**100.0%**	**93.1%**

3.14.3 Destinations – Australia

Figure 51 shows the final interstate destinations for full Tasmanian containers imported through the Port of Melbourne. New South Wales accounted for 4.5%, and Queensland 2.2%.

Figure 51 - DESTINATIONS for full Tasmanian IMPORT containers (Australia)



Area	TEU	TEU as % of Total
Victoria	68,693	93.1 %
NSW and ACT	3,351	4.5 %
Queensland	1,604	2.2 %
South Australia	137	0.2 %
Western Australia	26	0.0 %
Northern Territory	4	0.0 %
Total Australia	**73,815**	**100.0 %**

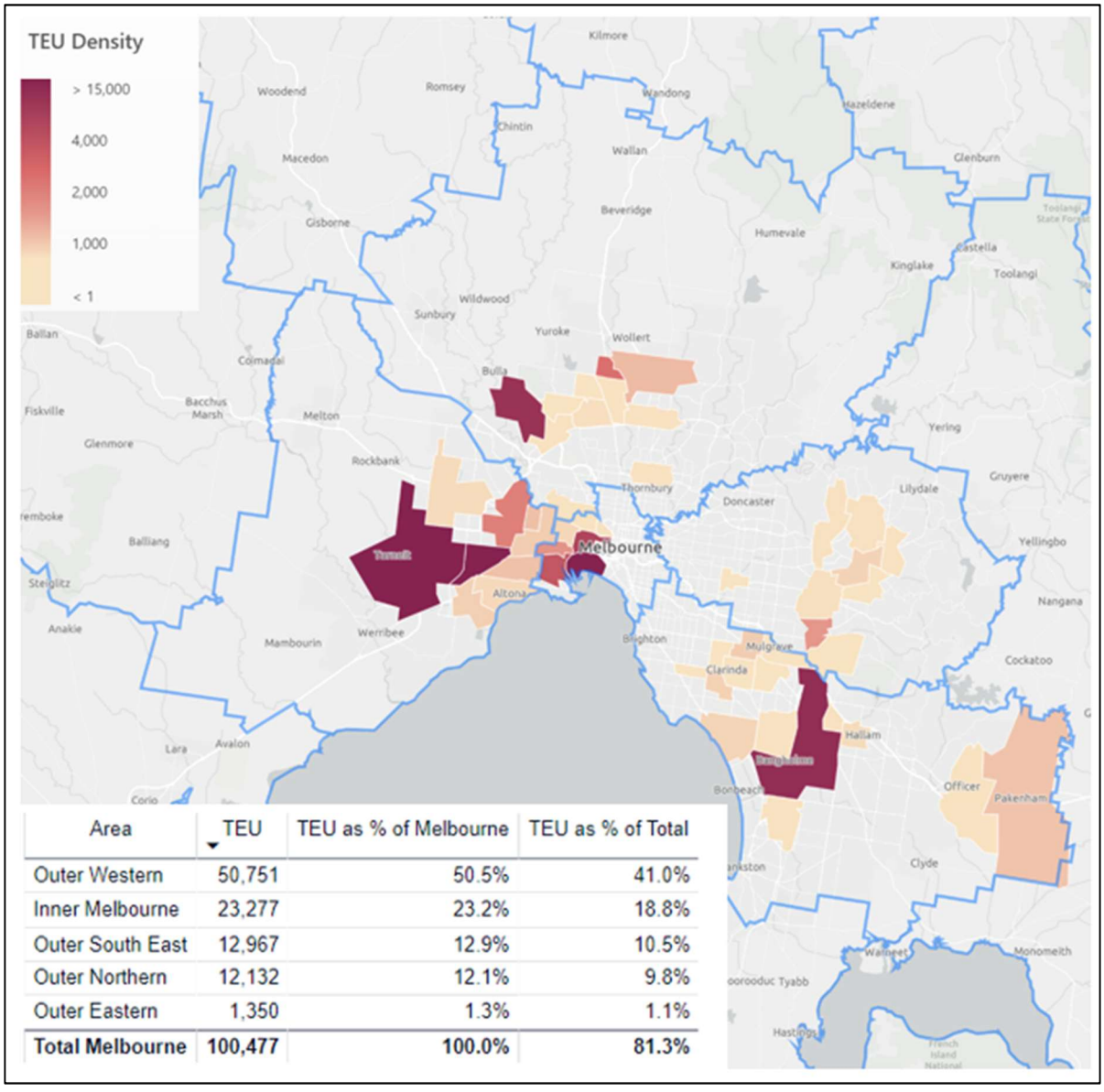
3.15 Tasmanian containerised freight transported from the mainland

This part of the report outlines the origins, from mainland Australia's domestic markets, for full containers exported through the Port of Melbourne to Tasmania. It should be noted that all plots and Tables in this section of the report exclude Tasmanian sea-to-sea transhipments.

3.15.1 Origins – Melbourne

Figure 52 shows the metropolitan Melbourne origins for full Tasmanian containers exported through the Port of Melbourne. Approximately 81.3% of containers exported to Tasmania originated from metropolitan Melbourne. The greatest proportion of these originated from Inner Melbourne (18.8%) and Outer Western (41.0%).

Figure 52 - ORIGINS of full Tasmanian EXPORT containers (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	50,751	50.5%	41.0%
Inner Melbourne	23,277	23.2%	18.8%
Outer South East	12,967	12.9%	10.5%
Outer Northern	12,132	12.1%	9.8%
Outer Eastern	1,350	1.3%	1.1%
Total Melbourne	**100,477**	**100.0%**	**81.3%**

Table 23 - Top 5 ORIGINS of full Tasmanian EXPORT containers (metropolitan Melbourne)

Postcode	Suburb	TEU
3026	Derrimut	25,626
3029	Truganina	21,908

3207	Port Melbourne	14,953
3175	Dandenong South	11,671
3045	Melbourne Airport	9,674

3.15.2 Origins – Victoria

Figure 53 shows the origins throughout regional Victoria for full Tasmanian containers exported through the Port of Melbourne. Of these containers, 7.9% originated in the South Western Corridor, 1.1% from the Western Corridor, and 1.1% from the North Western Corridor of Victoria.

Figure 53 - ORIGINS of full Tasmanian EXPORT containers (Victoria)

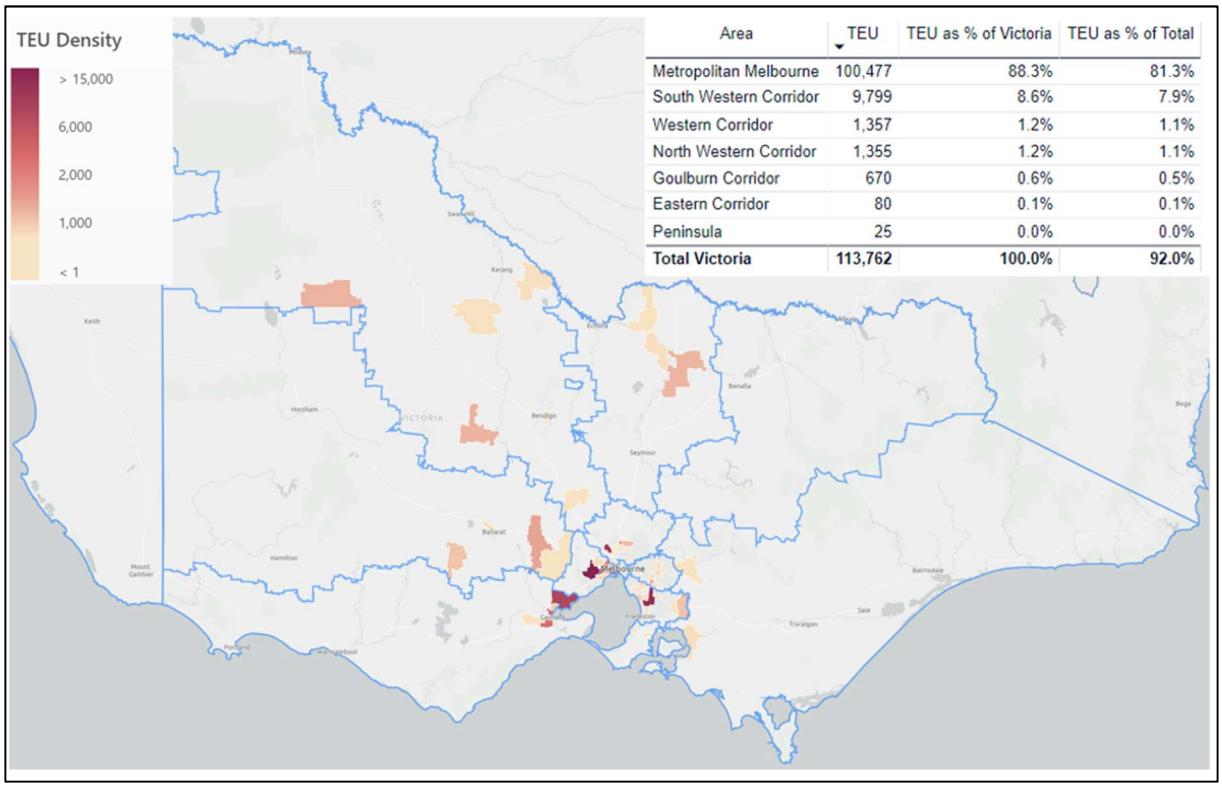


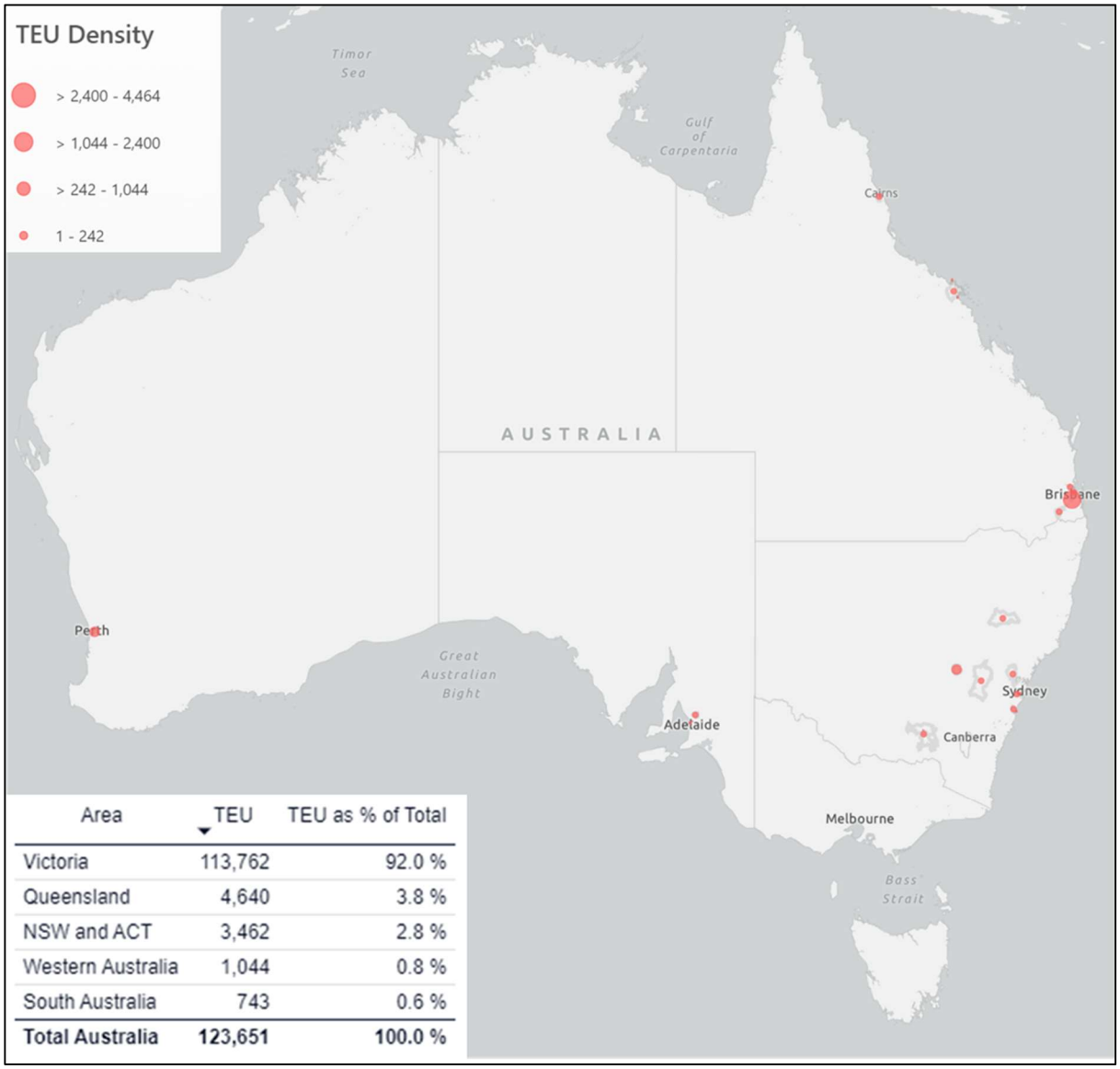
Table 24 - Top 5 ORIGINS of full Tasmanian EXPORT containers (regional Victoria)

Postcode	Suburb	TEU
3212	Lara	5,790
3216	Belmont	1,900
3215	North Geelong	1,870
3342	Ballan	842
3472	Dunolly	641

3.15.3 Origins – Australia

Figure 54 shows the interstate origins of containers exported through the Port of Melbourne to Tasmania. Containers originating outside of Victoria came from Queensland (3.8%), New South Wales (2.8%), Western Australia (0.8%), and South Australia (0.6%).

Figure 54 - ORIGINS of full Tasmanian EXPORT containers (Australia)



Area	TEU	TEU as % of Total
Victoria	113,762	92.0 %
Queensland	4,640	3.8 %
NSW and ACT	3,462	2.8 %
Western Australia	1,044	0.8 %
South Australia	743	0.6 %
Total Australia	**123,651**	**100.0 %**

3.16 Truck utilisation

This section includes analysis of the types of vehicles utilised for container transfer between nodes within the logistics chain and where data was available, the average level of vehicle utilisation (loaded TEU vs TEU capacity). Vehicle-type analysis was undertaken on data gathered from the survey participants and data from the container terminal vehicle booking system provider.

The truck types used between nodes were often not specified by data providers. However, individual truck identifiers and obtained trip data were used to determine the respective capacities and utilisations for different types of trucks used between nodes.

The data available for this section of the analysis was based on a specific sample and it should be noted where necessary was extrapolated to estimate annualised movements.

Table 25 shows the vehicle types (by capacity) used for movements associated with the Port of Melbourne container logistics chains.

This analysis considered full and empty containers, but excluded any vehicles not carrying containers. The analysis summarised TEU capacity and average loads per truck type.

Table 25 - TEU truck capacity (metropolitan Melbourne, regional Victoria and Interstate) between nodes

		Share of movements by truck capacity[2]			
From	To	1 TEU	2 TEU	3 TEU	4 TEU
Stevedore	Importer	0%	16%	65%	19%
	Depot	0%	50%	32%	17%
Depot	Importer/Exporter	1%	52%	14%	34%
	Stevedore	0%	74%	8%	18%
	Depot	0%	85%	8%	7%
	Empty Park	1%	66%	10%	22%
Exporter	Stevedore	0%	7%	66%	27%
	Depot	0%	48%	25%	27%
	Empty Park	1%	38%	33%	28%
Empty Park	Importer/Exporter	1%	50%	37%	12%
	Depot	0%	66%	9%	24%
	Stevedore	0%	18%	3%	79%
Total		0%	55%	21%	23%

As shown in the table above, a high percentage of four TEU capacity vehicles, such as super B-doubles, were used to stage containers to/from transport depots. A broad use of these vehicles is shown across the logistics chain. This is particularly evident for movements from empty parks to stevedores where bulk orders can be planned prior to vessel departures.

There is a mixed use of semi-trailers and B-Doubles between different business types in the logistics chain. However, B-Doubles are highly utilised for container movements between importer/exporter locations and stevedores.

[2] This table shows the % of movements between business types which are carried-out by a truck configuration capable of moving one, two, three or four TEU.

The annualised truck movement data for vehicles entering the stevedore terminals for container exchange provided a detailed picture of truck use in and out of the port terminals. In Table 26, the annual truck visits to port terminals is indicated by vehicle type, TEU exchanged, capacity and vehicle utilisation.

Table 26 - Annual truck visits to port terminals with utilisation by vehicle type (extrapolated from sample period data)

Truck Type	Truck Visits	Truck Movements	TEU Exchanged	Maximum Capacity	TEU Exchanged per truck movement
Semi Trailer	422,625	845,250	851,012	1,690,500	1.01
Super B-Double	393,269	786,538	1,373,253	3,146,153	1.75
B-Double	116,048	232,096	333,574	696,288	1.44
A-Double	44,555	89,110	183,733	356,441	2.06
Other	115,143	230,286	217,165	472,384	0.94
Total/Average	**1,091,641**	**2,183,282**	**2,958,737**	**6,361,766**	**1.36**

3.17 Lengths of container journeys

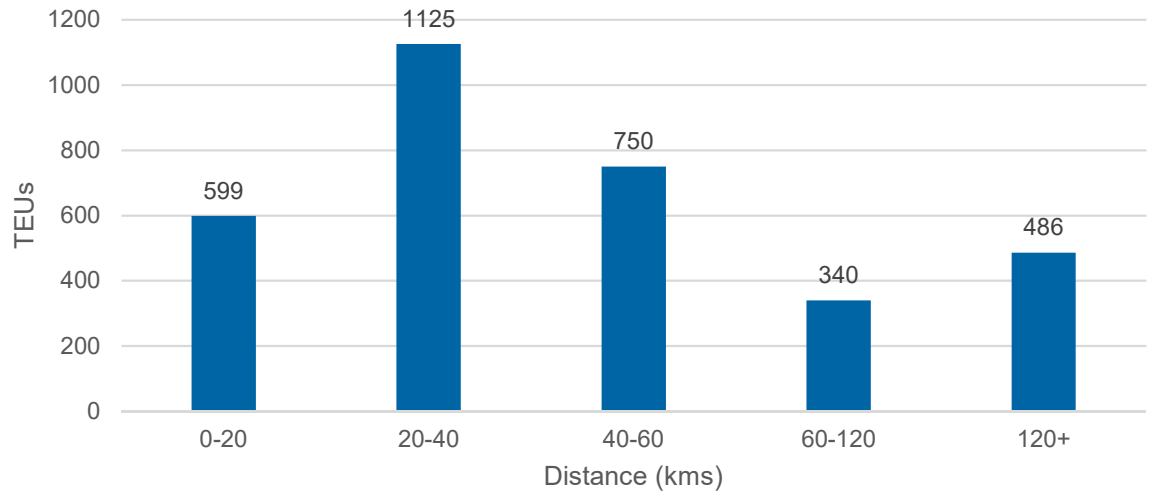
This section of the report provides an overview of the analysis for landside journey lengths for both import and export containers to and from the Port of Melbourne. The following outlines the typical origins and destinations for various distance ranges from the Port of Melbourne.

- Less than 50 kilometres, metropolitan Melbourne
- 50-200 kilometres, within Melbourne outskirts or regional Victoria
- 200-600 kilometres, regional Victoria or New South Wales (including Griffith)
- 600-800 kilometres, South Australia
- 800-2,500 kilometres, New South Wales or Queensland
- Greater than 2,500 kilometres, Northern Territory and Western Australia.

3.17.1 Road only – Import

Figure 55 shows the volume of full international and mainland coastal import containers and the length of their road-based journey on an average day in CY2019 (3,300 full containers (TEU)). The length of the journey is the estimated distance between the Port of Melbourne and the final destination (the importer) and includes travel between the Port of Melbourne and the transport depot, depot to importer. Figure 55 shows that trucks transporting 74% of full import containers traveled a total distance of less than 60 kilometers to deliver the containers to the importers.

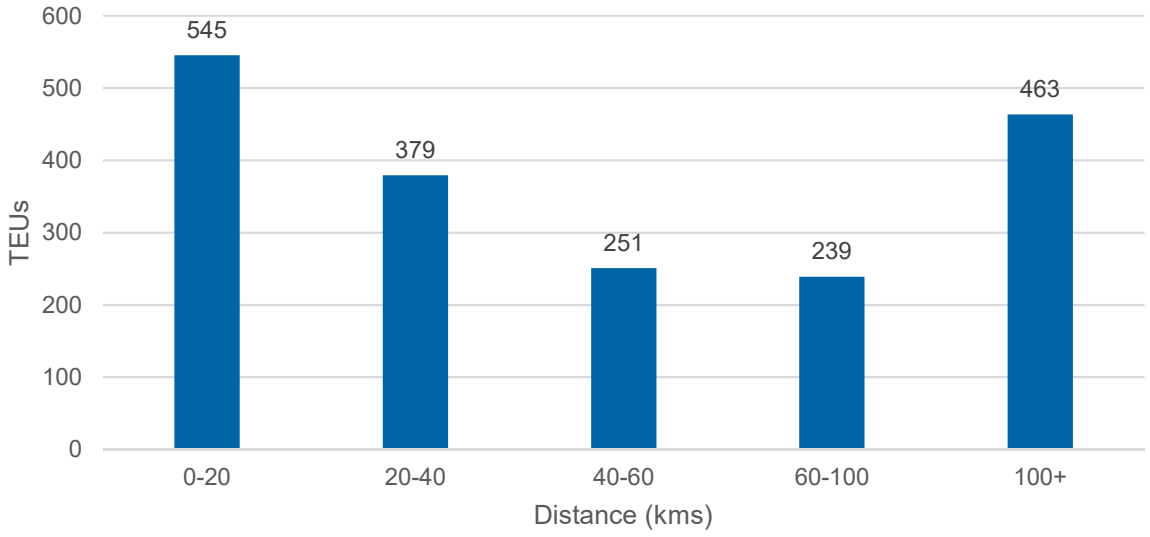
Figure 55 – Full international and mainland coastal IMPORT container distances travelled (road only)



3.17.2 Road only – Export

Figure 56 shows the volume of full international and mainland coastal export containers and the length of their road-based journeys for an average day in CY2019 (1,877 full containers (TEU)). Figure 56 shows that trucks transporting 63% of full export containers traveled a total distance of less than 60 kilometers to deliver the containers to the Port of Melbourne. Travel distances are inclusive of travel to and from transport depots.

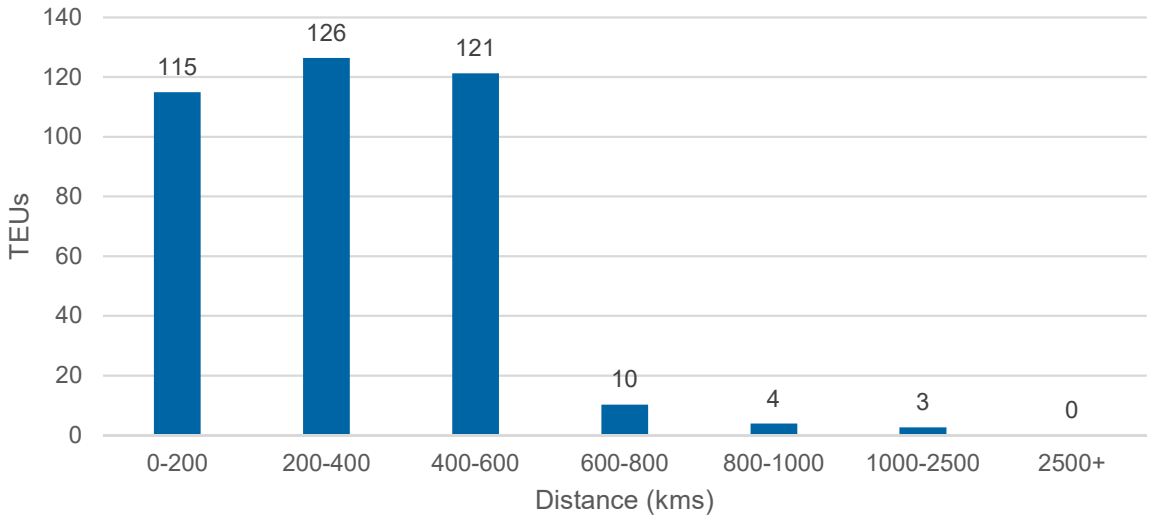
Figure 56 - Full international and mainland coastal EXPORT container distances travelled (road only)



3.17.3 Road and rail – Export

Figure 57 shows the volume of export containers and the length of their combined road and rail-based journeys for an average day in CY2019 (379 full containers (TEU)) and shows that only 4.5% of full export containers travelled in excess of 600 kilometres to move to the Port of Melbourne when a rail leg was involved.

Figure 57 - Full International and Mainland Coastal EXPORT container distances travelled (road and rail)



3.18 Elapsed times

The following section analyses the duration or elapsed time associated with each major node of the container logistics chains associated with the Port of Melbourne. The average daily totals have been calculated using the annualized container movements for each respective node as stated in section 0.

3.18.1 Transport depot

Figure 58 shows the distribution of elapsed times based on an average daily total of 2,882 full import containers (TEU) spent at transport depots before being transported to importers and On-Port or Dynon rail terminals. Of these, approximately 40% were staged for less than 12 hours, while 57.5% were staged for less than 24 hours. The average elapsed time for full import containers at road transport depots was 46.2 hours (1.9 days).

Figure 58 - Elapsed time for full IMPORT containers at road transport depots

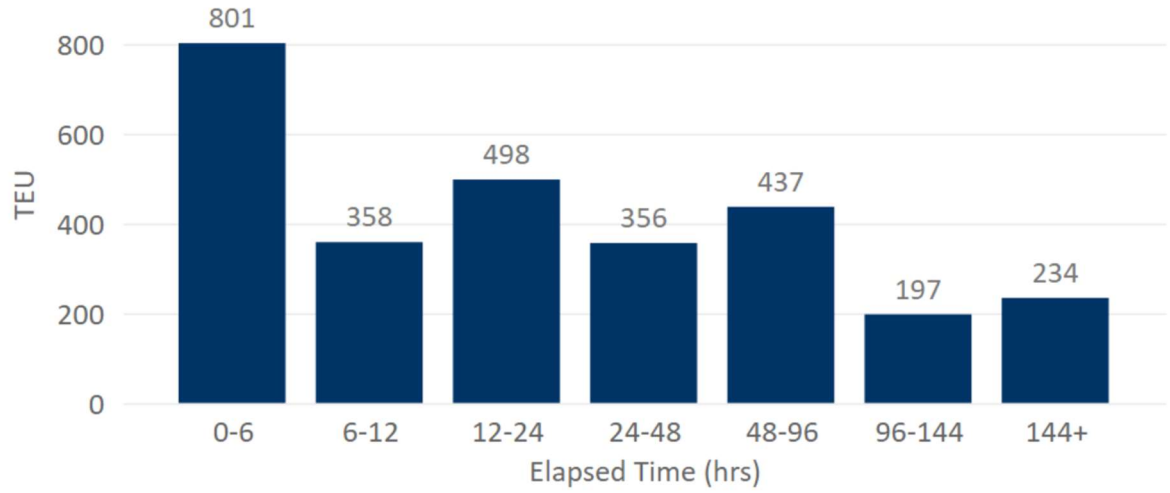
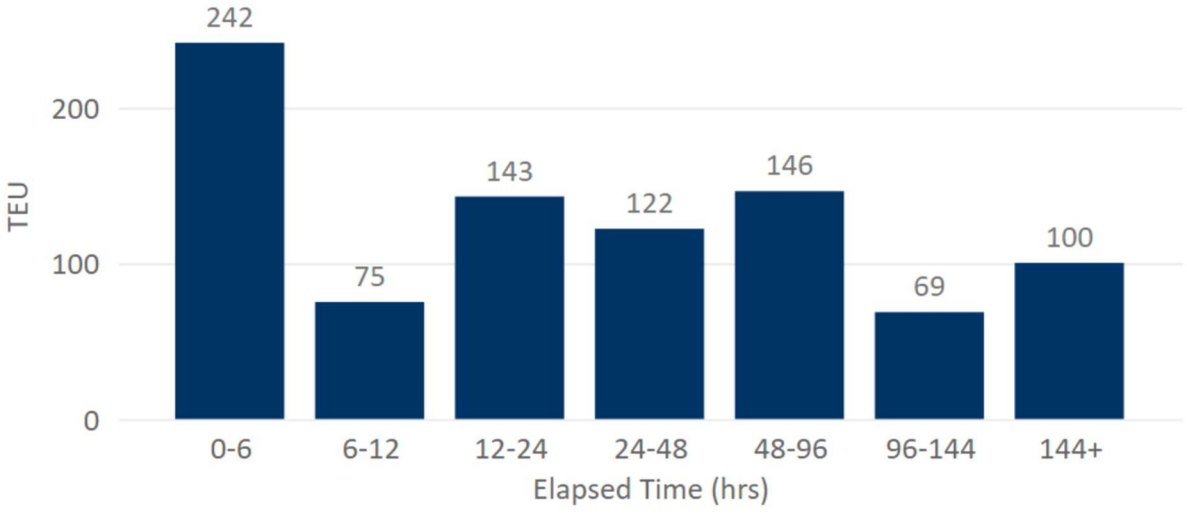


Figure 59 shows the distribution of elapsed times based on an average daily total of 897 full export containers (TEU) staged at transport depots prior to being transported to stevedores. The profile has been determined based on the elapsed time for containers during the sample period. From this data, 51% of were staged for less than 24 hours, and the average stay for full export containers at road transport depots was 2.2 days (the average stay is impacted by the extended periods of elapsed time where containers dwell in excess of 24 hours).

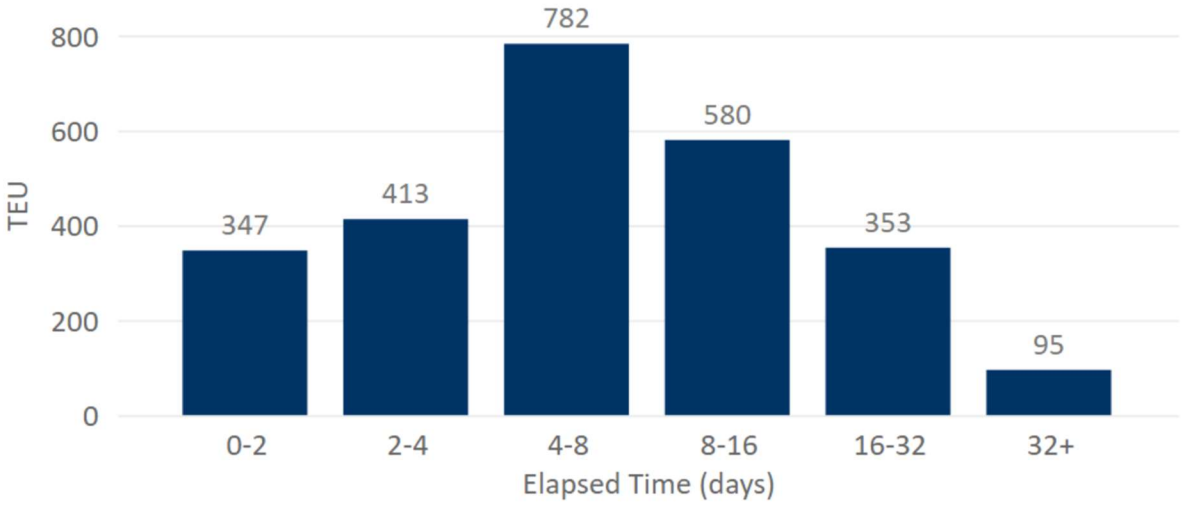
Figure 59 - Elapsed time for full EXPORT containers at road transport depots



3.18.2 Empty container parks

Figure 60 shows the distribution of elapsed times empty containers spend at empty container parks, based on a daily average of 2,562 empty containers (TEU). This estimation was based on the elapsed time for containers that departed empty container parks during the sample period. Of these, 30% of containers departed a container park within 4 days of arriving.

Figure 60 - Elapsed time for EMPTY containers at the empty container parks



This data indicates that the average stay for each container at an empty container park was 7 days. However, stakeholder consultation indicated that this figure varies considerably between different parks.

3.19 Times of day

This part of the report presents the analysis of the arrivals and departures of containers at various times of day for Monday to Friday (weekdays) and Saturday and Sunday (the weekend). The average daily totals have been calculated using the annualised container movements for each respective node as stated in section 0.

3.19.1 Stevedores – International and mainland coastal containers

Figure 61 shows the time of day profile for road only import containers departing the Port of Melbourne stevedores. This was for an average Monday to Friday for 4,180 full containers (TEU) and an average Saturday and Sunday for 1,140 full containers (TEU). This sample was based on information collected by the stevedore truck booking system.

Monday to Friday departures showed increasing volumes through the early morning peaking between 7:00 am and 8:00 am. Weekday volumes fluctuated as the day progressed, decreasing slightly through to midnight. The pattern of departures for weekends showed a similar morning trend with volumes peaking between 7:00 am and 8:00 am. Hourly weekend departures then decreased through the day before an evening peak between 6:00 pm and 7:00 pm.

For the Monday to Friday period, 57% of containers departed between 6:00 am and 6:00 pm, while on weekends 62% of containers departed between 6:00 am and 6:00 pm.

Figure 61 - Departure time of day for full IMPORT containers from Port of Melbourne stevedores

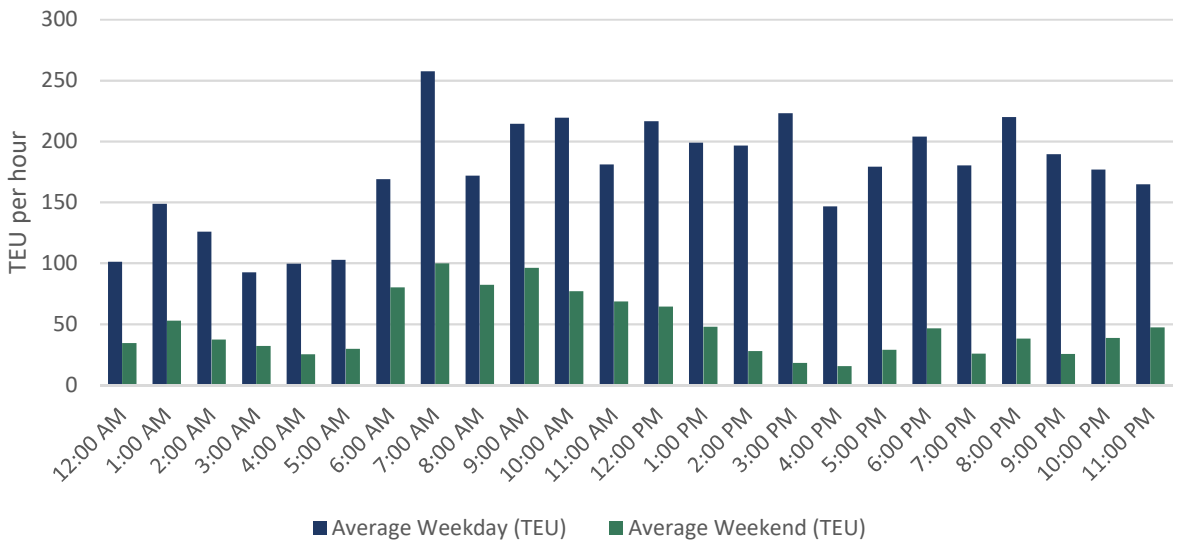
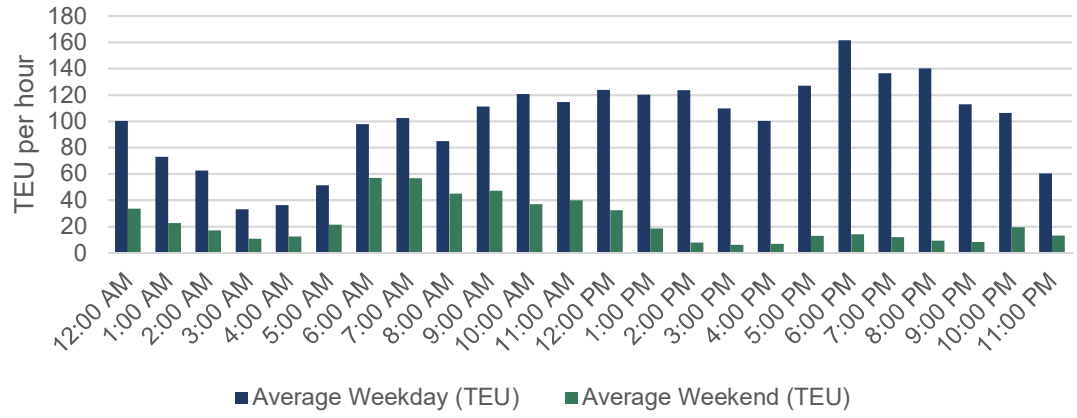


Figure 62 shows the time of day profile for road only export container arrivals at Port of Melbourne stevedores. This sample was based on an average Monday to Friday movement of 2,410 full containers (TEU) and an average Saturday and Sunday for 560 full containers (TEU). This sample was based on information collected by the stevedore truck booking system.

Monday to Friday arrivals showed lower than average hourly volumes from midnight to 6:00 am before escalating. Weekday arrivals remained consistently higher thereafter peaking in the evening between 6:00 pm and 7:00 pm. Weekend arrivals showed a similar morning pattern through to 6:00 am; however, volumes then gradually declined until 3:00 pm before remaining relatively flat thereafter.

For the Monday to Friday period, 55% of containers arrived between 6:00 am and 6:00 pm, while on weekends 65% of containers arrived between 6:00 am and 6:00 pm.

Figure 62 - Arrival time of day for full EXPORT containers at Port of Melbourne stevedores



3.19.2 Transport depots

Figure 63 shows the arrival times at transport depots for an average Monday to Friday (4,990 full containers (TEU)), and an average Saturday and Sunday (810 full containers (TEU)).

Monday to Friday arrivals showed relatively consistent volumes from 7:00 am to 4:00 pm, which represents 62% of all arrivals. The data suggests a morning peak occurs between 10:00 am and 11:00 am and an afternoon peak between 1:00 pm and 2:00 pm. Weekend arrivals showed a similar trend for peak periods; however, these periods began and finished earlier with the peak period occurring between 6:00 am and 2:00 pm. Arrivals within this peak period represented 51% of the total weekend arrival volume at transport depots.

On Monday to Friday, 74% of containers arrived between 6:00 am and 6:00 pm, while on weekends 60% of containers arrived between 6:00 am and 6:00 pm.

Figure 63 - Arrival time of day for full containers to transport depots

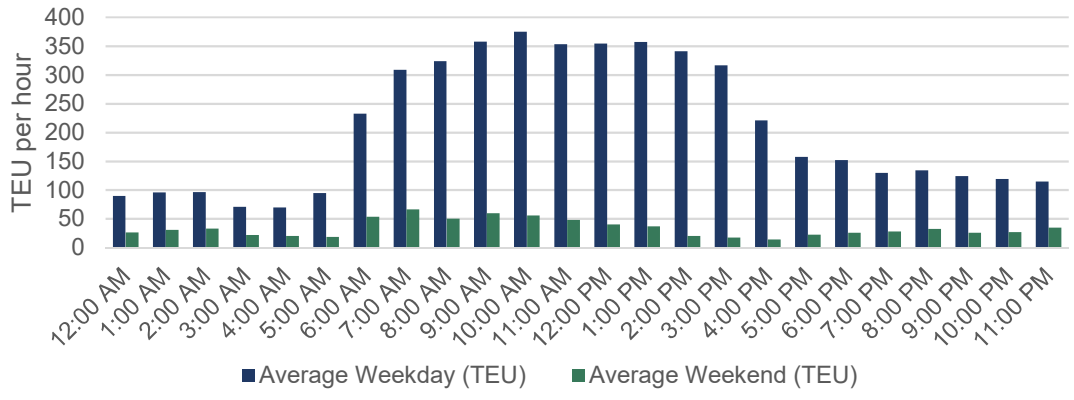
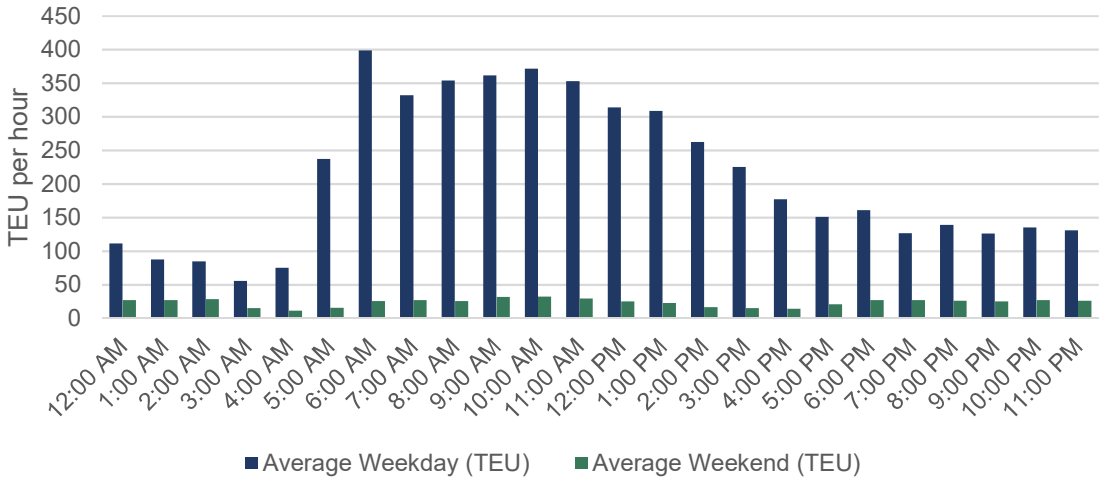


Figure 64 shows the departure times at transport depots for an average Monday to Friday (5,080 full containers (TEU)), and an average Saturday and Sunday (570 full containers (TEU)).

Monday to Friday departures showed a peak period between 6:00 am to 2:00 pm (55% of total volume) before tapering into the evening. Weekend departures fluctuated throughout the day.

On Monday to Friday, 71% of containers departed between 6:00 am and 6:00 pm, while on weekends 50% of containers departed between 6:00 am and 6:00 pm.

Figure 64 - Departure time of day for full containers from transport depots



3.19.3 Importers/exporters

Figure 65 shows the time of day profile for empty container arrivals to exporters for a daily average Monday to Friday (2,610 empty containers (TEU)) and an average Saturday to Sunday (1,300 empty containers (TEU)).

Monday to Friday empty arrivals increased gradually from midnight through to 1:00 pm before easing into the evening, albeit a spike between 9:00 pm and 11:00 pm. A midday peak occurred between 10:00 am and 1:00 pm and an afternoon peak between 3:00 pm and 4:00 pm. For weekend arrivals, the data suggests higher than average volumes occurred in the early hours of the morning between 12:00 am and 4:00 am before softening and remaining relatively consistent from 4:00 am through to 5:00 pm before an evening peak between 5:00 and 6:00 pm.

On Monday to Friday 68% of containers arrived between 6:00 am and 6:00 pm, while on weekends 53% of containers arrived between 6:00 am and 6:00 pm.

Figure 65 - Arrival time of day for empty containers to exporters

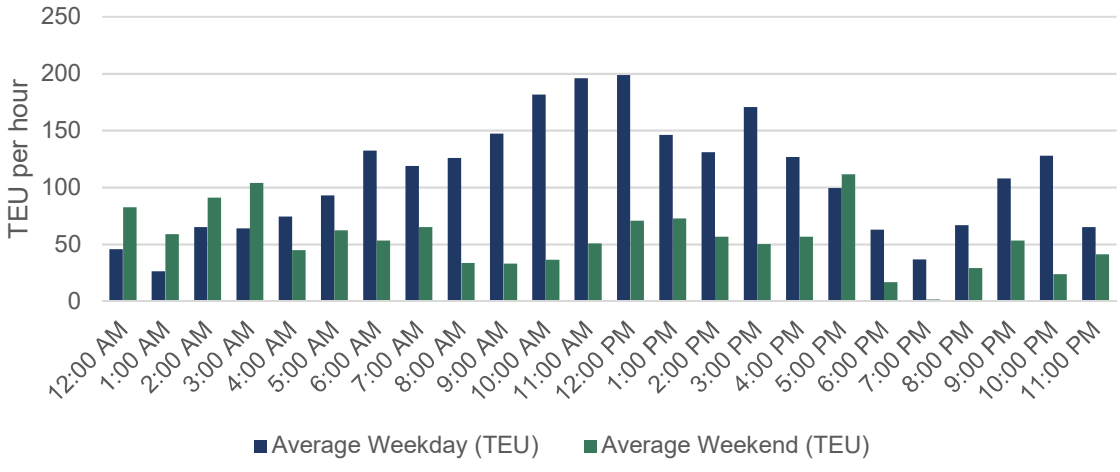


Figure 66 shows the time of day profile for full container arrivals to importers for a daily average Monday to Friday (4,650 full containers (TEU)) and an average Saturday to Sunday (700 full containers (TEU)).

Monday to Friday arrivals showed higher than average volumes between 6:00 am and 4:00 pm (66% of total volume), remaining relatively flat outside of these period withstanding an evening peak between 8:00 pm and 10:00 pm. Weekend arrivals showed a morning peak between 6:00 am and 8:00 am before a relatively consistent decline through to 4:00 pm before a slight uplift through to midnight.

On Monday to Friday 71% of containers arrived between 6:00 am and 6:00 pm, while on weekends 57% of containers arrived between 6:00 am and 6:00 pm.

Figure 66 - Arrival time of day for full containers to importers

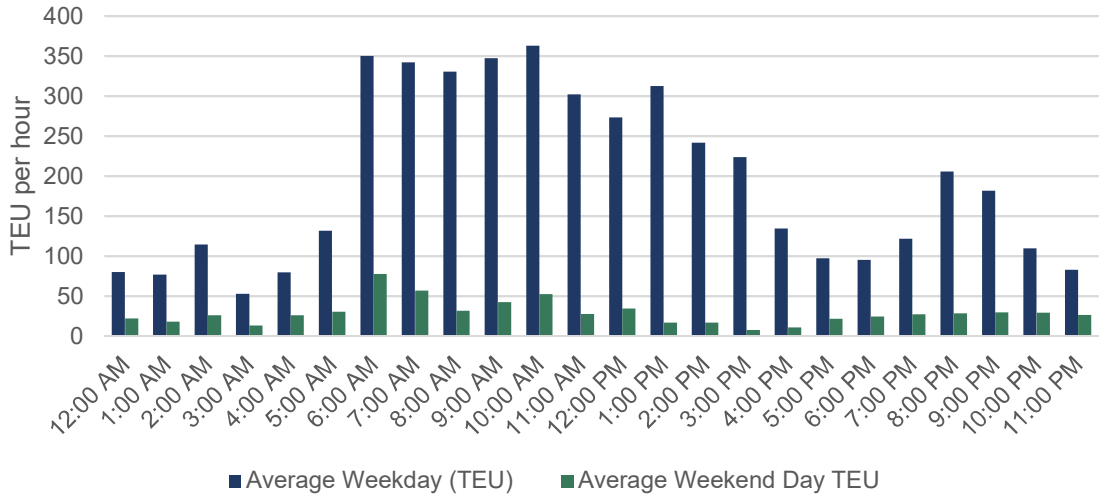


Figure 67 shows the time of day profile for empty container departing from importers for a weekly average Monday to Friday (4,860 empty containers (TEU)) and an average Saturday to Sunday (150 empty containers (TEU)).

Most empty containers departing importers on weekdays occurred between 6:00 am and 4:00 pm (86% of total volume). Outside of these periods, there is a consistently low volume of departures at each hourly interval.

On Monday to Friday, 92% of containers departed between 6:00 am and 6:00 pm, while on weekends 67% of containers departed between 6:00 am and 6:00 pm.

Figure 67 – Departure time of day for empty containers from importers.

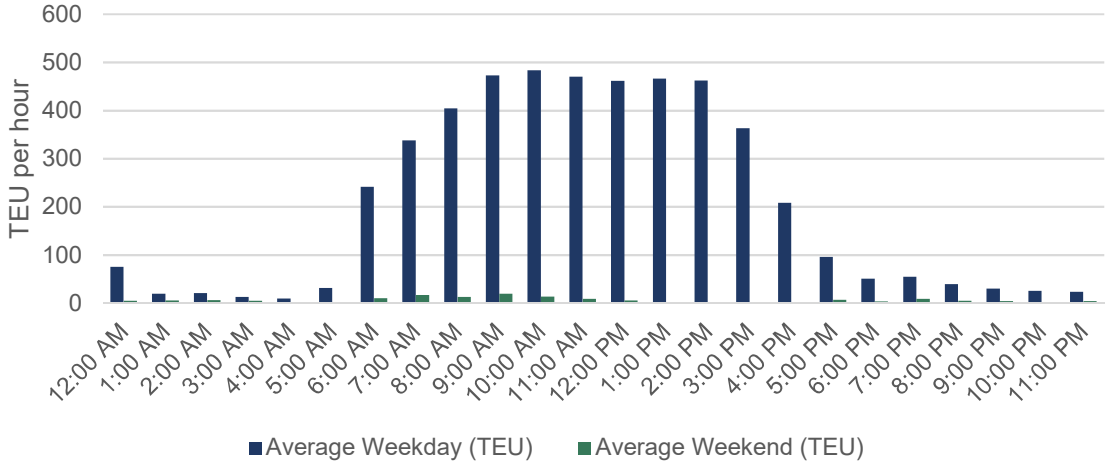
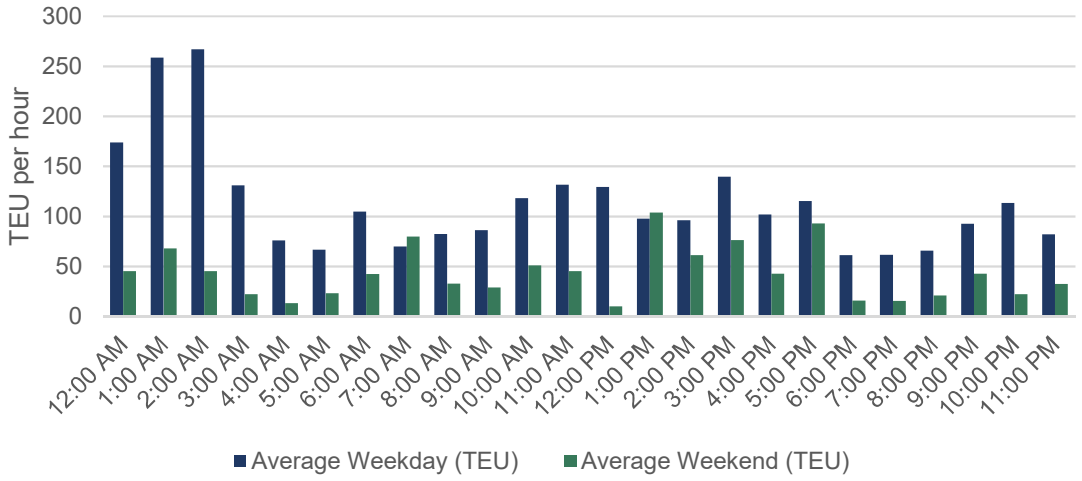


Figure 68 shows the time of day profile for full container departing from exporters for a weekly average Monday to Friday (2,720 full containers (TEU)) and an average Saturday to Sunday (1,030 full containers (TEU)).

On weekdays, departure of full containers from exporters appeared to be highest between midnight and 4:00 am and fluctuates across the day peaking between 10:00 and 6:00 pm. Weekend departures showed a morning peak between 7:00 and 8:00 am and higher than average volumes in the afternoon between 1:00 pm and 6:00 pm.

On Monday to Friday 47% of containers departed between 6:00 am and 6:00 pm, while on weekends 65% of containers departed between 6:00 am and 6:00 pm.

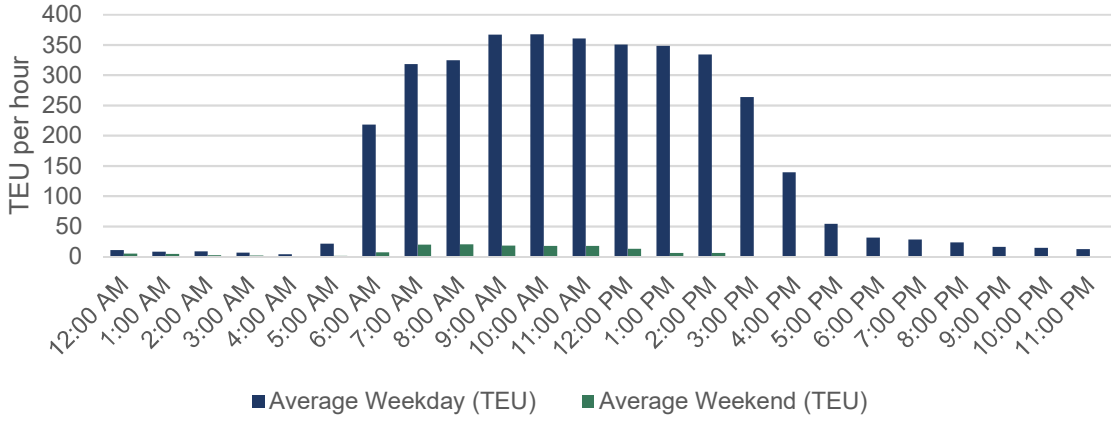
Figure 68 - Departure time of day for full containers from exporters



3.19.4 Empty container parks

Figure 69 shows the time of day profile for container arrivals at empty container parks for a daily average Monday to Friday 3,630 empty containers (TEU)) and an average Saturday to Sunday (140 empty containers (TEU)).

Figure 69 - Arrival time of day to empty container parks

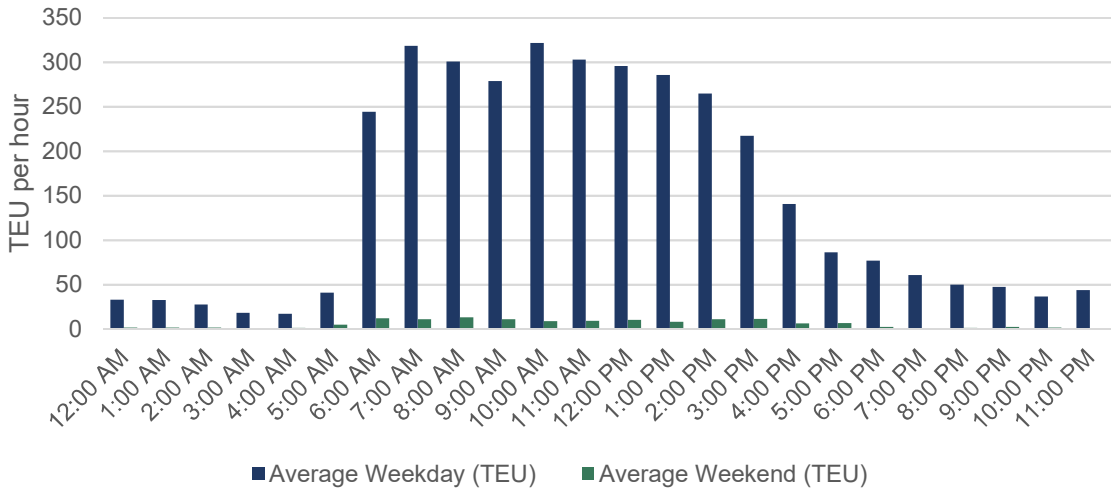


On Monday to Friday, 94.9% of containers arrived between 6:00 am and 6:00 pm, while on weekends 89.3% of containers arrived between 6:00 am and 3:00 pm. These times were indicative of empty container park operating hours with some larger parks open for longer periods.

Container arrivals at empty container parks spiked at 6:00 am, gradually increasing to a peak at 11:00 am. Volumes remained consistently high until 4:00 pm before easing to lower levels at 6:00 pm onwards. The data suggests that weekday volumes fluctuated between 7:00 am and 1:00 pm.

Figure 70 shows the time of day profile for container departures from empty container parks for a daily average Monday to Friday (3,540 empty containers (TEU)) and an average Saturday to Sunday (140 empty containers (TEU)).

Figure 70 - Departure time of day from empty container parks



On Monday to Friday, 86.3% of containers departed between 6:00 am and 6:00 pm, while on weekends 85.3% of containers departed between 6:00 am and 6:00 pm. Weekday departure volumes showed a similar trend to arrivals, with a spike at 6:00 am, increasing to a peak at 11:00 am. Container departures remained at higher levels until 4:00 pm and then tapered off gradually toward midnight. A significantly lower number of containers departed ECP's on weekends, with weekday volumes fluctuating between 6:00 am and 3:00 pm.

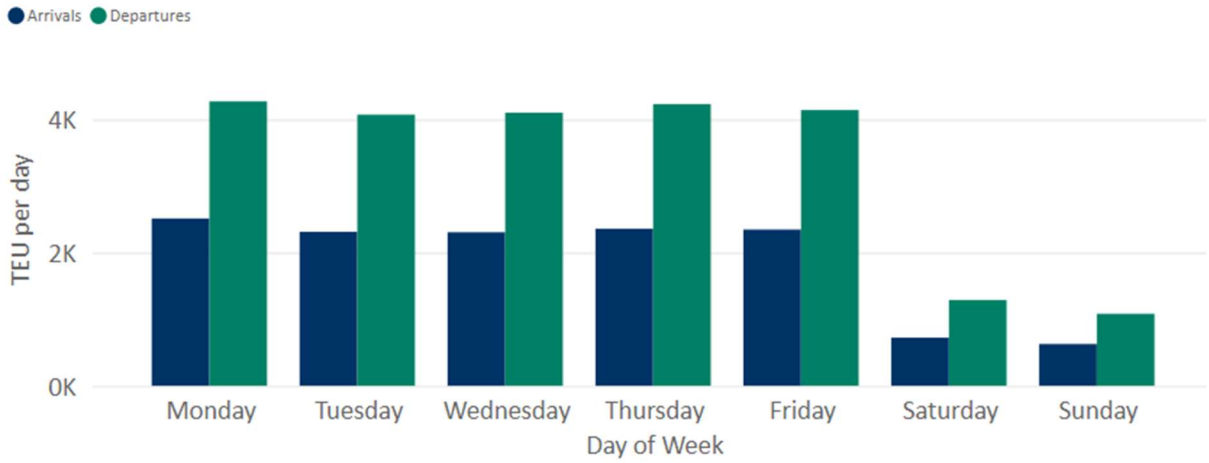
3.20 Days of week

This part of the report presents the analysis of the days of the week, for both arrivals and departures at major nodes along the logistics chain.

3.20.1 Stevedores – International and mainland coastal containers

Figure 71 shows the days of the week profile for container arrivals and departures at Port of Melbourne stevedores. The graph below represents an average week in 2019 (13,178 full container (TEU) arrivals and 23,166 full container (TEU) departures weekly).

Figure 71 – Port of Melbourne stevedores full container arrival/departure days of week

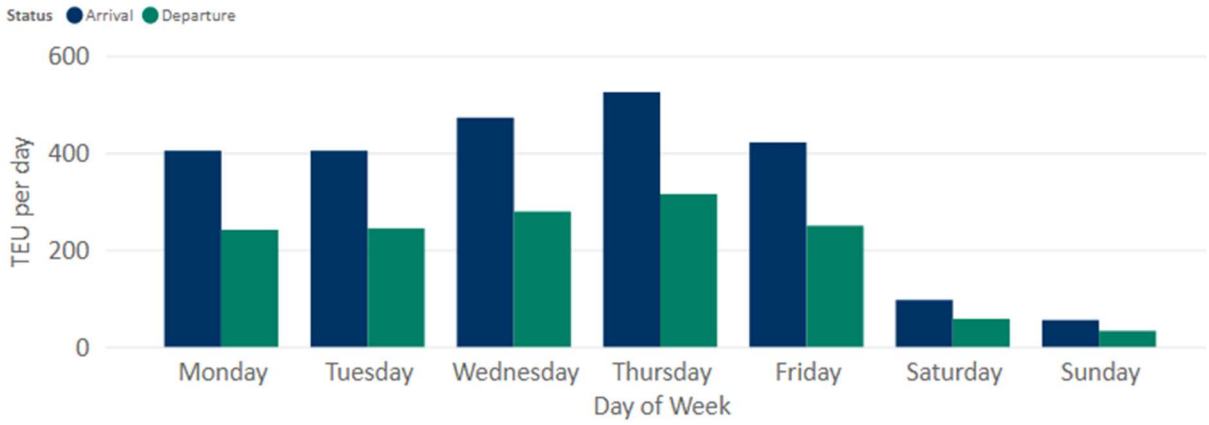


Full container arrivals at Port of Melbourne stevedore terminals were consistent during weekdays but reduced on the weekend. A similar trend was apparent for container departures with a peak on Mondays after lower volumes on the weekend. For both full container arrivals and departures at Port of Melbourne stevedores, 90% of container throughput was captured on weekdays.

3.20.2 Stevedores – Tasmanian containers

Figure 72 shows the days of week profile for full container arrivals and departures at stevedore terminals for Tasmanian containers. This was for an average week in 2019 (2,378 full container (TEU) arrivals and 1,419 full container (TEU) departures).

Figure 72 - Stevedores full container arrival/departure for Tasmanian Containers- days of week

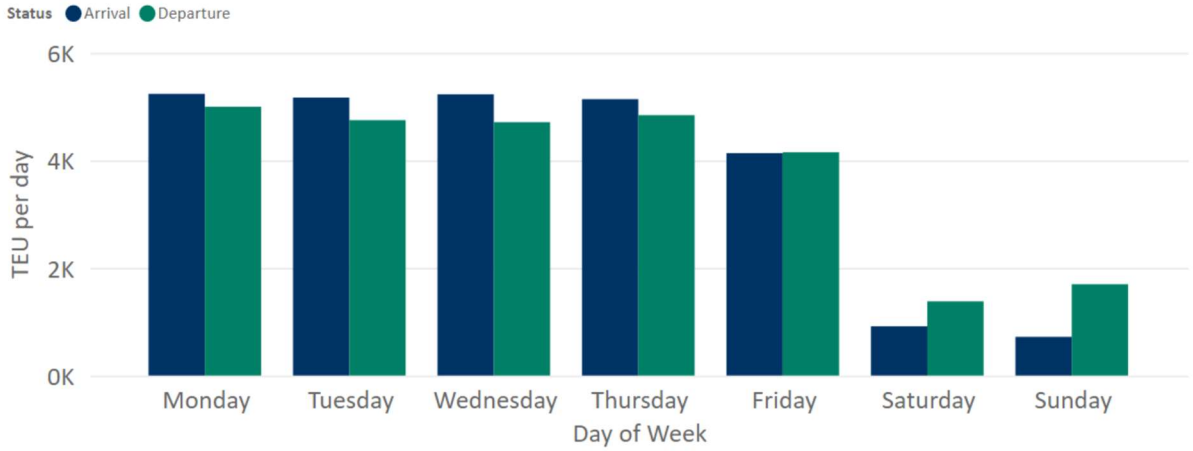


Full container arrivals at stevedores peak on Wednesday and Thursday with Thursday the busiest day. There was a higher number of arrivals than departures specifically on Monday and an increased volume of container departures than arrivals on the weekend. Weekend volumes were lower, particularly container departures. Tasmanian (Bass Strait) shipping schedules impact these volumes.

3.20.3 Transport depot

Figure 73 shows the days of the week profile for full container arrivals and departures for transport depots. This was for an average week in 2019 (26,546 full container (TEU) arrivals and 26,528 full container (TEU) departures).

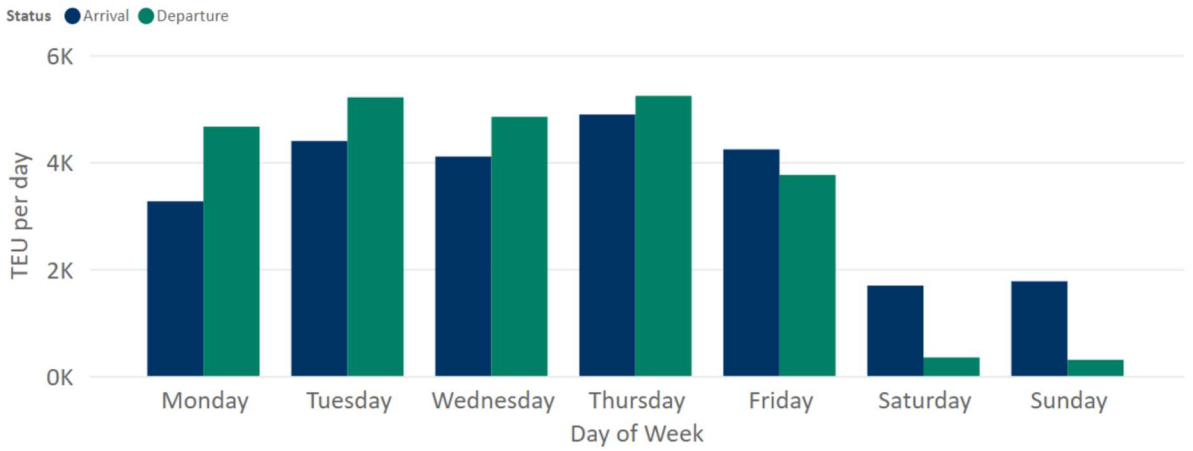
Figure 73 - Transport depot full container arrival/departure days of week



The number of full containers arriving and departing at transport depots throughout the week were consistent. For weekend arrivals and departures, there were substantially reduced volumes of departing containers aligned to industry work hours focused to weekdays.

Figure 74 shows the days of the week profile for empty container arrivals and departures for transport depots. This was for an average week in 2019 (19,389 empty container (TEU) arrivals and empty container 19,402 (TEU) departures).

Figure 74 - Transport depot empty container arrival/departure days of week

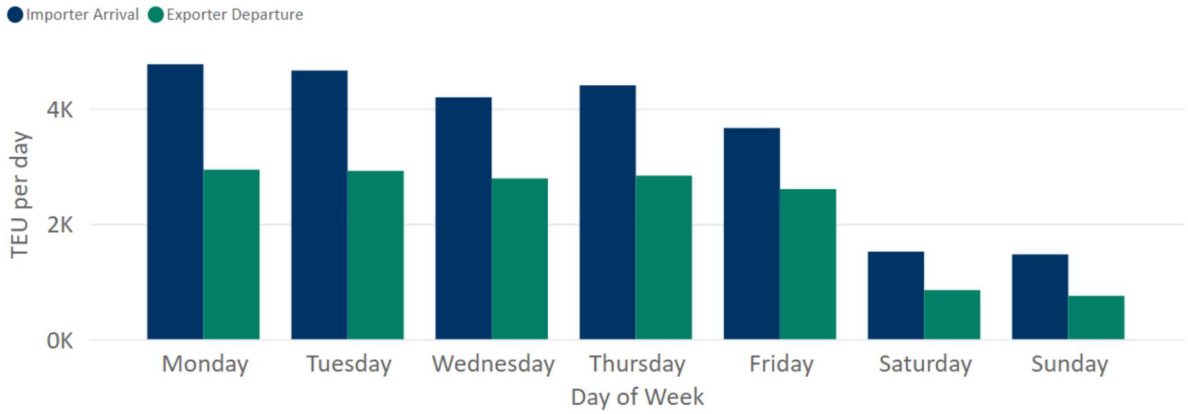


Empty container arrivals and departures to and from transport depots indicated a steady increase from Monday to Thursday. There was a sharp decrease in arrivals and departures occurring over the weekend.

3.20.4 Importers and exporters

Figure 75 shows the days of the week profile for container arrivals and departures at importers and exporters. This was for an average week in 2019 (24,653 full container (TEU) arrivals at importers and 15,673 full container (TEU) departures from exporters).

Figure 75 – Importer/exporter full arrival/departure days of week

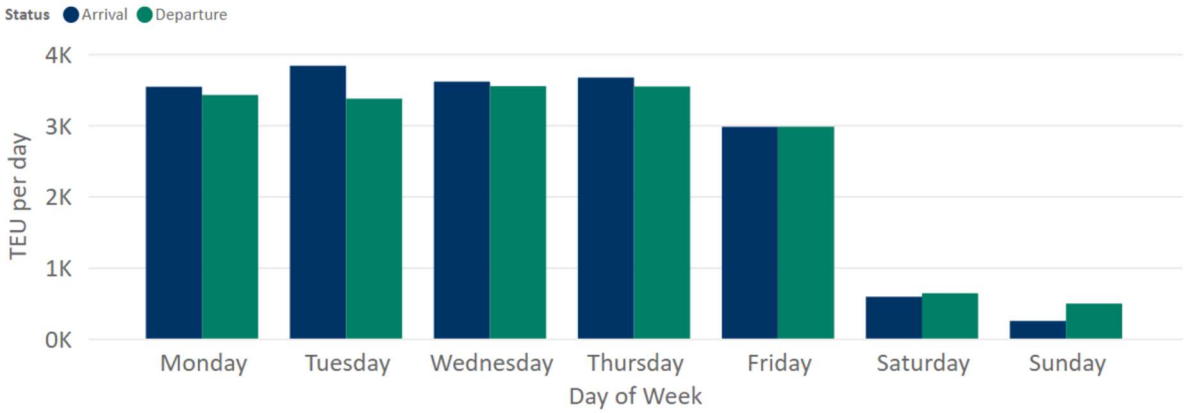


For importers and exporters, all weekdays were consistent in both container arrivals and departures with a slight drop off on Friday. Weekend arrivals were significantly less with slightly more container arrivals.

3.20.5 Empty container parks

Figure 76 shows the days of the week profile for container arrivals and departures at empty container parks. This was for an average week in 2019 (18,454, empty container (TEU) arrivals at container parks and 17,985 empty container (TEU) departures from container parks).

Figure 76 Container arrival/departures at empty container parks days of week



Container arrivals and departures were consistent during the week with around 5% of containers moving to and from empty container parks on weekends.

3.21 Commodities

Commodity based information and analysis is included in this section of the report based on information collated during the Study. The analysis covers international, mainland coastal and Tasmanian containers combined.

Commodity information was provided by PoM and empty containers have been added to this list for completeness.

Table 27 shows the import and export trade by commodity, sorted by import containers (TEU).

The most prevalent import commodity (full containers) at 45% of the total was 'Manufactured Goods Classified Chiefly by Materials[3]' with 632,078 TEU. This classification contains commodities such as rubber, paper products and paper board, non-metallic mineral and metal manufactures, as well as textile yarn, fabrics and iron and steel.

Table 27 - Import and export trade by major commodity classification (TEU), CY2019

Commodity	Import TEU	Export TEU	Total
Manufactured Goods Classified Chiefly by Materials	632,708	106,564	739,271
Timber, cotton, and wool	183,183	296,748	479,931
Food and food products	175,418	231,179	406,597
Empty containers	123,869	560,867	684,736
Miscellaneous Manufactured Articles	108,876	83,377	192,254
Machinery and transport equipment	77,466	12,116	89,581
Chemicals and chemical products	48,431	20,024	68,455
Beverage and tobacco	27,994	39,006	67,000
Essential oils, fats, and waxes	18,228	8,561	26,790
Petroleum products	5,376	3,295	8,671
Total	1,401,550	1,361,737	2,763,286

For exports, the commodity classification 'Timber, cotton and wool', was the largest, contributing 22% of the total with 296,748 full export containers (TEU). 'Food and food products' were the second largest, at 17%, with 231,179 full export containers (TEU).

Table 28 shows import commodities by region. The commodity with the highest volume for Metropolitan Melbourne was 'Manufactured Goods Classified Chiefly by Materials'.

Table 29 shows export commodities by region. For the largest export classification (Timber cotton and wool), the Outer Western region accounted for 37% of export TEUs.

For each of these Tables, no commodity information was available for some regions, and therefore the sum of commodity and empty TEU rows may not equal the total.

[3] Commodities include: electrical equipment, paper, metal parts, ceramic goods, clothing, dyeing and colouring materials, footwear, newspaper prints, vehicle parts, plastic wear and textiles.

Table 28 - IMPORT trade by major commodity classifications and region ('000 TEU)

	Inner Melbourne	Outer Eastern	Outer Northern	Outer South East	Outer Western	Eastern Corridor	Goulburn Corridor	Hume Corridor	North Western Corridor	Peninsula	South Western Corridor	Western Corridor	Southern NSW & ACT	Remainder of NSW	NT	QLD	SA	WA	Total
Manufactured Goods Classified Chiefly by Materials	46,126	50,141	92,609	185,184	220,584	1,899	1,554	3,722	2,331	935	10,503	1,839	2,724	8,511	31	1,206	2,412	395	632,708
Chemicals and chemical products	3,872	2,160	5,956	7,718	25,557	347	41	418	108	-	1,324	105	47	496	18	91	162	9	48,431
Machinery and transport equipment	3,150	*6,822*	15,412	21,696	20,070	947	442	564	2,752	231	1,509	912	719	1,316	11	211	612	89	77,466
Food and food products	13,043	5,601	27,733	39,326	84,266	1,052	501	446	503	204	757	65	8	1,358	4	333	174	46	175,418
Miscellaneous Manufactured Articles	8,763	8,206	15,013	27,114	41,478	904	300	403	1,229	294	1,588	348	362	1,181	29	951	555	160	108,876
Essential oils, fats, and waxes	1,831	762	5,665	4,699	4,705	-	41	104	20	-	125	6	23	120	-	57	70	-	18,228
Beverage and Tobacco	1,356	579	7,867	2,948	13,814	8	41	-	27	8	46	-	330	452	17	443	59	-	27,994
Timber, cotton, and wool	18,358	15,090	23,620	49,075	67,256	1,091	449	681	312	328	1,169	432	1,457	2,263	16	1,051	455	79	183,183
Petroleum products	491	179	551	910	2,950	-	-	93	26	-	96	32	-	15	-	15	19	-	5,376
Empty Containers	66,295	-	-	282	42,504	-	-	-	190	-	1,938	-	12,233	53	-	209	127	38	123,869
Total	63,284	89,540	194,427	338,951	523,183	6,247	3,370	6,431	7,498	2,001	19,056	3,738	17,904	15,766	127	4,566	4,646	815	1,401,550

Table 29 - EXPORT trade by major commodity classification and region ('000 TEU)

	Inner Melbourne	Outer Eastern	Outer Northern	Outer South East	Outer Western	Eastern Corridor	Goulburn Corridor	Hume Corridor	North Western Corridor	Peninsula	South Western Corridor	Western Corridor	Southern NSW & ACT	Remainder of NSW	NT	QLD	SA	WA	Total
Manufactured Goods Classified Chiefly by Materials	7,577	6,653	23,251	27,217	22,631	7,871	89	91	783	321	2,834	438	49	3,460	-	924	1,003	1,372	106,564
Chemicals and chemical products	1,442	1,968	585	2,927	11,100	70	260	-	11	44	886	23	377	197	-	52	57	25	20,024
Machinery and transport equipment	680	796	2,051	3,928	1,279	299	94	77	1,710	202	244	251	60	119	-	141	82	98	12,112
Food and food products	16,693	1,243	6,169	7,457	53,631	1,258	2,833	1,937	35,844	1,192	66,313	11,071	10,450	10,781	-	166	4,129	13	231,179
Miscellaneous Manufactured Articles	19,971	2,780	4,419	11,235	31,851	366	89	3	1,635	39	1,406	270	626	3,099	-	3,407	686	1,494	83,377
Essential oils, fats, and waxes	652	262	498	1,196	1,668	127	2,308	1	41	42	784	-	246	672	-	-	65	-	8,561
Beverage and Tobacco	889	2,582	4,150	701	8,710	11	1,077	17	4,860	950	430	15	9,598	471	-	476	4,070	-	39,006
Timber, cotton, and wool	25,545	9,088	15,608	36,892	148,463	14,201	860	90	9,998	890	8,548	11,360	6,955	6,409	-	227	273	1,342	296,748
Petroleum products	975	153	83	187	1,436	-	-	-	-	-	62	-	-	397	-	-	-	-	3,292
Empty Containers	163,204	9,032	19,567	45,185	258,259	1,048	1,203	1,077	3,113	423	9,622	480	--	1,615	163	429	168	137	560,874
Total	237,628	34,556	76,383	136,926	539,028	25,250	8,813	3,294	57,994	4,101	91,128	23,909	28,362	27,219	163	5,822	10,532	4,481	1,315,588

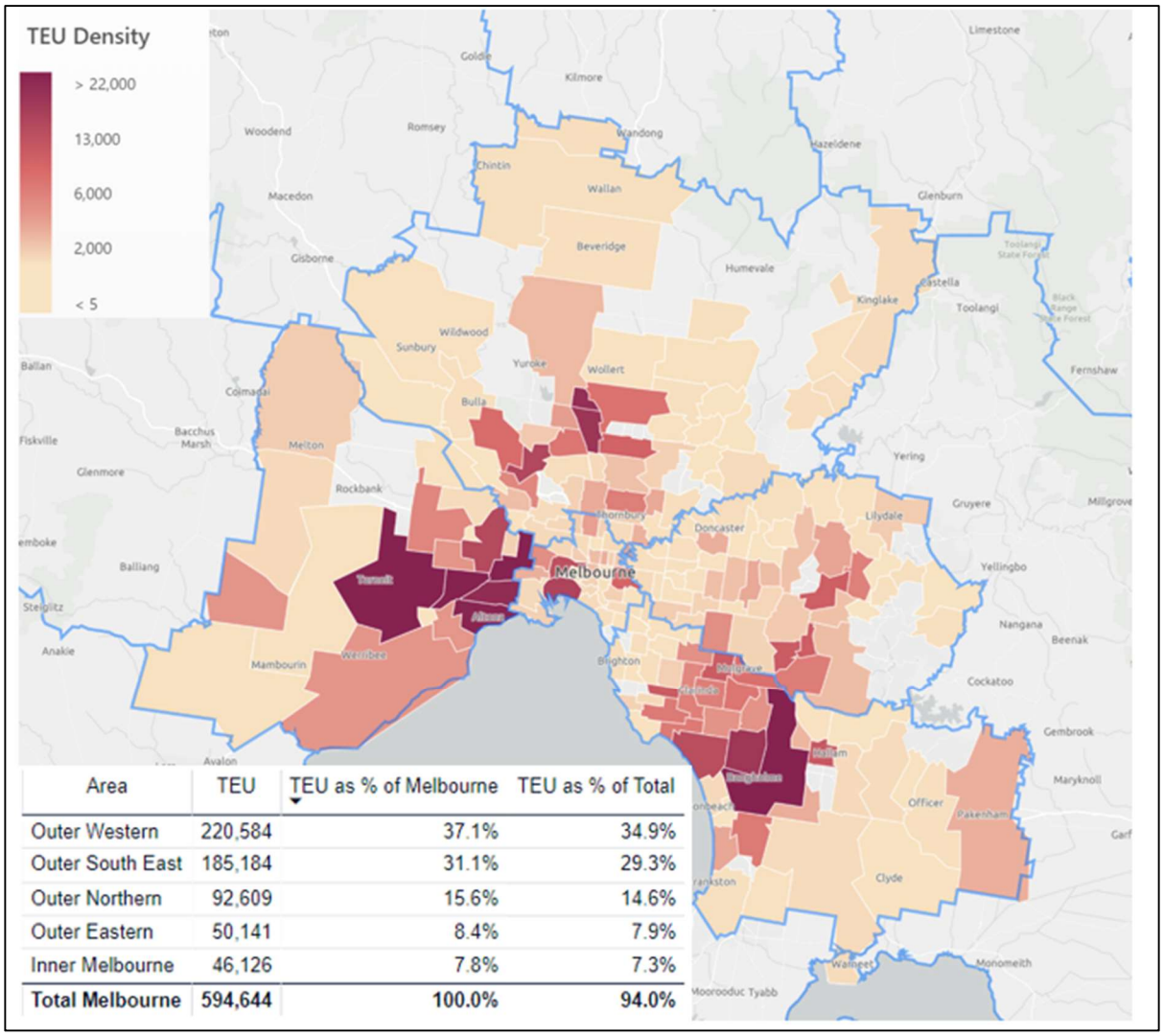
3.21.1 Destinations – Melbourne

Figure 77 to Figure 79 show the final destinations for full import containers for the top three import commodities:

- Manufactured Goods Classified Chiefly by Materials;
- Timber, cotton and wool;
- Food and food products

The top five locations for each of these commodities is shown in Table 30 to Table 32 below and in the respective maps.

Figure 77- DESTINATIONS for IMPORT containers with 'Manufactured Goods Classified Chiefly by Materials ' (metropolitan Melbourne)

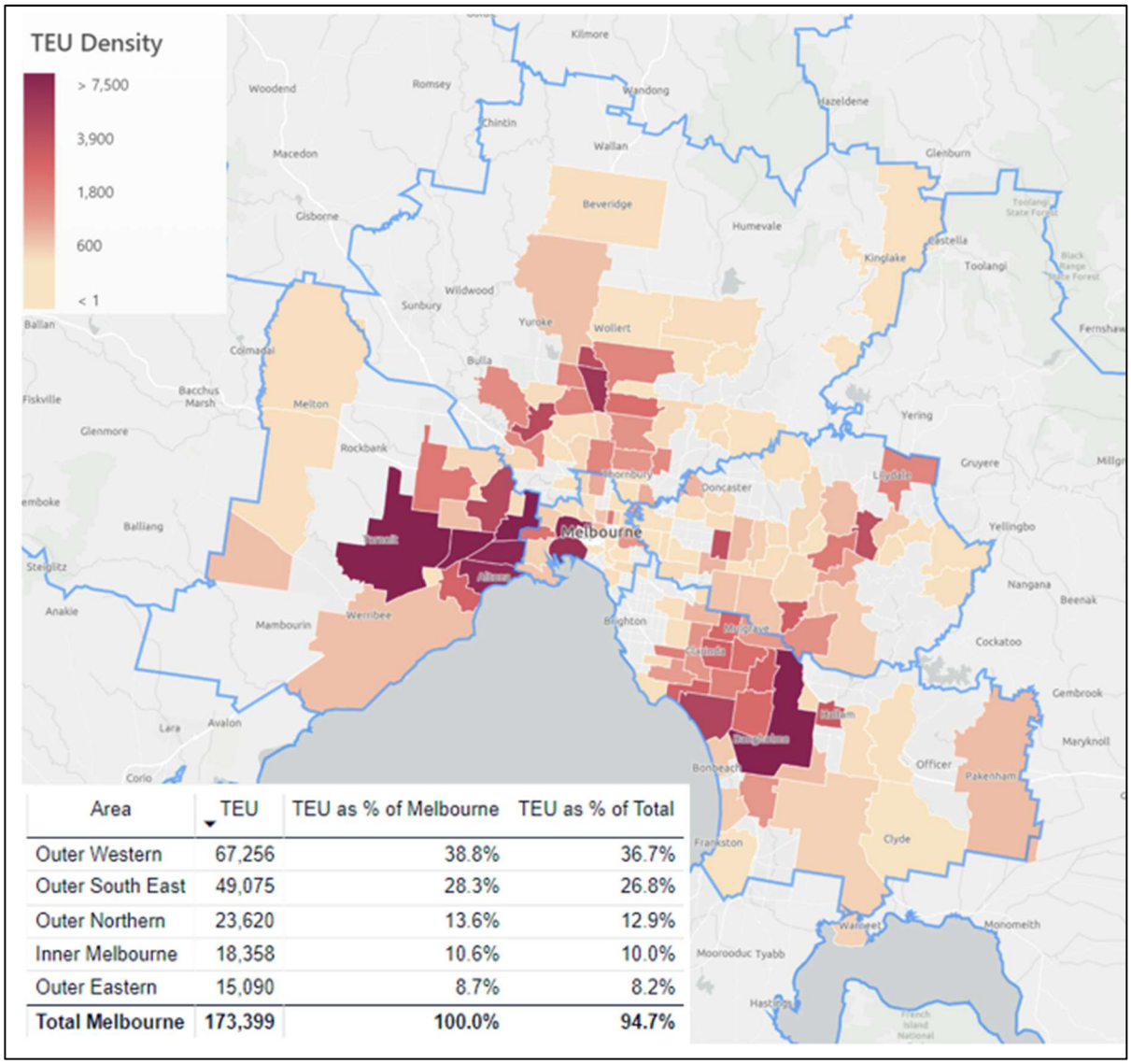


Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	220,584	37.1%	34.9%
Outer South East	185,184	31.1%	29.3%
Outer Northern	92,609	15.6%	14.6%
Outer Eastern	50,141	8.4%	7.9%
Inner Melbourne	46,126	7.8%	7.3%
Total Melbourne	**594,644**	**100.0%**	**94.0%**

Table 30 - Top 5 DESTINATIONS for IMPORT containers with 'Manufactured Goods Classified Chiefly by Materials' (metropolitan Melbourne)

Postcode	Suburb	TEU
3029	Truganina	75,780
3175	Dandenong South	71,806
3026	Derrimut	60,703
3012	Brooklyn	21,698
3025	Altona North	21,279

Figure 78 – DESTINATIONS for IMPORT containers with 'Timber, cotton and wool'

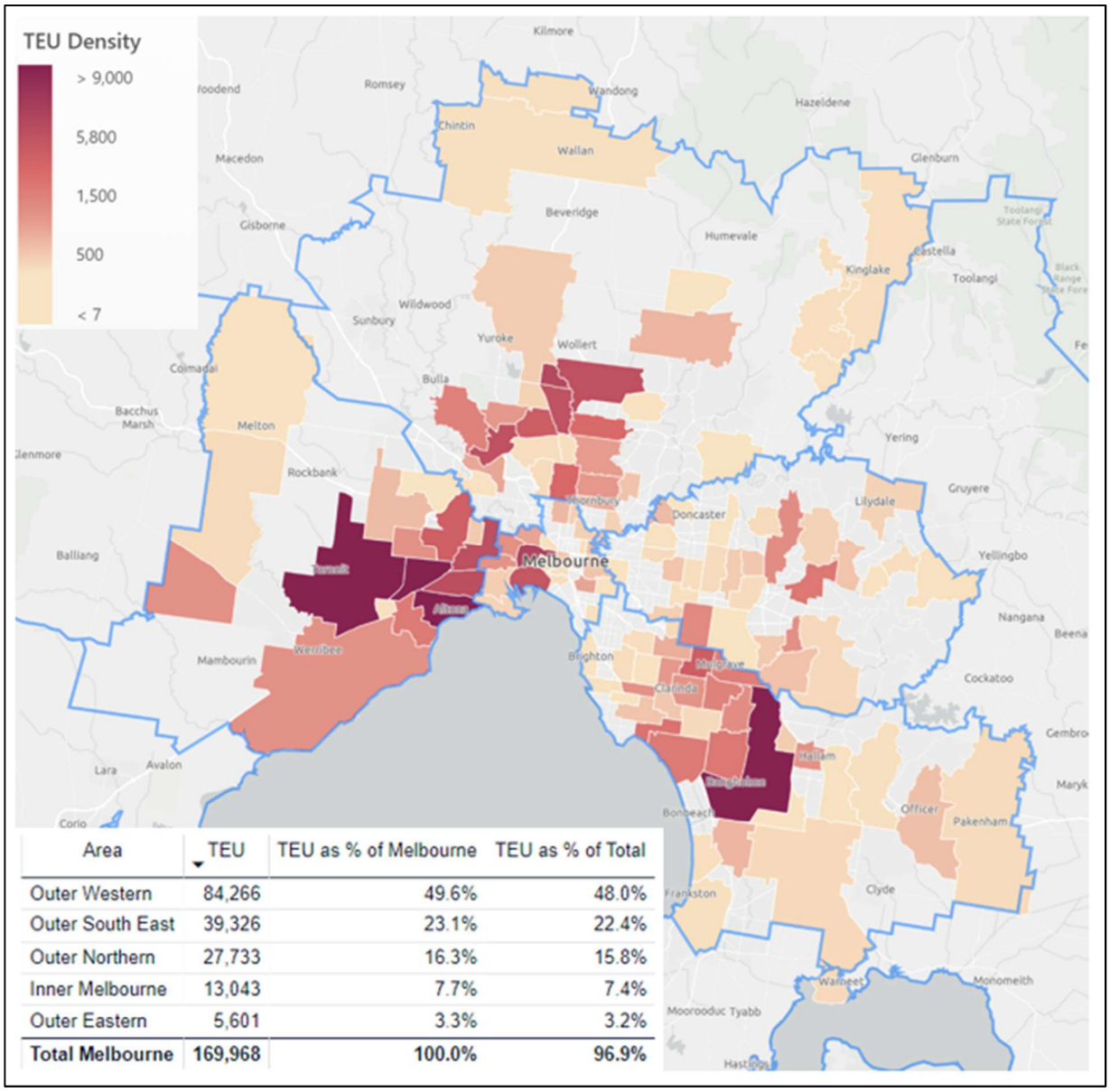


Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	67,256	38.8%	36.7%
Outer South East	49,075	28.3%	26.8%
Outer Northern	23,620	13.6%	12.9%
Inner Melbourne	18,358	10.6%	10.0%
Outer Eastern	15,090	8.7%	8.2%
Total Melbourne	**173,399**	**100.0%**	**94.7%**

Table 31 - Top 5 DESTINATIONS for IMPORT containers with 'Timber, cotton and wool'

Postcode	Suburb	TEU
3175	Dandenong South	22,035
3026	Derrimut	20,071
3003	West Melbourne	18,788
3207	Port Melbourne	7,543
3012	Brooklyn	6,919

Figure 79 - DESTINATIONS for IMPORT containers with 'Food and food products' (metropolitan Melbourne)



Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	84,266	49.6%	48.0%
Outer South East	39,326	23.1%	22.4%
Outer Northern	27,733	16.3%	15.8%
Inner Melbourne	13,043	7.7%	7.4%
Outer Eastern	5,601	3.3%	3.2%
Total Melbourne	**169,968**	**100.0%**	**96.9%**

Table 32 - Top 5 DESTINATIONS for IMPORT containers with 'Food and food products' (metropolitan Melbourne)

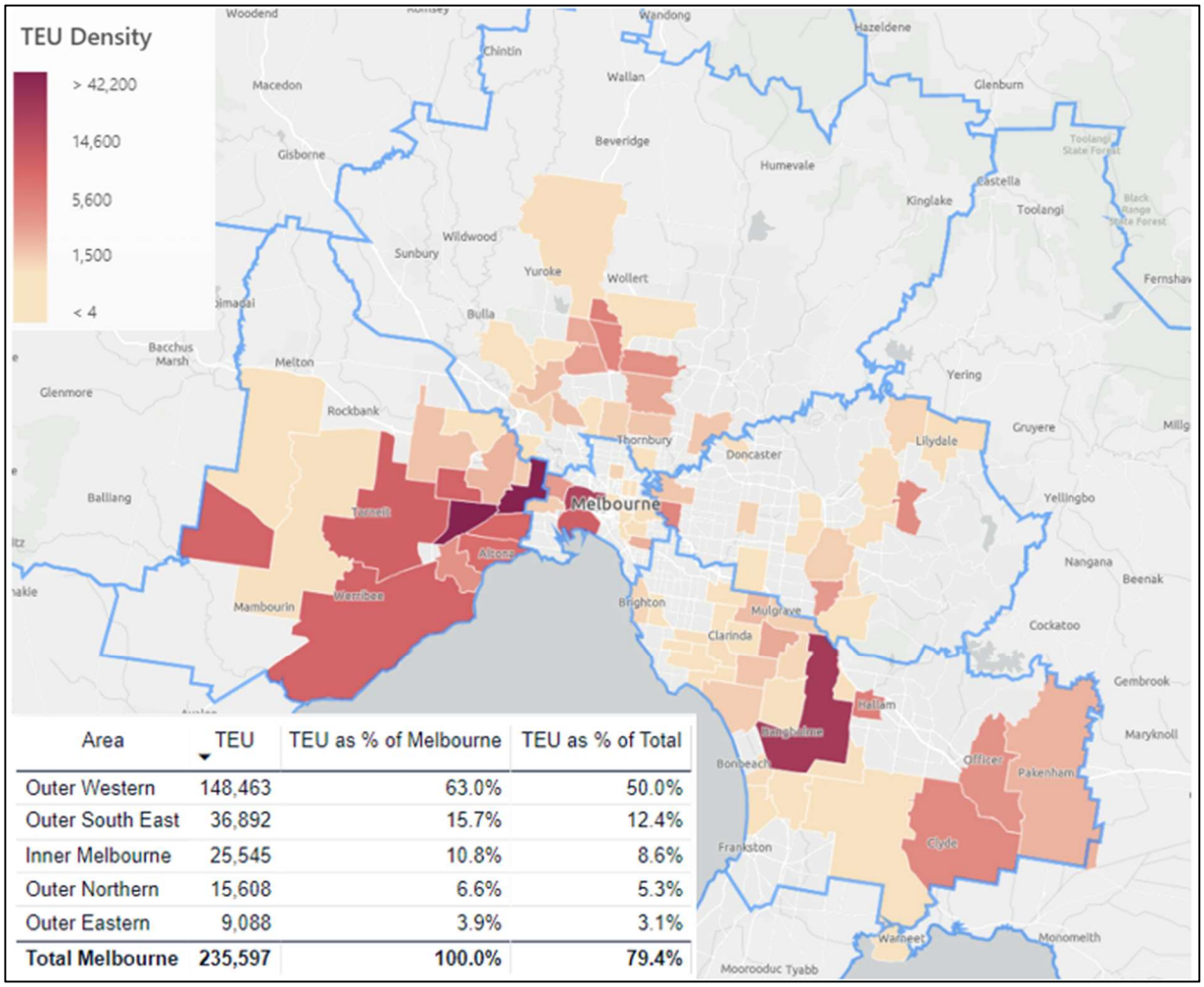
Postcode	Suburb	TEU
3026	Derrimut	34,727
3029	Truganina	26,900
3175	Dandenong South	25,400
3018	Altona	8,969
3003	West Melbourne	5,840

3.21.2 Origins – Melbourne

Figure 80 and Figure 81 show the origin of full export containers for the top two export commodities 'Timber, cotton and wool' and 'Food and food products. Differences in the spatial patterns between the three figures are more pronounced for export than for import commodities.

The top five locations where exports for these commodities originate from are shown in Table 33 and Table 34 below and the maps for each commodity. However, commodities may originate from regional and interstate locations and are often packed in metropolitan Melbourne.

Figure 80 - ORIGINS for EXPORT containers with 'Timber, cotton and wool' (metropolitan Melbourne)

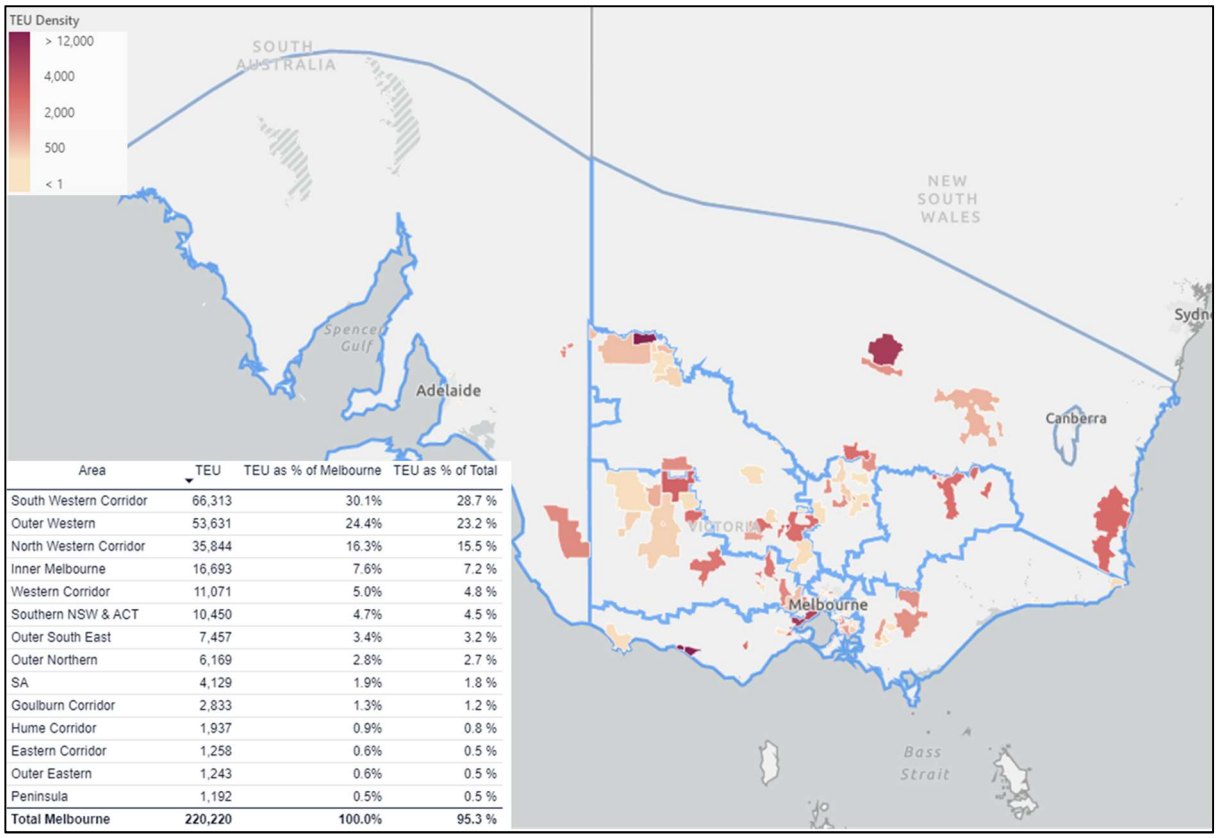


Area	TEU	TEU as % of Melbourne	TEU as % of Total
Outer Western	148,463	63.0%	50.0%
Outer South East	36,892	15.7%	12.4%
Inner Melbourne	25,545	10.8%	8.6%
Outer Northern	15,608	6.6%	5.3%
Outer Eastern	9,088	3.9%	3.1%
Total Melbourne	**235,597**	**100.0%**	**79.4%**

Table 33 - Top 5 ORIGINS for EXPORT containers with 'Timber, cotton and wool' (metropolitan Melbourne)

Postcode	Suburb	TEU
3012	Brooklyn	77,492
3026	Derrimut	42,232
3175	Dandenong South	22,909
3003	West Melbourne	14,559
3207	Port Melbourne	7,527

Figure 81 – ORIGINS for EXPORT containers with 'Food and food products'



Area	TEU	TEU as % of Melbourne	TEU as % of Total
South Western Corridor	66,313	30.1%	28.7 %
Outer Western	53,631	24.4%	23.2 %
North Western Corridor	35,844	16.3%	15.5 %
Inner Melbourne	16,693	7.6%	7.2 %
Western Corridor	11,071	5.0%	4.8 %
Southern NSW & ACT	10,450	4.7%	4.5 %
Outer South East	7,457	3.4%	3.2 %
Outer Northern	6,169	2.8%	2.7 %
SA	4,129	1.9%	1.8 %
Goulburn Corridor	2,833	1.3%	1.2 %
Hume Corridor	1,937	0.9%	0.8 %
Eastern Corridor	1,258	0.6%	0.5 %
Outer Eastern	1,243	0.6%	0.5 %
Peninsula	1,192	0.5%	0.5 %
Total Melbourne	**220,220**	**100.0%**	**95.3 %**

Table 34 - Top 5 ORIGINS for EXPORT containers with 'Food and food products'

Postcode	Suburb	TEU
3277/3280	Allansford/Warrnambool	38,774
3502/3505	Mildura/Merbein	28,870
3026	Derrimut	25,303
3029	Truganina	10,550
3215	North Geelong	9,825

4 Changes since the 2009 Study

This section of the report compares some of the findings of the previous 2009 Study to 2019 and discusses noticeable changes.

4.1 Changes in container size use

Table 35 shows that there has been an increasing trend in the use of 40' containers rather than 20' containers. This may be due to a combination of shipping lines' increased investment in 40' container equipment as well increases in more volumetric freight (consumer goods) relative to other commodities, and the increased ability of overseas consignees to handle 40' containers.

Table 35 2009 and 2019 Port of Melbourne import and export full container size shares – international, mainland coastal and Tasmanian

Direction	Size	Fulls	
		2009	2019
Imports	40'	42%	53%
	20'	58%	47%
Exports	40'	34%	47%
	20'	66%	53%

4.2 Changes in container volumes

Since 2009, there was an increase in the number of international and mainland coastal containers (TEU) across metropolitan Melbourne (import increase of 58.8% and export increase of 46.9%) and regional Victoria (import increase of 94.6%, and export increase of 41.4%). Overall, for 2019, there was an increase in imports and exports by 47.5% and 23.4% respectively when compared to 2009.

The following changes are also evident when comparing the results of the 2009 Study:

1. International and mainland coastal import containers handled and unpacked in metropolitan Melbourne increased from 87% in 2009 to 94.0% in 2019.
2. International and mainland coastal export containers handled and packed in metropolitan Melbourne increased from 54% in 2009 to 63.7% in 2019. Similarly, the number of export containers packed in Regional Victoria increased from 23% in 2009 to 26.9% in 2019.
3. International and mainland coastal export containers that were handled and packed in interstate locations has decreased from 23.0% in 2009 to 9.4%. This is mainly attributed to container movements from South Australia using additional direct shipping services at the Port of Adelaide since 2009.
4. The growth of the logistics and industrial sector in the Outer Western region for international and mainland coastal import containers being handled and unpacked increased from 26% in 2009 to 37.3%. Similarly, the number of international and mainland coastal export containers being handled and packed in this region has also increased from 26% in 2009 to 33.8% in 2019.
5. The number of international and mainland coastal import containers that were handled and unpacked in the Outer South Eastern region increased from 25% in 2009 to 26.6% in 2019. Additionally, the number of international and mainland coastal export containers being handled and packed in this region has also increased from 7% in 2009 to 11.5%.

4.3 International and mainland coastal import destinations

The following section provides a comparison between 2009 and 2019 for Melbourne and Victorian container destinations including staging. It is important to note that in some cases suburb names differ as this Study recognises industry suburbs for completeness.

4.3.1 Destinations – Melbourne

Table 36 compares the metropolitan Melbourne destinations for both full international and mainland coastal containers that are imported through the Port of Melbourne. There has been a significant increase in the number of import container journeys to western suburbs such as Derrimut. Large volumes of containers continue to be unpacked in the Dandenong area.

Table 36 – Comparisons of the Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (Melbourne)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3175	Dandenong South	71,323	3175	Dandenong South	142,195
3026	Derrimut	58,462	3026	Derrimut	138,555
3062	Somerton	36,398	3029	Truganina	122,790
3025	Altona	31,841	3012	Brooklyn	50,290
3043	Tullamarine	29,880	3018	Altona	38,025

4.3.2 Destinations – Victoria

Table 37 compares the destinations in regional Victoria for full international and mainland coastal containers imported through the Port of Melbourne. The growth in the Geelong region has increased container volumes in North Geelong, South Geelong, and Corio impacting regional import destinations.

Table 37 – Comparisons of the Top 5 DESTINATIONS for full international and mainland coastal IMPORT containers (Victoria)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3214	North Shore	2,449	3212	Lara	4,551
3690	Wodonga	2,137	3214	Corio	2,845
3677	Wangaratta	1,698	3215	North Geelong	2,808
3215	North Geelong	1,688	3220	South Geelong	1,982
3840	Morwell	1,386	3840	Morwell	1,815

4.3.3 Transport staging locations – all imports

Table 38 compares the staging locations for full international and mainland coastal containers through the Port of Melbourne. The staging locations remain largely unchanged when compared to container volumes in 2009.

Table 38 - Top 5 STAGING LOCATIONS for full international and mainland coastal IMPORT containers (metropolitan Melbourne)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3003	West Melbourne	368,600	3003	West Melbourne	363,220
3012	West Footscray	77,230	3012	Brooklyn	312,475
3011	Footscray	73,382	3026	Derrimut	109,276
3175	Dandenong South	41,852	3175	Dandenong South	102,826
3025	Altona North	27,213	3025	Altona North	50,865

4.4 International and mainland coastal export origins

4.4.1 Origins – Melbourne

Table 39 compares the metropolitan Melbourne origins for both full international and mainland coastal containers that are exported through the Port of Melbourne. When compared to 2009, a large proportion of export containers are still originating from Outer Western Region with a shift to areas such as Brooklyn and Derrimut.

Table 39 – Comparisons of the Top 5 ORIGINS for full international and mainland coastal EXPORT containers (Melbourne)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3028	Laverton	41,739	3012	Brooklyn	87,217
3003	West Melbourne	41,551	3026	Derrimut	71,574
3012	Brooklyn	34,697	3175	Dandenong South	35,260
3026	Derrimut	29,250	3029	Truganina	20,921
3025	Altona	27,325	3003	West Melbourne	18,989

4.4.2 Origins – Victoria

Table 40 compares the origins in regional Victoria for full international and mainland coastal containers exported through the Port of Melbourne.

Table 40 – Comparisons of the Top 5 ORIGINS for full international and mainland coastal EXPORT containers (Victoria)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3840	Morwell	34,636	3277/3280	Allansford/Warrnambool	38,851
3401	Horsham	28,931	3502/3505	Mildura/Merbein	30,028
3342	Ballan	16,057	3840	Morwell	21,992
3212	Lara	12,207	3125	North Geelong	10,939
3220	Geelong	8,921	3400	Horsham	10,793

4.4.3 Transport staging locations – all exports

Table 41 compares the staging locations for full international and mainland coastal containers.

Table 41 - Top 5 STAGING LOCATIONS for full international and mainland coastal EXPORT containers (metropolitan Melbourne)

2009			2019		
Postcode	**Suburb**	**TEU**	**Postcode**	**Suburb**	**TEU**
3012	West Footscray	78,399	3012	Brooklyn	131,855
3003	West Melbourne	65,809	3003	West Melbourne	126,761
3029	Hoppers Crossing	63,330	3025	Altona North	37,893
3011	Footscray	28,486	3026	Derrimut	28,822
3026	Laverton North	20,029	3175	Dandenong South	12,893

4.5 Rail mode share

Over the last decade, rail freight shares have reduced with more containers being moved on road. The absolute volume of containers transported by rail in 2019 compared to 2009 remained relatively unchanged (a slight decline), but the overall volumes of containers moved through the Port of Melbourne has increased significantly in particularly Metropolitan Melbourne volumes – all of which are transported by road.

As indicated above, since the 2009 Study, container movements involving a rail leg have decreased from 14% to 8.2% in 2019.

Furthermore, significant improvements have been made to provide broader access across road networks for heavy vehicles with bridge strengthening. This has increased the development and use of Super B-Doubles and A-Double combinations that can carry up to four TEU.

Rail network developments have been limited during the period from 2009 to 2019 although new investments including the Port of Melbourne Rail Transformation Project and the Department of Transport Port Rail Shuttle Project are planned to increase rail mode share.

4.6 Truck utilisation

High Productivity Freight Vehicles (HPFVs) are truck combinations that exceed 26 metres or have a mass greater than 68.5 tonnes. The HPFV approved network has been expanding in Victoria to connect major freight routes to major ports and the creation of interstate links. There has been a rapid uptake of these vehicles due to productivity gains in carrying more containers and improvements in freight policy. This is also reflective of the shift from 20-foot containers to 40-foot containers as HPFVs, such as Super B-Doubles, can carry up to two 40-foot containers.

The analysis has shown that the expanding HPFV network has contributed to the increased use of Super-B doubles between stevedores, transport depots, and importers/exporters.

5 Conclusions

This section contains the conclusions of the Study in terms of comparing results with its original aims and objectives.

Over a 100 million data records from over 50 different data sources that related to the Port of Melbourne container logistics chain were analysed. These data records were successfully used to identify and track full and empty container movements within the Port of Melbourne catchment. The Study has identified:

1. The current (2019) major locations for origins of export containers and destinations of import containers within Victoria and interstate;
2. The current (2019) major staging locations and movement patterns of the container logistics chain, the mode of transport including the vehicle type and capacity and utilisation at specific nodes;
3. The current times of day in which containers are moved and peaks and troughs during the weekly cycle;
4. The geographic shift of some logistics activities to the Outer Western region whilst maintaining existing activities in the Outer South Eastern and Outer Northern regions. The growth in these regions aligns with recent changes in land-use and expansion of the metropolitan corridors; and
5. Trends in the container logistics chain including an increase in the staging of containers and an increase in the use of larger truck configurations as access for heavy vehicles has improved across the Victorian Road network. Rail mode share has reduced to 8.2% compared with 14% in 2009.

The Study has been assisted by industry participation and data which has allowed an in-depth analysis of container flows and movements across the Port of Melbourne container logistics chain. The outcomes from this Study will assist with port planning, transport network development aligned to demand, and provide industry with information to support the ongoing development of their port-related activities.

6 Appendices

6.1 Appendix 1 – Staging locations

Table 42 Appendix Table A – Staged Port of Melbourne origins and destinations by postcode (full containers) (locations with less than 100 TEU have been excluded for confidentiality purposes)[4]

To Region	Postcode	Suburb	International and Mainland Coastal	
			Import TEU	Export TEU
Inner Melbourne	3000	MELBOURNE		391
	3003	WEST MELBOURNE	364,834	126,761
	3011	FOOTSCRAY	2,392	1,604
	3065	FITZROY	1,289	2,918
	3207	PORT MELBOURNE	1,979	4,689
Inner Melbourne Total			370,494	136,363
Outer Eastern Total			-	-
Outer Northern	3043	TULLAMARINE	47,338	10,101
	3045	MELBOURNE AIRPORT	11,549	1,160
	3049	CALDER PARK	158	
Outer Northern Total			59,045	11,261
Outer South East	3175	DANDENONG SOUTH	103,283	12,893
Outer South East Total			103,283	12,893
Outer Western	3012	BROOKLYN	313,863	131,855
	3018	ALTONA	2,284	3,515
	3020	SUNSHINE	1,176	649
	3025	ALTONA NORTH	51,091	37,893
	3026	DERRIMUT	109,761	28,822
	3028	LAVERTON	328	
	3029	TRUGANINA	20,979	9,860
	3030	WERRIBEE	326	
Outer Western Total			499,808	212,594
Eastern Corridor	3840	MORWELL		7,812
Eastern Corridor Total			-	7,812
Goulburn Corridor	3622	KOYUGA	2,919	
Goulburn Corridor Total			2,919	-
	3691	BARNAWARTHA NORTH	1,683	183
Hume Corridor Total			1,683	183
North Western Corridor	3505	MERBEIN/MILDURA		18,418
	3585	SWAN HILL		1,304
North Western Corridor Total			-	19,722
South Western Corridor	3212	LARA	5,744	7,007
	3214	CORIO	4,413	41,857
South Western Corridor Total			10,157	48,864
Western Corridor	3401	DOOEN		1,686
Western Corridor Total			-	1,686
Victoria Total			1,047,389	451,378
Southern NSW & ACT Total				13,215
Remainder of NSW Total			5,288	
Northern Territory Total			245	
South Australia Total			1,551	757
Western Australia Total			1,412	234
Australia Total			1,055,885	465,584

4 Excludes staged Tasmanian trade due information not being available for this study.

6.2 Appendix 2 – Origin and destinations

Table 43 - Appendix Table B Port of Melbourne origins and destinations by postcode (full containers) (locations with less than 100 TEU have been excluded for confidentiality purposes)

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
Inner Melbourne	3000	MELBOURNE	2,163	388		
	3003	WEST MELBOURNE	29,985	18,989		4,022
	3004	MELBOURNE	242	669		
	3006	SOUTHBANK	596	5,738		
	3008	DOCKLANDS	105	1,140		
	3011	FOOTSCRAY	4,501	2,367		158
	3013	YARRAVILLE	4,507	1,042		1,095
	3015	SPOTSWOOD	1,076			3,021
	3016	WILLIAMSTOWN NORTH	1,126			
	3031	KENSINGTON	1,014			
	3051	NORTH MELBOURNE	1,135	136		
	3052	PARKVILLE	292			
	3053	CARLTON	1,303			
	3054	CARLTON NORTH		305		
	3055	BRUNSWICK WEST	628			
	3056	BRUNSWICK	3,316	293		
	3057	BRUNSWICK EAST	691	229		
	3065	FITZROY	2,684			
	3066	COLLINGWOOD	853	164		
	3067	ABBOTSFORD	1,019			
	3068	FITZROY NORTH	383	171		
	3121	RICHMOND	7,892	846		
	3141	SOUTH YARRA	1,586	287		
	3142	TOORAK		255		
	3181	PRAHRAN	605	1,500		
	3182	ST KILDA	171	1,136		
	3205	SOUTH MELBOURNE	479	4,306		
	3206	ALBERT PARK	284	416		
	3207	PORT MELBOURNE	17,333	10,587	10,570	14,953
Inner Melbourne Total			**85,969**	**50,964**	**10,570**	**23,249**
Outer Eastern	3101	KEW	150	2,734		
	3103	BALWYN	201			
	3104	BALWYN NORTH	220	285		
	3105	BULLEEN	1,357			
	3106	TEMPLESTOWE	173			
	3107	TEMPLESTOWE LOWER	110			
	3108	DONCASTER	1,942			
	3109	DONCASTER EAST		1,057		
	3113	WARRANDYTE	116			
	3114	PARK ORCHARDS	113			
	3116	CHIRNSIDE PARK		956		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3122	HAWTHORN	309	3,236		
	3123	HAWTHORN EAST	119	134		
	3124	CAMBERWELL		150		
	3125	BURWOOD	888	683		
	3127	SURREY HILLS	307	173		
	3128	BOX HILL	4,339	852		
	3129	BOX HILL NORTH		167		
	3130	BLACKBURN	1,664	107		
	3131	NUNAWADING	2,122			
	3132	MITCHAM	1,473	147		
	3133	VERMONT	619	184		
	3134	RINGWOOD	2,183			
	3136	CROYDON	2,551	627		
	3137	KILSYTH	9,412	3,863		
	3140	LILYDALE	1,874	421		
	3146	GLEN IRIS	678	319		
	3147	ASHBURTON	529			
	3149	MOUNT WAVERLEY	4,316	761		
	3150	GLEN WAVERLEY	803	264		
	3151	BURWOOD EAST	204	152		
	3152	WANTIRNA SOUTH	914	942		
	3153	BAYSWATER	13,895	1,844	184	199
	3155	BORONIA	1,671	1,042		
	3156	FERNTREE GULLY	1,602			
	3178	ROWVILLE	6,816	181		
	3179	SCORESBY	13,821	1,697		1,036
	3180	KNOXFIELD	10,475	942		
	3765	MONTROSE	200			
	3766	KALORAMA	202			
	3767	MOUNT DANDENONG	204			
	3793	MONBULK	116			
Outer Eastern Total			**88,688**	**23,920**	**184**	**1,235**
Outer Northern	3032	MARIBYRNONG	292			
	3033	KEILOR EAST	1,413	583		
	3034	AVONDALE HEIGHTS		216		
	3039	MOONEE PONDS	327			
	3040	ESSENDON	286			
	3041	ESSENDON FIELDS		1,091		
	3042	KEILOR PARK	5,366	394		
	3043	TULLAMARINE	29,488	7,595		
	3044	PASCOE VALE	822			
	3045	MELBOURNE AIRPORT	11,486	495	1,233	9,674
	3046	GLENROY	283			
	3047	BROADMEADOWS	8,080	1,892	2,190	
	3048	COOLAROO	4,192	1,761		
	3049	CALDER PARK	1,920	302		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3058	COBURG	4,680	627		
	3060	FAWKNER	520			
	3061	CAMPBELLFIELD	32,453	6,574		
	3062	SOMERTON	37,925	18,404	3,021	1,810
	3064	DONNYBROOK	2,201	357		
	3070	FAIRFIELD	277			
	3071	THORNBURY	1,162			
	3072	PRESTON	7,006	1,461		
	3073	RESERVOIR	2,615	1,529		
	3074	THOMASTOWN	12,591	4,388		
	3076	EPPING	12,895	775	104	537
	3078	FAIRFIELD	2,084			
	3081	HEIDELBERG WEST	3,119	472		
	3082	MILL PARK	224			
	3083	BUNDOORA	796	216		
	3084	HEIDELBERG	293	552		
	3094	GREENSBOROUGH	149	156		
	3095	ELTHAM	301	212		
	3428	BULLA	155			
	3429	SUNBURY		479		
	3752	SOUTH MORANG	200			
	3753	BEVERIDGE	211			
	3754	DOREEN	452			
	3756	WALLAN	220			
	3759	PANTON HILL	169			
	3760	SMITHS GULLY	245			
	3761	ST ANDREWS	128			
	3762	BYLANDS	200			
	3763	KINGLAKE	245			
Outer Northern Total			**187,471**	**50,531**	**6,548**	**12,021**
Outer South East	3144	MALVERN	272	1,023		
	3148	CHADSTONE	233			
	3162	CAULFIELD SOUTH	140			
	3163	CARNEGIE	127			
	3165	BENTLEIGH EAST	671			
	3166	OAKLEIGH	4,480	340		
	3167	OAKLEIGH SOUTH	5,294	181		
	3168	CLAYTON	14,167	2,905	298	299
	3169	CLAYTON SOUTH	8,114	523		
	3170	MULGRAVE	8,780	1,061		
	3171	SPRINGVALE	8,929	1,665		
	3172	DINGLEY VILLAGE	4,601	757		
	3173	KEYSBOROUGH	24,514	5,542	107	
	3174	NOBLE PARK	6,915	2,488		
	3175	DANDENONG SOUTH	142,195	35,260	17,739	11,671
	3177	DOVETON	1,607	173		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3186	BRIGHTON	255	520		
	3189	MOORABBIN	11,904	925		
	3190	HIGHETT	389			
	3191	SANDRINGHAM	470			
	3192	CHELTENHAM	6,343	478		
	3193	BEAUMARIS		107		
	3194	MENTONE	8,912	1,004		
	3195	BRAESIDE	20,776	4,593		186
	3196	CHELSEA HEIGHTS	801	257		
	3197	PATTERSON LAKES		1,003		
	3198	SEAFORD	2,341	198		
	3199	FRANKSTON	127			
	3201	CARRUM DOWNS	6,820	1,598		
	3202	HEATHERTON	6,668	1,243		229
	3204	BENTLEIGH	217			
	3803	HALLAM	16,070	5,338		
	3805	NARRE WARREN	364	449		
	3806	BERWICK	307	244		
	3807	BEACONSFIELD		319		
	3809	OFFICER	439	2,276		
	3810	PAKENHAM	2,471	667	114	416
	3910	MCCLELLAND DR		272		
	3975	LYNDHURST	2,250	135		
	3976	HALLAM		158		
	3977	DEVON MEADOWS	626	517		
	3978	CLYDE		4,174		
Outer South East Total			**319,589**	**78,393**	**18,258**	**12,801**
Outer Western	3012	BROOKLYN	50,319	87,217	8,876	292
	3018	ALTONA	43,082	12,949	200	132
	3019	BRAYBROOK	1,051	382		474
	3020	SUNSHINE WEST	22,475	3,206	371	1,489
	3021	KEALBA	339			
	3023	RAVENHALL	8,328	1,763		114
	3024	MOUNT COTTRELL		149		
	3025	ALTONA NORTH	36,205	12,390	437	453
	3026	DERRIMUT	142,223	71,574	8,396	25,626
	3028	LAVERTON	10,721	5,328		263
	3029	TRUGANINA	128,215	20,921	13,858	21,908
	3030	WERRIBEE	3,744	13,825		
	3337	MELTON	1,294			
	3338	MELTON SOUTH	446	1,681		
Outer Western Total			**448,442**	**231,385**	**32,138**	**50,751**
Peninsula	3912	SOMERVILLE	229	391		
	3913	TYABB	325			
	3915	HASTINGS	281	145		
	3931	MORNINGTON	463	1,063		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3936	DROMANA		995		
	3937	RED HILL		947		
	3939	CAPEL SOUND	325			
Peninsula Total			**1,623**	**3,541**		
South Western Corridor	3212	AVALON	4,442	6,934		5,790
	3214	CORIO	2,782	1,260	220	227
	3215	NORTH GEELONG	2,845	10,939		1,870
	3216	BELMONT	249	196		1,900
	3219	BREAKWATER	989	146		
	3220	SOUTH GEELONG	2,024	10,476		
	3221	GNARWARRE	572		106	
	3224	MOOLAP	139	684		
	3228	TORQUAY	725			
	3250	COLAC	248	2,077		
	3272	MORTLAKE	234			
	3277/3280	ALLANSFORD/ WARRNAMBOOL	779	38,851		
	3305	PORTLAND	158			
South Western Corridor Total			**16,186**	**71,563**	**326**	**9,787**
Western Corridor	3340	PARWAN	110	458		
	3342	BALLAN		156		842
	3350	ALFREDTON	1,294	157		
	3352	MAGPIE	125			
	3353	BALLARAT		304		
	3355	WENDOUREE	864	1,138		109
	3356	DELACOMBE	364	315		
	3360	MANNIBADAR				403
	3364	SMEATON	158	1,904		
	3373	BEAUFORT	108			
	3377	ARARAT		1,867		
	3388	RUPANYUP		1,802		
	3393	WARRACKNABEAL		2,431		
	3400	HORSHAM	202	10,793		
	3401	BUNGALALLY	106	117		
	3414	DIMBOOLA		352		
	3418	NHILL		172		
	3458	TRENTHAM	137			
Western Corridor Total			**3,468**	**21,966**		**1,354**
Eastern Corridor	3139	WOORI YALLOCK	358			
	3770	COLDSTREAM	227			
	3775	YARRA GLEN	146			
	3799	WESBURN	122			
	3818	DROUIN	282	943		
	3820	WARRAGUL	275	108		
	3825	MOE	180	856		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3840	MORWELL	1,808	21,992		
	3844	TRARALGON EAST	165			
	3858	HEYFIELD	279			
	3875	BAIRNSDALE	133			
	3885	YALMY	427			
	3953	LEONGATHA	510			
	3962	AGNES	416			
	3981	KOO WEE RUP	173			
	3984	LANG LANG	132			
Eastern Corridor Total			**5,633**	**23,899**		
North Western Corridor	3395	BEULAH		472		635
	3438	NEW GISBORNE	178			
	3444	KYNETON		102		
	3450	CASTLEMAINE	148			
	3465	MARYBOROUGH	236			
	3467	AVOCA		109		
	3472	DUNOLLY				641
	3480	DONALD	2,340	3,103		
	3496	RED CLIFFS		260		
	3498	IRYMPLE	165			
	3501	KOORLONG	460	113		
	3502/3505	MILDURA/ MERBEIN	557	30,028		
	3516	BRIDGEWATER		5,385		
	3537	BOORT	125			
	3549	ROBINVALE	715			
	3550	EAST BENDIGO	681	3,426		
	3551	EPSOM	364	2,753		
	3555	GOLDEN SQUARE	290	149		
	3557	GOORNONG	106			
	3579	KERANG	226			
	3585	SWAN HILL	104	3,652		
	3589	WOORINEN NORTH	127			
	3597	KOOLOONONG		3,651		
Northern Western Corridor Total			**6,822**	**53,203**		**1,276**
Goulburn Corridor	3523	HEATHCOTE		201		
	3559	COLBINABBIN		356		
	3564	ECHUCA	263			
	3616	TATURA	113	911		
	3620	KYABRAM	108			
	3621	TONGALA	122	866		
	3629	MOOROOPNA NORTH	670	158		
	3630	SHEPPARTON	988	1,181		
	3631	LEMNOS	557			602
	3636	NUMURKAH		2,331		
	3638	NATHALIA		143		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	3644	COBRAM		692		
Goulburn Corridor Total			**2,821**	**6,839**		**602**
Hume Corridor	3672	BENALLA	931			
	3677	WANGARATTA	687			
	3678	NORTH WANGARATTA	210			
	3690/3691	WEST WODONGA/ BARNAWATHA NORTH	1,292	2,092		
	3713	EILDON	100			
	3714	ALEXANDRA	136			
	3717	YEA	161			
	3718	MOLESWORTH	110			
	3719	YARCK	219			
	3720	BONNIE DOON	143			
	3726	DEVENISH	201			
	3727	ST JAMES	135			
	3728	TUNGAMAH	135			
	3732	MYRRHEE	205			
	3737	MYRTLEFORD	146			
	3738	OVENS	115			
	3739	EUROBIN	139			
	3741	BRIGHT	249			
	3746	ELDORADO	171			
	3747	BEECHWORTH	186			
	3749	YACKANDANDAH	126			
Hume Corridor Total			**5,797**	**2,092**		
Southern NSW & ACT	2550	YAMBULLA		1,900		
	2640	ALBURY	2,185			
	2641	LAVINGTON	141	306		
	2650	WAGGA WAGGA	1,001	7,572		
	2680	GRIFFITH	1,203	13,994		
	2706	DARLINGTON POINT	642	2,799		
	2714	TOCUMWAL	373	1,765		
Southern NSW & ACT Total			**5,545**	**28,336**		
Remainder of NSW	2000	SYDNEY	1,351			
	2010	SURRY HILLS	302			
	2015	ALEXANDRIA	121			
	2019	BANKSMEADOW	472		543	2,400
	2027	DARLING POINT	1,469			
	2036	MATRAVILLE	204			
	2060	NORTH SYDNEY	268			
	2067	CHATSWOOD	110	140		
	2085	BELROSE		865		
	2100	ALLAMBIE HEIGHTS	201			
	2104	BAYVIEW		165		
	2113	NORTH RYDE	121	3,271		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	2120	PENNANT HILLS	302			
	2127	SYDNEY OLYMPIC PARK	357	144		
	2129	HOMEBUSH		279		
	2138	RHODES	114			
	2140	HOMEBUSH	368	302		
	2141	LIDCOMBE		1,456		
	2142	ROSEHILL	216			242
	2145	GREYSTANES	139			
	2147	SEVEN HILLS	254	223		
	2148	BLACKTOWN	333			
	2151	NORTH ROCKS	200			
	2153	BAULKHAM HILLS		304		
	2156	KENTHURST		170		
	2160	MERRYLANDS		1,699		
	2163	VILLAWOOD		103		
	2164	WETHERILL PARK	296			
	2166	CABRAMATTA	167			
	2170	MOOREBANK	256			
	2211	PADSTOW		584		
	2212	REVESBY	155			
	2229	CARINGBAH SOUTH		351		
	2250	KULNURA	131			
	2259	RAVENSDALE	192			
	2400	MOREE		5,072		
	2516	BULLI		1,934		
	2526	CORDEAUX		3,414		
	2565	DENHAM COURT	271			
	2566	MINTO	174			
	2659	WALLA WALLA	106			
	2713	FINLEY	108			
	2736	TOOLEYBUC		135		
	2766	EASTERN CREEK	574			
	2770	MOUNT DRUITT		183		
	2865	MANILDRA		367		484
	2880	BROKEN HILL	158			
	2190	GREENACRE			2,532	
	2795	COPPERHANNIA				186
Remainder of NSW Total			**9,490**	**21,161**	**3,075**	**3,312**
South Australia						
	5009	BEVERLEY	238	290		
	5010	REGENCY PARK	166			696
	5012	WOODVILLE NORTH	206			
	5013	WINGFIELD	282			
	5033	RICHMOND	117			
	5035	BLACK FOREST	106			
	5039	EDWARDSTOWN	145	200		

Region	Postcode	Suburb	International and Mainland Coastal		Tasmanian	
			Import TEU	Export TEU	Import TEU	Export TEU
	5063	PARKSIDE		324		
	5067	NORWOOD		279		
	5068	KENSINGTON PARK		410		
	5070	FELIXSTOW		1,538		
	5072	WOODFORDE		118		
	5073	ROSTREVOR		1,575		
	5090	HOPE VALLEY	988			
	5094	DRY CREEK		242		
	5121	PENFIELD GARDENS		260		
South Australia Total			**2,248**	**5,236**	**-**	**696**
Northern Territory			**123**			
Queensland			**2,750**	**752**	**1,604**	**4,641**
Western Australia			**752**	**3,324**	**26**	**1,044**
Australia Total			**1,193,417**	**677,105**	**72,729**	**122,769**

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