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Cover Photo: A LINX Port Botany rail shuttle commences unloading containers at Patrick Sydney AutoRail Terminal, June 2021. Photo courtesy of NSW Ports.

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Foreword

Waterline is published by the Bureau of Infrastructure and Transport Research Economics (BITRE) and provides information on container movements on both the wharf-side and the landside of five Australian major port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. This issue of *Waterline* covers port terminal activity up to the June quarter 2021.

Waterline reports on trends in container handling productivity on the waterfront in Australia, as well as the cost of importing and exporting containers. It covers loading and unloading of container ships and the landside transport of containers to and from container terminals. Waterline provides the latest available data on stevedoring productivity and landside performance.

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Shona Rosengren
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September 2022

At a glance

Throughput

- The *number of twenty-foot equivalent units (TEUs) handled by stevedores* in the Five ports increased to 4.2 million TEUs in January–June 2021. This is an increase of 0.7 per cent over previous record throughput in July–December 2020, and 16.8 per cent higher than in January–June 2020.

  The record total throughput comes despite declines of 11.6 per cent in Adelaide, and 2.6 per cent in Fremantle, compared to July–December 2020, these being offset by increases in Brisbane (3.1 per cent), Sydney (1.7 per cent) and Melbourne (1.3 per cent).

- The Five-port average *lifts per berth visit* declined to 1476 lifts, a decrease of 1.9 per cent relative to July–December 2020. The largest decrease occurred in Sydney (4.8 per cent), followed by Adelaide (3.8 per cent) and Brisbane (2.3 per cent).

  Given the growth in overall throughput, these declines are offset in most ports by increases in the *number of unitised cellular container (UCC) vessels handled by stevedores*: Sydney increased by 7.0 per cent to 504 vessel calls; Brisbane by 4.0 per cent (466 calls) and Melbourne by 2.2 per cent (467 calls). Fremantle was steady, while only Adelaide suffered a significant decline in this measure also—5.4 per cent to 140 vessel calls.

  While the decline in *lifts per berth visit* runs counter to the broader trend of increasing vessel and call sizes, this is typical of seasonality in the January–June period. (The measure is still 13.0 per cent above that seen in January–June 2020.)

Productivity

- Stevedoring velocity remained low in January–June 2021 compared to historical trends, with the Five-port average *crane rate*, *labour rate* and *ship rate* (measured in containers per hour) down by 7.3 per cent, 1.9 per cent and 8.7 per cent, respectively, compared to January–June 2020.

  Some recovery is evident compared to the immediate prior period, however: compared to July–December 2020, the Five-port average *crane rate* improved by 3.3 per cent and *labour rate* by 4.0 per cent, although *ship rate* declined by 0.7 per cent due to declines in Fremantle (14.7 per cent) and Melbourne (6.9 per cent).

- Average *truck turnaround time* across the Five ports improved by 4.5 per cent (1.5 minutes) compared to July–December 2020, despite *average containers per truck* also increasing slightly (0.8 per cent).

  As a result, *container turnaround time* improved in all five ports relative to July–December 2020: 13.6 per cent in Fremantle, 12.3 per cent at Brisbane, 10.0 per cent in Adelaide, 2.6 per cent at Melbourne and 2.5 per cent at Sydney.

- *Lifts per berth hour* declined by 5.2 per cent on average across the Five ports compared to January–June 2020, to 38.8 lifts. Again, some recovery is evident, as compared to July–December 2020 this constitutes a 6.6 per cent improvement in the same measure.

  Melbourne again had the best performance, at 50.8 lifts per berth hour.

- The *number of VBS timeslots actually used* across the Five ports decreased by 3.1 per cent in January–June 2021 compared to January–June 2020.

  Across the same period, the *VTS/TAS timeslots used by trucks in all off-peak periods, as a proportion of total timeslots used* declined by 1.5 percentage points, as usage of weekend timeslots declined by 2.2 percentage points.

Port interface costs

- In constant-price terms, port interface costs for exports declined in January–June 2021 compared to January–June 2020.
  - Export costs for small (5 000–20 000 gross tonnes) vessels declined by $53
  - For mid-sized (35 000–50 000 gross tonnes) vessels, export costs declined by $43
  - Export costs for large (65 000–80 000 gross tonnes) vessels declined by $37
- In constant-price terms, port interface costs for imports declined in January–June 2021 compared to January–June 2020.
  - Import costs for small (5 000–20 000 gross tonnes) vessels declined by $51
  - For mid-sized (35 000–50 000 gross tonnes) vessels, import costs declined by $29
  - Import costs for large (65 000–80 000 gross tonnes) vessels declined by $25

Acknowledgements

BITRE is particularly grateful for the assistance of the following organisations in the provision of data used to prepare *Waterline*:

- stevedoring companies: DP World, Flinders Adelaide Container Terminal, Hutchison Ports Australia, Patrick and Victoria International Container Terminal
- individual port authorities and corporations: Port of Brisbane Pty Ltd, Maritime Safety Queensland, Port Authority of New South Wales, NSW Ports, Port of Melbourne Operations Pty Ltd, Flinders Ports and Fremantle Ports
- Ports Australia
- Containerchain Pty Ltd
- shipping lines
- customs brokers
- road transport operators
- pilot, tug and mooring operators.

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CHAPTER 1
Measures of container terminal throughput

Overview

Chapter 1 of *Waterline* presents all container port throughput indicators in a consolidated format. The indicators are in four groups—wharf-side, landside, whole of container terminal and whole of port.

There are four wharf-side quarterly throughput indicators:

1.1 UCC ships handled, as reported by stevedores

1.2 Total containers handled by stevedores

1.3 Total TEUs handled by stevedores

1.4 40-foot containers as per cent of all containers handled

There are seven landside quarterly throughput indicators:

1.5 Number of trucks used in VBS/TAS operations

1.6 Total number of containers transported by trucks and rail

1.7 Total number of containers transported by trucks

1.8 Number of containers by rail

1.9 Total number of TEUs transported by trucks and rail

1.10 Total number of TEUs transported by trucks

1.11 Number of TEUs by rail

Using data from port authorities, there are two quarterly whole-of-terminal throughput indicators:

1.12 Total number of container ship visits

1.13 Total number of containers (lifts) exchanged

Using data from port authorities, there are seven quarterly whole-of-port throughput indicators:

1.14 Total cargo throughput

1.15 Non-containerised general cargo throughput

1.16 Total number of TEUs exchanged

1.17 Number of TEUs: Full import

1.18 Number of TEUs: Empty import

1.19 Number of TEUs: Full export

1.20 Number of TEUs: Empty export

Indicators are presented separately for Brisbane, Sydney, Melbourne, Adelaide and Fremantle, as well as for the five ports as a whole, where applicable.

Container terminal

The movement of containers from/to the container ship takes place on a wharf or pier known as a container terminal. Unlike a traditional wharf, a container terminal needs a large stacking area adjoining the wharf for storing containers. While in the terminal, the containers are at the disposal of a stevedoring company.

Stevedoring

The term stevedore can refer to a company which manages the operation of loading or unloading a ship. In Australia the people who work on the waterfront are referred to as waterside workers or stevedores. A stevedoring company typically owns equipment used in the loading or discharging operation and hires labour for that purpose. A stevedoring company may also contract with a terminal owner to manage all terminal operations. In Australia, there are three major stevedoring companies which handle containers: Patrick, Dubai Ports World and Hutchison Ports Australia.

Wharf-side throughput measures

Measures of throughput at the wharf-side relate only to containers moved by stevedoring companies from/to UCC ships at the container terminals.

Indicator 1.1 UCC ships handled, as reported by stevedores

Only fully cellular ships, or Unitised Cellular Container (UCC) ships, are included in this indicator. Normally these purpose built container ships are equipped with 40-foot cell guides below deck as a minimum requirement.

Indicator 1.2 Total containers handled

This is the total number of containers lifted on/off UCC ships at specialised container berths. These counts are not standardised to account for different container sizes. Thus, one 20-foot container and one 40-foot container are counted as two containers.

Indicator 1.3 Total TEUs handled

This indicator is similar to total containers handled (Indicator 1.2), but measured in 'twenty-foot equivalent units' (TEUs). It accounts for containers of different sizes. The TEU is a universally-recognised measure which represents containers of different sizes in a standardised way. A 20-foot container equals one TEU, and a 40-foot container equals two TEUs. Less common container sizes may be fractions of a TEU.

Indicator 1.4 40-foot containers as proportion of all containers handled

This is the number of 40-foot containers as a proportion of all containers handled.

Landside throughput measures

Indicator 1.5 Number of trucks used in VBS/TAS operations

This is the count of trucks processed through either the vehicle booking system (VBS) or the truck appointments system (TAS). This count excludes trucks that perform bulk runs of empty containers between the container parks and container terminals. This indicator counts trucks on a round trip. That is, a truck entering a container terminal and the same truck exiting the container terminal is counted as one truck.

Indicator 1.6 Total number of containers transported by trucks and rail

This indicator includes the total number of containers transported in all modes on the landside, either by trucks or by rail. Counts of containers in this indicator are further broken down into Indicator 1.7 (containers moved by trucks) and Indicator 1.8 (containers moved by rail).

Indicator 1.7 Total number of containers transported by trucks

This indicator includes the total number of containers transported by VBS/TAS trucks. This indicator is computed using data provided by stevedores. Up to Waterline 55, this indicator included the trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.8 Number of containers by rail

The total number of containers carried by rail in or out of container terminals, using data supplied by container port operators.

This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'On-dock' refers to rail sidings accessible by yard container handling equipment, whereas 'near-dock' sidings are those within the port precinct, but accessed via the public road network. Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.

Indicator 1.9 Total number of TEUs transported by trucks and rail

This indicator includes the total number of TEUs transported in all modes on the landside, either by trucks or by rail. Counts of TEUs in this indicator are further broken down into Indicator 1.10 (TEUs moved by trucks) and Indicator 1.11 (TEUs moved by rail).

Indicator 1.10 Total number of TEUs transported by trucks

This indicator includes the total number of TEUs transported by VBS/TAS trucks. Up to Waterline 55, this indicator included the number of TEUs transported by trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.11 Number of TEUs by rail

The total number of TEUs carried by rail in or out of container terminals, using data supplied by container port operators.

This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'On-dock' refers to rail sidings accessible by yard container handling equipment, whereas 'near-dock' sidings are those within the port precinct, but accessed via the public road network. Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.

Whole of container terminal throughput

Indicator 1.12 Total number of container ship visits

This is a count of all port calls by UCC ships where the vessel visited and exchanged containers at the container terminal. Tables 1.7 and 1.8 summarise ship visits by size of ship and by container port.

Indicator 1.13 Total number of containers (lifts) exchanged

This indicator is estimated using Indicator 1.4 (proportion of 40-foot containers) and the total number of TEUs exchanged with container vessels, as reported by ports.

Whole of port throughput

Indicator 1.14 Total cargo throughput

This is the weight, measured in tonnes, of all container and non-container general cargoes that passed through the port.

Indicator 1.15 Non-containerised general cargo throughput

This is the weight of non-container general cargoes processed through a port. Non-container general cargo refers to break bulk commodities including machinery, iron and steel products, timber, paper and timber products and other general cargoes. It does not include bulk cargoes.

Indicator 1.16 Total number of TEUs exchanged

This is a count of TEUs, exchanged through the port. This count is further broken down into Indicators 1.17 to 1.20.

Indicator 1.17 Full import TEUs

This is a count of full containers in TEUs imported (unloaded) at the port.

Indicator 1.18 Empty import TEUs

This is a count of empty containers in TEUs imported (unloaded) at the port.

Indicator 1.19 Full export TEUs

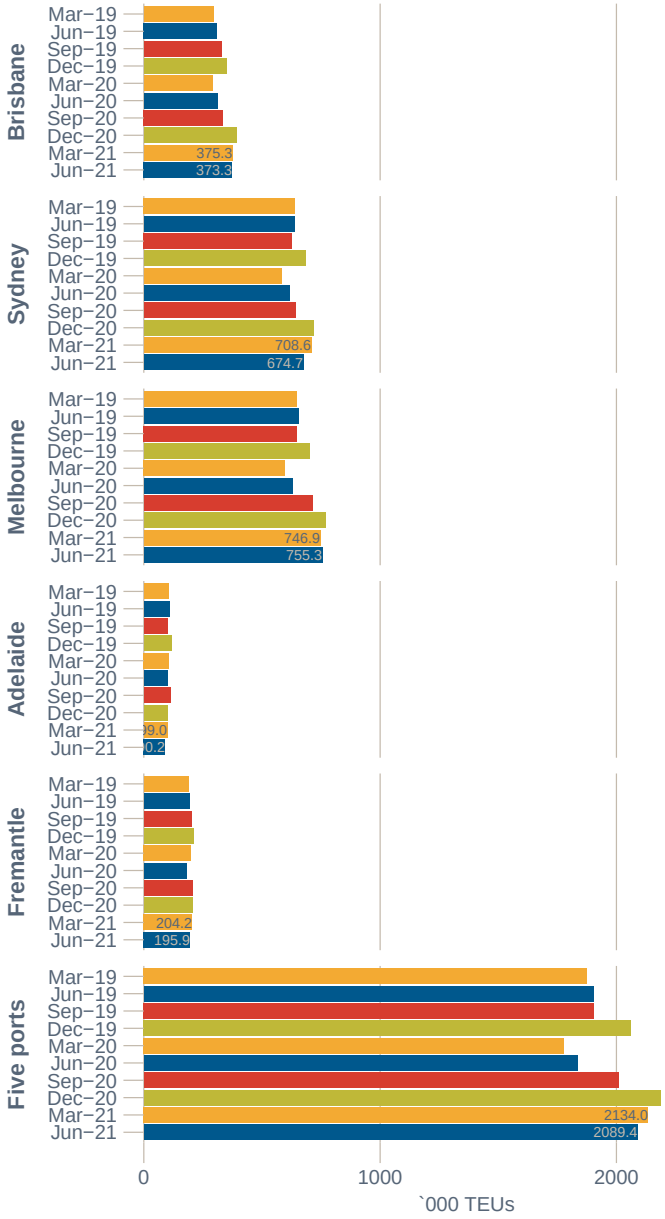
This is a count of full containers in TEUs exported (loaded) at the port.

Indicator 1.20 Empty export TEUs

This is a count of empty containers in TEUs exported (loaded) at the port.

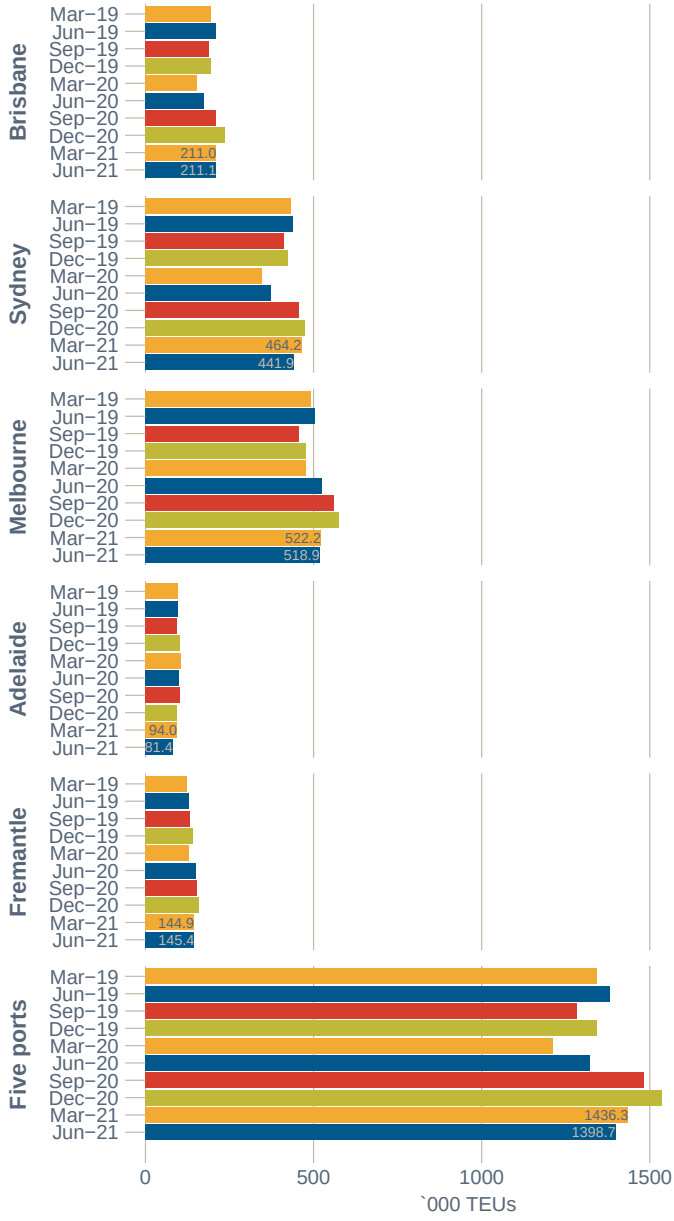
Automated rail mounted gantry (ARMG) crane at Patrick Sydney AutoRail Terminal (foreground) and Patrick Sydney AutoStrad Terminal (background), October 2020. Photo courtesy of NSW Ports.

Figure 1.1 TEU throughput by container port: wharf-side



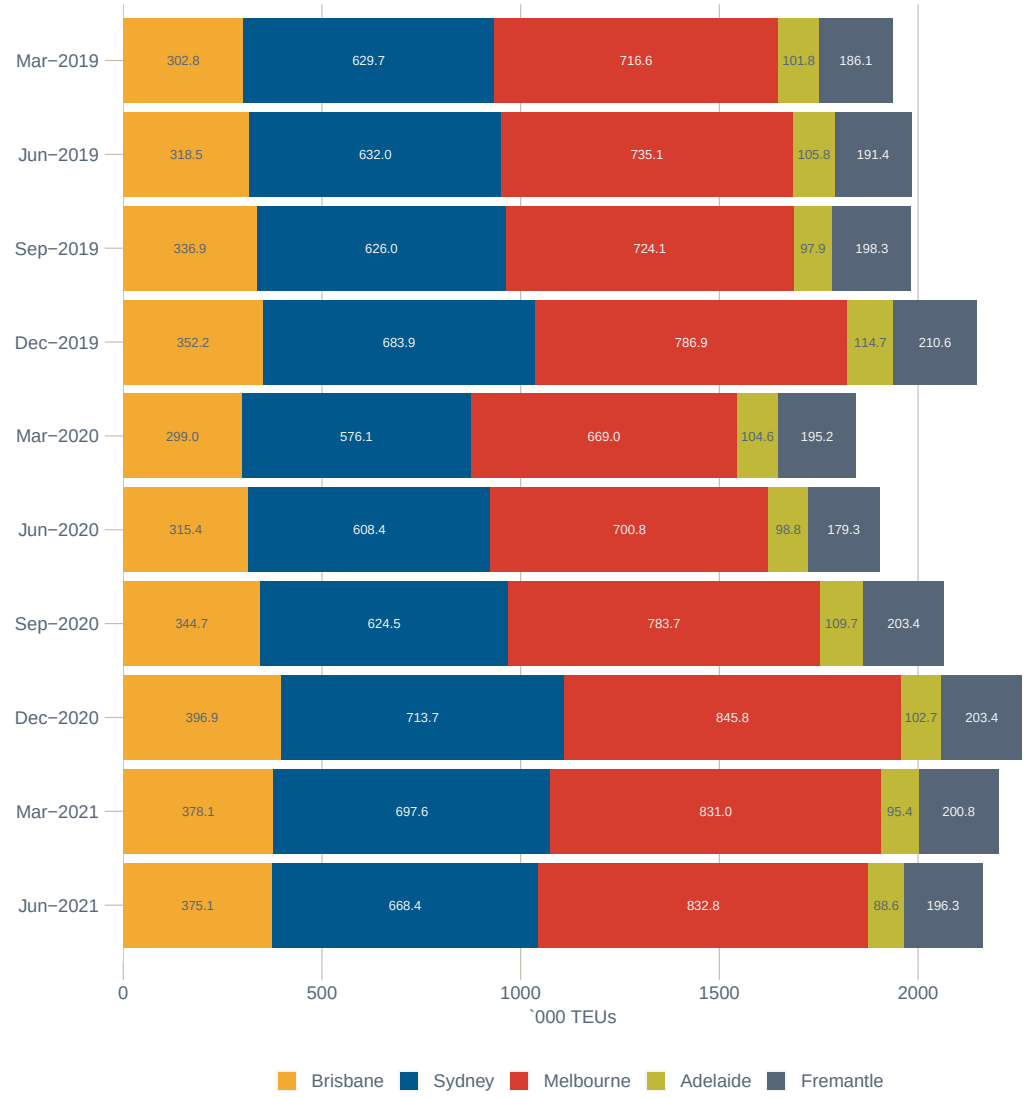
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 1.2 TEU throughput by container port: landside



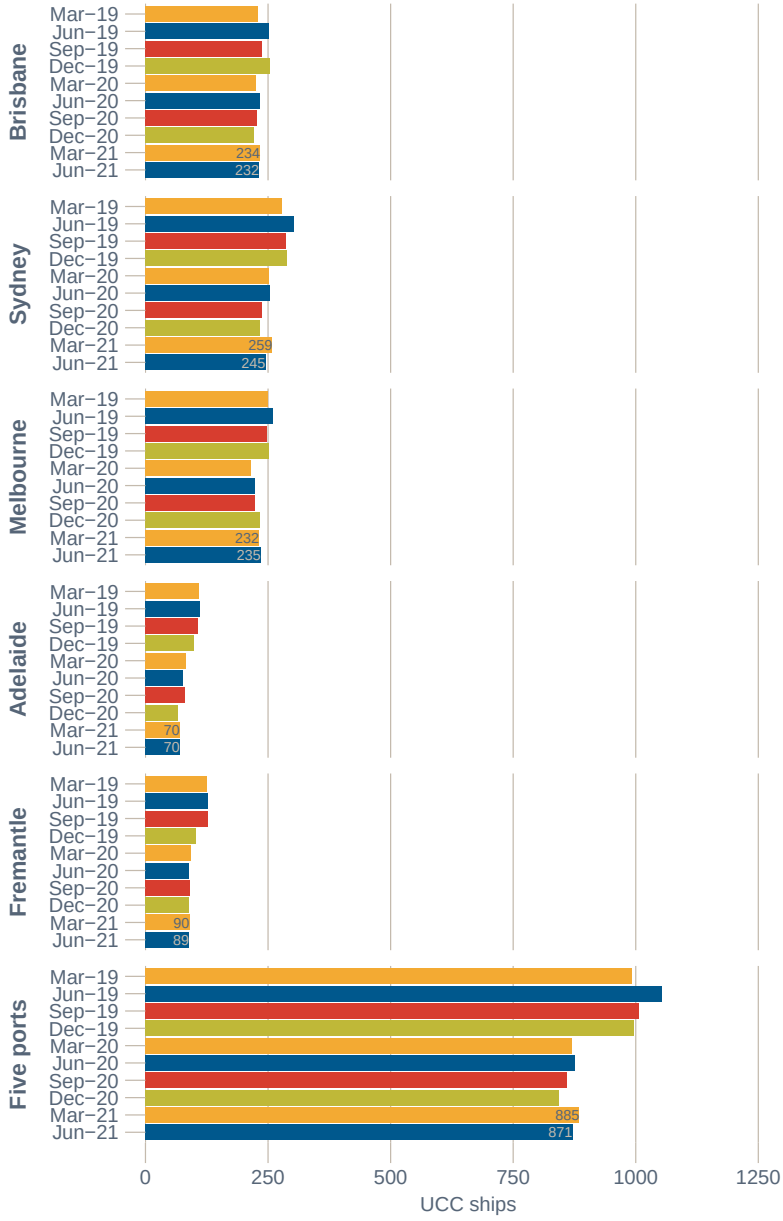
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021), Victoria International Container Terminal (2021), Flinders Ports (2021), Port of Brisbane Pty Ltd (2021), Port of Melbourne Operations Pty Ltd (2021) and Fremantle Ports (2021)

Figure 1.3 TEU throughput by container port: whole of port



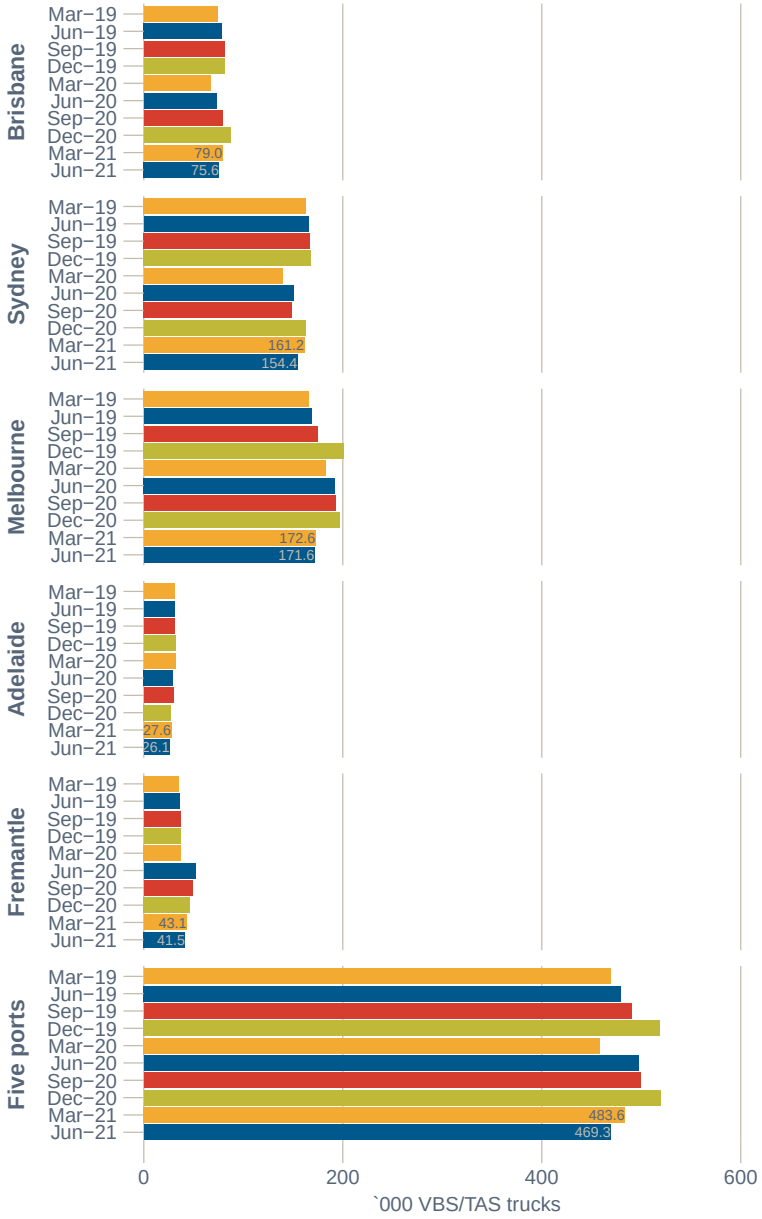
Sources: Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Figure 1.4 Container terminal traffic: number of UCC ships handled



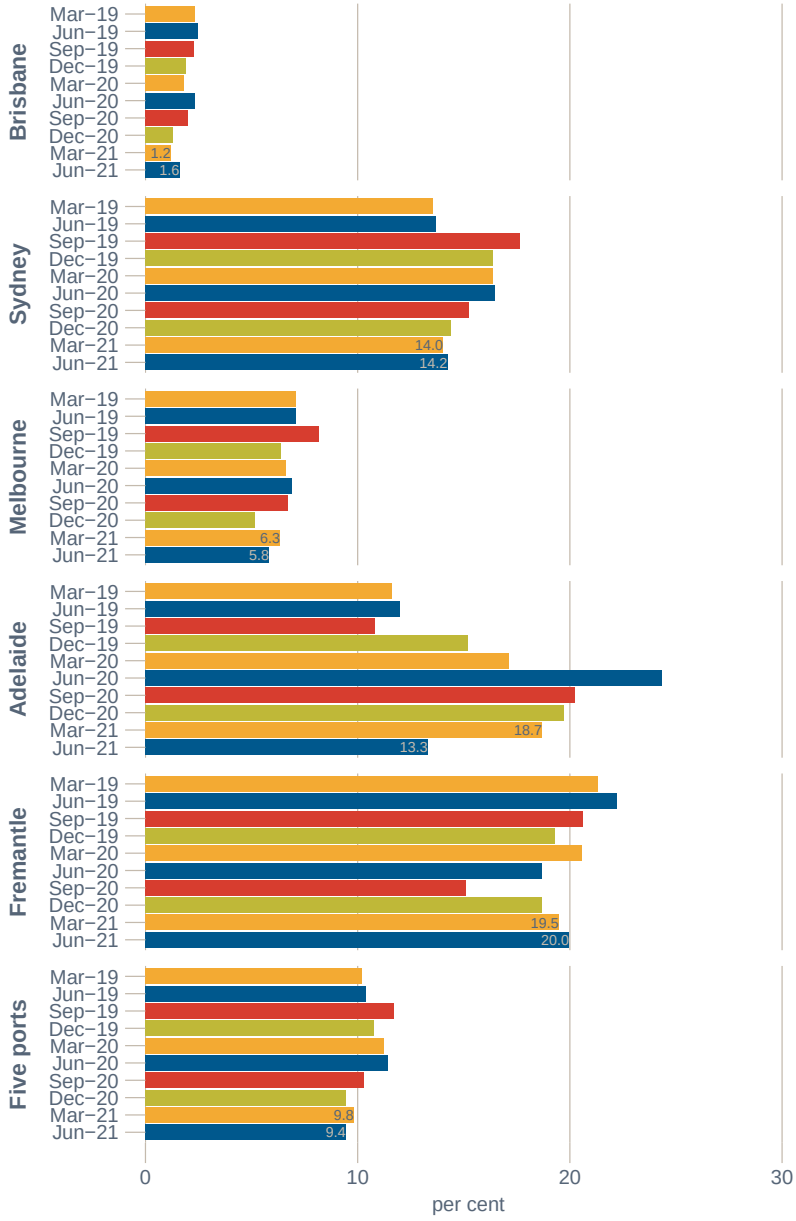
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 1.5 Container terminal traffic: number of trucks used in VBS/TAS operations



Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 1.6 Rail share of TEUs handled



Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021), Flinders Ports (2021), Port of Brisbane Pty Ltd (2021), Port of Melbourne Operations Pty Ltd (2021) and Fremantle Ports (2021)

Table 1.1 Container terminal throughput: Brisbane

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	230	252	**482**	237	254	**491**	226	233	**459**	227	221	**448**	234	232	**466**
Total containers handled *('000)*	190.6	198.6	**389.2**	211.8	221.8	**433.6**	189.1	201.2	**390.3**	212.4	246.0	**458.4**	234.5	234.8	**469.3**
Total TEUs handled *('000)*	295.9	309.1	**605.0**	329.4	349.3	**678.8**	291.9	311.9	**603.7**	334.5	391.5	**726.0**	375.3	373.3	**748.5**
40-foot containers as proportion of all containers handled *(%)*	55.3	55.6	**55.5**	55.6	57.5	**56.5**	54.4	55.0	**54.7**	57.5	59.1	**58.4**	60.0	58.9	**59.5**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	73.8	78.5	**152.2**	80.9	81.0	**161.9**	67.0	73.0	**140.0**	78.9	86.9	**165.9**	79.0	75.6	**154.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	130.9	138.8	**269.6**	143.5	143.8	**287.3**	117.2	128.0	**245.2**	136.1	153.2	**289.3**	140.7	139.3	**280.0**
Containers by VBS/TAS trucks *('000)*	124.5	131.7	**256.3**	136.8	138.0	**274.8**	112.4	121.5	**233.8**	130.2	148.7	**278.9**	136.7	134.0	**270.7**
Containers by rail *('000)*	6.3	7.0	**13.3**	6.8	5.7	**12.5**	4.8	6.5	**11.3**	6.0	4.5	**10.4**	4.1	5.3	**9.4**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	196.3	210.4	**406.7**	189.7	194.9	**384.6**	153.3	173.1	**326.4**	210.4	236.3	**446.8**	211.0	211.1	**422.1**
TEUs by VBS/TAS trucks *('000)*	189.3	202.7	**392.1**	182.1	188.3	**370.4**	148.0	165.8	**313.7**	203.8	231.2	**435.0**	206.5	205.1	**411.6**
TEUs by rail *('000)*	7.0	7.7	**14.7**	7.6	6.6	**14.2**	5.3	7.3	**12.7**	6.7	5.1	**11.7**	4.5	6.0	**10.5**
Whole of container terminal															
Total number of container ship visits	239	257	**496**	247	263	**510**	237	232	**469**	235	224	**459**	240	237	**477**
Total number of containers (lifts) exchanged *('000)*	190.3	197.8	**388.2**	213.5	218.2	**431.7**	190.7	189.7	**380.3**	209.2	237.4	**446.6**	227.2	226.1	**453.3**
Whole of port															
Total cargo throughput *(million tonnes)*	8.2	8.5	**16.8**	8.7	8.2	**16.9**	8.1	6.4	**14.5**	7.1	7.3	**14.4**	7.5	7.4	**14.9**
Non-containerised general cargo throughput *(million tonnes)*	0.2	0.2	**0.5**	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.3	0.3	**0.6**
Total TEUs exchanged *('000)*	302.8	318.5	**621.3**	336.9	352.2	**689.1**	299.0	315.4	**614.4**	344.7	396.9	**741.6**	378.1	375.1	**753.2**
Full import *('000)*	139.3	142.7	**282.0**	149.1	159.6	**308.7**	131.3	145.7	**277.0**	162.1	189.0	**351.1**	177.5	166.5	**344.0**
Empty import *('000)*	13.7	18.1	**31.9**	26.6	17.1	**43.8**	15.1	20.3	**35.4**	16.6	15.4	**32.0**	13.2	19.7	**32.9**
Full export *('000)*	79.8	92.8	**172.6**	97.6	90.5	**188.1**	78.6	86.4	**165.0**	88.6	90.8	**179.3**	74.0	91.2	**165.2**
Empty export *('000)*	69.9	64.9	**134.8**	63.6	85.0	**148.5**	73.9	63.1	**137.0**	77.4	101.7	**179.1**	113.5	97.6	**211.1**

Note: Blank cells mean no data were reported in that period.

Sources: DP World (2021), Hutchison Ports Australia (2021), Patrick (2021) and Port of Brisbane Pty Ltd (2021)

Table 1.2 Container terminal throughput: Sydney

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	279	303	**582**	287	289	**576**	252	254	**506**	238	233	**471**	259	245	**504**
Total containers handled *('000)*	408.4	408.2	**816.6**	400.4	430.7	**831.1**	369.9	389.7	**759.6**	397.1	441.5	**838.5**	437.9	419.6	**857.4**
Total TEUs handled *('000)*	640.0	638.2	**1 278.2**	627.7	684.0	**1 311.7**	583.7	616.0	**1 199.7**	641.9	719.0	**1 360.9**	708.6	674.7	**1 383.4**
40-foot containers as proportion of all containers handled *(%)*	56.7	56.4	**56.5**	56.8	58.8	**57.8**	57.8	58.1	**57.9**	61.7	62.9	**62.3**	61.8	60.8	**61.3**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	163.1	165.5	**328.6**	167.1	168.0	**335.1**	139.4	151.1	**290.5**	148.9	162.4	**311.3**	161.2	154.4	**315.6**
Total containers transported by VBS/TAS trucks and rail *('000)*	285.4	290.0	**575.4**	307.2	305.8	**613.0**	253.1	276.3	**529.5**	285.7	297.0	**582.7**	293.7	280.1	**573.8**
Containers by VBS/TAS trucks *('000)*	229.8	233.9	**463.7**	237.3	235.6	**472.9**	192.1	211.8	**403.9**	223.7	229.7	**453.4**	226.4	214.6	**441.0**
Containers by rail *('000)*	55.6	56.1	**111.7**	69.8	70.2	**140.1**	61.0	64.6	**125.6**	62.0	67.3	**129.3**	67.3	65.5	**132.7**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	431.6	439.7	**871.3**	413.2	424.5	**837.7**	346.7	374.4	**721.2**	457.2	473.3	**930.5**	464.2	441.9	**906.1**
TEUs by VBS/TAS trucks *('000)*	344.9	352.4	**697.2**	302.4	312.5	**614.9**	251.2	272.9	**524.1**	359.5	369.6	**729.1**	364.8	345.9	**710.6**
TEUs by rail *('000)*	86.7	87.3	**174.1**	110.9	112.0	**222.8**	95.5	101.5	**197.1**	97.7	103.7	**201.4**	99.4	96.1	**195.5**
Whole of container terminal															
Total number of container ship visits	276	297	**573**	285	289	**574**	250	253	**503**	236	231	**467**	256	240	**496**
Total number of containers (lifts) exchanged *('000)*	407.9	400.5	**808.4**	398.5	430.9	**829.5**	360.9	387.7	**748.7**	392.7	432.2	**824.9**	429.0	405.0	**834.0**
Whole of port															
Total cargo throughput *(million tonnes)*	5.8	6.2	**12.0**	6.1	5.7	**11.7**	5.4	5.7	**11.1**	5.3	6.7	**12.0**	7.7	6.6	**14.3**
Non-containerised general cargo throughput *(million tonnes)*	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.1	0.0	**0.1**	0.0	0.0	**0.0**	0.0	0.0	**0.0**
Total TEUs exchanged *('000)*	629.7	632.0	**1 261.7**	626.0	683.9	**1 309.9**	576.1	608.4	**1 184.5**	624.5	713.7	**1 338.2**	697.6	668.4	**1 366.0**
Full import *('000)*	307.5	310.2	**617.7**	320.8	339.5	**660.3**	283.1	308.6	**591.7**	323.1	362.1	**685.3**	340.3	336.1	**676.5**
Empty import *('000)*	2.3	4.0	**6.3**	4.1	4.1	**8.2**	3.1	3.0	**6.2**	1.2	0.9	**2.1**	2.1	1.7	**3.8**
Full export *('000)*	118.6	127.0	**245.6**	125.8	126.1	**251.9**	113.2	114.0	**227.2**	103.8	109.1	**213.0**	116.8	125.3	**242.1**
Empty export *('000)*	201.3	190.8	**392.1**	175.3	214.2	**389.5**	176.7	182.8	**359.4**	196.4	241.6	**437.9**	238.4	205.3	**443.6**

Note: Blank cells mean no data were reported in that period.
Cells with a value of ''0.0'' mean that data were reported but rounded to zero.
Sources: DP World (2021), Hutchison Ports Australia (2021), Patrick (2021) and NSW Ports (2021)

Table 1.3 Container terminal throughput: Melbourne

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	250	261	**511**	247	252	**499**	215	223	**438**	223	234	**457**	232	235	**467**
Total containers handled *('000)*	416.4	421.5	**837.9**	416.1	446.5	**862.6**	384.4	405.8	**790.2**	449.9	482.5	**932.4**	468.2	473.0	**941.2**
Total TEUs handled *('000)*	647.4	654.8	**1 302.2**	647.8	699.9	**1 347.7**	597.1	629.3	**1 226.4**	712.8	769.8	**1 482.6**	746.9	755.3	**1 502.2**
40-foot containers as proportion of all containers handled *(%)*	55.4	55.4	**55.4**	55.7	56.7	**56.2**	55.3	55.1	**55.2**	58.4	59.6	**59.0**	59.5	59.7	**59.6**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	166.1	168.8	**334.8**	174.5	201.2	**375.7**	182.8	192.1	**374.9**	193.0	196.4	**389.4**	172.6	171.6	**344.2**
Total containers transported by VBS/TAS trucks and rail *('000)*	318.0	322.6	**640.7**	351.2	416.8	**768.0**	340.6	359.1	**699.7**	354.3	364.7	**719.0**	335.6	331.9	**667.5**
Containers by VBS/TAS trucks *('000)*	288.6	292.7	**581.3**	317.3	388.3	**705.6**	315.1	331.0	**646.1**	324.0	339.8	**663.8**	305.9	304.3	**610.2**
Containers by rail *('000)*	29.5	29.9	**59.4**	34.0	28.5	**62.4**	25.5	28.1	**53.6**	30.3	25.0	**55.2**	29.7	27.6	**57.3**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	493.7	503.1	**996.8**	455.5	477.7	**933.2**	477.9	523.7	**1 001.6**	559.4	574.5	**1 133.9**	522.2	518.9	**1 041.1**
TEUs by VBS/TAS trucks *('000)*	447.9	456.5	**904.4**	402.6	433.1	**835.6**	438.2	480.2	**918.4**	511.4	534.7	**1 046.1**	474.8	474.9	**949.7**
TEUs by rail *('000)*	45.8	46.5	**92.3**	52.9	44.6	**97.5**	39.7	43.5	**83.2**	48.0	39.8	**87.8**	47.4	44.0	**91.4**
Whole of container terminal															
Total number of container ship visits	251	257	**508**	248	235	**483**	221	223	**444**	221	234	**455**	225	227	**452**
Total number of containers (lifts) exchanged *('000)*	415.8	413.8	**829.6**	416.6	418.8	**835.3**	382.3	399.5	**781.8**	436.8	472.9	**909.8**	449.2	457.0	**906.2**
Whole of port															
Total cargo throughput *(million tonnes)*	8.8	9.0	**17.8**	9.0	9.2	**18.2**	8.4	9.0	**17.5**	9.3	9.7	**18.9**	9.6	9.9	**19.5**
Non-containerised general cargo throughput *(million tonnes)*	0.5	0.5	**1.0**	0.5	0.4	**0.9**	0.5	0.4	**0.8**	0.4	0.5	**0.9**	0.5	0.6	**1.1**
Total TEUs exchanged *('000)*	716.6	735.1	**1 451.7**	724.1	786.9	**1 511.0**	669.0	700.8	**1 369.8**	783.7	845.8	**1 629.6**	831.0	832.8	**1 663.8**
Full import *('000)*	325.2	331.2	**656.3**	341.3	356.8	**698.1**	299.7	324.2	**623.9**	366.8	406.2	**773.1**	381.2	375.5	**756.6**
Empty import *('000)*	33.6	35.8	**69.5**	32.3	35.3	**67.6**	36.5	35.5	**72.1**	31.6	29.1	**60.8**	37.0	33.7	**70.7**
Full export *('000)*	212.1	229.7	**441.8**	223.8	228.3	**452.1**	206.8	222.0	**428.9**	234.8	236.1	**470.9**	226.0	229.8	**455.8**
Empty export *('000)*	145.7	138.4	**284.1**	126.7	166.6	**293.3**	125.9	119.0	**244.9**	150.5	174.4	**324.9**	186.8	193.8	**380.7**

Note: Blank cells mean no data were reported in that period.
The counts of containers by rail include those handled by Qube Logistics.

Sources: DP World (2021), Patrick (2021), Victoria International Container Terminal (2021) and Port of Melbourne Operations Pty Ltd (2021)

Table 1.4 Container terminal throughput: Adelaide

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	109	111	**220**	107	98	**205**	83	77	**160**	81	67	**148**	70	70	**140**
Total containers handled *('000)*	72.2	75.2	**147.4**	70.0	84.0	**154.0**	76.0	69.9	**145.9**	76.2	70.1	**146.3**	68.5	61.3	**129.9**
Total TEUs handled *('000)*	104.4	107.5	**211.9**	99.1	117.3	**216.4**	106.4	100.0	**206.3**	113.0	101.0	**214.0**	99.0	90.2	**189.2**
40-foot containers as proportion of all containers handled *(%)*	44.6	42.9	**43.7**	41.5	39.6	**40.5**	39.9	43.1	**41.4**	48.2	44.1	**46.2**	44.5	47.1	**45.7**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	31.1	30.9	**61.9**	30.7	31.6	**62.3**	32.0	29.3	**61.3**	29.6	27.2	**56.8**	27.6	26.1	**53.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	66.3	66.7	**133.0**	64.2	72.1	**136.3**	74.5	71.8	**146.3**	72.9	66.1	**139.0**	66.7	56.2	**122.9**
Containers by VBS/TAS trucks *('000)*	58.2	58.5	**116.8**	57.7	61.0	**118.7**	61.5	53.3	**114.7**	55.0	51.0	**106.0**	52.4	47.4	**99.8**
Containers by rail *('000)*	8.1	8.2	**16.2**	6.5	11.2	**17.7**	13.1	18.5	**31.6**	17.9	15.1	**33.0**	14.3	8.7	**23.0**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	95.5	97.6	**193.2**	93.1	103.0	**196.1**	104.6	99.8	**204.4**	103.5	94.0	**197.5**	94.0	81.4	**175.4**
TEUs by VBS/TAS trucks *('000)*	83.4	84.8	**168.2**	82.4	85.2	**167.6**	86.4	75.5	**161.9**	80.6	74.1	**154.8**	75.5	69.4	**144.9**
TEUs by rail *('000)*	12.1	12.9	**25.0**	10.7	17.8	**28.5**	18.2	24.3	**42.5**	22.9	19.9	**42.8**	18.5	12.0	**30.5**
Whole of container terminal															
Total number of container ship visits	108	112	**220**	107	99	**206**	83	77	**160**	82	70	**152**	69	70	**139**
Total number of containers (lifts) exchanged *('000)*	70.7	74.3	**145.0**	69.2	81.7	**150.9**	74.4	67.8	**142.2**	72.1	70.0	**142.1**	65.5	59.4	**125.0**
Whole of port															
Total cargo throughput *(million tonnes)*	3.0	3.3	**6.3**	3.0	3.3	**6.3**	3.1	3.8	**6.9**	3.6	3.7	**7.3**	4.2	3.7	**8.0**
Non-containerised general cargo throughput *(million tonnes)*	0.1	0.1	**0.2**	0.1	0.1	**0.2**	0.1	0.0	**0.1**	0.1	0.1	**0.2**	0.1	0.1	**0.2**
Total TEUs exchanged *('000)*	101.8	105.8	**207.6**	97.9	114.7	**212.6**	104.6	98.8	**203.4**	109.7	102.7	**212.4**	95.4	88.6	**184.0**
Full import *('000)*	40.9	38.8	**79.7**	35.8	45.5	**81.3**	34.5	33.0	**67.5**	41.2	39.4	**80.6**	40.4	33.6	**74.0**
Empty import *('000)*	9.9	15.5	**25.4**	13.9	15.1	**29.0**	15.4	15.1	**30.5**	11.0	11.5	**22.4**	7.0	6.3	**13.4**
Full export *('000)*	37.5	43.8	**81.3**	39.5	43.5	**83.0**	45.4	47.1	**92.5**	49.4	44.0	**93.5**	38.0	39.0	**77.0**
Empty export *('000)*	12.2	7.3	**19.5**	8.4	7.9	**16.3**	8.5	2.6	**11.1**	5.4	6.0	**11.4**	9.3	8.9	**18.2**

Note: Blank cells mean no data were reported in that period.
Cells with a value of ''0.0'' mean that data were reported but rounded to zero.
Sources: Flinders Adelaide Container Terminal (2021) and Flinders Ports (2021)

Table 1.5 Container terminal throughput: Fremantle

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	125	127	**252**	128	103	**231**	93	89	**182**	91	89	**180**	90	89	**179**
Total containers handled *('000)*	126.1	130.1	**256.2**	135.1	137.7	**272.9**	132.2	118.8	**251.0**	131.4	132.6	**264.0**	133.1	126.8	**259.9**
Total TEUs handled *('000)*	187.9	192.8	**380.7**	201.3	211.1	**412.3**	199.0	179.3	**378.3**	205.5	205.5	**411.0**	204.2	195.9	**400.1**
40-foot containers as proportion of all containers handled *(%)*	49.0	48.1	**48.6**	48.9	53.3	**51.1**	50.5	50.9	**50.7**	56.4	54.9	**55.7**	53.5	54.5	**54.0**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	35.3	36.1	**71.4**	37.0	36.9	**73.9**	37.5	51.8	**89.3**	48.8	46.5	**95.3**	43.1	41.5	**84.6**
Total containers transported by VBS/TAS trucks and rail *('000)*	89.9	93.8	**183.7**	93.0	90.1	**183.1**	96.7	116.8	**213.5**	102.3	105.4	**207.7**	100.3	96.3	**196.6**
Containers by VBS/TAS trucks *('000)*	59.8	61.3	**121.0**	62.4	60.7	**123.0**	67.7	93.2	**160.9**	80.1	79.7	**159.8**	73.8	71.1	**145.0**
Containers by rail *('000)*	30.2	32.6	**62.7**	30.6	29.5	**60.1**	29.0	23.6	**52.6**	22.2	25.6	**47.9**	26.5	25.1	**51.7**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	124.9	129.6	**254.5**	132.5	142.6	**275.2**	130.4	150.7	**281.1**	151.7	158.8	**310.6**	144.9	145.4	**290.3**
TEUs by VBS/TAS trucks *('000)*	84.8	86.8	**171.6**	91.0	101.9	**192.9**	89.5	117.2	**206.6**	120.7	120.5	**241.2**	105.2	106.2	**211.4**
TEUs by rail *('000)*	40.1	42.8	**82.9**	41.5	40.7	**82.3**	41.0	33.5	**74.5**	31.0	38.4	**69.4**	39.8	39.1	**78.9**
Whole of container terminal															
Total number of container ship visits	125	129	**254**	126	106	**232**	92	88	**180**	94	90	**184**	90	91	**181**
Total number of containers (lifts) exchanged *('000)*	124.9	129.2	**254.1**	132.2	134.0	**266.2**	125.5	115.5	**240.9**	130.2	128.8	**259.0**	130.1	127.2	**257.3**
Whole of port															
Total cargo throughput *(million tonnes)*	9.0	8.7	**17.7**	8.6	8.4	**17.0**	8.3	7.4	**15.7**	7.2	7.9	**15.1**	7.7	7.6	**15.3**
Non-containerised general cargo throughput *(million tonnes)*	0.2	0.2	**0.4**	0.2	0.3	**0.5**	0.2	0.2	**0.5**	0.2	0.3	**0.5**	0.2	0.3	**0.5**
Total TEUs exchanged *('000)*	186.1	191.4	**377.5**	198.3	210.6	**408.9**	195.2	179.3	**374.5**	203.4	203.4	**406.8**	200.8	196.3	**397.1**
Full import *('000)*	85.4	85.0	**170.4**	92.9	99.0	**191.8**	89.3	91.5	**180.8**	97.8	100.8	**198.7**	96.3	94.6	**190.8**
Empty import *('000)*	9.3	12.4	**21.7**	11.9	10.6	**22.5**	5.1	4.4	**9.5**	4.2	5.2	**9.4**	2.2	2.9	**5.1**
Full export *('000)*	64.4	66.7	**131.1**	65.6	63.9	**129.5**	55.9	52.4	**108.3**	51.3	55.2	**106.5**	56.1	60.2	**116.3**
Empty export *('000)*	27.0	27.3	**54.3**	27.9	37.1	**65.1**	44.9	31.1	**75.9**	50.1	42.2	**92.3**	46.2	38.7	**84.9**

Note: Blank cells mean no data were reported in that period.
Sources: DP World (2021), Patrick (2021) and Fremantle Ports (2021)

Table 1.6 Container terminal throughput: Five ports

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
UCC ships handled, as reported by stevedores	993	1 054	**2 047**	1 006	996	**2 002**	869	876	**1 745**	860	844	**1 704**	885	871	**1 756**
Total containers handled *('000)*	1 213.7	1 233.6	**2 447.3**	1 233.4	1 320.8	**2 554.2**	1 151.6	1 185.4	**2 337.0**	1 267.0	1 372.7	**2 639.7**	1 342.1	1 315.5	**2 657.6**
Total TEUs handled *('000)*	1 875.5	1 902.4	**3 777.9**	1 905.3	2 061.5	**3 966.9**	1 778.1	1 836.4	**3 614.5**	2 007.7	2 186.8	**4 194.5**	2 134.0	2 089.4	**4 223.4**
40-foot containers as proportion of all containers handled *(%)*	54.5	54.2	**54.4**	54.5	56.1	**55.3**	54.4	54.9	**54.7**	58.5	59.3	**58.9**	59.0	58.8	**58.9**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	469.3	479.7	**949.0**	490.3	518.7	**1 009.0**	458.6	497.3	**956.0**	499.2	519.4	**1 018.6**	483.6	469.3	**952.9**
Total containers transported by VBS/TAS trucks and rail *('000)*	890.5	911.9	**1 802.4**	959.2	1 028.7	**1 987.8**	882.2	951.9	**1 834.1**	951.4	986.3	**1 937.7**	937.0	903.7	**1 840.8**
Containers by VBS/TAS trucks *('000)*	760.9	778.1	**1 539.0**	811.4	883.6	**1 695.0**	748.7	810.7	**1 559.5**	812.9	848.9	**1 661.8**	795.2	771.5	**1 566.7**
Containers by rail *('000)*	129.6	133.8	**263.4**	147.7	145.1	**292.8**	133.5	141.2	**274.7**	138.5	137.4	**275.9**	141.8	132.2	**274.1**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	1 342.0	1 380.5	**2 722.5**	1 284.0	1 342.8	**2 626.7**	1 212.9	1 321.8	**2 534.7**	1 482.4	1 537.0	**3 019.4**	1 436.3	1 398.7	**2 835.0**
TEUs by VBS/TAS trucks *('000)*	1 150.3	1 183.2	**2 333.5**	1 060.4	1 121.0	**2 181.4**	1 013.2	1 111.5	**2 124.8**	1 276.0	1 330.2	**2 606.2**	1 226.8	1 201.5	**2 428.3**
TEUs by rail *('000)*	191.8	197.2	**389.0**	223.6	221.8	**445.3**	199.7	210.3	**409.9**	206.3	206.9	**413.2**	209.5	197.2	**406.7**
Whole of container terminal															
Total number of container ship visits	999	1 052	**2 051**	1 013	992	**2 005**	883	873	**1 756**	868	849	**1 717**	880	865	**1 745**
Total number of containers (lifts) exchanged *('000)*	1 209.8	1 215.6	**2 425.4**	1 230.3	1 283.8	**2 513.9**	1 133.9	1 160.4	**2 294.2**	1 241.3	1 341.2	**2 582.5**	1 301.2	1 274.5	**2 575.8**
Whole of port															
Total cargo throughput *(million tonnes)*	34.8	35.8	**70.6**	35.4	34.7	**70.1**	33.3	32.3	**65.6**	32.5	35.2	**67.8**	36.8	35.3	**72.1**
Non-containerised general cargo throughput *(million tonnes)*	1.0	1.0	**2.1**	1.0	1.0	**1.9**	1.1	0.8	**1.9**	0.9	1.2	**2.1**	1.1	1.3	**2.4**
Total TEUs exchanged *('000)*	1 937.0	1 982.9	**3 919.9**	1 983.2	2 148.3	**4 131.5**	1 843.8	1 902.8	**3 746.6**	2 066.0	2 262.6	**4 328.6**	2 203.0	2 161.2	**4 364.2**
Full import *('000)*	898.3	907.9	**1 806.1**	939.8	1 000.3	**1 940.1**	838.0	902.9	**1 740.9**	991.1	1 097.6	**2 088.7**	1 035.7	1 006.3	**2 042.0**
Empty import *('000)*	68.9	85.9	**154.7**	88.9	82.2	**171.1**	75.3	78.4	**153.6**	64.6	62.1	**126.6**	61.6	64.3	**125.9**
Full export *('000)*	512.4	560.0	**1 072.4**	552.4	552.3	**1 104.6**	499.9	522.0	**1 021.9**	527.9	535.2	**1 063.1**	511.0	545.5	**1 056.4**
Empty export *('000)*	456.1	428.7	**884.7**	401.9	510.8	**912.7**	429.8	398.5	**828.4**	479.7	565.9	**1 045.6**	594.1	544.3	**1 138.4**

Note: Blank cells mean no data were reported in that period.

Sources: DP World (2021), Patrick (2021), Hutchison Ports Australia (2021), Flinders Adelaide Container Terminal (2021), Victoria International Container Terminal (2021), Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Table 1.7 Container ship visits by port: January–June 2021

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Five ports
Gross Tonnage						
5 000–20 000 GT	55	68	38	-	44	205
20 001–35 000 GT	60	64	62	6	10	202
35 001–50 000 GT	120	116	114	51	32	433
50 001–65 000 GT	52	34	38	2	2	128
65 001–80 000 GT	129	142	122	35	44	472
80 001–95 000 GT	39	43	47	17	18	164
95 001–110 000 GT	11	28	29	28	28	124
All ship sizes	466	495	450	139	178	1 728

Sources: Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Table 1.8 Container ship visits by port: July–December 2020

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Five ports
Gross Tonnage						
5 000–20 000 GT	55	64	44	1	36	200
20 001–35 000 GT	27	46	48	4	5	130
35 001–50 000 GT	124	112	122	48	31	437
50 001–65 000 GT	54	28	28	3	3	116
65 001–80 000 GT	136	143	128	45	55	507
80 001–95 000 GT	43	44	48	18	19	172
95 001–110 000 GT	12	27	30	29	29	127
All ship sizes	451	464	448	148	178	1 689

Sources: Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Table 1.9 Container ship visits by port: January–June 2020

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Five ports
Gross Tonnage						
5 000–20 000 GT	49	79	37	-	25	190
20 001–35 000 GT	33	44	42	2	4	125
35 001–50 000 GT	160	146	155	61	45	567
50 001–65 000 GT	76	48	48	5	-	177
65 001–80 000 GT	100	115	89	42	59	405
80 001–95 000 GT	32	41	43	24	25	165
95 001–110 000 GT	9	25	24	24	21	103
All ship sizes	459	498	438	158	179	1 732

Sources: Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

CHAPTER 2
Measures of container terminal productivity

Overview

Chapter 2 of *Waterline* presents container terminal productivity measures. The indicators are in three groups—wharfside, landside and whole of container terminal.

Seven quarterly wharf-side productivity indicators are covered:

2.1 Crane rate—containers per hour

2.2 Elapsed labour rate—containers per hour

2.3 Ship rate—containers per hour

2.4 Crane rate—TEUs per hour

2.5 Elapsed labour rate—TEUs per hour

2.6 Ship rate—TEUs per hour

2.7 Throughput pbm (containers per berth metre)

The following five quarterly landside productivity indicators are reported for trucks involved in VBS/TAS operations. Bulk run trucks are not included in calculating these indicators:

2.1 Containers per truck

2.2 TEUs per truck

2.3 Per cent of trucks backloaded

2.4 Average truck turnaround time

2.5 Average container turnaround time

Twelve indicators are reported for whole of container terminal productivity.

2.1 Median of ship turnaround time

2.2 95th percentile of ship turnaround time

2.3 Number of ships waiting at anchorage for more than 2 hours

2.4 Per cent of ships waiting at anchorage for more than 2 hours

2.5 Average waiting time at anchorage

2.6 Median waiting time at anchorage

2.7 Total time ships spent at berth

2.8 Average TEUs per ship-hour at berth

2.9 Average lifts per ship-hour at berth

2.10 Total time ships available to stevedores

2.11 Average lifts per hour of stevedoring operation

2.12 Average lifts per berth visit

The indicators are presented for Brisbane, Sydney, Melbourne, Adelaide, and Fremantle, as well as aggregates of the five ports, where applicable.

Wharfside productivity measures

Measures of productivity on the wharf-side of a container terminal relate only to containers moved by stevedoring companies from/to UCC ships at that container terminal.

Indicator 2.1 Crane rate—containers per hour

This is computed as the total number of containers handled divided by the net crane time (see details in Box 2.1).

Indicator 2.2 Elapsed labour rate—containers per hour

This indicator is computed as the number of containers handled divided by the total elapsed labour time (see details in Box 2.2). Sometimes this measure is reported as the ''ship working rate''.

Indicator 2.3 Ship rate—containers per hour

This is the average number of containers moved on or off a ship, per net elapsed crane hour. It is equivalent to the crane rate multiplied by the average crane intensity.

Indicator 2.4 Crane rate—TEUs per hour

This is similar to Indicator 2.1 after converting containers to TEUs.

Indicator 2.5 Elapsed labour rate—TEUs per hour

This is similar to Indicator 2.2 after converting containers to TEUs.

Indicator 2.6 Ship rate—TEUs per hour

This is similar to Indicator 2.3 after converting containers to TEUs.

Indicator 2.7 Throughput pbm (containers per berth metre)

This is the number of containers through a container terminal divided by the length (in metres) of berths. At a container terminal it measures the intensity of use of the terminal container handling facility. The six month figure is a weighted average of the corresponding quarterly throughput.

Box 2.1 Net crane time

This is the crane time allocated by the stevedore to work on a container ship, assuming the container ship is ready for loading or unloading. It is the sum of hours that each quay crane is allocated to a ship, less operational and non-operational delays:

- No labour allocated
- Closed-port holiday
- Port-wide industrial stoppage
- Total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear
- Award or enterprise agreement breaks as applicable
- Adverse weather
- Delays caused by the ship or its agent
- All breakdowns, including spreader changes
- Other equipment breakdowns which stop crane operations
- Booming up for passing ships
- Handling hatch covers
- Cage work and lashing/unlashing where crane operations are affected
- Crane long-travelling between hatches and crossing accommodation
- Labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages
- Over-dimensional containers requiring additional (rigid) spreader
- Spreader changes
- Waiting for export cargo
- Defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim).

Landside productivity measures

These indicators relate to the performance in processing containers through the formal vehicle booking systems (VBS and TAS). They do not include the performance of bulk run trucks.

Indicator 2.8 Containers per truck

Count of containers processed through the VBS/TAS systems divided by the total number of VBS/TAS trucks used.

Box 2.2 Elapsed labour time

This is the time elapsed between labour first boarding a container ship and labour last leaving the ship, less any time when the labour has not worked for whatever reasons including non-operational delays such as:

- No labour allocated to ship
- Closed-port holiday
- Industrial stoppages
- Break bulk and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear.

In contrast to 'crane time' (Box 2.1), elapsed labour time is not equivalent to the total labour-hours worked.

Indicator 2.9 TEUs per truck

Count of TEUs through the VBS/TAS systems divided by the total number of VBS/TAS trucks used. In contrast to Indicator 2.8, this indicator measures the truck efficiency in a standard unit, a TEU, and thus takes into account the different sizes of containers.

Indicator 2.10 Proportion of trucks backloaded

This indicator shows the number of backloaded trucks as a proportion of the total VBS/TAS trucks. It was published for the first time in Waterline 57.

'Backloaded operations' refers to trucks which haul containers on both the inbound and outbound legs of a single trip. Such operations make more effective use of trucks and landside infrastructure.

Indicator 2.11 Average truck turnaround time

The indicator measures the time elapsed from when the truck enters the gate of a container terminal to the time when the last container is loaded. It does not include the time the truck waits outside the gate of a container terminal.

This is a measure of stevedoring efficiency and shows how quickly a stevedoring company processes trucks at a container terminal.

Indicator 2.12 Average container turnaround time

This indicator is calculated as the 'average truck turnaround time' (Indicator 2.11) divided by 'average containers per truck' (Indicator 2.8). It is a measure of the stevedoring efficiency in handling containers at a container terminal.

Container turnaround time improves (that is, it goes down) if either the truck utilisation rates improve, implying that the number of containers per truck increases, or the container terminal is faster in processing each truck.

Whole of container terminal measures

Indicator 2.13 Median of ship turnaround time

This is the median of the time (in hours) a container ship is in a port. It is the time that elapses from the time a ship enters a port to the time a ship leaves the port.

Indicator 2.14 95th percentile of ship turnaround time

The 95th percentile indicates that for 95 per cent of the ships, the turnaround time is below the value of the indicator. Conversely, for 5 per cent of the ships, the turnaround time is above the value of the indicator.

Indicator 2.15 Number of ships waiting at anchorage for more than 2 hours

This indicator provides the number of container ships, as reported by port authorities, that waited for longer than 2 hours for port entry clearance at the time of the ship's first entry. Delay before entering a port usually results from the geography-specific situation of a port and may also be caused by operational reasons, either at the terminal, the ship, or both.

Indicator 2.16 Proportion of ships waiting at anchorage for more than 2 hours

This is the number of container ships in Indicator 2.15 as a proportion of the total number of container ships that visited the container terminal in the period.

Indicator 2.17 Average waiting time at anchorage

This is the average time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.

Indicator 2.18 Median waiting time at anchorage

This is the median of time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.

Indicator 2.19 Total time ships spent at berth

This is the total hours spent in berth by all dedicated container ships (UCC) that exchanged containers at that port. The time a ship spends in berth is the elapsed time between the time a ship arrives at berth and the time of its departure from berth. Port authorities report the berth time as a 'gross value' including all times spent by a ship at berth such as time for loading/unloading containers, for maintenance and supply operations, or waiting for labour or suitable weather.

Indicator 2.20 Average TEUs per ship-hour at berth

This is the total TEUs lifted on/off dedicated container ships (UCC) divided by the total time ship spent in berth (Indicator 2.19). The indicator is strongly influenced by changes in average number of TEUs exchanged per visiting ships and by the mix of ship sizes during the period. The average number of TEUs exchanged also varies seasonally and cyclically.

Indicator 2.21 Average lifts per ship-hour at berth

This indicator is similar to Indicator 2.20 whereas the total crane lifts (containers handled) is used in calculating the indicator rather than the number of TEUs.

Indicator 2.22 Total time ships are available to stevedores

This is the total time (in hours) when ships can be loaded or unloaded.

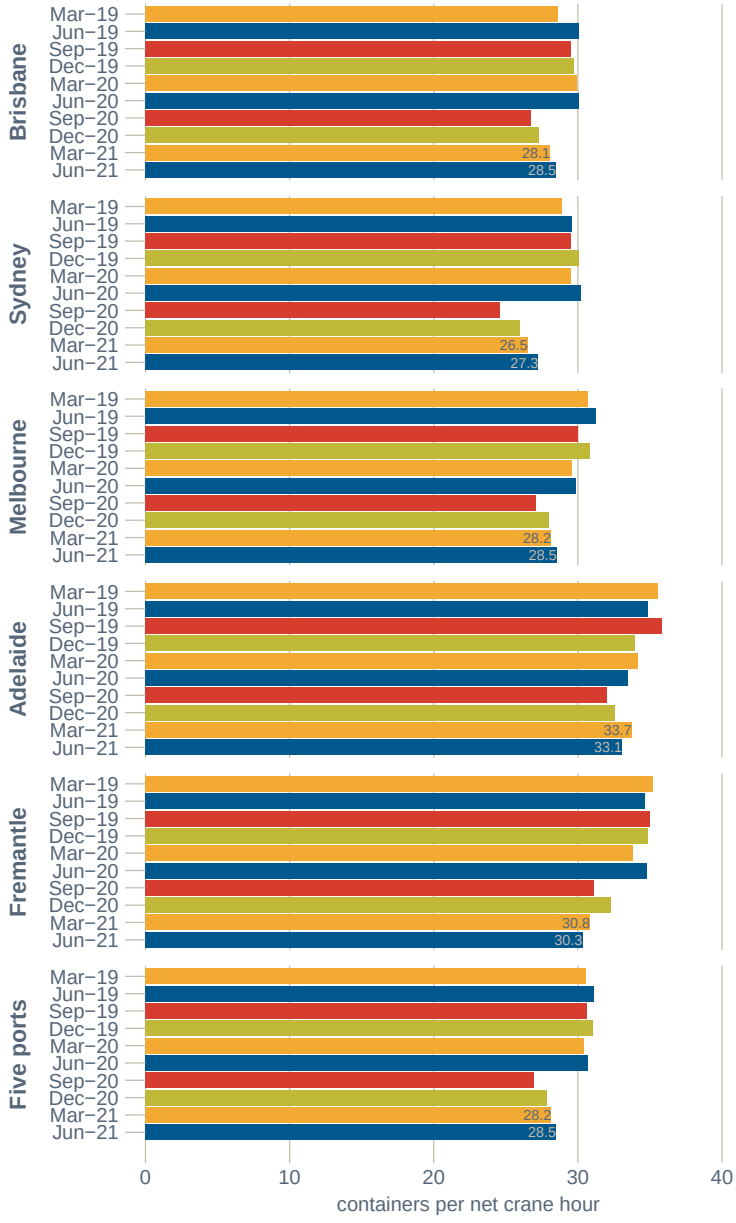
Indicator 2.23 Average lifts per hour of stevedoring operation

This is the total number of crane lifts (containers handled) divided by the total (gross) time available to stevedores for loading and unloading containers.

Indicator 2.24 Average lifts per berth visit

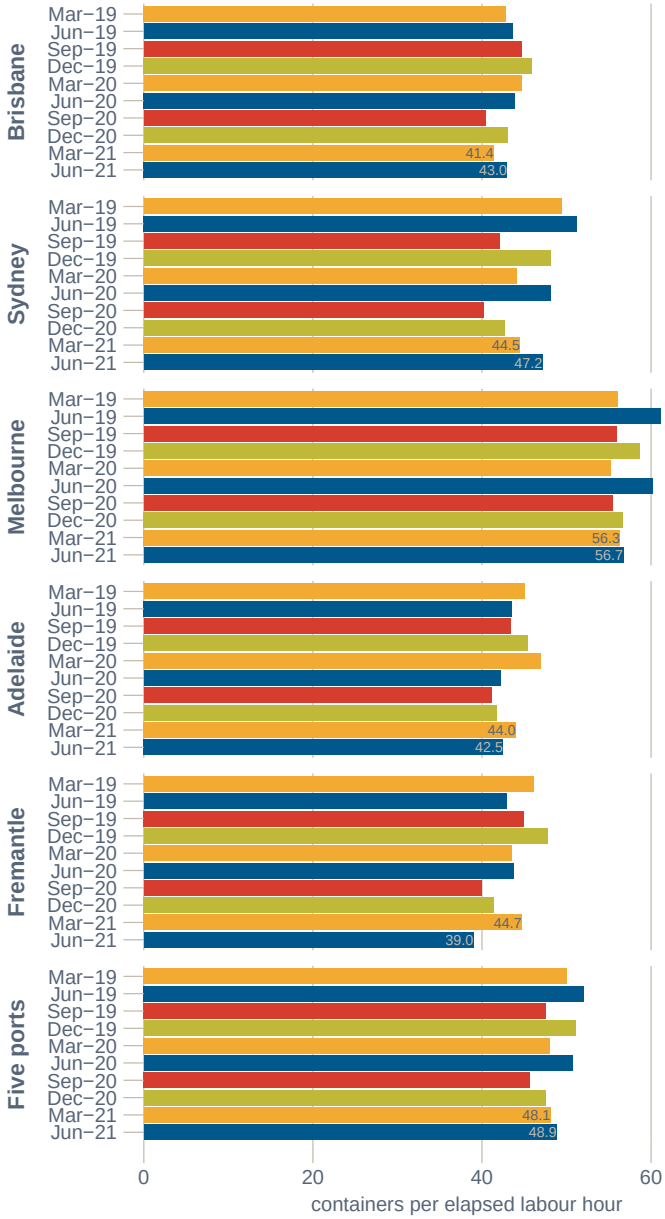
This is the number of crane lifts (containers handled) divided by the number of berth visits of dedicated container ships (UCC).

Figure 2.1 Wharf-side crane rate



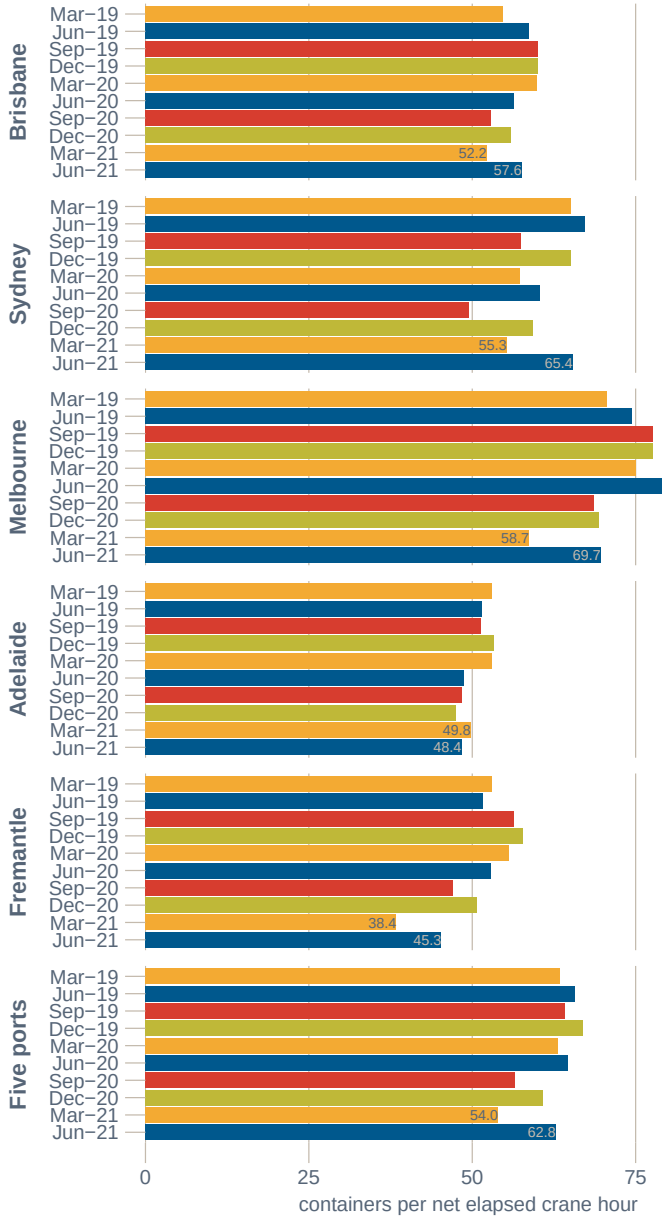
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 2.2 Wharf-side elapsed labour rate



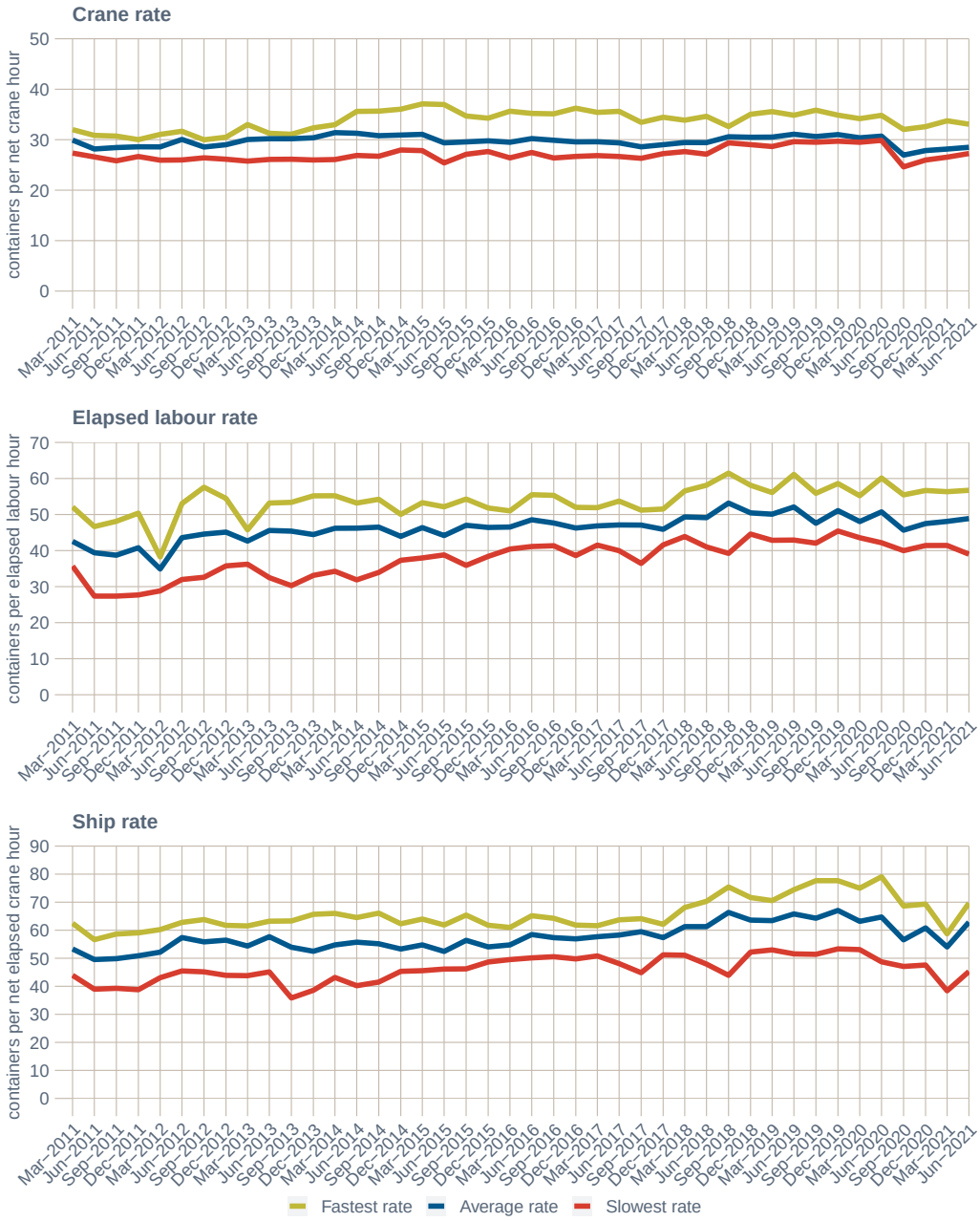
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 2.3 Wharf-side ship rate



Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

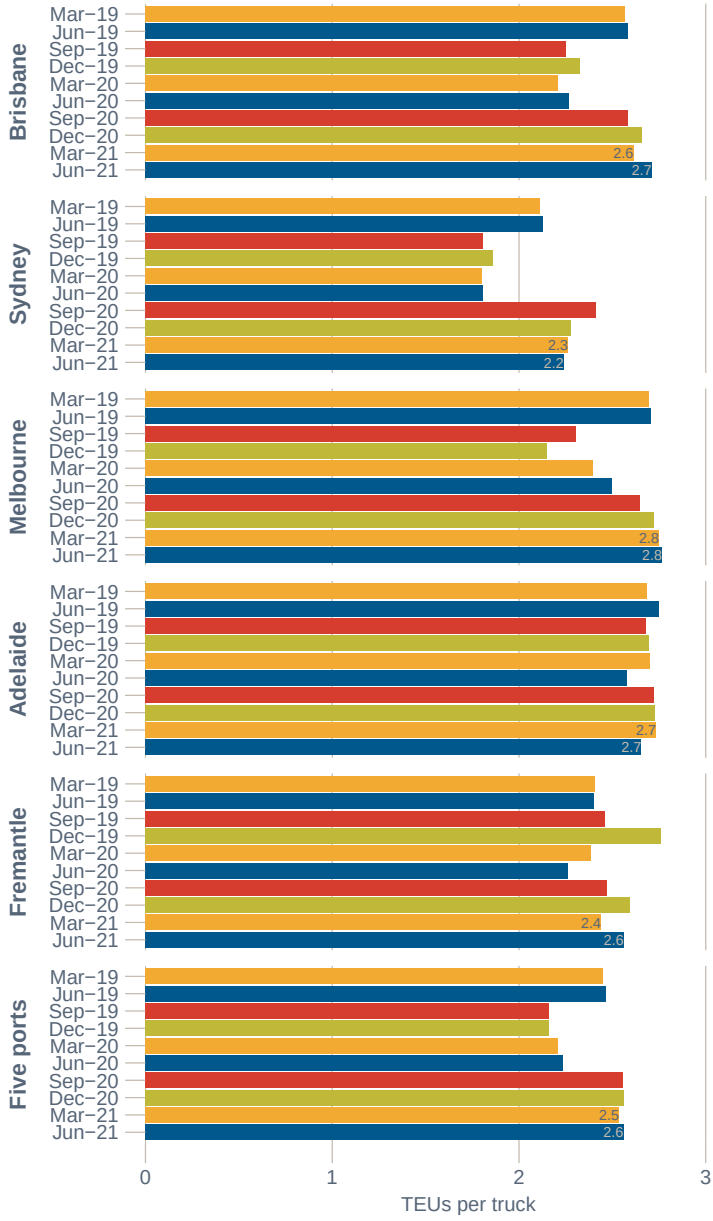
Figure 2.4 Productivity in five ports: Comparison of wharfside rates



Note: The wharf-side crane rate, labour rate and ship rate are compared among all five ports and the fastest, average and slowest rates are illustrated. The fastest and slowest rate may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.
Crane rate is measured in containers per net crane hour. Labour rate is measured in containers per elapsed labour hour. Ship rate is measured in containers per net elapsed crane hour.

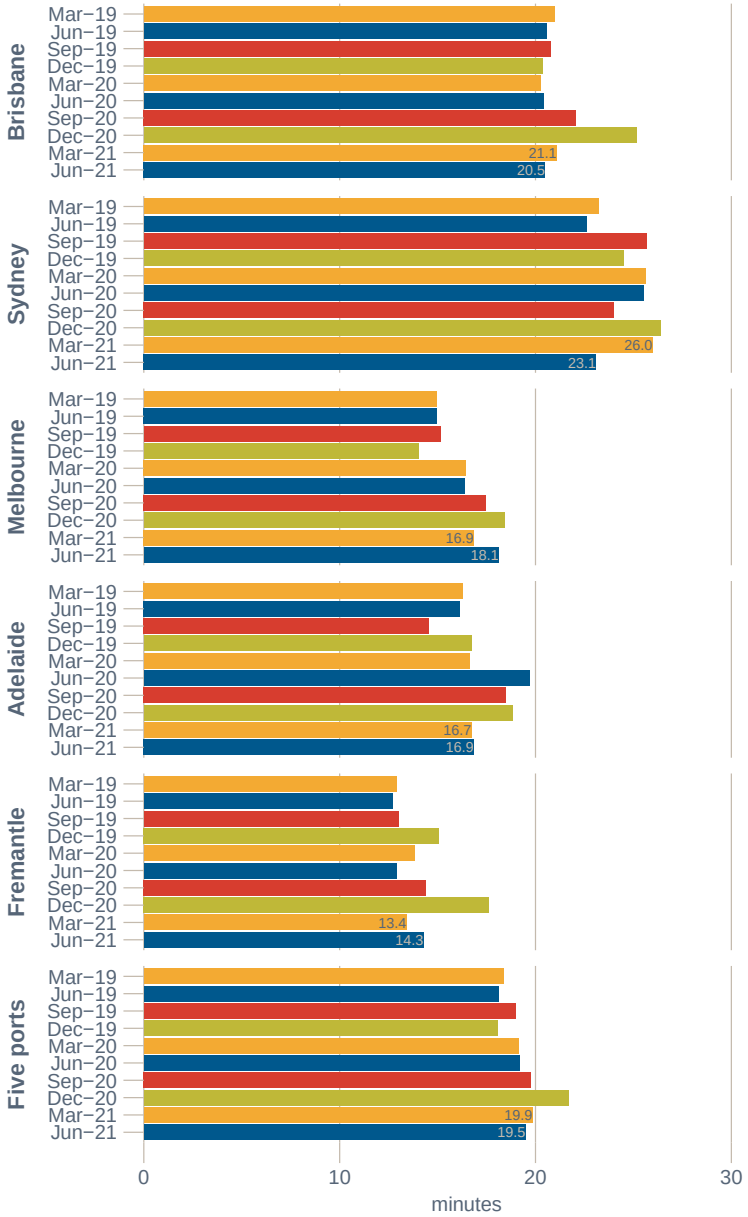
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 2.5 Average TEUs per truck on landside of container terminals



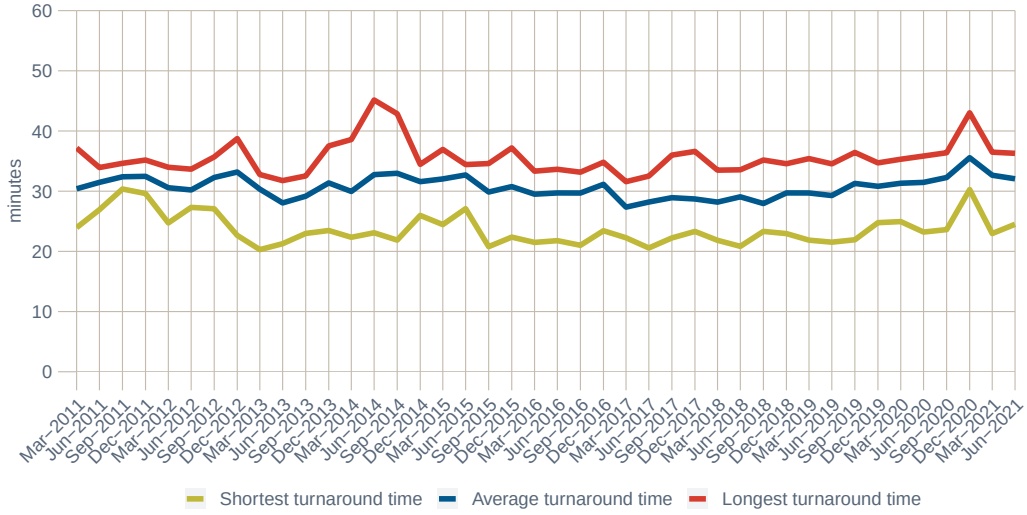
Note: This indicator is based on only the trucks that are processed through the VBS/TAS system.
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 2.6 Average container turnaround time on landside of container terminals



Note: This indicator is based on only the trucks that are processed through the VBS/TAS system.
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

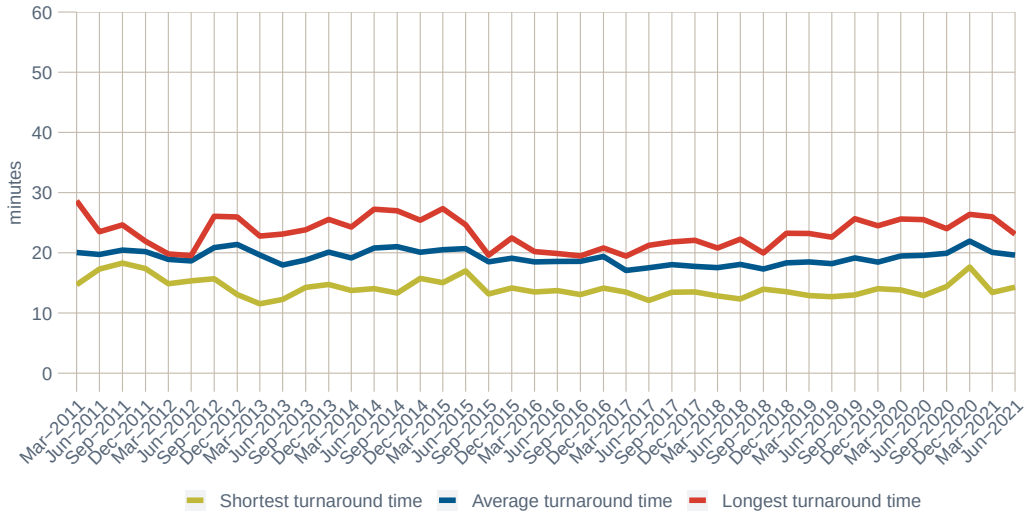
Figure 2.7 Longest and shortest truck turnaround time in five ports



Note: The truck turnaround time is compared among all five ports in each quarter. The longest and shortest truck turnaround time may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.

Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

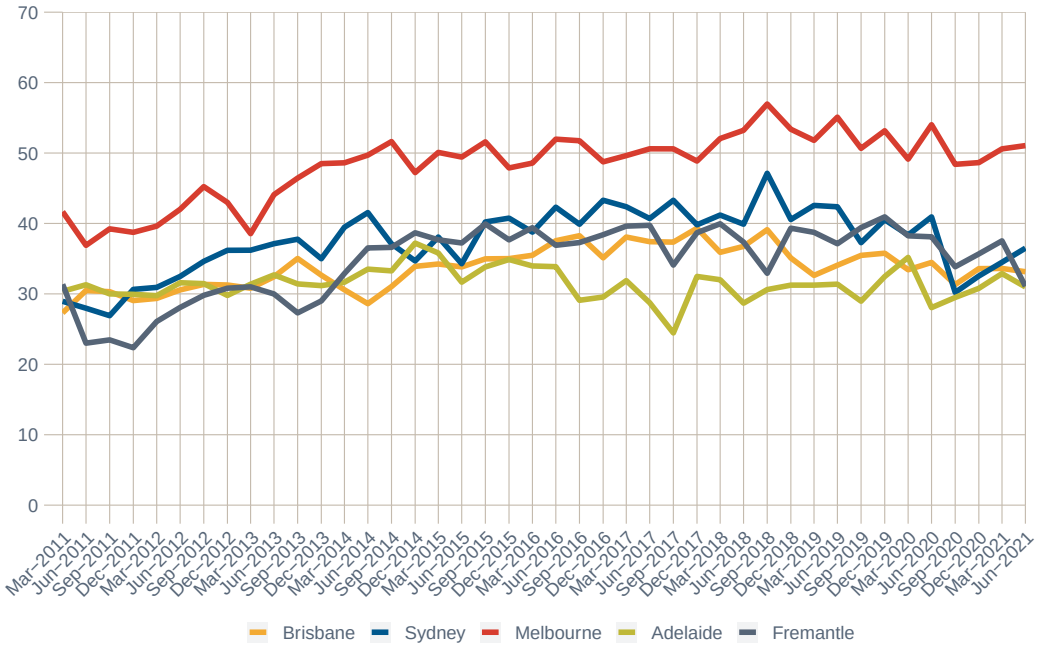
Figure 2.8 Longest and shortest container turnaround time in five ports



Note: The container turnaround time is compared among all five ports in each quarter. The longest and shortest container turnaround time may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.

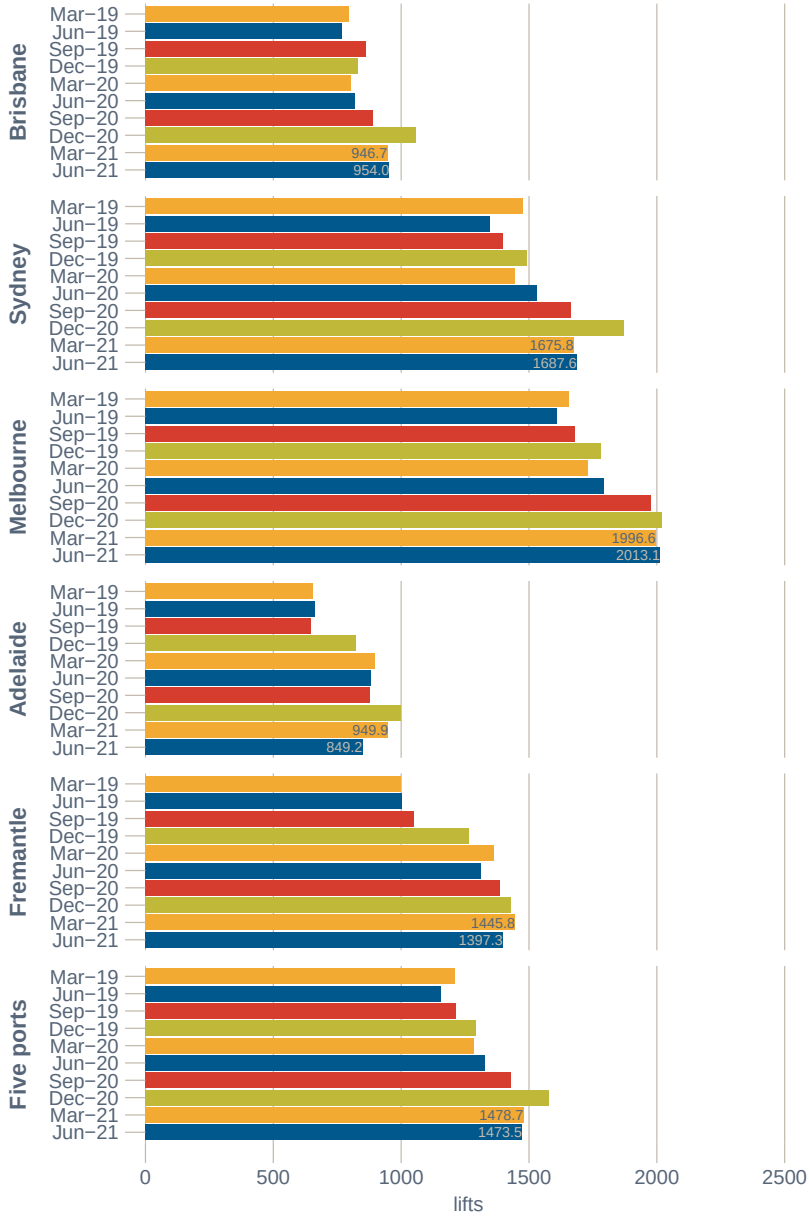
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 2.9 Average number of lifts per hour a ship spent at berth



Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Figure 2.10 Average number of lifts per berth visit



Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

Table 2.1 Container terminal productivity: Brisbane

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	28.6	30.1	**29.4**	29.5	29.7	**29.6**	30.0	30.1	**30.0**	26.7	27.3	**27.0**	28.1	28.5	**28.3**
Elapsed labour rate	42.9	43.6	**43.2**	44.7	45.9	**45.3**	44.7	43.9	**44.3**	40.4	43.0	**41.8**	41.4	43.0	**42.2**
Ship rate	54.7	58.7	**56.7**	60.0	60.0	**60.0**	59.9	56.5	**58.1**	52.9	56.0	**54.6**	52.2	57.6	**54.9**
TEUs per hour															
Crane rate	44.5	46.8	**45.7**	45.9	46.9	**46.4**	46.4	46.6	**46.5**	42.1	43.5	**42.9**	45.0	45.4	**45.2**
Elapsed labour rate	66.6	67.8	**67.2**	69.4	72.3	**70.9**	69.1	68.1	**68.6**	63.8	68.5	**66.3**	66.2	68.1	**67.1**
Ship rate	85.0	91.9	**88.5**	93.5	94.8	**94.2**	92.6	87.7	**90.1**	83.8	89.2	**86.7**	83.3	91.2	**87.2**
Containers per berth metre	76.4	79.7	**78.1**	84.9	89.0	**87.0**	75.8	80.7	**78.3**	85.2	98.7	**91.9**	94.1	94.2	**94.1**
Landside															
Containers per truck	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.6	1.7	**1.7**	1.7	1.8	**1.8**
TEUs per truck	2.6	2.6	**2.6**	2.3	2.3	**2.3**	2.2	2.3	**2.2**	2.6	2.7	**2.6**	2.6	2.7	**2.7**
Per cent of trucks backloaded *(%)*	11.8	11.9	**11.9**	12.4	11.8	**12.1**	10.9	10.9	**10.9**	11.0	11.9	**11.5**	10.8	11.9	**11.3**
Average truck turnaround time *(mins)*	35.4	34.5	**35.0**	35.1	34.7	**34.9**	34.0	34.0	**34.0**	36.4	43.0	**39.9**	36.5	36.3	**36.4**
Average container turnaround time *(mins)*	21.0	20.6	**20.8**	20.8	20.4	**20.6**	20.2	20.4	**20.3**	22.1	25.1	**23.7**	21.1	20.5	**20.8**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	30.6	29.1	**29.8**	31.0	30.1	**30.5**	30.7	29.7	**30.4**	34.6	39.8	**37.6**	38.0	36.5	**37.2**
95th percentile of ship turnaround time *(hours)*	56.2	52.0	**52.9**	60.3	57.8	**58.7**	63.2	57.8	**61.5**	68.4	100.4	**91.2**	104.7	75.9	**81.8**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	15	21	**36**	23	20	**43**	24	16	**40**	30	43	**73**	14	4	**18**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	6.3	8.2	**7.3**	9.3	7.6	**8.4**	10.1	6.9	**8.5**	12.8	19.2	**15.9**	5.8	1.7	**3.8**
Average waiting time at anchorage *(hours)*	17.5	15.0	**16.1**	19.0	20.5	**19.7**	15.4	21.0	**17.7**	24.1	28.2	**26.5**	38.3	13.1	**32.7**
Median waiting time at anchorage *(hours)*	13.0	9.2	**11.4**	16.2	14.3	**14.3**	9.6	16.1	**12.2**	14.8	14.6	**14.6**	17.3	5.2	**16.7**
Total time ships spent at berth *('000 hours)*	5.8	5.8	**11.6**	6.0	6.1	**12.1**	5.7	5.5	**11.2**	6.7	7.1	**13.7**	6.8	6.8	**13.6**
Average TEUs per ship-hour at berth *(TEUs per hour)*	50.7	53.0	**51.8**	55.2	56.3	**55.8**	51.6	53.4	**52.5**	49.3	53.4	**51.4**	53.8	52.7	**53.2**
Average lifts per ship-hour at berth *(lifts per hour)*	32.6	34.1	**33.3**	35.5	35.8	**35.6**	33.4	34.5	**33.9**	31.3	33.6	**32.5**	33.6	33.1	**33.4**
Total time ships are available to stevedores *('000 hours)*	4.5	4.6	**9.0**	4.7	4.8	**9.6**	4.2	4.6	**8.8**	5.3	5.7	**11.1**	5.7	5.6	**11.3**
Average lifts per hour of stevedoring operation *(lifts per hour)*	42.6	43.4	**43.0**	45.0	45.1	**45.0**	45.0	41.3	**43.1**	39.2	41.4	**40.3**	40.0	40.6	**40.3**
Average lifts per berth visit *(lifts)*	796.3	769.8	**782.6**	864.3	829.8	**846.5**	804.5	817.6	**810.9**	890.3	1 059.7	**972.9**	946.7	954.0	**950.3**

Note: Cells may not sum to totals due to rounding.

Sources: DP World (2021), Hutchison Ports Australia (2021), Patrick (2021), Port of Brisbane Pty Ltd (2021) and Maritime Safety Queensland (2021)

Table 2.2 Container terminal productivity: Sydney

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	28.9	29.6	**29.3**	29.5	30.1	**29.8**	29.5	30.2	**29.9**	24.6	26.0	**25.3**	26.5	27.3	**26.9**
Elapsed labour rate	49.4	51.3	**50.3**	42.1	48.1	**45.2**	44.1	48.1	**46.2**	40.1	42.7	**41.5**	44.5	47.2	**45.8**
Ship rate	65.2	67.3	**66.2**	57.4	65.1	**61.4**	57.3	60.4	**58.9**	49.5	59.3	**54.6**	55.3	65.4	**60.2**
TEUs per hour															
Crane rate	45.3	46.3	**45.8**	46.3	47.8	**47.1**	46.5	47.7	**47.1**	39.9	42.3	**41.1**	42.8	43.8	**43.3**
Elapsed labour rate	77.7	80.2	**78.9**	65.9	76.6	**71.4**	69.8	76.0	**73.0**	64.8	69.6	**67.3**	72.4	76.0	**74.2**
Ship rate	102.6	105.3	**103.9**	89.9	103.8	**97.1**	90.5	95.5	**93.1**	80.0	96.4	**88.7**	90.0	105.4	**97.5**
Containers per berth metre	112.3	112.2	**112.3**	110.1	118.4	**114.3**	101.7	107.2	**104.4**	109.2	121.4	**115.3**	120.4	115.4	**117.9**
Landside															
Containers per truck	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.5	1.4	**1.5**	1.4	1.4	**1.4**
TEUs per truck	2.1	2.1	**2.1**	1.8	1.9	**1.8**	1.8	1.8	**1.8**	2.4	2.3	**2.3**	2.3	2.2	**2.3**
Per cent of trucks backloaded *(%)*	6.9	7.4	**7.1**	7.9	6.7	**7.3**	6.1	6.4	**6.2**	6.3	5.0	**5.6**	5.2	4.9	**5.0**
Average truck turnaround time *(mins)*	32.7	31.9	**32.3**	36.4	34.3	**35.4**	35.3	35.8	**35.5**	36.1	37.3	**36.7**	36.5	32.1	**34.3**
Average container turnaround time *(mins)*	23.2	22.6	**22.9**	25.7	24.5	**25.1**	25.6	25.5	**25.6**	24.0	26.4	**25.2**	26.0	23.1	**24.6**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	32.3	29.4	**30.7**	33.5	33.8	**33.6**	35.5	34.0	**34.8**	46.1	49.5	**48.7**	44.3	41.1	**43.3**
95th percentile of ship turnaround time *(hours)*	66.1	56.0	**60.2**	70.0	69.2	**69.7**	68.8	66.8	**68.8**	126.0	116.6	**116.6**	91.6	89.0	**89.8**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	54	45	**99**	75	77	**152**	51	69	**120**	92	123	**215**	104	67	**171**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	19.6	15.2	**17.3**	26.3	26.6	**26.5**	20.4	27.3	**23.9**	39.0	53.2	**46.0**	40.6	27.9	**34.5**
Average waiting time at anchorage *(hours)*	19.5	13.6	**16.8**	25.3	14.2	**19.7**	16.9	31.1	**25.0**	35.6	55.1	**46.8**	881.0	109.9	**578.9**
Median waiting time at anchorage *(hours)*	7.2	6.6	**7.0**	15.5	8.8	**10.3**	9.9	12.5	**10.4**	25.2	31.2	**28.9**	23.6	13.3	**20.1**
Total time ships spent at berth *('000 hours)*	9.6	9.5	**19.0**	10.7	10.6	**21.3**	9.4	9.5	**18.9**	13.0	13.3	**26.3**	12.4	11.1	**23.5**
Average TEUs per ship-hour at berth *(TEUs per hour)*	66.7	66.2	**66.5**	58.4	64.4	**61.4**	60.5	64.7	**62.6**	48.8	53.0	**50.9**	55.8	58.7	**57.2**
Average lifts per ship-hour at berth *(lifts per hour)*	42.6	42.4	**42.5**	37.3	40.5	**38.9**	38.4	40.9	**39.6**	30.2	32.5	**31.4**	34.5	36.5	**35.4**
Total time ships are available to stevedores *('000 hours)*	8.4	8.1	**16.5**	9.7	9.3	**19.0**	8.6	8.2	**16.8**	10.3	10.7	**20.9**	10.1	9.2	**19.2**
Average lifts per hour of stevedoring operation *(lifts per hour)*	48.3	49.6	**48.9**	41.1	46.5	**43.7**	42.0	47.0	**44.4**	38.2	40.6	**39.4**	42.6	44.2	**43.3**
Average lifts per berth visit *(lifts)*	1 478.0	1 348.4	**1 410.9**	1 398.4	1 491.1	**1 445.1**	1 443.7	1 532.5	**1 488.4**	1 663.9	1 871.0	**1 766.3**	1 675.8	1 687.6	**1 681.5**

Note: Cells may not sum to totals due to rounding.
Sources: DP World (2021), Hutchison Ports Australia (2021), Patrick (2021), NSW Ports (2021) and Port Authority of New South Wales (2021)

Table 2.3 Container terminal productivity: Melbourne

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	30.7	31.3	**31.0**	30.0	30.9	**30.4**	29.6	29.9	**29.7**	27.1	28.0	**27.6**	28.2	28.5	**28.3**
Elapsed labour rate	56.1	61.1	**58.6**	55.9	58.6	**57.3**	55.2	60.1	**57.7**	55.5	56.7	**56.1**	56.3	56.7	**56.5**
Ship rate	70.5	74.4	**72.5**	77.7	77.7	**77.7**	75.0	79.1	**77.1**	68.6	69.3	**69.0**	58.7	69.7	**64.2**
TEUs per hour															
Crane rate	47.6	48.3	**47.9**	46.5	48.2	**47.4**	45.8	46.1	**46.0**	42.7	44.5	**43.7**	44.9	45.5	**45.2**
Elapsed labour rate	87.2	94.9	**91.1**	87.0	92.0	**89.6**	85.9	93.3	**89.7**	88.0	90.6	**89.4**	89.9	90.6	**90.2**
Ship rate	110.0	115.9	**113.0**	121.0	122.0	**121.5**	116.7	122.7	**119.8**	109.0	110.9	**110.0**	93.5	111.3	**102.5**
Containers per berth metre	146.0	147.7	**146.8**	145.8	156.5	**151.2**	134.7	142.2	**138.5**	157.7	169.1	**163.4**	164.1	165.8	**164.9**
Landside															
Containers per truck	1.7	1.7	**1.7**	1.8	1.9	**1.9**	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.8	1.8	**1.8**
TEUs per truck	2.7	2.7	**2.7**	2.3	2.2	**2.2**	2.4	2.5	**2.4**	2.7	2.7	**2.7**	2.8	2.8	**2.8**
Per cent of trucks backloaded *(%)*	18.1	18.1	**18.1**	16.4	11.5	**13.8**	16.9	17.0	**16.9**	17.5	17.4	**17.5**	18.6	19.5	**19.0**
Average truck turnaround time *(mins)*	26.0	26.0	**26.0**	27.6	27.1	**27.3**	28.4	28.2	**28.3**	29.3	31.8	**30.6**	29.9	32.1	**31.0**
Average container turnaround time *(mins)*	15.0	15.0	**15.0**	15.2	14.0	**14.5**	16.4	16.4	**16.4**	17.5	18.4	**18.0**	16.9	18.1	**17.5**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	37.8	35.6	**36.7**	39.9	40.2	**40.1**	42.4	40.5	**41.3**	48.8	48.0	**48.3**	46.1	44.5	**45.4**
95th percentile of ship turnaround time *(hours)*	64.1	51.0	**57.9**	70.3	70.6	**70.6**	76.4	77.4	**77.4**	104.8	134.9	**119.0**	86.6	91.5	**89.0**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	1	2	**3**	7	6	**13**	9	12	**21**	20	21	**41**	3	4	**7**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	0.4	0.8	**0.6**	2.8	2.6	**2.7**	4.1	5.4	**4.7**	9.0	9.0	**9.0**	1.3	1.8	**1.5**
Average waiting time at anchorage *(hours)*	6.3	54.5	**38.4**	20.3	19.5	**19.9**	24.0	32.6	**28.9**	30.1	45.5	**38.0**	55.1	35.9	**44.1**
Median waiting time at anchorage *(hours)*	6.3	54.5	**18.9**	18.1	17.7	**18.1**	14.4	37.3	**26.1**	26.1	36.2	**26.5**	70.6	12.7	**17.1**
Total time ships spent at berth *('000 hours)*	8.0	7.5	**15.5**	8.2	7.9	**16.1**	7.8	7.4	**15.2**	9.0	9.7	**18.7**	8.9	9.0	**17.8**
Average TEUs per ship-hour at berth *(TEUs per hour)*	80.5	85.6	**83.0**	78.9	83.3	**81.1**	76.3	83.8	**79.9**	76.7	77.6	**77.2**	80.7	81.5	**81.1**
Average lifts per ship-hour at berth *(lifts per hour)*	51.8	55.1	**53.4**	50.7	53.2	**51.9**	49.1	54.0	**51.5**	48.4	48.6	**48.5**	50.6	51.1	**50.8**
Total time ships are available to stevedores *('000 hours)*	7.4	6.9	**14.3**	7.5	7.6	**15.1**	7.0	6.8	**13.8**	8.2	8.6	**16.8**	8.4	8.4	**16.7**
Average lifts per hour of stevedoring operation *(lifts per hour)*	56.0	59.9	**57.9**	55.8	54.7	**55.3**	54.3	59.1	**56.7**	53.5	55.0	**54.2**	53.6	54.7	**54.1**
Average lifts per berth visit *(lifts)*	1 656.7	1 610.0	**1 633.1**	1 680.0	1 782.0	**1 729.4**	1 729.7	1 791.5	**1 760.7**	1 976.7	2 021.0	**1 999.5**	1 996.6	2 013.1	**2 004.9**

Note: Cells may not sum to totals due to rounding.
Whole of container terminal refers to East and West Swanson Docks and Webb Dock East.

Sources: DP World (2021), Patrick (2021), Port of Melbourne Operations Pty Ltd (2021) and Victoria International Container Terminal (2021)

Table 2.4 Container terminal productivity: Adelaide

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	35.6	34.8	**35.2**	35.9	33.9	**34.8**	34.2	33.5	**33.9**	32.0	32.6	**32.3**	33.7	33.1	**33.4**
Elapsed labour rate	45.0	43.5	**44.3**	43.4	45.4	**44.5**	46.9	42.2	**44.6**	41.1	41.7	**41.4**	44.0	42.5	**43.3**
Ship rate	53.0	51.6	**52.3**	51.4	53.3	**52.5**	53.1	48.7	**51.0**	48.5	47.6	**48.0**	49.8	48.4	**49.1**
TEUs per hour															
Crane rate	51.4	49.8	**50.6**	50.7	47.4	**48.9**	47.8	47.9	**47.9**	47.5	46.9	**47.2**	48.7	48.6	**48.7**
Elapsed labour rate	65.1	62.2	**63.7**	61.3	63.4	**62.5**	65.6	60.3	**63.1**	60.9	60.1	**60.6**	63.6	62.5	**63.1**
Ship rate	76.7	73.7	**75.2**	72.7	74.5	**73.7**	74.3	69.7	**72.1**	71.8	68.6	**70.3**	71.9	71.2	**71.6**
Containers per berth metre	120.3	125.4	**122.8**	116.7	140.0	**128.3**	126.7	116.5	**121.6**	127.1	116.8	**122.0**	114.2	102.2	**108.2**
Landside															
Containers per truck	1.9	1.9	**1.9**	1.9	1.9	**1.9**	1.9	1.8	**1.9**	1.9	1.9	**1.9**	1.9	1.8	**1.9**
TEUs per truck	2.7	2.7	**2.7**	2.7	2.7	**2.7**	2.7	2.6	**2.6**	2.7	2.7	**2.7**	2.7	2.7	**2.7**
Per cent of trucks backloaded *(%)*	29.0	29.5	**29.2**	26.2	27.4	**26.8**	25.8	22.1	**24.0**	22.6	23.2	**22.9**	21.2	19.0	**20.1**
Average truck turnaround time *(mins)*	30.5	30.6	**30.6**	27.4	32.2	**29.8**	31.9	35.8	**33.8**	34.3	35.3	**34.8**	31.8	30.6	**31.2**
Average container turnaround time *(mins)*	16.3	16.1	**16.2**	14.6	16.7	**15.7**	16.6	19.7	**18.1**	18.5	18.8	**18.6**	16.7	16.9	**16.8**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	20.5	20.9	**20.7**	21.9	23.3	**22.8**	24.6	29.4	**26.3**	27.7	32.0	**29.3**	25.9	26.7	**26.1**
95th percentile of ship turnaround time *(hours)*	33.8	33.0	**33.0**	33.5	43.1	**40.6**	38.9	68.2	**47.9**	49.8	63.0	**60.5**	60.6	41.7	**48.4**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	7	8	**15**	3	6	**9**	5	6	**11**	7	9	**16**	9	3	**12**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	6.5	7.1	**6.8**	2.8	6.1	**4.4**	6.0	7.8	**6.9**	8.5	12.9	**10.5**	13.0	4.3	**8.6**
Average waiting time at anchorage *(hours)*	11.1	18.3	**14.9**	12.3	23.0	**19.4**	12.5	34.3	**24.4**	30.7	21.5	**25.5**	44.9	18.9	**38.4**
Median waiting time at anchorage *(hours)*	11.7	20.4	**13.4**	12.5	24.7	**19.8**	9.7	23.8	**16.8**	29.9	18.3	**24.8**	40.7	22.5	**33.8**
Total time ships spent at berth *('000 hours)*	2.3	2.4	**4.6**	2.4	2.5	**4.9**	2.1	2.4	**4.5**	2.4	2.3	**4.7**	2.0	1.9	**3.9**
Average TEUs per ship-hour at berth *(TEUs per hour)*	45.2	44.8	**45.0**	41.0	45.3	**43.2**	49.2	40.1	**44.4**	43.7	44.4	**44.0**	47.5	45.6	**46.6**
Average lifts per ship-hour at berth *(lifts per hour)*	31.2	31.4	**31.3**	29.0	32.5	**30.8**	35.2	28.1	**31.4**	29.5	30.8	**30.1**	32.9	31.0	**32.0**
Total time ships are available to stevedores *('000 hours)*	1.6	1.7	**3.3**	1.6	1.8	**3.5**	1.6	1.7	**3.3**	1.9	1.7	**3.5**	1.6	1.4	**3.0**
Average lifts per hour of stevedoring operation *(lifts per hour)*	44.1	43.0	**43.5**	42.9	44.2	**43.6**	45.9	40.9	**43.4**	38.9	41.7	**40.2**	42.1	41.2	**41.7**
Average lifts per berth visit *(lifts)*	654.5	663.5	**659.0**	647.2	824.9	**732.6**	896.2	880.3	**888.5**	879.7	1 000.7	**935.1**	949.9	849.2	**899.3**

Note: Cells may not sum to totals due to rounding.

Sources: Flinders Adelaide Container Terminal (2021) and Flinders Ports (2021)

Table 2.5 Container terminal productivity: Fremantle

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	35.2	34.6	**34.9**	35.0	34.9	**34.9**	33.8	34.8	**34.3**	31.1	32.3	**31.7**	30.8	30.3	**30.6**
Elapsed labour rate	46.1	42.9	**44.5**	45.0	47.7	**46.4**	43.6	43.7	**43.6**	40.0	41.4	**40.7**	44.7	39.0	**41.9**
Ship rate	53.0	51.6	**52.3**	56.4	57.8	**57.1**	55.6	52.9	**54.3**	47.1	50.8	**48.9**	38.4	45.3	**41.8**
TEUs per hour															
Crane rate	52.5	51.3	**51.9**	52.3	53.4	**52.8**	50.5	52.2	**51.3**	48.1	49.6	**48.8**	46.8	46.4	**46.6**
Elapsed labour rate	68.7	63.6	**66.1**	67.0	73.2	**70.2**	65.5	65.9	**65.7**	62.4	63.9	**63.2**	68.5	60.2	**64.5**
Ship rate	78.9	76.4	**77.6**	83.9	88.7	**86.3**	83.7	79.9	**81.9**	73.5	78.3	**75.9**	57.8	69.9	**63.7**
Containers per berth metre	98.3	101.4	**99.9**	104.6	106.6	**105.6**	102.4	91.9	**97.1**	101.7	102.7	**102.2**	103.0	98.2	**100.6**
Landside															
Containers per truck	1.7	1.7	**1.7**	1.7	1.6	**1.7**	1.8	1.8	**1.8**	1.6	1.7	**1.7**	1.7	1.7	**1.7**
TEUs per truck	2.4	2.4	**2.4**	2.5	2.8	**2.6**	2.4	2.3	**2.3**	2.5	2.6	**2.5**	2.4	2.6	**2.5**
Per cent of trucks backloaded *(%)*	11.4	11.4	**11.4**	11.4	9.8	**10.5**	7.7	7.3	**7.5**	8.3	8.1	**8.2**	7.7	8.3	**8.0**
Average truck turnaround time *(mins)*	21.9	21.5	**21.7**	21.9	24.8	**23.3**	25.0	23.2	**23.9**	23.6	30.3	**26.9**	23.0	24.5	**23.7**
Average container turnaround time *(mins)*	12.9	12.7	**12.8**	13.0	15.1	**14.0**	13.8	12.9	**13.3**	14.4	17.6	**16.0**	13.4	14.3	**13.8**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	28.9	30.0	**29.3**	30.2	36.5	**33.1**	40.6	38.1	**38.8**	43.9	44.2	**44.1**	44.5	48.2	**46.8**
95th percentile of ship turnaround time *(hours)*	48.4	53.0	**50.2**	48.0	66.2	**59.2**	74.5	66.5	**74.1**	89.5	88.9	**89.5**	84.3	93.5	**93.5**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	4	6	**10**	6	7	**13**	6	7	**13**	8	4	**12**	9	5	**14**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	3.2	4.7	**3.9**	4.8	6.6	**5.6**	6.5	8.0	**7.2**	8.5	4.4	**6.5**	10.0	5.5	**7.7**
Average waiting time at anchorage *(hours)*	29.8	17.6	**22.5**	16.0	30.4	**23.7**	22.8	18.8	**20.7**	33.6	21.7	**29.6**	26.9	24.0	**25.9**
Median waiting time at anchorage *(hours)*	23.0	17.5	**17.5**	14.1	30.3	**16.0**	22.4	16.3	**16.3**	28.5	17.3	**18.3**	18.5	18.6	**18.6**
Total time ships spent at berth *('000 hours)*	3.2	3.5	**6.7**	3.4	3.3	**6.6**	3.3	3.0	**6.3**	3.8	3.6	**7.5**	3.5	4.1	**7.6**
Average TEUs per ship-hour at berth *(TEUs per hour)*	57.7	55.0	**56.3**	58.7	62.7	**60.7**	57.6	57.5	**57.5**	52.9	55.3	**54.1**	57.6	48.0	**52.4**
Average lifts per ship-hour at berth *(lifts per hour)*	38.7	37.1	**37.9**	39.4	40.9	**40.2**	38.2	38.1	**38.2**	33.9	35.7	**34.7**	37.5	31.1	**34.0**
Total time ships are available to stevedores *('000 hours)*	2.7	3.0	**5.8**	3.0	2.9	**5.9**	3.0	2.7	**5.8**	3.3	3.2	**6.5**	3.0	3.3	**6.2**
Average lifts per hour of stevedoring operation *(lifts per hour)*	45.6	42.6	**44.0**	44.0	46.4	**45.2**	41.3	42.4	**41.8**	39.5	39.8	**39.7**	43.6	39.1	**41.3**
Average lifts per berth visit *(lifts)*	998.9	1 001.9	**1 000.4**	1 049.5	1 264.0	**1 147.5**	1 364.0	1 312.0	**1 338.6**	1 385.0	1 430.6	**1 407.4**	1 445.8	1 397.3	**1 421.5**

Note: Cells may not sum to totals due to rounding.
Sources: DP World (2021), Patrick (2021) and Fremantle Ports (2021)

Table 2.6 Container terminal productivity: Five ports

	2019						2020						2021		
	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**	Sep Qtr	Dec Qtr	**Jul-Dec**	Mar Qtr	Jun Qtr	**Jan-Jun**
Wharfside															
Containers per hour															
Crane rate	30.5	31.1	**30.8**	30.6	31.0	**30.8**	30.4	30.7	**30.6**	27.0	27.9	**27.4**	28.2	28.5	**28.3**
Elapsed labour rate	50.1	52.0	**51.1**	47.6	51.1	**49.4**	48.0	50.7	**49.4**	45.7	47.5	**46.6**	48.1	48.9	**48.5**
Ship rate	63.4	65.7	**64.6**	64.2	67.0	**65.7**	63.1	64.7	**63.9**	56.6	60.8	**58.8**	54.0	62.8	**58.3**
TEUs per hour															
Crane rate	47.0	47.8	**47.4**	47.2	48.3	**47.8**	46.8	47.4	**47.1**	42.5	44.2	**43.4**	44.6	45.2	**44.9**
Elapsed labour rate	77.6	80.5	**79.1**	73.5	80.0	**76.9**	74.4	78.7	**76.6**	72.4	75.8	**74.2**	76.6	77.8	**77.2**
Ship rate	98.6	102.1	**100.3**	99.6	105.2	**102.5**	97.9	100.6	**99.3**	89.8	97.3	**93.7**	86.1	100.2	**93.1**
Containers per berth metre	111.7	113.5	**112.6**	113.4	121.4	**117.4**	105.9	109.0	**107.4**	116.5	126.2	**121.4**	123.4	121.0	**122.2**
Landside															
Containers per truck	1.6	1.6	**1.6**	1.7	1.7	**1.7**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**
TEUs per truck	2.5	2.5	**2.5**	2.2	2.2	**2.2**	2.2	2.2	**2.2**	2.6	2.6	**2.6**	2.5	2.6	**2.5**
Per cent of trucks backloaded *(%)*	12.6	12.8	**12.7**	12.7	10.4	**11.5**	11.7	11.6	**11.6**	11.9	11.5	**11.7**	11.5	12.0	**11.7**
Average truck turnaround time *(mins)*	29.8	29.4	**29.6**	31.4	30.8	**31.1**	31.3	31.3	**31.3**	32.2	35.5	**33.9**	32.6	32.0	**32.3**
Average container turnaround time *(mins)*	18.4	18.1	**18.2**	19.0	18.1	**18.5**	19.1	19.2	**19.2**	19.8	21.7	**20.8**	19.9	19.5	**19.7**
Whole of container terminal															
Ship turnaround time															
Median of ship turnaround time *(hours)*	31.8	30.1	**30.9**	32.4	33.8	**33.1**	35.1	34.7	**34.9**	41.0	44.3	**42.8**	41.5	39.9	**40.9**
95th percentile of ship turnaround time *(hours)*	59.6	52.0	**56.2**	67.3	64.3	**66.0**	71.0	67.4	**69.2**	101.2	113.3	**105.1**	88.8	87.3	**87.7**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	81	82	**163**	114	116	**230**	95	110	**205**	157	200	**357**	139	83	**222**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	8.1	7.8	**7.9**	11.3	11.7	**11.5**	10.8	12.6	**11.7**	18.1	23.6	**20.8**	15.8	9.6	**12.7**
Average waiting time at anchorage *(hours)*	18.8	15.7	**17.2**	22.9	17.0	**19.9**	17.3	29.2	**23.7**	32.4	46.1	**40.1**	668.9	93.2	**453.7**
Median waiting time at anchorage *(hours)*	9.1	9.2	**9.2**	15.7	10.1	**12.5**	10.7	15.0	**12.9**	24.0	24.9	**24.3**	24.2	15.7	**20.5**
Total time ships spent at berth *('000 hours)*	28.9	28.6	**57.6**	30.7	30.4	**61.1**	28.3	27.8	**56.1**	35.0	36.0	**71.0**	33.5	32.9	**66.4**
Average TEUs per ship-hour at berth *(TEUs per hour)*	64.6	65.5	**65.1**	61.9	65.9	**63.9**	61.9	64.6	**63.2**	56.2	59.4	**57.8**	61.7	61.6	**61.6**
Average lifts per ship-hour at berth *(lifts per hour)*	41.8	42.5	**42.1**	40.1	42.2	**41.2**	40.1	41.7	**40.9**	35.5	37.3	**36.4**	38.8	38.8	**38.8**
Total time ships are available to stevedores *('000 hours)*	24.7	24.3	**49.0**	26.5	26.5	**53.0**	24.5	24.0	**48.5**	28.9	29.9	**58.8**	28.7	27.8	**56.5**
Average lifts per hour of stevedoring operation *(lifts per hour)*	49.0	50.0	**49.5**	46.4	48.5	**47.4**	46.2	48.4	**47.3**	42.9	44.8	**43.9**	45.4	45.9	**45.6**
Average lifts per berth visit *(lifts)*	1 211.0	1 155.5	**1 182.5**	1 214.5	1 294.1	**1 253.8**	1 284.1	1 329.2	**1 306.5**	1 430.1	1 579.7	**1 504.1**	1 478.7	1 473.5	**1 476.1**

Note: Cells may not sum to totals due to rounding.

Sources: DP World (2021), Patrick (2021), Hutchison Ports Australia (2021), Flinders Adelaide Container Terminal (2021), Victoria International Container Terminal (2021), Port of Brisbane Pty Ltd (2021), Maritime Safety Queensland (2021), Port Authority of New South Wales (2021), NSW Ports (2021), Port of Melbourne Operations Pty Ltd (2021), Flinders Ports (2021) and Fremantle Ports (2021)

CHAPTER 3
Vehicle booking system and empty container park operations

Overview

This chapter reports on three main indicator types:

1. The number of truck booking or appointment timeslots available at a container terminal
2. The number of truck booking or appointment timeslots used at a container terminal
3. The volume of container traffic through empty container parks

The data is derived from the vehicle booking systems used by the stevedores. An important use of these statistics is to monitor the time of day and week when trucks access the container terminals to pick up or deliver containers. For this reason the count of slots available and used are provided for the following windows:

Monday to Friday Day: 6:01 AM to 6:00 PM

Monday to Friday Evening: 6:01 PM to 12:00 Midnight

Monday to Friday Night: 12:01 Midnight to 6:00 AM

Saturday Day: 6:01 AM to 6:00 PM

Saturday Evening: 6:01 PM to 12:00 Midnight

Saturday Night: 12:01 Midnight to 6:00 AM

Sunday Day: 6:01 AM to 6:00 PM

Sunday Evening: 6:01 PM to 12:00 Midnight

Sunday Night: 12:01 Midnight to 6:00 AM

The stevedores at the five container terminals do not have identical day, evening and night shifts. Thus data has been adjusted to fit into these standardised work shifts for comparative purposes.

Indicator 3.1 Number of truck timeslots available

The total number of standard VBS/TAS timeslots made available for container receival/delivery. Bulk runs are excluded. See Box 3.1 for information on factors affecting slot availability.

Box 3.1 Container timeslots

Stevedoring companies make available a number of container timeslots at various times in each day, based on the deployment of container handling equipment. The main factors affecting the availability of timeslots are the volume of containers to be processed, and terminal resources available to process containers. When shipping schedules and container volumes demand extra resources, additional labour and extra equipment can be deployed to the landside of a container terminal to increase slot availability. Such extra timeslots are normally advertised one or two days in advance.

Indicator 3.2 Number of timeslots actually used

This is the count of VBS/TAS timeslots actually used by trucks. As for Indicator 3.1, containers moved by bulk runs are excluded.

Indicator 3.3 Timeslots used by trucks in all off-peak periods as proportion of total timeslots used at container terminals

This indicator, derived from Indicator 3.2, gives the count of timeslots used by trucks during the off-peak period as a proportion of all timeslots used. The off-peak period is defined as all time periods except Monday to Friday 6:01 AM to 6:00 PM.

Results for this indicator are presented in Figure 3.1. The indicator is further divided up into Monday to Friday off-peak (Indicator 3.4) and weekend usage (Indicator 3.5).

Indicator 3.4 Timeslots used by trucks in Monday to Friday off-peak periods as proportion of total timeslots used

This indicator, derived from Indicator 3.2, gives a count of timeslots used by trucks during the Monday to Friday off-peak period as a proportion of all timeslots used. Results for this indicator are presented in Figure 3.2.

Indicator 3.5 Timeslots used by trucks on Saturday and Sunday as proportion of total timeslots used

This indicator, derived from Indicator 3.2, gives a count of timeslots used by trucks during the Weekend (Saturday to Sunday) as a proportion of all timeslots used. Results for this indicator are presented in Figure 3.3.

Indicator 3.6 Average TEUs handled per VBS/TAS truck timeslot

This indicator is a measure of the intensity of usage of timeslots. The indicator increases as opportunities for out/return load carrying trips in one job increase. Results for this indicator are presented in Figure 3.4.

Indicator 3.7 Number of containers moved through empty container parks

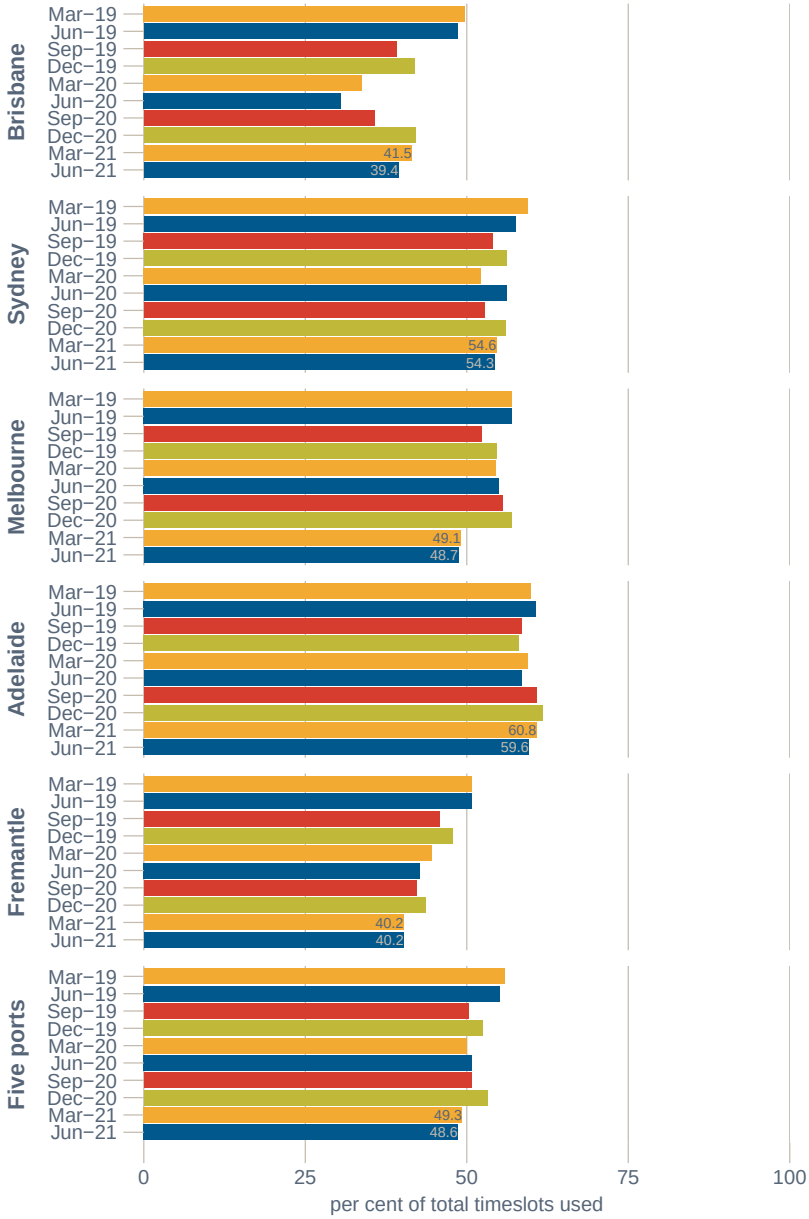
This indicator is a measure of the usage of empty container parks. It shows the number of notifications of container movements to empty container parks in the vicinity of each port.

Indicator 3.8 Number of TEUs moved through empty container parks

This indicator is a measure of the usage of empty container parks. It shows the number of TEUs moved in the operations shown by Indicator 3.7.

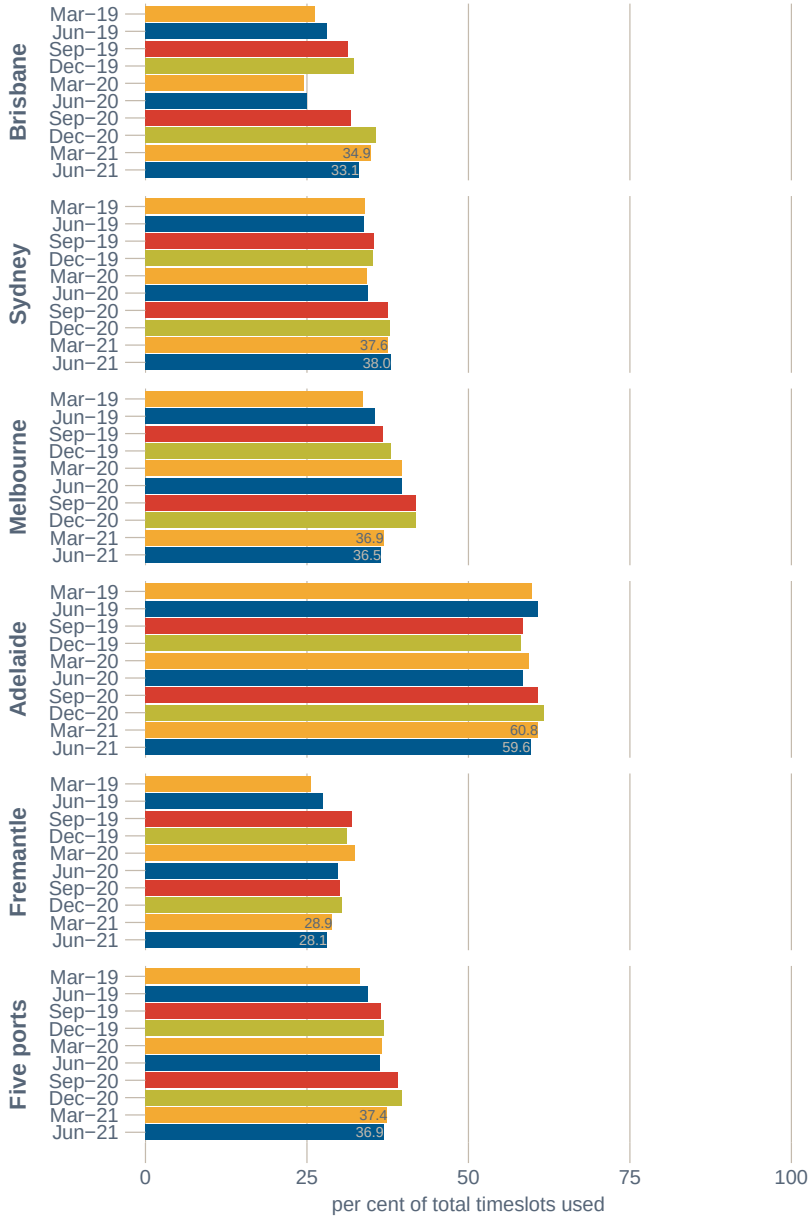
Aerial view over Port Botany from Foreshore Road, October 2019. Photo courtesy of NSW Ports.

Figure 3.1 Timeslots used by trucks in all off-peak periods



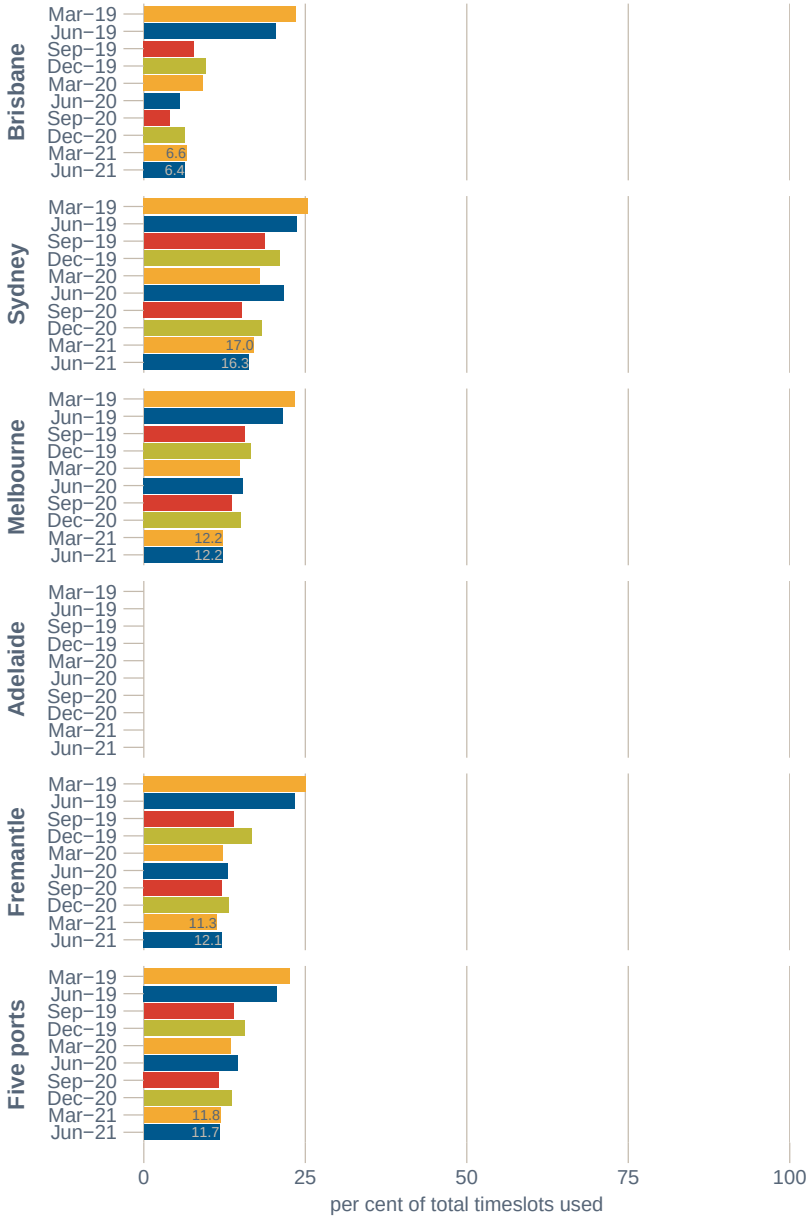
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 3.2 Timeslots used by trucks in off-peak periods Monday to Friday



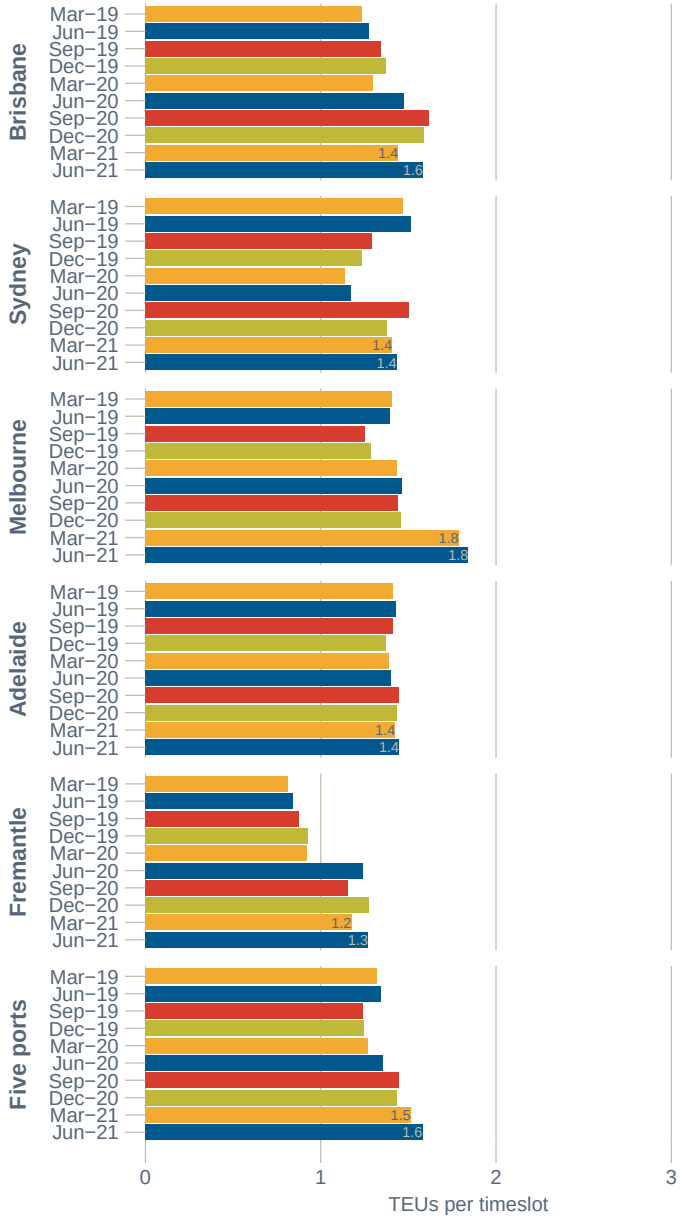
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 3.3 Timeslots used by trucks on Saturday and Sunday



Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Figure 3.4 TEUs processed per VBS timeslot used at container terminals



Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Table 3.1 Timeslots available and actually used by trucks: Brisbane

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	84.6	88.0	117.6	114.0	109.7	109.7	114.2	115.0	119.4	110.3
		Evening	30.0	31.4	40.1	39.9	31.7	31.6	36.4	41.8	45.9	40.2
		Night	15.0	18.0	22.7	26.0	11.4	8.7	21.3	30.4	27.9	24.7
		Sub-total	129.7	137.4	180.5	179.9	152.8	150.0	171.9	187.3	193.1	175.2
	Saturday	Day	16.6	14.9	8.5	10.4	7.7	1.2	5.3	9.5	11.9	9.9
		Evening	4.8	4.1	0.1	0.1	0.1	0.1	0.0	0.2	0.2	0.0
		Night	3.4	1.9	2.0	2.6	1.5	0.7	0.3	1.6	1.9	0.9
		Sub-total	24.8	20.9	10.6	13.1	9.4	2.0	5.5	11.3	14.0	10.8
	Sunday	Day	8.8	9.8	2.6	2.8	2.9	2.9	0.4	0.6	1.0	1.0
		Evening	0.9	0.9	0.9	0.9	0.8	0.9	0.7	1.3	0.8	0.6
		Night	2.1	1.6	0.6	0.9	1.0	1.0	0.6	0.6	0.8	0.8
		Sub-total	11.8	12.3	4.1	4.6	4.7	4.8	1.7	2.5	2.6	2.4
		Total timeslots available	166.2	170.6	195.2	197.6	166.8	156.8	179.2	201.1	209.8	188.3
Used *('000)*	Monday–Friday	Day	77.1	81.8	82.4	79.7	75.4	78.0	81.0	84.5	83.7	78.4
		Evening	27.3	29.0	27.2	26.9	20.5	21.8	25.3	30.0	31.8	27.5
		Night	13.0	15.8	15.3	17.5	7.6	6.3	14.7	21.9	18.2	15.3
		Sub-total	117.5	126.7	124.9	124.1	103.5	106.1	121.0	136.4	133.7	121.2
	Saturday	Day	16.3	14.7	4.9	6.8	4.5	0.7	3.7	6.4	6.7	5.9
		Evening	4.7	4.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0
		Night	3.4	1.9	1.6	1.9	1.2	0.7	0.2	1.1	1.0	0.6
		Sub-total	24.4	20.6	6.6	8.7	5.9	1.5	3.9	7.6	7.7	6.5
	Sunday	Day	8.8	9.4	2.5	2.8	2.8	2.8	0.1	0.5	0.4	0.6
		Evening	0.8	0.9	0.9	0.8	0.7	0.9	0.5	0.7	0.4	0.3
		Night	2.1	1.6	0.6	0.9	1.0	1.0	0.6	0.5	0.8	0.8
		Sub-total	11.7	11.9	3.9	4.4	4.6	4.7	1.1	1.7	1.7	1.7
		Total timeslots used	153.5	159.2	135.4	137.3	113.9	112.2	126.0	145.7	143.1	129.4

Note: Data are rounded to the nearest 1000. Cells with an entry of ''0.0'' mean that data were reported but rounded to zero.
Sources: DP World (2021), Hutchison Ports Australia (2021) and Patrick (2021)

Table 3.2 Timeslots available and actually used by trucks: Sydney

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	127.6	128.1	175.6	180.1	176.9	166.9	177.1	180.7	177.3	165.9
		Evening	56.9	56.4	73.3	76.8	68.5	70.1	76.8	83.3	77.0	72.4
		Night	43.2	45.5	60.1	63.5	54.0	55.8	62.9	69.9	68.1	60.6
		Sub-total	227.7	230.0	309.1	320.3	299.4	292.8	316.8	333.9	322.4	298.9
	Saturday	Day	19.2	17.6	16.2	21.8	16.6	19.0	15.2	22.4	20.4	18.3
		Evening	9.9	9.5	2.7	2.8	2.3	3.2	2.2	4.3	3.1	3.1
		Night	11.1	10.0	10.2	11.9	9.7	10.2	8.0	8.8	8.4	7.9
		Sub-total	40.2	37.1	29.2	36.5	28.5	32.4	25.5	35.6	31.9	29.3
	Sunday	Day	17.7	17.1	19.0	21.2	18.5	20.5	14.7	19.5	16.8	15.1
		Evening	4.8	4.4	10.6	11.4	9.4	9.5	6.9	8.7	8.5	7.1
		Night	9.8	7.2	3.1	3.3	2.4	3.7	4.3	4.7	4.0	3.7
		Sub-total	32.4	28.7	32.7	35.8	30.3	33.7	25.9	32.9	29.4	25.9
		Total timeslots available	300.3	295.8	370.9	392.6	358.2	358.9	368.2	402.3	383.7	354.1
Used *('000)*	Monday–Friday	Day	95.5	98.9	107.5	110.9	105.7	102.3	112.9	117.7	117.6	110.4
		Evening	44.2	43.8	45.7	48.3	42.6	45.0	50.0	55.6	53.0	50.6
		Night	35.7	35.1	37.2	40.5	33.2	35.3	39.7	45.7	44.3	41.0
		Sub-total	175.3	177.8	190.3	199.8	181.5	182.5	202.6	218.9	214.9	202.0
	Saturday	Day	15.5	14.4	10.4	14.0	10.4	13.7	10.0	15.4	14.1	12.9
		Evening	8.6	8.2	2.3	2.5	1.6	2.8	1.7	3.3	2.2	2.1
		Night	8.1	7.8	6.3	7.6	5.2	6.4	3.7	4.2	4.2	4.3
		Sub-total	32.1	30.4	19.0	24.1	17.1	22.9	15.4	22.8	20.4	19.4
	Sunday	Day	14.8	15.0	14.1	17.0	13.9	17.1	11.8	15.4	13.6	11.7
		Evening	3.9	3.5	8.0	9.0	6.8	7.2	5.3	6.4	6.5	5.0
		Night	8.8	6.2	2.6	3.0	1.7	3.3	3.8	4.3	3.5	3.2
		Sub-total	27.5	24.7	24.7	28.9	22.4	27.6	20.9	26.0	23.6	20.0
		Total timeslots used	235.0	232.9	234.1	252.8	221.1	233.1	238.9	267.8	259.0	241.3

Sources: DP World (2021), Hutchison Ports Australia (2021) and Patrick (2021)

Table 3.3 Timeslots available and actually used by trucks: Melbourne

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	151.5	148.1	174.7	166.3	152.6	154.3	157.3	165.5	154.1	149.4
		Evening	47.9	90.0	98.5	90.7	84.3	83.0	84.8	93.8	70.9	67.0
		Night	34.2	66.1	69.0	64.8	60.1	56.5	58.8	71.2	45.0	43.1
		Sub-total	233.6	304.2	342.3	321.9	297.0	293.8	300.9	330.5	270.0	259.5
	Saturday	Day	31.6	27.1	20.5	20.8	17.9	18.6	20.1	22.2	17.4	16.4
		Evening	9.0	7.9	3.5	3.7	3.1	2.6	0.5	0.4	0.1	0.1
		Night	8.9	12.9	12.8	11.9	9.1	8.0	7.1	9.3	5.7	5.6
		Sub-total	49.6	47.8	36.9	36.5	30.1	29.2	27.7	31.9	23.2	22.1
	Sunday	Day	26.3	26.7	18.9	18.3	15.8	14.9	10.9	13.2	8.7	8.9
		Evening	3.6	4.5	7.7	8.8	11.3	11.9	11.6	12.5	7.4	6.7
		Night	6.6	6.7	3.9	3.7	3.8	4.3	4.4	4.2	2.1	1.5
		Sub-total	36.5	37.8	30.5	30.8	30.9	31.0	27.0	29.9	18.2	17.1
		Total timeslots available	319.7	389.9	409.7	389.1	358.0	354.0	355.5	392.3	311.4	298.7
Used *('000)*	Monday–Friday	Day	137.2	140.5	153.2	152.7	139.1	147.4	158.0	158.1	135.3	132.3
		Evening	73.1	73.3	75.7	79.9	76.6	81.7	91.5	92.0	62.4	59.3
		Night	34.3	42.8	42.3	47.9	44.5	48.2	57.5	61.6	35.6	34.7
		Sub-total	244.6	256.6	271.1	280.4	260.2	277.3	307.0	311.8	233.3	226.3
	Saturday	Day	28.0	23.7	15.3	18.7	15.3	18.3	18.0	20.0	14.8	14.0
		Evening	8.5	7.7	3.4	3.4	1.8	2.3	2.1	3.5	0.1	0.1
		Night	7.7	8.4	7.1	7.8	5.7	5.5	4.4	6.1	3.8	3.8
		Sub-total	44.3	39.9	25.8	29.9	22.8	26.2	24.5	29.7	18.7	18.0
	Sunday	Day	20.3	19.5	13.5	15.1	13.0	13.7	9.9	11.1	6.1	6.9
		Evening	3.5	4.3	7.1	7.5	6.9	7.7	10.4	10.5	5.5	5.1
		Night	6.3	6.5	3.6	3.3	2.6	2.8	3.7	3.9	2.0	1.4
		Sub-total	30.1	30.3	24.1	25.9	22.5	24.2	24.0	25.5	13.6	13.5
		Total timeslots used	319.0	326.8	321.0	336.2	305.4	327.6	355.6	367.0	265.6	257.7

Note: VICT 'Used timeslots' are included from March quarter 2017, however VICT 'Available timeslots' are counted only from September quarter 2018.
Sources: DP World (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Table 3.4 Timeslots available and actually used by trucks: Adelaide

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	24.0	24.0	25.0	26.7	25.5	23.2	23.2	22.1	22.2	21.0
		Evening	19.5	19.6	19.2	19.2	20.2	17.6	18.6	17.0	17.7	16.5
		Night	18.8	19.4	19.5	20.4	20.1	18.8	20.4	19.8	19.3	18.6
		Sub-total	62.3	63.0	63.6	66.2	65.8	59.6	62.2	58.8	59.2	56.2
	Saturday	Day										
		Evening										
		Night										
		Sub-total										
	Sunday	Day										
		Evening										
		Night										
		Sub-total										
		Total timeslots available	62.3	63.0	63.6	66.2	65.8	59.6	62.2	58.8	59.2	56.2
Used *('000)*	Monday–Friday	Day	23.7	23.3	24.2	26.0	25.2	22.4	21.9	19.7	20.8	19.4
		Evening	19.2	19.1	18.6	18.8	19.8	16.7	17.1	15.6	16.4	14.9
		Night	16.1	17.0	15.5	17.3	17.1	14.8	16.8	16.3	15.8	13.7
		Sub-total	59.0	59.3	58.3	62.1	62.1	53.8	55.7	51.6	53.0	48.0
	Saturday	Day										
		Evening										
		Night										
		Sub-total										
	Sunday	Day										
		Evening										
		Night										
		Sub-total										
		Total timeslots used	59.0	59.3	58.3	62.1	62.1	53.8	55.7	51.6	53.0	48.0

Note: Blank cells mean no data was reported for the categories.
Sources: Flinders Adelaide Container Terminal (2021)

Table 3.5 Timeslots available and actually used by trucks: Fremantle

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	52.8	52.2	67.5	70.6	66.4	63.5	70.3	64.3	64.0	60.2
		Evening	17.7	19.0	23.5	25.3	23.2	22.0	25.2	23.4	21.6	20.8
		Night	10.0	10.3	14.2	14.6	14.2	11.8	12.8	11.0	10.0	9.4
		Sub-total	80.5	81.5	105.2	110.5	103.8	97.3	108.3	98.7	95.6	90.5
	Saturday	Day	11.9	11.2	6.6	9.1	7.1	5.1	7.2	6.6	6.3	6.3
		Evening	4.0	3.7	0.2	0.2	0.0	0.0	0.2	0.4	0.0	0.2
		Night	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
		Sub-total	19.0	18.1	6.8	9.2	7.1	5.1	7.4	7.1	6.5	6.6
	Sunday	Day	7.4	6.4	8.7	10.1	6.3	7.9	6.5	6.4	5.0	5.6
		Evening	0.3	0.1	0.7	0.8	0.5	0.8	0.4	0.5	0.3	0.3
		Night	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
		Sub-total	7.8	6.4	9.4	10.9	6.9	8.8	6.9	6.9	5.3	6.0
		Total timeslots available	107.3	106.1	121.4	130.6	117.7	111.2	122.6	112.8	107.4	103.1
Used *('000)*	Monday–Friday	Day	51.4	51.0	56.4	57.5	53.9	54.0	60.5	53.3	53.5	50.0
		Evening	16.9	18.2	20.2	21.1	19.6	18.0	21.3	19.1	17.7	16.5
		Night	9.8	10.2	13.0	13.1	11.9	10.0	10.3	9.6	8.2	7.0
		Sub-total	78.2	79.4	89.6	91.7	85.4	82.0	92.1	82.1	79.3	73.5
	Saturday	Day	11.8	11.1	5.8	8.0	6.0	4.3	6.3	5.8	5.4	5.2
		Evening	3.9	3.7	0.2	0.1	0.0	0.0	0.2	0.3	0.0	0.0
		Night	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
		Sub-total	18.7	17.8	6.0	8.1	6.0	4.4	6.5	6.2	5.5	5.2
	Sunday	Day	7.1	6.2	7.8	9.5	5.3	7.1	5.8	5.8	4.3	4.5
		Evening	0.3	0.1	0.6	0.7	0.5	0.8	0.4	0.5	0.2	0.3
		Night	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
		Sub-total	7.5	6.3	8.4	10.2	5.8	7.9	6.2	6.3	4.6	5.0
		Total timeslots used	104.4	103.5	104.0	110.1	97.2	94.3	104.7	94.5	89.4	83.7

Note: Data are rounded to the nearest 1000. Cells with an entry of ''0.0'' mean that data were reported but rounded to zero.
Sources: DP World (2021) and Patrick (2021)

Table 3.6 Timeslots available and actually used by trucks: Five ports

	Weekday	Shift	2019				2020				2021	
			Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available *('000)*	Monday–Friday	Day	440.5	440.5	560.5	557.7	531.1	517.7	542.1	547.6	537.0	506.8
		Evening	172.1	216.4	254.6	251.8	227.8	224.3	241.8	259.3	233.0	216.9
		Night	121.2	159.3	185.5	189.3	159.8	151.6	176.2	202.3	170.3	156.5
		Sub-total	733.8	816.2	1 000.6	998.8	918.7	893.6	960.1	1 009.2	940.4	880.2
	Saturday	Day	79.3	70.8	51.8	62.1	49.3	44.0	47.8	60.8	56.0	50.9
		Evening	27.8	25.2	6.6	6.8	5.5	6.0	2.9	5.4	3.4	3.4
		Night	26.5	27.9	25.1	26.4	20.3	18.8	15.3	19.7	16.1	14.5
		Sub-total	133.6	123.9	83.5	95.3	75.1	68.7	66.1	85.9	75.6	68.8
	Sunday	Day	60.2	59.9	49.2	52.4	43.5	46.2	32.5	39.7	31.5	30.5
		Evening	9.6	9.9	19.9	21.8	22.0	23.1	19.7	22.9	17.0	14.7
		Night	18.6	15.6	7.5	7.9	7.3	9.1	9.3	9.5	7.0	6.1
		Sub-total	88.4	85.3	76.6	82.1	72.7	78.3	61.6	72.2	55.5	51.4
		Total timeslots available	955.8	1 025.4	1 160.8	1 176.2	1 066.5	1 040.6	1 087.8	1 167.3	1 071.5	1 000.4
Used *('000)*	Monday–Friday	Day	384.8	395.6	423.7	426.8	399.4	403.9	434.3	433.3	410.8	390.4
		Evening	180.7	183.3	187.3	195.0	179.1	183.1	205.0	212.4	181.3	168.9
		Night	109.0	120.8	123.3	136.4	114.2	114.7	139.1	155.2	122.1	111.7
		Sub-total	674.5	699.8	734.2	758.2	692.7	701.7	778.4	800.8	714.2	671.0
	Saturday	Day	71.6	63.9	36.4	47.4	36.2	37.1	38.0	47.6	40.9	38.1
		Evening	25.7	23.7	6.0	6.1	3.5	5.3	4.0	7.2	2.3	2.2
		Night	22.3	21.2	15.0	17.3	12.1	12.6	8.3	11.5	9.1	8.8
		Sub-total	119.5	108.7	57.3	70.8	51.8	54.9	50.2	66.3	52.3	49.0
	Sunday	Day	50.9	50.2	38.0	44.4	35.0	40.8	27.6	32.8	24.5	23.8
		Evening	8.6	8.9	16.5	17.9	14.9	16.5	16.5	18.0	12.7	10.8
		Night	17.3	14.2	6.7	7.2	5.3	7.1	8.1	8.7	6.4	5.5
		Sub-total	76.8	73.2	61.2	69.5	55.2	64.4	52.3	59.5	43.5	40.1
		Total timeslots used	870.8	881.7	852.8	898.5	799.7	821.0	880.9	926.6	810.1	760.1

Note: VICT 'Used timeslots' are included from March quarter 2017, however VICT 'Available timeslots' are counted only from September quarter 2018.
Sources: DP World (2021), Flinders Adelaide Container Terminal (2021), Hutchison Ports Australia (2021), Patrick (2021) and Victoria International Container Terminal (2021)

Table 3.7 Empty container park operations

	Port	2018				2019				2020	
		Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Number of containers *('000)*	Brisbane	129.9	150.8	148.6	142.0	135.6	140.7	169.5	198.1	164.4	174.2
	Sydney	175.7	187.1	212.9	225.1	219.2	212.8	258.6	324.1	286.3	289.6
	Melbourne	348.3	355.9	369.9	364.6	335.3	335.6	345.3	384.9	348.1	356.4
	Adelaide	27.8	25.4	25.3	24.7	27.2	25.2	28.4	30.7	33.9	30.7
	Fremantle	94.0	96.3	97.4	109.0	103.4	104.6	114.2	126.1	120.6	112.0
	Five ports	775.7	815.4	854.0	865.3	820.7	819.0	916.0	1 063.9	953.2	962.9
Number of TEUs *('000)*	Brisbane	184.5	219.0	218.7	206.7	198.8	206.5	252.0	299.2	244.2	258.4
	Sydney	267.7	281.6	321.7	344.7	337.7	330.1	398.9	507.4	447.1	451.1
	Melbourne	517.9	533.5	556.6	554.3	514.8	515.7	529.3	594.2	536.4	547.5
	Adelaide	37.9	36.8	36.8	35.0	38.5	36.6	40.7	42.7	48.3	44.6
	Fremantle	134.6	138.5	138.8	155.7	147.0	148.2	163.1	188.7	178.4	167.2
	Five ports	1 142.5	1 209.4	1 272.5	1 296.4	1 236.8	1 237.1	1 384.1	1 632.3	1 454.4	1 468.8

Sources: Containerchain Pty Ltd (2021)
Data currently available to June 2020.

CHAPTER 4
Port interface cost index

Overview

The port interface cost index (PICI) provides a measure of shore-based shipping charges which approximate costs of carting containers through Australia's mainland major city ports. PICI is based on an indicative approach; that is, the index is not an average of all charges, but is based on typical charges levied by service providers. In particular, note that PICI uses scheduled service prices and does not account for specific commercial arrangements.

PICI is computed as a national average in current (Table 4.6) and constant prices (Table 4.7), taking into account the port fees and charges for imports and exports of containers at the five major container ports (Tables 4.1 to 4.5).

Box 4.1 Changes to PICI

Prior to *Waterline 67*, PICI was calculated for three vessel size classes (5,000–20,000 gross tonnes, 35,000-40,0000 gross tonnes and 50,000–55,000 gross tonnes). However, the shift in fleet profile towards larger vessels means these groups are no longer appropriate, with most vessels' tonnage exceeding the largest class.

The new size classes are all of even width (15,000 gross tonnes), beginning with 5,000–20,000 gross tonnes:

- **5,000–20,000 gross tonnes**
- 20,000–35,000 gross tonnes
- **35,000–50,000 gross tonnes**
- 50,000–65,000 gross tonnes
- **65,000–80,000 gross tonnes**
- 80,000–95,000 gross tonnes
- 95,000–110,000 gross tonnes

The three size classes in bold are enumerated in Tables 4.1 to 4.5. The national PICI is computed over all size classes.

Calculations for several components, particularly those under 'Other charges', have been updated to reflect costs per average TEU, rather than per twenty-foot container.

What PICI measures

PICI is a measure of shore-based shipping costs or charges for containers moved through mainland capital city ports. These are ''shore-based'' in that they are the subset of charges paid by importers and exporters of containers which are directly related to the activity which occurs in the port and on the wharf. PICI does not include the charges applicable to the ocean freight service itself, nor does it cover all ancillary charges paid by shippers to customs brokers, freight forwarders and other service providers.

The index is a measure of the movements in costs to users of waterfront and related services, and signals whether the cost is increasing or decreasing. The waterfront is defined as the interface between seaports and land transport, hence the term port interface cost index. Port interface costs are estimated for standard representative ships.

PICI is based on twenty-one indicators which fall in four main groups:

1. Parameters used in computing the index;
2. Ship-based charges;
3. Cargo-based charges; and
4. Other charges, namely: stevedoring costs; customs brokers' fees; road transport costs.

Parameters used in computing the index

These parameters enable the PICI charges to be estimated on a per TEU basis for these typical ships.

Indicator 4.1 Ship size

Port interface costs vary by ship size. To calculate PICI, ships are divided into size ranges (based on 'gross tonnage', or GT) which are represented by a 'typical' vessel within that size range. The vessel's other parameters, such as length and draft, are used as necessary.

All size groups are used to calculate the national Port Interface Cost Index (Indicator 4.25). A breakdown of charges is provided in Tables 4.1 to 4.5 for 5 000–20 000 GT, 35 000– 50 000 GT and 65 000–80 000 GT.

Indicator 4.2 Average TEUs exchanged

The total TEUs exchanged by ships in the size range, averaged over the number of visits made by those ships. Equivalent to the sum of Indicator 4.3 and Indicator 4.6.

Indicator 4.3 Average full (loaded) TEUs exchanged

The total loaded TEUs exchanged by ships in the size range, averaged over the number of visits made by those ships. Equivalent to the sum of Indicator 4.4 and Indicator 4.5.

Indicator 4.4 Average full import TEUs

The sum of full (loaded) import containers moved into a port by ships in the size range, averaged over the number of visits made by those ships during the specified period.

Indicator 4.5 Average full export TEUs

The sum of full (loaded) export containers moved out of a port by ships in the size range, averaged over the number of visits made by those ships during the specified period.

Indicator 4.6 Empty TEUs

The sum of empty import and export containers exchanged by ships in the size range, averaged over the number of visits made by those ships.

Indicator 4.7 Number of port calls

The average number of port calls made by ships in the size range, to a given port, during the period.

Indicator 4.8 Average elapsed berth time

The total elapsed berth time for ships in the size range, divided by the number of ship visits (by ships in the size range) during the period. A ship's elapsed berth time is the time between a ship's arrival at berth, and its departure.

Ship-based charges (per ship visit)

Indicator 4.9 Total ship-based charges by ship visit

The total ship-based charges paid by the size range's representative vessel, given the parameters in Indicators 4.1 to 4.8.

Indicator 4.10 Total ship-based charges for handling empty containers

The total charges paid on empty containers, given the parameters in Indicators 4.1 to 4.8.

This is the sum of wharfage, harbour dues, berth charges and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged (Indicator 4.6).

Ship-based charges (per TEU)

Indicator 4.11 Conservancy

Conservancy charges are navigation service charges levied by the government of the state in which the port is situated.

Indicator 4.12 Tonnage

Tonnage charges are port service charges levied by the port authority, based on the Gross Tonnage of the ship.

Indicator 4.13 Pilotage

Pilotage charges cover services for piloting the ship. A pilot is a mariner who guides ships through dangerous or congested waters, such as harbors or river mouths. Pilots are expert ship handlers who possess detailed knowledge of local waterways.

Indicator 4.14 Towage

Towage charges are levied by the operator of a tugboat—a boat that manoeuvres vessels by pushing or towing them. Charges are typically levied per tug, with higher charges for larger vessels.

Depending on ship's equipment, larger vessels may also require additional tugs. For PICI, the standard towage requirements published in port information handbooks are used.

Indicator 4.15 Mooring, unmooring charges

Mooring charges relate to the services of linesmen and related line and launch hire. (Un)mooring is the making fast (loosening) of a ship to (from) moorings or anchorage by means of lines, cables and/or anchors. Depending on local arrangements for lines services, mooring charges may be levied by the port authority, stevedore or another service provider.

Indicator 4.16 Total ship-based charges per TEU

The sum of the charges in Indicators 4.11 to 4.15 or, equivalently, the total ship-based charges (Indicator 4.9) divided by the total TEUs exchanged (Indicator 4.2).

Cargo-based charges (per TEU)

Each of these fees and charges are discussed only once in the text below. They are however, listed separately for imports and exports in Tables 4.1 to 4.5.

Some charge schedules levy a different fee for a forty-foot container than for a twenty-foot container. Where this occurs, PICI uses the fee charged per twenty-foot container.

Indicator 4.17 Wharfage

Wharfage is a charge assessed against cargo or merchandise, vessel's stores, fuel and supplies for passage on, over, under or through any wharf, pier, or bank controlled by a port authority. Wharfage is also charged for cargo passing between ships or overside ships (to or from barge, lighter or water) when berthed at a wharf, pier or bank controlled by the port authority.

Indicator 4.18 Harbour dues

These are monies that a ship owner must pay to a port authority for keeping a ship in a harbour. The amount charged is usually based on the volume of cargo the ship is carrying.

Other charges (per TEU)

Indicator 4.19 Stevedoring charge (wharfside)

Charges levied by stevedoring companies for container handling at the wharf. The charge is estimated on an annual, per-lift basis from the ACCC *Container Stevedoring Monitoring Report* series. A price per TEU is then calculated using the proportion of 40-foot containers transferred at the port (Indicator 1.4).

Indicator 4.20 Stevedoring charge (landside)

Typical landside and ancillary service charges levied by stevedoring companies for container handling, excluding terminal access charges. The charge is calculated from stevedoring landside revenue per lift reported in the ACCC *Container Stevedoring Monitoring Report*, less a

BITRE estimate of total terminal access charges. A price per TEU is then calculated using the proportion of 40-foot containers transferred at the port (Indicator 1.4).

Indicator 4.21 Terminal access charges

Terminal access charges (formerly infrastructure charges) are levied by terminal operators on all full containers.

Indicator 4.22 Customs broker fees

These are the fees charged by customs brokers for the administrative costs associated with organising the import and export of containers for a representative consignment.

Indicator 4.23 Total fees and charges

This is the sum of ship-based charges per TEU, the cargo-based charges per TEU, and the other cargo-based charges per TEU. These costs enable the calculation of the national PICI measured in current and constant prices in dollars per TEU. These are computed separately for imports and exports in Tables 4.1 to 4.5.

Indicator 4.24 Port's share in national index

These shares are used in computing the national PICI and they are computed for exports and imports separately.

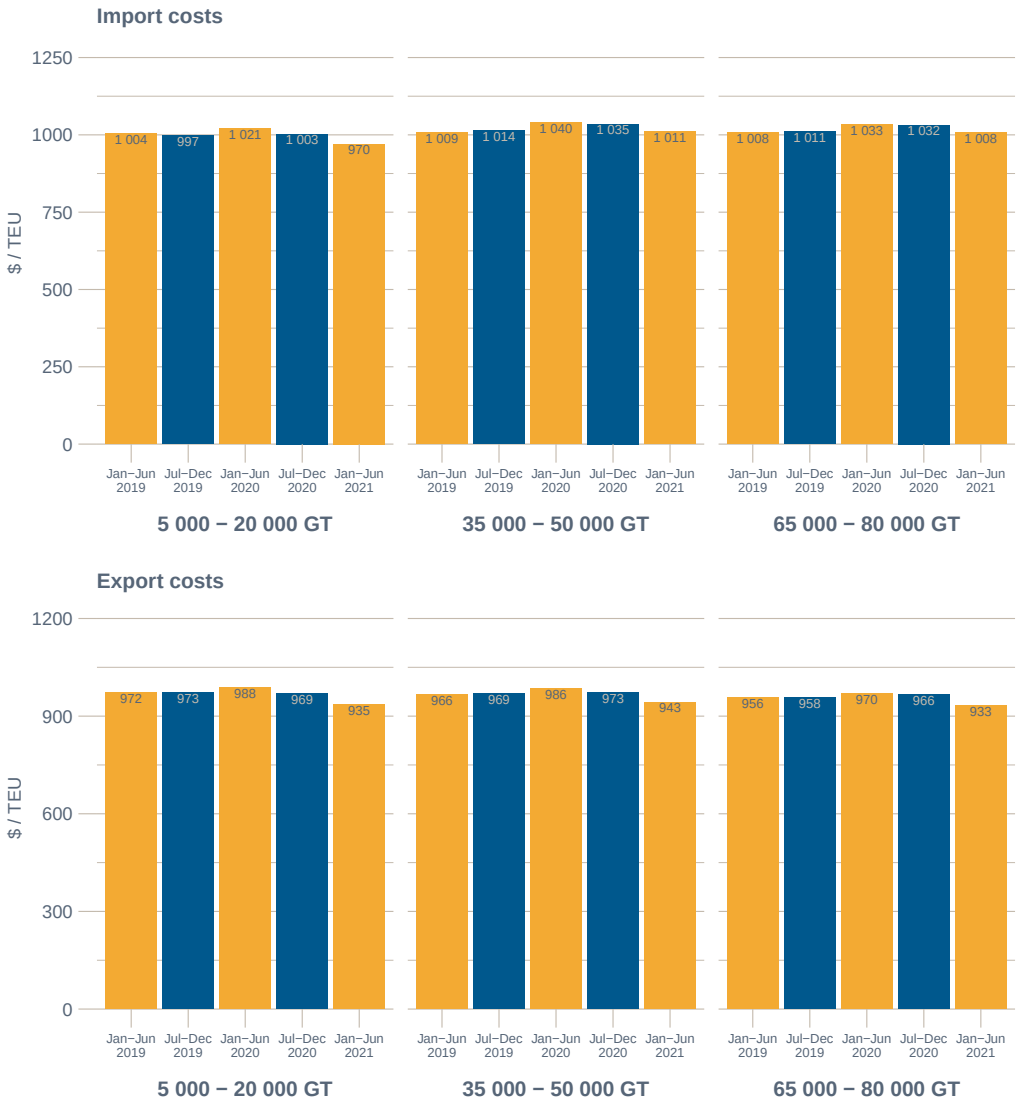
Indicator 4.25 National Port Interface Cost Index

The national port interface cost indexes are the main outputs of the PICI calculations. These indexes are computed separately for imports and exports and for each of the ship size ranges monitored in *Waterline*.

The national PICI for ships in a GT range is the national average cost per TEU. From BTCE (1993), this is a weighted average of individual port estimates.

Commissioning of automated rail mounted gantry (ARMG) cranes at the new Patrick Sydney AutoRail Terminal, June 2020. Photo courtesy of NSW Ports.

Figure 4.1 Port interface costs, constant prices (January–June 2021), by ship size



Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and ABS (2021).

Table 4.1 Port interface costs by ship type—parameters and estimates: Brisbane

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Port call parameters[a]															
Total TEUs exchanged	326	330	398	525	426	1 050	1 220	1 116	1 374	1 235	1 663	1 847	1 646	1 901	2 090
Loaded	245	244	292	386	302	871	966	888	1 093	979	1 136	1 280	1 217	1 402	1 434
Loaded inwards	104	117	124	238	181	549	625	596	773	649	721	814	821	983	1 029
Loaded outwards	141	127	168	148	121	322	341	292	320	330	415	466	396	419	405
Empty[b]	81	86	107	138	124	179	254	228	281	255	527	566	429	499	656
Number of port calls	7	11	7	8	8	5	4	4	3	4	4	4	4	4	4
Elapsed berth time *(hours)*	24	22	28	28	21	21	21	21	27	25	27	28	25	33	35
Charges per ship visit *($)*															
Total ship-based charges	37 055	37 693	37 959	38 528	38 715	58 731	59 778	60 160	61 106	61 375	68 053	69 284	69 692	70 818	71 104
Empty	1 337	1 350	1 688	2 548	2 167	3 608	5 121	4 677	5 863	5 360	10 604	11 488	8 626	10 340	13 662
Ship-based charges *($/TEU)*															
Conservancy	11	12	10	7	9	9	8	9	7	8	10	9	10	9	8
Tonnage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilotage	37	38	31	24	30	19	17	18	15	17	13	12	13	12	10
Towage	57	57	48	37	46	26	22	25	20	23	17	16	18	16	14
Mooring, unmooring[c]	8	8	6	5	6	2	2	2	2	2	1	1	2	1	1
Total ship-based charges *($/TEU)*	114	114	95	73	91	56	49	54	44	50	41	38	42	37	34
Fees and charges for imports															
Total ship-based charges *($/TEU)*	114	114	95	73	91	56	49	54	44	50	41	38	42	37	34
Cargo-based charges															
Wharfage	38	39	39	39	39	38	39	39	39	39	38	39	39	39	39
Harbour dues	68	69	69	69	69	68	69	69	69	69	68	69	69	69	69
Other charges															
Stevedoring—wharfside	150	150	151	152	151	150	150	151	152	151	150	150	151	152	151
Stevedoring—landside	28	32	33	35	34	28	32	33	35	34	28	32	33	35	34
Terminal access charges[d]	34	39	52	65	72	34	39	52	65	72	34	39	52	65	72
Road transport charges[e]	431	431	433	434	434	431	431	433	434	434	431	431	433	434	434
Customs broker fees	127	125	123	122	122	127	125	123	122	122	127	125	123	122	122
Total fees and charges *($ / import TEU)*	990	1 000	996	988	1 013	932	934	954	959	972	917	923	943	952	956
Port's share in national index[f] *(%)*	10	12	11	16	12	19	21	20	21	20	10	13	16	18	19

(cont.)

Table 4.1 Port interface costs by ship type—parameters and estimates: Brisbane *(continued)*

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Fees and charges for exports															
Total ship-based charges *($/TEU)*	114	114	95	73	91	56	49	54	44	50	41	38	42	37	34
Cargo-based charges															
Wharfage	38	39	39	39	39	38	39	39	39	39	38	39	39	39	39
Harbour dues	68	69	69	69	69	68	69	69	69	69	68	69	69	69	69
Other charges															
Stevedoring—wharfside	150	150	151	152	151	150	150	151	152	151	150	150	151	152	151
Stevedoring—landside	28	32	33	35	34	28	32	33	35	34	28	32	33	35	34
Terminal access charges[d]	34	39	46	53	59	34	39	46	53	59	34	39	46	53	59
Road transport charges[e]	431	431	433	432	433	431	431	433	432	433	431	431	433	432	433
Customs broker fees	115	114	113	113	113	115	114	113	113	113	115	114	113	113	113
Total fees and charges *($ / export TEU)*	979	989	979	966	990	921	924	938	937	949	906	913	927	930	933
Port's share in national index[g] *(%)*	11	11	13	12	9	19	22	19	20	20	10	14	14	17	16

Note: Estimates of charges are rounded to the nearest whole dollar. A value of zero indicates that the charge per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the size category for the given period.

b Sum of wharfage, harbour, berth and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d Charges as levied by container terminal operators. These were reported separately for the first time in *Waterline 63*.

e BITRE estimates based on a survey of road transport operators. Survey responses from July–December 2017 onwards are not directly comparable to earlier results.

f Estimated as the TEUs imported through the port by ships in the size class, as a fraction of TEUs imported through the five ports by ships in the size class.

g Estimated as the TEUs exported through the port by ships in the size class, as a fraction of TEUs exported through the five ports by ships in the size class.

Sources: BITRE estimates based on ship call data from Port of Brisbane Pty Ltd (2021) and other sources (see text).

Table 4.2 Port interface costs by ship type—parameters and estimates: Sydney

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Port call parameters[a]															
Total TEUs exchanged	593	572	523	686	649	1 941	2 051	2 139	2 516	2 164	3 098	3 200	3 078	3 394	3 459
Loaded	499	456	418	527	565	1 440	1 514	1 538	1 747	1 603	2 052	2 188	2 168	2 398	2 380
Loaded inwards	220	184	169	239	227	1 013	1 094	1 141	1 320	1 159	1 537	1 641	1 595	1 874	1 848
Loaded outwards	279	272	249	288	338	427	419	397	428	445	515	547	573	524	531
Empty[b]	94	116	105	159	84	501	537	601	768	561	1 046	1 012	910	995	1 080
Number of port calls	11	14	12	9	9	4	4	3	3	3	3	4	4	4	4
Elapsed berth time *(hours)*	26	27	27	37	30	31	36	-	55	46	40	42	43	62	52
Charges per ship visit *($)*															
Total ship-based charges	31 355	32 183	32 362	32 605	32 831	63 814	65 581	65 903	66 329	66 717	84 093	86 558	86 902	87 368	87 770
Empty	1 356	1 706	1 545	2 338	1 268	7 231	7 908	8 849	11 310	8 500	15 091	14 902	13 393	14 651	16 366
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	17	18	20	15	16	13	13	13	11	12	14	14	14	13	13
Pilotage	10	11	12	9	9	5	5	5	4	5	4	4	4	4	3
Towage	21	22	25	19	21	12	11	11	9	11	8	8	8	7	7
Mooring, unmooring[c]	5	5	5	4	5	2	2	2	2	2	2	2	2	2	2
Total ship-based charges *($/TEU)*	53	56	62	48	51	33	32	31	26	31	27	27	28	26	25
Fees and charges for imports															
Total ship-based charges *($/TEU)*	53	56	62	48	51	33	32	31	26	31	27	27	28	26	25
Cargo-based charges															
Wharfage	135	142	142	142	146	135	142	142	142	146	135	142	142	142	146
Harbour dues	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other charges															
Stevedoring—wharfside	150	150	150	150	151	150	150	150	150	151	150	150	150	150	151
Stevedoring—landside	28	32	32	34	34	28	32	32	34	34	28	32	32	34	34
Terminal access charges[d]	30	37	54	58	72	30	37	54	58	72	30	37	54	58	72
Road transport charges[e]	475	476	478	477	480	475	476	478	477	480	475	476	478	477	480
Customs broker fees	129	132	135	136	136	129	132	135	136	136	129	132	135	136	136
Total fees and charges *($ / import TEU)*	1 000	1 025	1 053	1 044	1 069	980	1 001	1 021	1 023	1 049	974	996	1 019	1 023	1 043
Port's share in national index[f] *(%)*	29	23	22	16	16	32	34	35	33	34	41	39	37	37	38

(cont.)

Table 4.2 Port interface costs by ship type—parameters and estimates: Sydney *(continued)*

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Fees and charges for exports															
Total ship-based charges *($/TEU)*	53	56	62	48	51	33	32	31	26	31	27	27	28	26	25
Cargo-based charges															
Wharfage	90	96	96	96	99	90	96	96	96	99	90	96	96	96	99
Harbour dues	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other charges															
Stevedoring—wharfside	150	150	150	150	151	150	150	150	150	151	150	150	150	150	151
Stevedoring—landside	28	32	32	34	34	28	32	32	34	34	28	32	32	34	34
Terminal access charges[d]	30	37	50	52	59	30	37	50	52	59	30	37	50	52	59
Road transport charges[e]	475	476	478	477	478	475	476	478	477	478	475	476	478	477	478
Customs broker fees	107	107	107	106	106	107	107	107	106	106	107	107	107	106	106
Total fees and charges *($ / export TEU)*	933	955	974	962	978	913	930	943	941	958	908	925	940	941	952
Port's share in national index[g] *(%)*	31	32	29	24	27	24	26	24	24	26	24	25	25	22	23

Note: Estimates of charges are rounded to the nearest whole dollar. A value of zero indicates that the charge per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the size category for the given period.

b Sum of wharfage, harbour, berth and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d Charges as levied by container terminal operators. These were reported separately for the first time in *Waterline 63*.

e BITRE estimates based on a survey of road transport operators. Survey responses from July–December 2017 onwards are not directly comparable to earlier results.

f Estimated as the TEUs imported through the port by ships in the size class, as a fraction of TEUs imported through the five ports by ships in the size class.

g Estimated as the TEUs exported through the port by ships in the size class, as a fraction of TEUs exported through the five ports by ships in the size class.

Sources: BITRE estimates based on ship call data from NSW Ports (2021) and other sources (see text).

Table 4.3 Port interface costs by ship type—parameters and estimates: Melbourne

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Port call parameters[a]															
Total TEUs exchanged	947	913	836	852	903	2 101	2 206	2 148	2 591	2 589	3 244	3 639	3 736	3 939	3 970
Loaded	841	794	720	729	772	1 631	1 729	1 703	2 028	1 909	2 369	2 731	2 896	3 042	2 971
Loaded inwards	323	286	277	291	319	999	1 103	1 043	1 350	1 240	1 469	1 761	1 844	1 946	1 914
Loaded outwards	519	508	443	438	454	632	626	660	678	669	900	971	1 051	1 096	1 057
Empty[b]	106	120	117	123	130	470	477	444	563	680	875	908	840	898	999
Number of port calls	6	6	6	5	4	4	4	4	3	3	3	3	4	4	4
Elapsed berth time *(hours)*	29	28	26	28	27	27	30	29	38	35	34	40	41	44	44
Charges per ship visit *($)*															
Total ship-based charges	40 923	41 293	41 545	42 011	42 188	62 928	63 541	63 838	64 686	64 895	86 704	87 619	87 921	89 239	89 450
Empty	2 024	2 323	2 268	2 435	2 584	9 014	9 272	8 637	11 190	13 507	16 784	17 643	16 326	17 841	19 848
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	10	11	12	12	11	12	11	12	10	10	14	13	13	12	12
Pilotage	11	12	13	13	12	7	7	7	6	6	5	5	4	4	4
Towage	19	20	22	22	21	10	10	10	8	9	7	6	6	6	6
Mooring, unmooring[c]	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1
Total ship-based charges *($/TEU)*	43	45	50	49	47	30	29	30	25	25	27	24	24	23	23
Fees and charges for imports															
Total ship-based charges *($/TEU)*	43	45	50	49	47	30	29	30	25	25	27	24	24	23	23
Cargo-based charges															
Wharfage	120	122	124	135	135	120	122	124	135	135	120	122	124	135	135
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring—wharfside	150	150	151	151	151	150	150	151	151	151	150	150	151	151	151
Stevedoring—landside	28	32	33	35	34	28	32	33	35	34	28	32	33	35	34
Terminal access charges[d]	49	54	71	72	81	49	54	71	72	81	49	54	71	72	81
Road transport charges[e]	461	462	465	464	466	461	462	465	464	466	461	462	465	464	466
Customs broker fees	128	127	127	126	126	128	127	127	126	126	128	127	127	126	126
Total fees and charges *($ / import TEU)*	981	993	1 019	1 034	1 041	968	977	999	1 009	1 019	964	972	993	1 007	1 017
Port's share in national index[f] *(%)*	19	16	17	14	12	34	34	35	38	36	33	33	32	34	34

(cont.)

Table 4.3 Port interface costs by ship type—parameters and estimates: Melbourne *(continued)*

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Fees and charges for exports															
Total ship-based charges *($/TEU)*	43	45	50	49	47	30	29	30	25	25	27	24	24	23	23
Cargo-based charges															
Wharfage	105	103	103	105	105	105	103	103	105	105	105	103	103	105	105
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring—wharfside	150	150	151	151	151	150	150	151	151	151	150	150	151	151	151
Stevedoring—landside	28	32	33	35	34	28	32	33	35	34	28	32	33	35	34
Terminal access charges[d]	49	54	65	63	62	49	54	65	63	62	49	54	65	63	62
Road transport charges[e]	461	462	464	463	464	461	462	464	463	464	461	462	464	463	464
Customs broker fees	114	113	111	110	110	114	113	111	110	110	114	113	111	110	110
Total fees and charges *($ / export TEU)*	952	959	976	977	974	939	943	956	953	952	936	938	950	951	949
Port's share in national index[g] *(%)*	25	26	24	25	20	38	38	43	42	39	36	35	34	41	40

Note: Estimates of charges are rounded to the nearest whole dollar. A value of zero indicates that the charge per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the size category for the given period.

b Sum of wharfage, harbour, berth and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d Charges as levied by container terminal operators. These were reported separately for the first time in *Waterline 63*.

e BITRE estimates based on a survey of road transport operators. Survey responses from July–December 2017 onwards are not directly comparable to earlier results.

f Estimated as the TEUs imported through the port by ships in the size class, as a fraction of TEUs imported through the five ports by ships in the size class.

g Estimated as the TEUs exported through the port by ships in the size class, as a fraction of TEUs exported through the five ports by ships in the size class.

Sources: BITRE estimates based on ship call data from Port of Melbourne Operations Pty Ltd (2021) and other sources (see text).

Table 4.4 Port interface costs by ship type—parameters and estimates: Adelaide

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Port call parameters[a]															
Total TEUs exchanged	322	-	-	861	-	765	782	813	878	914	1 134	1 196	1 370	1 374	1 478
Loaded	287	-	-	182	-	652	643	637	748	740	833	883	1 028	1 112	1 217
Loaded inwards	232	-	-	0	-	340	326	307	337	380	371	384	340	463	463
Loaded outwards	55	-	-	182	-	313	317	330	410	360	462	499	688	649	754
Empty[b]	35	-	-	679	-	113	139	176	130	174	301	314	342	262	261
Number of port calls	1	-	-	1	-	5	4	3	3	3	3	3	4	4	4
Elapsed berth time *(hours)*	24	-	-	29	-	18	22	23	27	24	23	26	30	31	30
Charges per ship visit *($)*															
Total ship-based charges	34 240	28 043	28 213	36 556	28 873	52 306	55 401	56 111	59 508	58 634	64 485	66 563	67 347	69 386	68 958
Empty	0	-	-	0	-	0	0	0	0	0	0	0	0	0	0
Ship-based charges *($/TEU)*															
Conservancy	11	-	-	4	-	5	7	6	7	7	8	8	6	6	6
Tonnage	22	-	-	10	-	13	14	14	15	13	14	14	14	15	13
Pilotage	23	-	-	9	-	10	10	10	9	9	7	7	6	6	5
Towage	49	-	-	19	-	41	40	39	36	35	28	27	24	24	22
Mooring, unmooring[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total ship-based charges *($/TEU)*	106	-	-	42	-	68	71	69	68	64	57	56	49	51	47
Fees and charges for imports															
Total ship-based charges *($/TEU)*	106	-	-	42	-	68	71	69	68	64	57	56	49	51	47
Cargo-based charges															
Wharfage	90	91	91	94	94	90	91	91	94	94	90	91	91	94	94
Harbour dues	7	30	30	30	30	7	30	30	30	30	7	30	30	30	30
Other charges															
Stevedoring—wharfside	155	-	-	157	-	155	157	157	157	157	155	157	157	157	157
Stevedoring—landside	31	-	-	38	-	31	36	36	38	38	31	36	36	38	38
Terminal access charges[d]	20	-	-	20	-	20	21	20	20	20	20	21	20	20	20
Road transport charges[e]	381	-	-	379	-	381	382	382	379	379	381	382	382	379	379
Customs broker fees	131	-	-	129	-	131	131	130	129	129	131	131	130	129	129
Total fees and charges *($ / import TEU)*	922	-	-	890	-	884	919	915	915	912	873	904	895	898	894
Port's share in national index[f] *(%)*	0	-	-	0	-	5	4	4	4	5	6	4	3	3	2

(cont.)

Table 4.4 Port interface costs by ship type—parameters and estimates: Adelaide *(continued)*

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Fees and charges for exports															
Total ship-based charges *($/TEU)*	106	-	-	42	-	68	71	69	68	64	57	56	49	51	47
Cargo-based charges															
Wharfage	90	91	91	94	94	90	91	91	94	94	90	91	91	94	94
Harbour dues	7	30	30	30	30	7	30	30	30	30	7	30	30	30	30
Other charges															
Stevedoring—wharfside	155	-	-	157	-	155	157	157	157	157	155	157	157	157	157
Stevedoring—landside	31	-	-	38	-	31	36	36	38	38	31	36	36	38	38
Terminal access charges[d]	20	-	-	20	-	20	21	20	20	20	20	21	20	20	20
Road transport charges[e]	381	-	-	379	-	381	382	382	379	379	381	382	382	379	379
Customs broker fees	86	-	-	88	-	86	88	89	88	88	86	88	89	88	88
Total fees and charges *($ / export TEU)*	877	-	-	848	-	839	876	873	874	871	828	861	853	857	853
Port's share in national index[g] *(%)*	0	-	-	0	-	8	8	8	10	9	13	11	10	9	8

Note: Estimates of charges are rounded to the nearest whole dollar. A value of zero indicates that the charge per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the size category for the given period.

b Sum of wharfage, harbour, berth and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d Charges as levied by container terminal operators. These were reported separately for the first time in *Waterline 63*.

e BITRE estimates based on a survey of road transport operators. Survey responses from July–December 2017 onwards are not directly comparable to earlier results.

f Estimated as the TEUs imported through the port by ships in the size class, as a fraction of TEUs imported through the five ports by ships in the size class.

g Estimated as the TEUs exported through the port by ships in the size class, as a fraction of TEUs exported through the five ports by ships in the size class.

Sources: BITRE estimates based on ship call data from Flinders Ports (2021) and other sources (see text).

Table 4.5 Port interface costs by ship type—parameters and estimates: Fremantle

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Port call parameters[a]															
Total TEUs exchanged	1 951	2 360	2 574	2 876	2 707	1 326	1 350	1 134	1 146	1 097	1 430	1 760	2 509	2 433	2 385
Loaded	1 801	2 020	2 105	2 218	2 135	1 135	1 134	923	934	875	1 084	1 314	1 796	1 707	1 837
Loaded inwards	948	1 188	1 165	1 391	1 314	716	794	631	667	597	578	736	1 018	988	952
Loaded outwards	852	833	939	826	821	418	340	292	267	278	506	578	778	719	884
Empty[b]	150	340	469	658	573	192	216	211	211	223	346	447	713	726	548
Number of port calls	12	13	12	10	10	5	5	4	5	5	5	5	6	5	6
Elapsed berth time *(hours)*	33	32	34	44	43	25	24	26	24	27	26	29	39	43	44
Charges per ship visit *($)*															
Total ship-based charges	23 998	24 343	24 515	24 803	24 963	42 316	42 945	43 219	43 719	44 015	65 808	66 726	67 227	68 024	68 446
Empty	1 848	4 272	5 899	8 353	7 342	2 363	2 711	2 655	2 682	2 857	4 264	5 614	8 968	9 224	7 029
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	2	2	2	1	2	8	8	9	9	10	12	10	7	7	7
Pilotage	3	3	2	2	2	8	8	9	9	10	7	6	4	4	4
Towage	7	5	5	5	5	15	15	18	18	19	26	21	15	16	16
Mooring, unmooring[c]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total ship-based charges *($/TEU)*	12	10	10	9	9	32	32	38	38	40	46	38	27	28	29
Fees and charges for imports															
Total ship-based charges *($/TEU)*	12	10	10	9	9	32	32	38	38	40	46	38	27	28	29
Cargo-based charges															
Wharfage	82	83	83	84	85	82	83	83	84	85	82	83	83	84	85
Harbour dues	38	39	39	40	40	38	39	39	40	40	38	39	39	40	40
Other charges															
Stevedoring—wharfside	153	152	153	153	153	153	152	153	153	153	153	152	153	153	153
Stevedoring—landside	30	34	34	35	36	30	34	34	35	36	30	34	34	35	36
Terminal access charges[d]	5	5	26	31	31	5	5	26	31	31	5	5	26	31	31
Road transport charges[e]	419	418	419	418	418	419	418	419	418	418	419	418	419	418	418
Customs broker fees	155	153	151	150	150	155	153	151	150	150	155	153	151	150	150
Total fees and charges *($ / import TEU)*	895	895	915	918	922	915	916	944	948	953	929	922	932	938	941
Port's share in national index[f] *(%)*	42	49	49	54	60	10	7	6	5	5	11	11	12	8	6

(cont.)

Table 4.5 Port interface costs by ship type—parameters and estimates: Fremantle *(continued)*

	5 000 to 20 000 GT ships					35 000 to 50 000 GT ships					65 000 to 80 000 GT ships				
	2019		2020		2021	2019		2020		2021	2019		2020		2021
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Fees and charges for exports															
Total ship-based charges *($/TEU)*	12	10	10	9	9	32	32	38	38	40	46	38	27	28	29
Cargo-based charges															
Wharfage	82	83	83	84	85	82	83	83	84	85	82	83	83	84	85
Harbour dues	38	39	39	40	40	38	39	39	40	40	38	39	39	40	40
Other charges															
Stevedoring—wharfside	153	152	153	153	153	153	152	153	153	153	153	152	153	153	153
Stevedoring—landside	30	34	34	35	36	30	34	34	35	36	30	34	34	35	36
Terminal access charges[d]	5	5	21	22	22	5	5	21	22	22	5	5	21	22	22
Road transport charges[e]	419	418	419	417	417	419	418	419	417	417	419	418	419	417	417
Customs broker fees	123	120	118	117	117	123	120	118	117	117	123	120	118	117	117
Total fees and charges *($ / export TEU)*	863	862	876	876	879	883	884	905	906	910	897	890	893	896	898
Port's share in national index[g] *(%)*	32	31	34	39	44	10	6	6	4	5	17	16	17	12	12

Note: Estimates of charges are rounded to the nearest whole dollar. A value of zero indicates that the charge per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the size category for the given period.

b Sum of wharfage, harbour, berth and channel fees levied per empty TEU, multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d Charges as levied by container terminal operators. These were reported separately for the first time in *Waterline 63*.

e BITRE estimates based on a survey of road transport operators. Survey responses from July–December 2017 onwards are not directly comparable to earlier results.

f Estimated as the TEUs imported through the port by ships in the size class, as a fraction of TEUs imported through the five ports by ships in the size class.

g Estimated as the TEUs exported through the port by ships in the size class, as a fraction of TEUs exported through the five ports by ships in the size class.

Sources: BITRE estimates based on ship call data from Fremantle Ports (2021) and other sources (see text).

Table 4.6 National port interface costs, by size of ship (current prices)

Port interface costs *($ / TEU)*		2019		2020		2021
		Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
Import	5,000–20,000 GT	951	953	973	966	970
	20,000–35,000 GT	975	983	1 015	1 016	1 022
	35,000–50,000 GT	956	970	991	997	1 011
	50,000–65,000 GT	950	962	992	999	1 012
	65,000–80,000 GT	955	967	984	994	1 008
	80,000–95,000 GT	958	969	983	990	1 001
	95,000–110,000 GT	-	968	985	987	1 003
Export	5,000–20,000 GT	921	931	942	933	935
	20,000–35,000 GT	941	947	966	959	958
	35,000–50,000 GT	915	927	940	937	943
	50,000–65,000 GT	910	919	940	942	946
	65,000–80,000 GT	906	916	925	930	933
	80,000–95,000 GT	913	921	927	932	936
	95,000–110,000 GT	-	912	922	922	932

Sources: BITRE estimates based on data in Tables 4.1 to 4.5.

Table 4.7 National port interface costs, by size of ship (constant prices)

Port interface costs *($ / TEU)*		2019		2020		2021
		Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	ABS non-farm GDP deflator	94.7	95.6	95.3	96.3	100.0
Import	5,000–20,000 GT	1 004	997	1 021	1 003	970
	20,000–35,000 GT	1 029	1 028	1 065	1 055	1 022
	35,000–50,000 GT	1 009	1 014	1 040	1 035	1 011
	50,000–65,000 GT	1 002	1 007	1 040	1 037	1 012
	65,000–80,000 GT	1 008	1 011	1 033	1 032	1 008
	80,000–95,000 GT	1 011	1 014	1 031	1 028	1 001
	95,000–110,000 GT	-	1 013	1 034	1 025	1 003
Export	5,000–20,000 GT	972	973	988	969	935
	20,000–35,000 GT	993	991	1 013	995	958
	35,000–50,000 GT	966	969	986	973	943
	50,000–65,000 GT	960	961	986	978	946
	65,000–80,000 GT	956	958	970	966	933
	80,000–95,000 GT	964	963	973	968	936
	95,000–110,000 GT	-	954	967	957	932

Notes: Values in constant prices are derived using the ABS non-farm GDP deflator, with January–June 2021 as the base period.

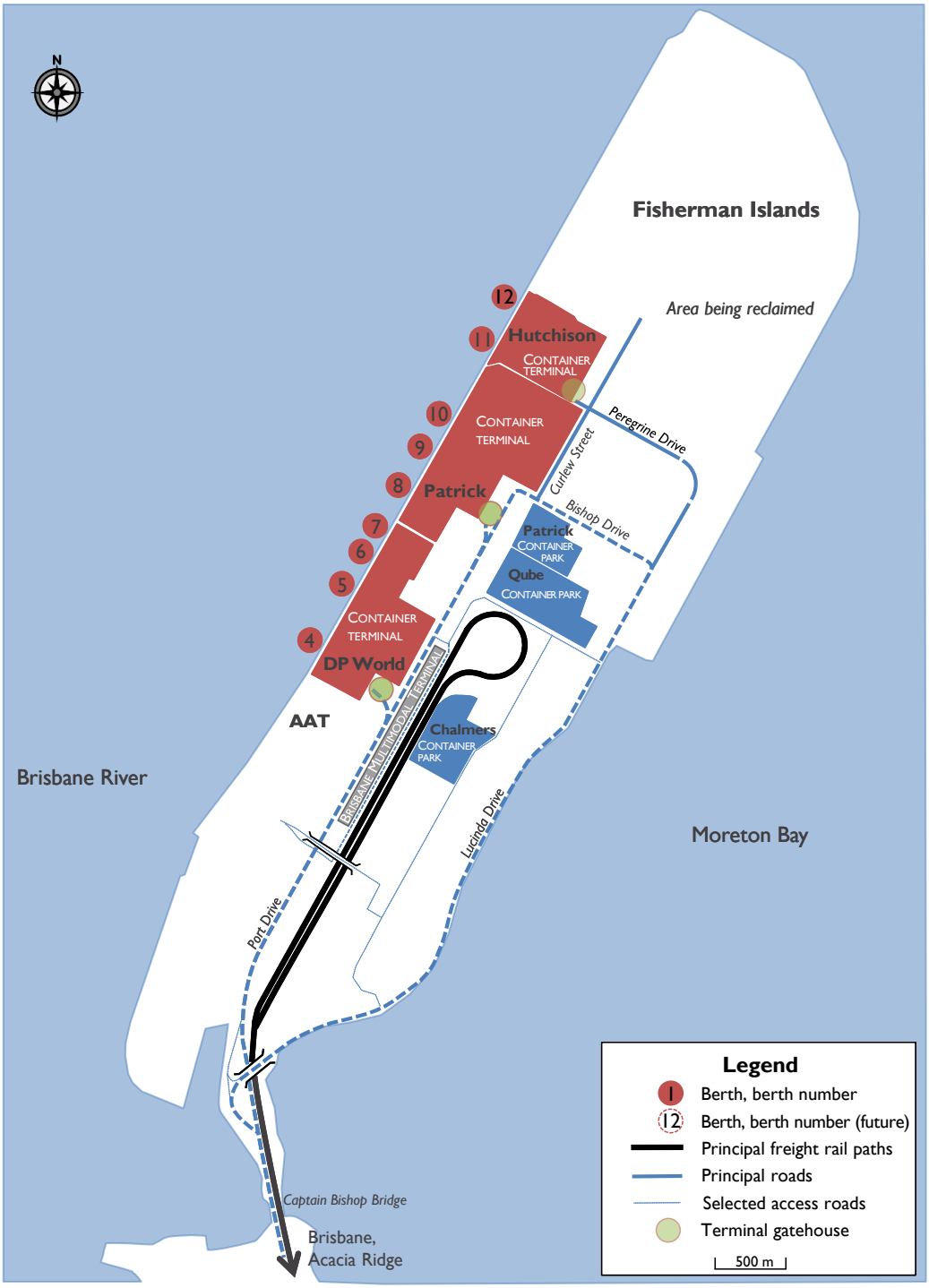
Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and ABS (2021).

APPENDIX A

Maps of five major Australian container ports

This appendix presents maps of container terminals and supplementary information about facilities and port services available at the five major Australian container ports as at June 2021.

Figure A.1 Brisbane (Fisherman Islands terminals)



(Last updated: September 2016)

Brisbane (Fisherman Islands terminals)

The Port of Brisbane is managed and developed by the Port of Brisbane Pty Ltd, under a 99-year lease from the Queensland Government.

Dockside

Stevedores. The map shows the DP World, Patrick and Hutchison Ports Australia terminals. Some containers are also handled by Australian Amalgamated Terminals (AAT), who provide a multi-purpose, multi-user facility that is based at Berths 1–3, to the west of the DP World container yard.

Berths. DP World operates from container berths 4–7. The Patrick container berths are 8–10. Hutchison operates berths 11 and 12.

Equipment. DP World has 5 post-Panamax quay cranes, of which 4 are twin-lift and 1 single-lift. DP World's semi-automated terminal has 16 automated stacking cranes. Patrick has 4 post-Panamax cranes, with a fifth post-Panamax crane being commissioned; in addition, Patrick has 35 automated straddle carriers (AutoStrads). Hutchison's Brisbane Container Terminals includes 4 post-Panamax cranes and 6 automated stacking cranes.

Road

Road access to the area is via the bridge to Fisherman Islands, over the Captain Bishop Bridge. Access to the DP World and Patrick terminals is via Port Drive or Lucinda Drive / Bishop Drive / Curlew Street; access to the Hutchison terminal is via Curlew Street.

Rail

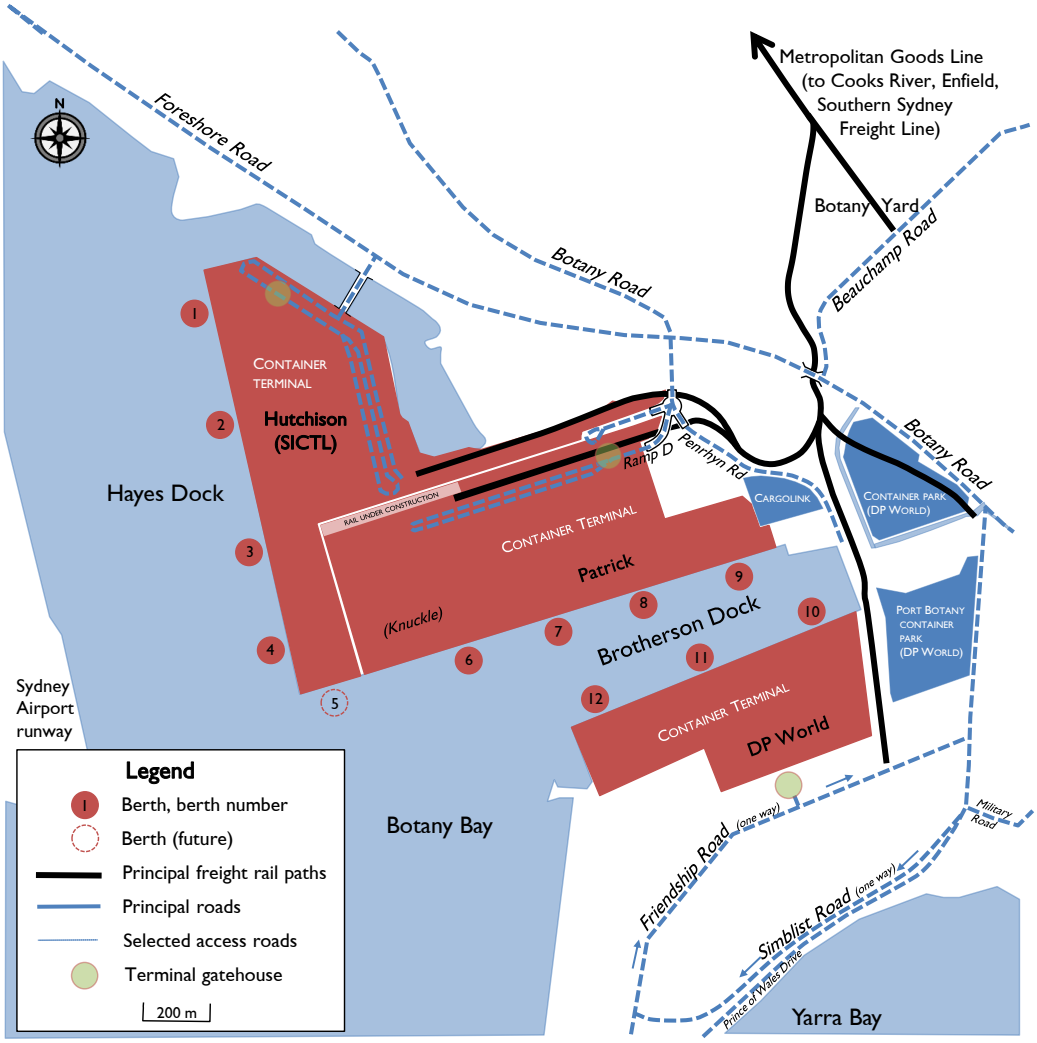
Facilities. Brisbane Multimodal Terminal provides ''near-dock'' intermodal rail facilities at Fisherman Islands. Train lengths of up to 850 metres are permitted. Containers are moved on public roads between the container terminals and the intermodal rail terminal.

Services. Scheduled rail services to the Brisbane Multimodal Terminal include long haul:

- bulk coal from West Moreton and grain from western Queensland, both via narrow gauge;
- reefer containers containing meat from Rockhampton, by narrow-gauge trains;
- some containers are taken from Fisherman Islands—the presumption is that they are mainly empty containers; and
- there are no scheduled standard-gauge container trains.

National rail connections. Dual narrow- and (national) standard-gauge tracks are installed between Fisherman Islands and the inter-/intra-state intermodal terminal at Acacia Ridge.

Figure A.2 Sydney (Port Botany terminals)



(Last updated: November 2021)

Sydney (Port Botany terminals)

Port Botany is managed by the NSW Ports Consortium, which has a 99-year lease of the State-owned assets at the port.

Dockside

Stevedores. The three container terminals at Port Botany are served by the stevedores Patrick, DP World and Hutchison (Sydney International Container Terminals Limited, SICTL).

Berths. Patrick operates four berths, numbers 6–9. DP World's three berths are numbered 10–12. Hutchison has four operational berths (1–4).

Equipment. DP World equipment includes 6 twin-lift quay cranes and 1 single-lift quay crane.

Patrick operates 9 twin-lift quay cranes. The Patrick container yard is automated, with 56 automated straddle carriers (AutoStrads). Automatic operations commenced on 2 April 2015.

The Hutchison terminal operates 4 post-Panamax quay cranes and 12 automated stacking cranes (ASCs). 10 (manned) shuttle carriers move containers between the quay line and the ASCs.

Road

Access to the DP World terminal is via Friendship Road (one-way). The Patrick terminal is accessed from Penrhyn Road. Hutchison's terminal is accessed via a bridge from Foreshore Road.

Rail

Facilities. Each stevedore has on-dock rail facilities. DP World has 3 sidings of 340 metre length.

Patrick are investing jointly with NSW Ports to significantly upgrade on-dock rail capacity. Two new 300 metre sidings have been completed, along with commissioning of three (3) Automated Rail-Mounted Gantries (ARMGs). Upon completion, the rail terminal will have four 600 metre sidings.

Hutchison's terminal has 2 rail sidings of 680 metres; these are parallel to the Patrick sidings.

Services. Scheduled short haul and long haul rail container services between Botany and the hinterland include:

- Short-haul services from Yennora, Cooks River, Minto and Enfield.
- processed meat, grain and other agricultural products from Dubbo (Fletcher Export International / Southern Shorthaul Railroad);
- wheat, barley, oilseeds and pulses from Narrabri (Crawfords Freightlines / Southern Shorthaul Railroad);
- specialised grain transport from Forbes, Narrabri, Dubbo, Coonamble and Narromine (Qube Logistics);

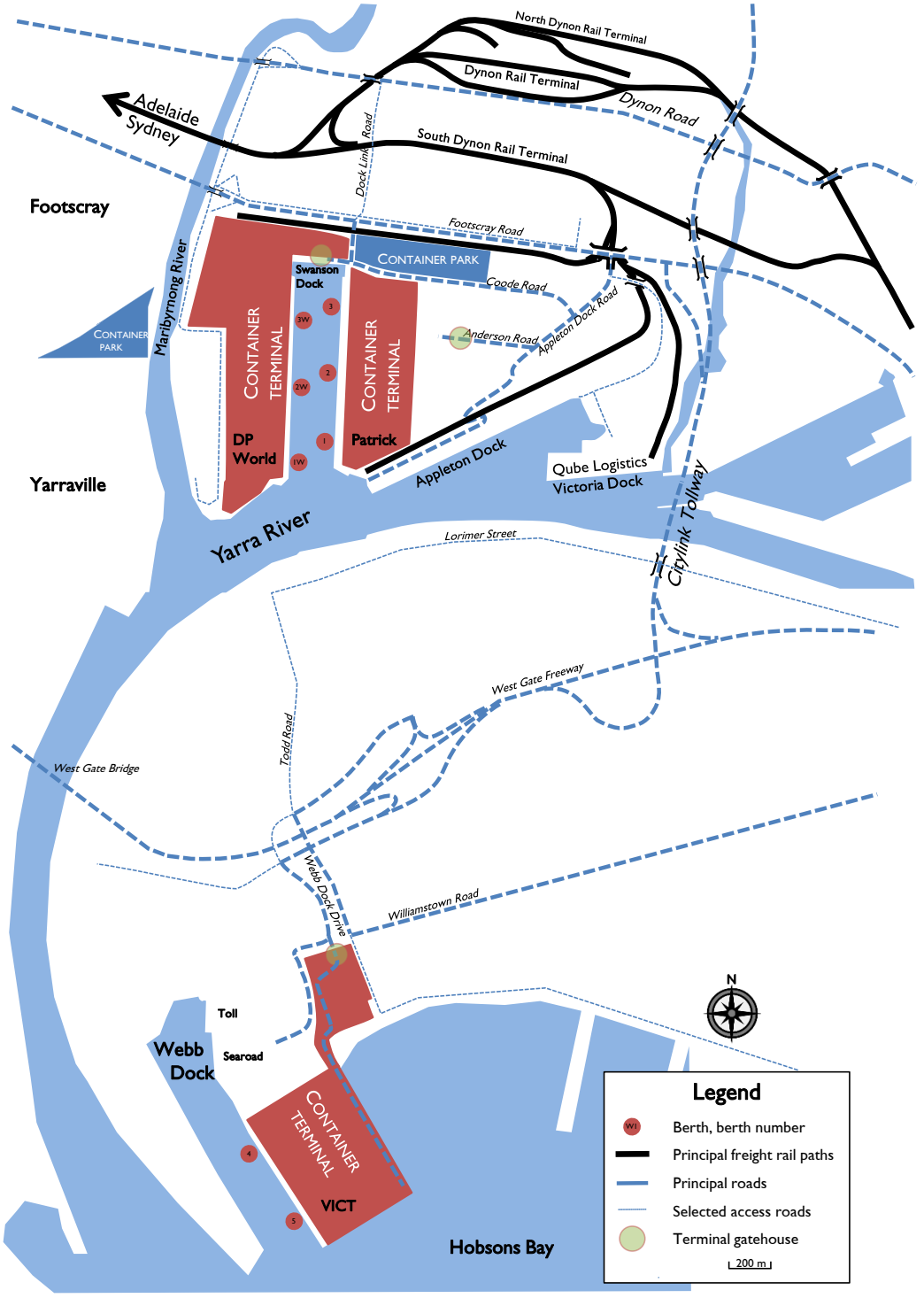
- cotton and agricultural produce from Nevertire, Warren, Warren South, Trangie South, Narrabri and Wee Waa (Qube Logistics; Sydney Rail Services);
- paper products and grain from Harefield (Qube Logistics);
- aluminium and agricultural produce from Walsh Point, Carrington and Sandgate [Newcastle] (Qube Logistics and Crawfords Freightlines / Sydney Rail Services);
- grain, meat and other agricultural produce from Werris Creek (Crawfords Freightlines / Sydney Rail Services).

Rail access. Railway sidings at Botany Yard are used to regulate train entry to the port; to split trains, where necessary, for onwards movements to the port, and to re-form trains from port-terminal wagon rakes for movements to Cooks River, Enfield and beyond.

National and regional rail connections. The port is linked to the intrastate and interstate rail network, including the Southern Sydney Freight Line, and via the Metropolitan Freight Network (including the Port Botany Goods Line).

Aerial view of Port Botany terminals along Brotherson Dock towards the Georges River. Photo courtesy of NSW Ports.

Figure A.3 Melbourne (Swanson and Webb Dock terminals)



(Last updated: November 2021)

Melbourne (Swanson and Webb Dock terminals)

The Port of Melbourne is operated by Port of Melbourne Operations Pty Ltd on behalf of the Lonsdale Consortium, which holds a 50-year lease of the State-owned assets at the port.

Dockside

Stevedores. DP World's container terminal is at Swanson Dock West. Patrick has a container terminal across the dock at Swanson Dock East. Victoria International Container Terminal (VICT) operates on Webb Dock East.

Logistics. Qube Logistics has a container and general cargo terminal at Victoria Dock, with one berth.

Equipment. The Patrick terminal has 7 post-Panamax cranes, with the latest two ZPMC cranes replacing older Panamax hardware in early 2020. The DP World terminal has 7 quay cranes, including 6 post-Panamax, twin-lift cranes and one single-lift crane.

VICT has 5 remotely-operated, neo-Panamax quay cranes. Patrick has 40 straddle carriers, DP World has 48 straddle carriers and VICT has 11 automated container carriers and 20 automated stacking cranes (ASCs).

Berths. There are 3 container berths at Patrick's Swanson Dock East—berths 1–3. There are 3 berths at DP World's Swanson Dock West—berths 1W–3W. There are two berths at Webb Dock East operated by VICT. There is one general cargo berth at Victoria Dock (berth 24) which handles containers.

Road

Access to the DP World terminal is via Coode Road. Access to the Patrick terminal is via Appleton Dock Road; an access road leads to the Qube terminal from Appleton Dock Road. Access to VICT is from Webb Dock Road.

Rail

Facilities. Import and export containers are rail-served to near the dockside. Containers are also railed through the Dynon rail terminals (to the north of the docks) and conveyed by road between those terminals and the on-dock container stacks.

- West Swanson Intermodal Terminal serves DP World. This is a single dual-gauge (standard and broad) siding of 510 metres, running just to the south of Footscray Road; there is also a locomotive run-around track;
- ACFS Port Logistics operates the Appleton Rail Terminal, providing near-dock rail facilities to Swanson and Appleton Docks. The yard has two dual (standard and broad) gauge tracks of 640 metres in length and a locomotive run-around track;
- A new on-dock rail terminal is under development adjacent to the Patrick container terminal at East Swanson Dock. The rail terminal is planned to be operational in 2023. Once operational, the terminal will have two 600-metre rail sidings.
- Qube's Victoria Dock sidings have two dual-gauge (standard and broad) sidings, with 630 metre lengths, plus a locomotive run-around track.

Services. Scheduled long-haul rail services shifting containers include:

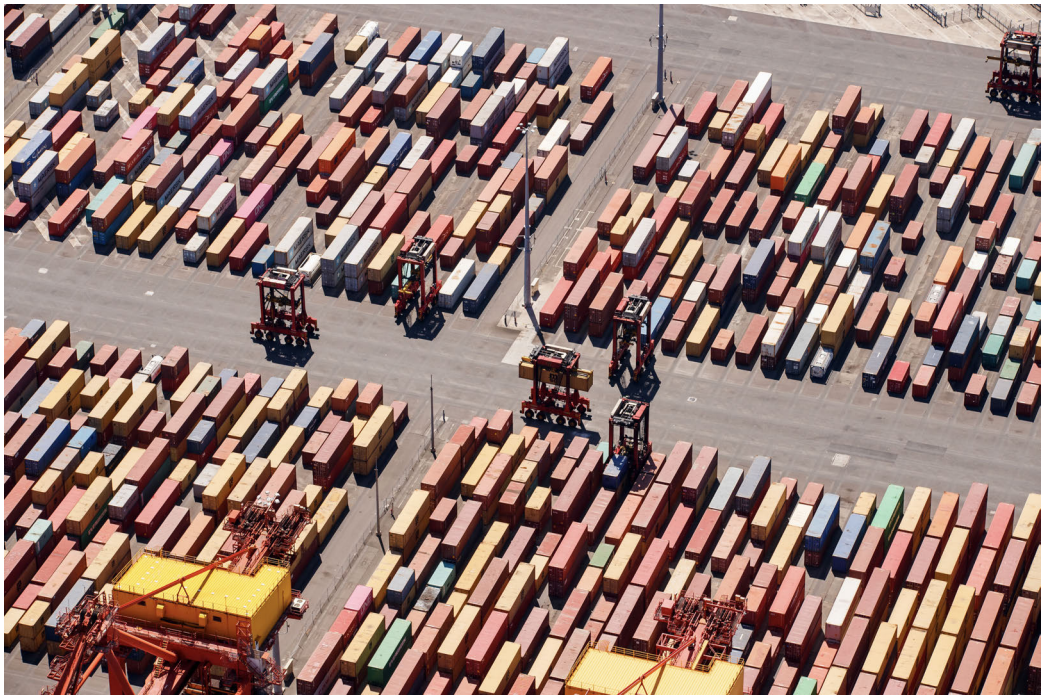
- rice from Deniliquin to Victoria Dock sidings (Qube Logistics, broad gauge);
- paper products from Maryvale to Victoria Dock sidings (Qube Logistics, broad gauge);
- cotton from Barnawartha to Appleton Dock (SCT, standard gauge);
- grain, hay and pulses from Dooen to Appleton Dock (SCT / Wimmera Container Line, standard gauge);
- meat and milk products from Warrnambool to Appleton Dock (Westvic Container Export Services; Pacific National, broad gauge);
- grain, hay and rice from Tocumwal to Appleton Dock (Pacific National and Qube Logistics, broad gauge);
- wine and agricultural products, including fruit in reefer containers, from Merbein / Mildura to Appleton Dock (Pacific National, standard gauge);
- grain and peas from Donald to Appleton Dock (Pacific National, standard gauge);
- cotton, beverages, meat and agricultural products from Griffith, Wumbulgal, Leeton and Ettamogah to Appleton Dock (Pacific National, standard gauge);
- paper products and bottled water from Ettamogah to Appleton Dock (Pacific National, standard gauge);
- hay, grain and wine from Ultima to Victoria Dock (Qube, broad gauge).

Port rail containers also arrive by road shuttles from the Dynon railway terminals.

Rail linkages. The dock area consists of rail facilities near the docks and the nearby intermodal container terminals at South Dynon, Dynon and North Dynon. Although there is an eastern link from the Dynon terminals towards the east (Southern Cross and Flinders Street), the container movements are to and from the west via the Tottenham–Dynon line.

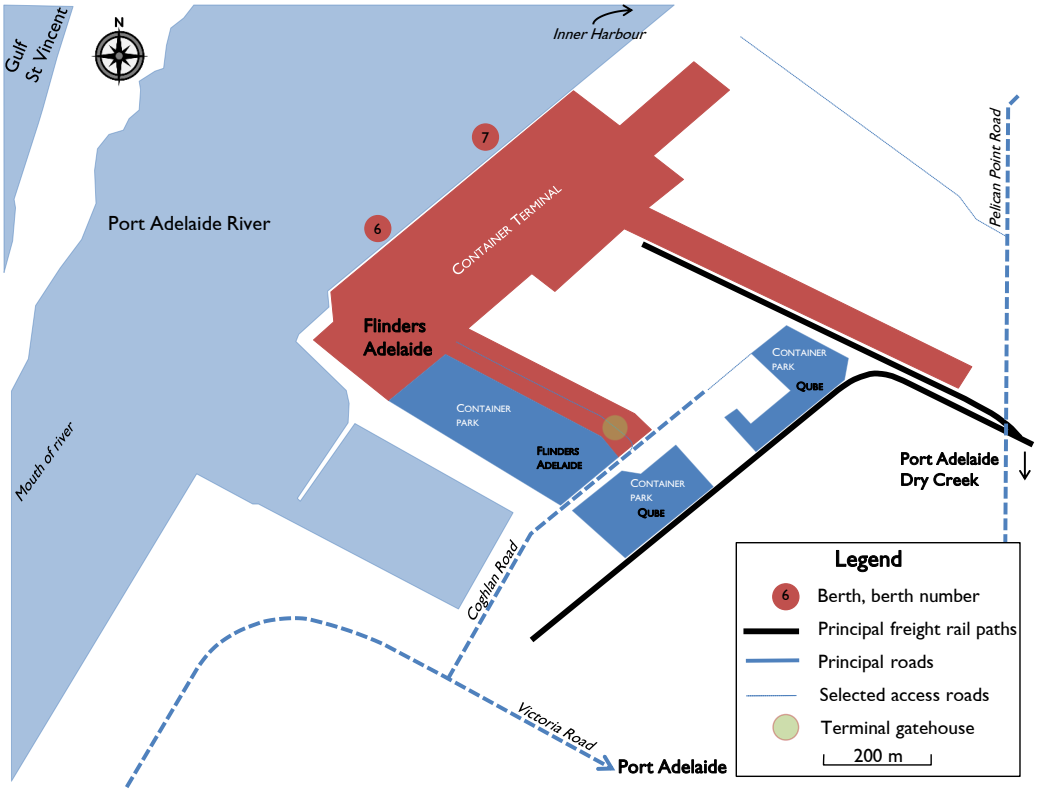
Of the five container ports represented here, the Port of Melbourne is unique in the proximity of intermodal terminals near to the docks as well as the on- / near-dock facilities.

National rail connections. Principal freight rail paths are shown; most tracks (including dockside tracks) are dual gauge (namely, broad- and standard-gauge tracks). Access to the interstate network is via the dual-gauge track to the west, via Tottenham.



Automated straddle carriers operating in the yard at Patrick Sydney AutoStrad terminal. Photo courtesy of NSW Ports.

Figure A.4 Adelaide (Outer Harbor / Pelican Point)



(Last updated: October 2018)

Adelaide (Flinders Adelaide Container Terminal)

Flinders Ports manages the port facilities in Adelaide; these are at Outer Harbor and the Inner Harbour (up the Port Adelaide River). The Outer Harbor shipping channel was widened in late 2019, enabling post-Panamax ships to call at the port.

Container services are provided by Flinders Adelaide Container Terminal at Outer Harbor.

Dockside

Stevedores. Port Adelaide's Outer Harbor Container Terminal is operated by Flinders Adelaide, using two berths.

Berths. The map shows the container terminal located in the outer harbour (at Outer Harbor) of Port Adelaide; the Inner Harbour at Port Adelaide is not shown. The Flinders Adelaide container facilities use berths 6 and 7.

Equipment. The terminal has three post-Panamax container-handling cranes. A fourth, Panamax-sized crane was decommissioned in December 2017.

Road

Flinders Adelaide Container Terminal is accessed via Coghlan Road.

Rail

Facilities. The Outer Harbor terminal has two sets of standard-gauge rail sidings. Two sidings, each of 640 metre length, serve the Flinders Adelaide Container Terminal. The other set of sidings serve the Qube Logistics terminal and container park.

In October 2018, Flinders Ports upgraded the rail facility to increase the staging area for rail containers.

Services. Scheduled railed movements to the dockside include:

Short-haul:

- Penfield (Direk) to Flinders Adelaide (SCT Logistics).

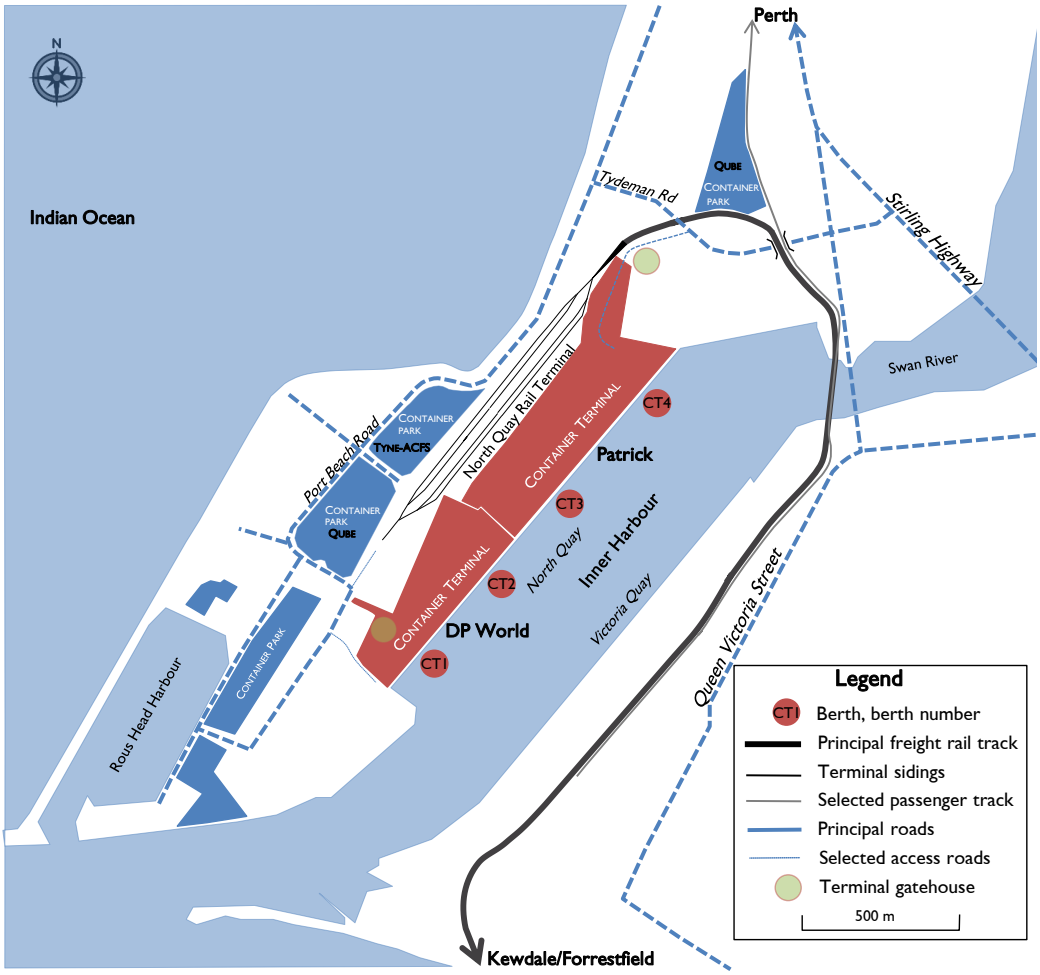
Long-haul:

- containerised lead from Port Pirie, agricultural products from Bowmans Intermodal Terminal, via Port Flat (Bowmans Rail);
- containerised wine from Penfield (SCT Logistics);
- bulk grain from various producers. Some of this is containerised for export by Viterra's 'inverter' grain loader at Inner Harbour.

Rail linkages. The Outer Harbor facility is at the extremity of a freight-only railway between Outer Harbor, Port Adelaide and Dry Creek.

National rail connections. The Outer Harbor – Dry Creek line connects with the interstate network at Dry Creek. Nearby intermodal terminals include the One Rail Australia terminal at Dry Creek, the Pacific National terminal at Islington (including the Northline logistics facility) and the SCT Logistics terminal at Penfield.

Figure A.5 Fremantle (North Quay terminals in the Inner Harbour)



(Last updated: September 2022)

Fremantle (North Quay terminals)

Fremantle Ports, a Western Australian Government trading enterprise, manages the port.

Dockside

Stevedores. Container stevedoring is undertaken at North Quay in the Inner Harbour by Patrick and DP World. Patrick have four berths and DP World has three berths.

Berths. DP World operates two berths, numbers CT01 and CT02. Patrick operates from berths CT03 and CT04.

Equipment. The Patrick terminal has 4 post-Panamax cranes, the latest of which was commissioned in early 2020. The DP World terminal has 4 cranes, including 3 post-Panamax. DP World received its third post-Panamax crane in September 2018.

Road

The principal roads on this peninsula are Tydeman Road (from the Stirling Highway) and Port Beach Road / Rudderham Drive. The DP World terminal is accessed via Rudderham Drive while the Patrick terminal is accessed via Tydeman Road.

Rail

Facilities. North Quay Rail Terminal, to the west of the Patrick terminal, serves both Patrick and DP World container terminals. The sidings at that location are around 690 metres in length, accommodating blocks of 600 metre-length trains. The rail terminal has dual-gauge tracks.

Services. Scheduled rail services to the port include the following (standard-gauge) trains:

- containers between Kewdale / Forrestfield and North Quay Rail Terminal (Intermodal Link Services, Pacific National);
- a container shuttle service between Kwinana and North Quay Rail Terminal (Aurizon);
- containers from Kalgoorlie, via the Kwinana service (Aurizon).
- Long-haul:
    - lead and nickel matte from Leonora and Kalgoorlie to Kwinana. (Aurizon)

Rail linkages. Trains access the Rail Terminal on a dual narrow- and standard-gauge, freight-only line from Midland. Freight and passenger trains share a track on the bridge over the Swan River.

National rail connections. The rail link to Midland, on the interstate network, includes spur tracks to interstate intermodal terminals at Kewdale and Forrestfield.

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