

A second container port for Melbourne? Build it in the west for 2036

**CENTRE FOR SUPPLY CHAIN
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About the Centre for Supply Chain and Logistics

The Centre for Supply Chain and Logistics (CSCL) is a research centre at Deakin University specialising in freight logistics, international trade, food and agribusiness and supply chain strategy. Before the CSCL Team joined Deakin University (February 2017) they, as the Institute for Supply Chain and Logistics team at Victoria University, produced *Build it but will they come? A pre-mortem analysis of the Port of Hastings Development Project to encourage alternative integrated planning (2014)*, which is appended to this document.

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Executive Summary

1. Overview

Infrastructure Victoria is seeking submissions to prepare advice to government on the need, timing and location of a second container port in Victoria – at either Hastings or Bay West.

In this submission, we present evidence to demonstrate that Bay West is the only feasible location for a second container port.

Melbourne is the fastest growing city in Australia and its ongoing economic and population growth relies on a world-class port. The Port of Melbourne abuts Melbourne's central business and activity district. Twice it has moved downstream, away from the city, to develop additional port capacity at Swanson and Webb Docks, but further expansion is problematic.

It is increasingly unlikely that the Port of Melbourne will retain its license to operate as a city port when the proposed expansion projects are scrutinised by the community given the ongoing concerns about livability and social amenity.

2. Timing is important and we cannot delay the decision

Our research demonstrates that a new container port will be required in 15 to 20 years. Given the long lead time for building a new port, policy decisions, planning, transport corridor reservation and investment need to start now, with a clear decision on the location and the likely time frame. The time to identify the location for the facility is now.

Our analysis also indicates that the maximum achievable container throughput at the Port of Melbourne is around five million TEU per year. This capacity is likely to be reached by around 2036. The investment needed to address the significant landside logistics and maritime infrastructure challenges to expand capacity to meet demand over the coming decades is unlikely to provide a positive return on investment for Victoria.

It will take at least 10 to 15 years to plan, design, gain approval for, and construct a new port facility. Postponing the decision on the location of a new port will create uncertainties in investment, economic activity and employment and will be detrimental to trade and the Victorian economy. The associated landside transport and logistics systems also require investor confidence and lead times to adapt to a new port location.

The Port of Melbourne (even if expanded) has a limited life span and an alternative should be considered sooner rather than later.

3. The time to identify the location of the second port is now

Equally, or arguably even more important, is a clear decision on the location of the second port. A timely decision is vital in guiding private sector investment that will enhance the efficiency of Victorian exporters and importers and their freight dependent supply chain and logistics businesses.

Bay West (as defined by Infrastructure Victoria) provides a rare opportunity to ensure Victoria's next container port is established on the 'right' side of town in a greenfield location where the use of Victoria's existing road and rail networks to connect with metropolitan, intra- and interstate import and export trade will be optimised to best support Victoria's supply chain and logistics businesses.

Bay West offers the opportunity to develop a world-class landside and maritime port system whilst an expanded Port of Melbourne or a new port at Hastings are each severely compromised by cost, landside logistics issues, environmental impact and loss of urban amenity. Gaining the social license for a second

port at Hastings will be more difficult than at Bay West due to greater environmental and social impacts. Identifying the location of the second port as soon as possible is vital to its successful development.

4. *The changing landscape of Melbourne*

Presently, nearly half of Melbourne's population lives in the north and west, and this proportion is increasing. Over 80 per cent of rural and regional Victoria, including the largest regional cities of Geelong, Bendigo and Ballarat, will continue to rely on access to Melbourne from the north and west for the supply and export of goods.

With this shift in Melbourne's population, the geographical distribution of markets for imported goods, and warehouse and distribution centres will also change.

A significant proportion of Melbourne's freight distribution centres are already concentrated in the north and west. Relatively cheap land suitable for logistics related activities and construction of freight and intermodal terminals is readily available near Bay West.

5. *Contestability*

A number of major ports on the eastern seaboard of Australia, in particular Adelaide and Sydney, are competing with Melbourne for contestable cargoes (mainly exports). A significant proportion of export containers originate in northern and western regions of Victoria or interstate. Relocation of the port to Hastings is likely to cause significant increases in travel times and costs, and risks the loss of exports to other Australian ports.

Critically, a port's capacity to attract importers and exporters to use its services is influenced by land transport mode related factors, in particular the availability, price and reliability of alternative landside transport modes (e.g. road, rail), and the comparative cost of accessing competing ports. All these factors favour the location of the port at Bay West over Hastings.

6. *Road-based container transport and externality costs*

More than 80 per cent of the Port of Melbourne's import containers are destined for locations within the Melbourne metropolitan area. Approximately 95 per cent of container freight to and from the Port of Melbourne, including all metropolitan container freight, is transported by road.

Congestion on arterial roads servicing the Port of Melbourne is at a tipping point. It is clear that even with possible expensive network enhancements to service both Swanson Dock and Webb Dock, congestion will remain at high or critical levels.

Capacity enhancement of key arterial roads, and their operation as tolled roads, is expected to continue. This means that the comparative distance and associated travel and externality costs between the port and origins and destinations of export and import containers will become a critical determinant in selecting the location of the second port.

The Bay West location will have direct access to current and proposed road networks, providing excellent long-term port access to regional corridors. Import container destinations and export container origins are concentrated in the west and north-west and to a lesser extent, the south-east area of Melbourne. Travel times and total costs for road-based container movements between these areas and a second port at Bay West will be around 35 per cent less than for a port at Hastings. These differences could amount to several billion dollars over the life of the port. Externality costs will also be around 40 per cent less for a port at Bay West than at Hastings.

7. *Rail network connections*

The *IV Discussion Paper* mentions a target of 10 per cent rail mode share; however, this is a conservative target and for port efficiency the target should be more like 20 to 30 per cent. A greater rail share of

container freight will be easier and cheaper at the Bay West location than at an expanded Port of Melbourne or Hastings.

If a port were developed at Hastings and it were to reach design capacity of nine million TEU, assuming 30 per cent of the freight is transported by rail to and from importers and exporters in Melbourne's west and north, the resultant demand on the freight rail system would be untenable. One freight train would need to pass through Flinders Street and Melbourne's other busiest commuter railway stations (Caulfield, Richmond and Southern Cross stations) every 15 minutes, every day and night of the year.

8. Vessel size and port capacity

Vessels are sent to markets, not individual ports. The Australian port with the most restricted infrastructure limits on the size of vessels coming to Australia is currently the Port of Melbourne. Air draught restrictions under the West Gate Bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future, affecting the capacity of the Port of Melbourne to continue as Australia's leading container port.

We expect these restrictions will become a major impediment in 10 to 15 years when the majority of container vessels will be unable to pass under the West Gate Bridge or access Swanson Dock, thereby threatening Melbourne's position as Australia's leading container port.

Five million TEU is generally accepted as the upper limit of capacity at the Port of Melbourne using the current quay line and some enhancements to Swanson Dock. However, in the future the restrictions of Swanson Dock mean it will only be able to handle the smaller container vessels. The forecast capacity of eight million TEU per year for an expanded Webb Dock is highly aspirational. Moreover, transporting these containers to importers and exporters would mean that four million TEU would need to be transported over a 12-hour window at night on 360 days a year (if moving 50 per cent of the road freight to night operations as proposed by Infrastructure Victoria). Assuming the use of high productivity vehicles this equates to one million truck trips, or 230 truck trips per hour, moving to and from Webb Dock across the road network (including through a built-up residential area) each night, seven days per week.

Globally, vessel size is increasing and shipping lines are looking to send larger vessels to Australian ports. However, given Australia's small market we will most likely see vessels of only up to 8,000 to 10,000 TEU coming here on a regular basis. Access to Port Phillip is currently suitable for these vessels to enter the bay at most times.

Whilst Hastings has been considered a natural deep-water port, a significant amount of dredging is required to construct a container terminal suitable to handle large container vessels. Further, the orientation of the quay line and approach channels will be adversely affected by the prevailing westerly winds, severely affecting the handling and safe berthing of large container vessels.

9. Environmental impacts

The two locations canvassed for the second container port have significant biodiversity and ecological value, with the total area for the proposed port at Hastings and part of the proposed location of Bay West (a much smaller area than at Hastings) recognised under the Ramsar Convention on Wetlands of International Significance.

The Hastings option is likely to have unacceptable impacts on flora and fauna, in particular with damage to seagrass habitat in Western Port and associated marine and terrestrial fauna. On the other hand, the Bay West location would have fewer biodiversity and ecosystem impacts. The access route to Bay West is primarily through agricultural land, which is likely to have comparatively low biodiversity values. The

proposed location of the port is offshore in an area that offers the potential for minimising impacts on a number of key habitats with significant biodiversity and ecological value.

10. The 'social licence' for a second port

A 'social license' represents community acceptance that the sum of the benefits (e.g. trade, economic activity and employment) of operating and expanding an existing port or building a new port outweighs the aggregate of actual or perceived disbenefits (e.g. poor visual amenity, congestion, noise, adverse environmental impacts, and business and employment dislocation).

Hastings lacks the required rail connection and a suitable rail connection would cost more than \$5 billion. Most of Western Port, including Hastings, is covered by the Ramsar Wetlands Convention and requires major mitigation measures to avoid damage to the environment.

Large volumes of trucks or trains moving along particular corridors have detrimental impacts including visual amenity, noise and air quality. The need to move significant volumes from a port at Hastings to the distribution centres in Melbourne's north and west will create greater impacts than under the Bay West option.

The aggregate of these social and environmental considerations make a new port in Bay West more likely to receive a 'social license' than a port at Hastings.

11. Reasons for Bay West to be the location for the second port: salient points

1. Bay West can easily be connected to existing and proposed metropolitan and intra- and interstate road and rail networks.
2. Relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available near the suggested port location.
3. The design provides for a contiguous quay line of 4,100 meters, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line.
4. Access to Bay West through the Heads, the Great Ship Channel and Port Phillip is currently suitable for 8,000 to 10,000 TEU vessels to enter at most times.
5. Bay West requires the least amount of dredging with the least environmental impact. The area of Bay West covered by the Ramsar Convention on Wetlands of International Significance is much smaller than the Ramsar area at Hastings.
6. Road-based container transport travel times and transport and externality costs for both Hastings and Bay West would increase with a move from the Port of Melbourne, but the increases for Bay West will be significantly smaller than the increases for Hastings.

12. The Way forward

Infrastructure Victoria, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the 'inconvenient truth' about the Port of Melbourne's prohibitive limitations to building the necessary capacity to last 50 years needs to be recognised.

Commercial arrangements with an existing port operator do not abrogate the responsibility of the Victorian Government to manage sovereign risk and strategic long-term planning for Victorians.

Planning and corridor reservation for a second container port at Bay West needs to occur without delay to ensure Victoria’s economic and social wellbeing is future-proofed.

A comparative assessment of each potential port location

Criteria	Port of Melbourne (expanded)	Hastings	Bay West
1. ECONOMIC			
Victoria meets its economic development objectives	Moderate	Negative	Positive
Port contestability	Moderate	Negative	Positive
Trade expansion	Negative	Negative	Positive
Supply chain investor confidence	Moderate	Negative	Positive
Multi-generation impact	Negative	Negative	Positive
2. PORT AND LANDSIDE LOGISTICS			
Roads	Negative	Moderate	Positive
Truck numbers, truck utilisation	Moderate	Moderate	Positive
Traffic and road congestion impact	Negative	Moderate	Positive
Rail	Negative	Negative	Positive
Intermodal connectivity	Negative	Negative	Positive
Multimodal port shuttling	Negative	Negative	Positive
Integrating the port with an effective land transport system	Negative	Moderate	Positive
Accepting larger vessels (10,000 TEU and possibly 14,000)	Positive	Positive	Positive
Air draught limitations	Moderate	Positive	Positive
Dredging required	Moderate	Negative	Moderate
Importers access	Positive	Moderate	Positive
Exporters access	Positive	Moderate	Positive
Storage and distribution capabilities	Moderate	Positive	Positive
3. SOCIAL AND ENVIRONMENTAL			
Social impact and the license to operate	Negative	Negative	Positive
Urban amenity and preserving Melbourne’s liveability	Negative	Moderate	Moderate
Gaining and retaining the port’s community licence to construct and operate	Negative	Negative	Positive
Environmental impact	Moderate	Negative	Moderate
Vehicle emissions	Moderate	Negative	Moderate
Noise, reverberations	Negative	Negative	Positive
Safety through the clear separation of land use	Negative	Moderate	Positive
Transport accidents impact	Moderate	Negative	Positive
4. PLANNING FOR THE FUTURE			
Freight corridors, freight terminals	Negative	Moderate	Positive
Buffers	Negative	Moderate	Positive
Available and affordable land	Negative	Positive	Positive
Marine berths and channel development capability	Negative	Positive	Positive

Key:

 Negative  Moderate  Positive

1. Introduction

In March 2017, Infrastructure Victoria (IV) released a discussion paper documenting the current evidence base for when and where a second container port should be built in Victoria (Infrastructure Victoria, 2017). This paper (henceforth referred to as the *IV Discussion Paper*) provides important new research that the Centre for Supply Chain and Logistics (CSCL) at Deakin University welcomes and values.

A short history of Melbourne's new container port

Over the last few years CSCL has become a leader through its research on the subject of Melbourne's next container port. In 2014, the team, in partnership with the independent Supply Chain Advisory Network, responded to the then Victorian Government's decision to invest \$110 million to extend the Port of Hastings Development Authority to enable it to secure the necessary approvals to develop the port at Hastings to become Victoria's next container port (Attachment 1: Institute for Supply Chain and Logistics, 2014). In doing so, the proposed Port of Hastings would eventually replace the Port of Melbourne and then be relied upon to serve the commercial interests of exporters and importers across the port hinterland (i.e. Melbourne, regional Victoria, southern New South Wales, South Australia and Tasmania). Yet, at the time of this investment, no detailed consideration had been given to landside logistics nor the social and environmental issues and approvals required to build a nine million TEU¹ container port, costing \$18 billion, to attract the world's largest megaships. Ships are sent to markets, not ports, and Australia and Victoria are small markets in global shipping terms, so much so that the cost for multinational shipping lines to send the world's largest vessels, upwards of 10,000 TEU, to serve a small market far from the major east-west trade routes is too great and highly unlikely to occur.

In 2014, with the change of state government, the Port of Hastings Development Authority project was effectively shut down. In 2015, the Victorian Government created Infrastructure Victoria and in 2016 invited IV to provide advice about the development of Victoria's next container port. Specifically, IV was asked to provide advice on when a new container port is required and where it should be located – Bay West or Hastings.

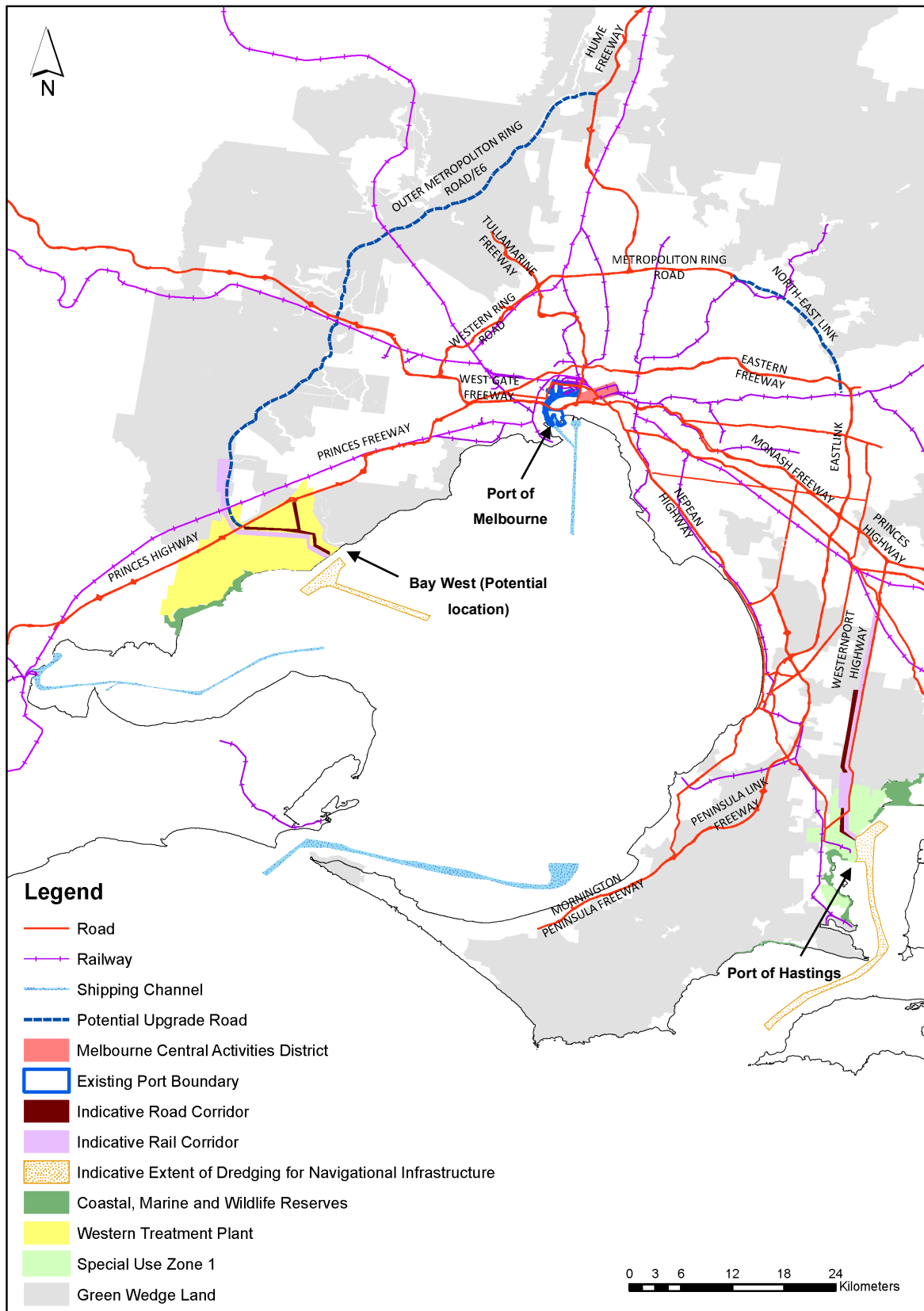
In 2016 however, the Victorian Government privatised the lease for the management of the Port of Melbourne. The lease is for 50 years and the Government provided a warrantee not to sponsor the operation of a competing port within the first 15 years of the lease. Ministers of the Victorian Government and the Chief Executive Officer of the Port of Melbourne promote the view that the Port of Melbourne will not reach capacity until the 50-year lease expires. For this reason, this report considers future port capacity in relation to three alternatives for location of the port: the Port of Melbourne, Hastings and Bay West (see Figure 1).

When and where should the new port be built?

The first question of 'when' a next container port is required encourages research into the current capacity of the Port of Melbourne and how that capacity could be increased to extend the current life of the port as an effective and cost competitive international container port. Our research indicates the investment required to manage and mitigate the significant landside logistics and maritime infrastructure challenges presented by its current location are unlikely to provide a positive return on investment for Victoria. Instead, a new port away from inner city pressure is required in approximately 15 to 20 years, that is by 2036.

¹ TEU, or twenty-foot equivalent unit, is the standard unit of measurement for shipping containers

Figure 1: Potential locations for the second container port



The second question about the location of Victoria's next container port – Bay West (as defined by IV) or Hastings – provides a rare opportunity to ensure Victoria's next container port is established on the 'right' side of town in a greenfield location where the use of Victoria's existing road and rail networks are optimised. This new port would connect effectively with metropolitan, intra- and interstate import and export trade to best support Victoria's supply chain businesses and the state; and to respond to demographic and consumer growth trends across Melbourne. According to successive government growth strategies most of these enterprises will be located in the west and north of the metropolitan area.

Planning for a new port

Melbourne is a port city, which increases complexity for port planning and construction process. The Port of Melbourne abuts Melbourne's central business and activity district and since the advent of freight containerisation in the 1970s has twice moved downstream to develop new port capacity (at Swanson and then Webb Dock) and to utilise new generations of port infrastructure. The relocation of port infrastructure downstream is an ongoing worldwide phenomenon for port cities and in part is necessary to escape the mounting pressure of, for example: expanding central business/activity districts; new and competing land-use priorities; urban residential encroachment; traffic congestion; amenity issues and freight related externalities and environmental issues. As cities grow, expand and 'turn to face the sea' for lifestyle and property reasons, ports are relocated to escape inner-urban pressure and to gain the necessary social approvals for port construction, maintenance and operations.

Port planning is also complex for commercial reasons. While essential, sea-ports are but one point in international supply chains; they link exporters with customers in global markets, and importers with goods for consumers and are used by businesses of all types in all industries. For ports to serve supply chain businesses, port planning needs to be firmly based on realistic, commercial and operational whole of supply and logistics chain imperatives and processes. To compete internationally importers and exporters require cost competitive landside and maritime transportation, reliable fit for purpose services, and efficiency along the whole chain. If costs are too high, corporate business and the small and medium enterprises (SMEs) that can, will relocate. Australia's location far from overseas markets plus the well-recognised intensification of market competition globally, results in Australian business sensitivity to any landside transportation cost increases, especially those related to accessing the essential service provided by monopolistic ports.

An opportunity for a world-class port for Melbourne

World-class port systems provide reliable, streamlined and cost effective use of multimodal landside and maritime transport. Optimal landside logistics becomes possible when importers, exporters and their transport and logistics service providers can use reliable and high-functioning road and/or rail networks linking the port to its hinterland. For various reasons, most notably its location on the port city interface and the lack of investment in fit for purpose road and rail infrastructure, the landside task at the Port of Melbourne remains sub-optimal: there is no on-dock rail connection to its main container terminals at Swanson Dock; Webb Dock has no rail; and the road networks leading to and from the port precinct often are congested with city traffic. Congestion is likely to increase when the Western Distributor channels non-port traffic into the port precinct, and become extreme when road incidents block traffic particularly in relation to the West Gate Bridge.

The development of the next port therefore provides an opportunity to ensure increasing freight volumes are transported efficiently and effectively (away from the inner city) to and from the port's hinterland. Road and rail connectivity should be a high priority in the decision-making process, and protection of road and rail freight corridors is essential. So too is the location, and protection of land

necessary for the development of logistics terminals away from the port which serve the port's landside system.

An optimum landside port system is feasible at Bay West. The opportunity for the development of a world class port system at an expanded Port of Melbourne or a new port at Hastings are severely compromised by cost, landside logistics, environmental impact and loss of urban amenity.

International sea-ports are well understood as significant economic enablers for regions and nations. International container ports are also significant infrastructure investments, lasting at least half a century. The decision about port capacity and port location is therefore of multigenerational consequence and will impact every man, woman and child in Victoria for the next 15 to 100 years.

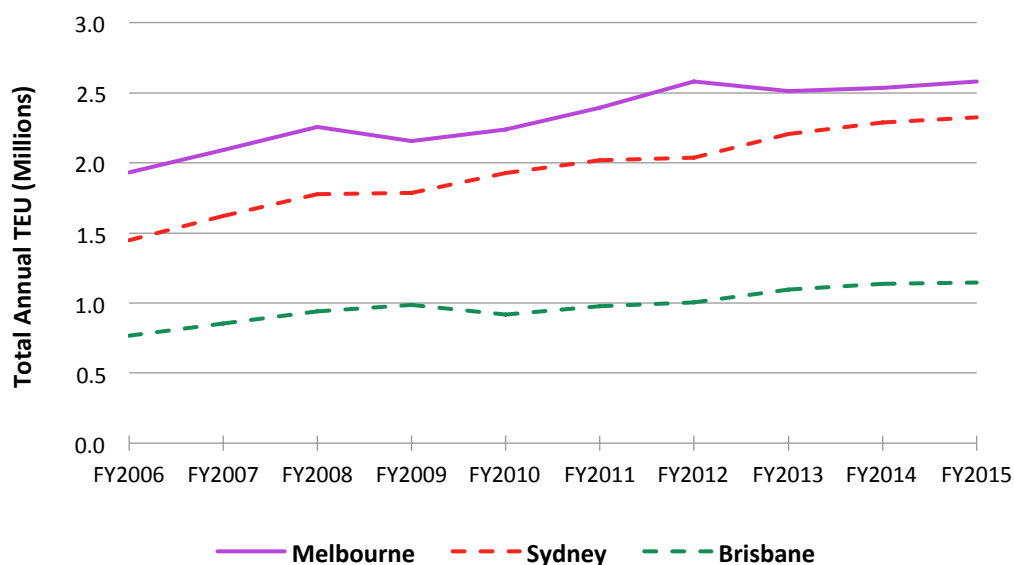
IV, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the 'inconvenient truth' about the Port of Melbourne's prohibitive limitations to building the necessary capacity to last 50 years can be publicly recognised.

2. When

2.1 Container growth and port capacity

The number of containers (expressed in TEU) through Melbourne, Sydney and Brisbane ports increased over the 2006 to 2015 period (Figure 2), with some intermittent fluctuations. The total number of containers (TEU) through the Port of Melbourne has grown at a slightly lower rate than that through Port Botany in Sydney. This might suggest a shift in the respective container markets and in container shipments already being relocated for better services at lower prices from the Port of Melbourne to Port Botany. Corporate businesses with national footprints seek cost minimisation as a priority.

Figure 2: Observed total annual TEU through the ports of Melbourne, Sydney and Brisbane



Forecast container demand

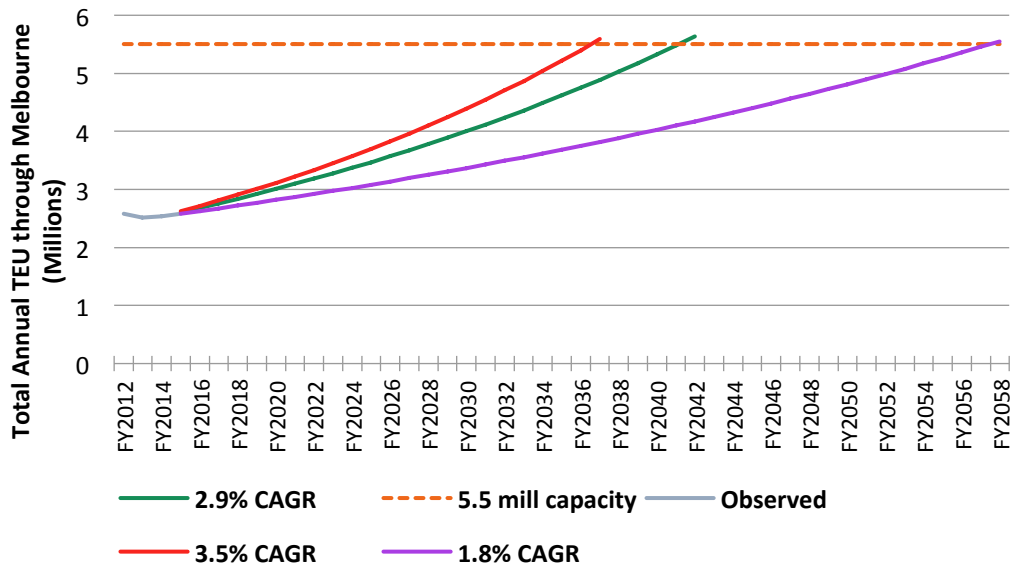
Based on historical trends, growth in total shipping container demand through the Port of Melbourne is likely to continue to move upwards, driven by future domestic economic growth and favourable economic conditions with our trading partners.

Figure 3 illustrates the possible future trends in the Port of Melbourne's container growth under three plausible growth scenarios, namely low, medium and high. These scenarios provide broad insights into a wide spectrum of likely future outcomes of container demand patterns.

- **Low growth scenario: Compound growth of 1.8 per cent per year.** Historical growth rates of container throughput indicate that a compound annual (year on year) growth rate (CAGR) of 1.8 per cent per year for total containers through the Port of Melbourne is feasible, giving the future trend indicated by the purple line in Figure 3.
- **Medium growth scenario: Compound growth of 2.9 per cent per year.** Historical year on year growth rates for containers through the Port of Melbourne ranged from about two per cent per year in FY 2013 to about minus three per cent per year in FY 2015. Given this wide variation, we have assumed a growth rate of 2.9 per cent per year for the medium growth scenario (indicated by the green line in Figure 3).

- **High growth scenario: Compound growth of 3.5 per cent per year.** Growth rates for containers through the Port of Melbourne in recent years have been around 3.5 per cent per year (indicated by the red line in Figure 3).

Figure 3: Possible growth scenarios for total TEU through the Port of Melbourne and port capacity



Port of Melbourne capacity and the need for a new port

In 2015/2016, the Port of Melbourne handled 2.64 million TEU. The Port of Melbourne’s current capacity is about five million TEU per year split between about three to four million TEU at Swanson Dock East and West and 1.4 million TEU per year at the new Webb Dock terminal (Infrastructure Victoria, 2017, p. 58).

A comparison of current capacity of Port of Melbourne and the estimated medium to long-term containerised demand indicates a potential gap under various scenarios. IV has used three growth cases, stating that:

“The central case will be used as the demand forecast input to other parts of our advice. The high and low forecasts will be used to test different scenarios, often referred to as a ‘sensitivity analysis’.” (Infrastructure Victoria, 2017, p. 26)

The IV forecasts predict an estimated total containerised demand in 2031 of 4.3 million TEU under the central case scenario, 4.2 million TEU under the low case scenario and 5.5 million TEU under the high case scenario. By 2046 container demand is estimated to reach 5.6 million, 6.5 million or 8.0 million TEU under the under the low, central and high case scenarios, respectively (Infrastructure Victoria, 2017, p.27).

Our scenario analysis and other available information indicate that the maximum achievable yearly throughput for containers at the Port of Melbourne is around 5.5 million TEU per year, shown by the dashed orange line in Figure 3. The figure indicates that capacity in the Port of Melbourne might be reached by the year 2036 with the high growth rate of 3.5 per cent, 2042 with the medium 2.9 per cent growth rate and 2055 for the low growth rate scenario of 1.8 per cent.

There is a recognition that significantly increasing Port of Melbourne capacity is likely to be economically inefficient and may cost more for each additional TEU than building capacity at a second port location (Infrastructure Victoria, 2017, p. 71).

The *Preparing advice on Victoria's future ports capacity – Discussion paper* (Infrastructure Victoria, 2016) posed the question: “*If and when we need to build a second container port...?*” The above findings strongly support the case for a second container port for Melbourne, possibly as early as 2036, underlining the need for a decision sooner rather than later.

2.2 The decision cannot be delayed

Long lead times

According to IV the lead time for large infrastructure projects can vary between ten and twenty years, from conception to commencement of operation. Where a project requires the creation of a financing vehicle and involves three tiers of government, particularly planning for broader regulatory arrangements, a longer lead time would be expected.

Examples from North America are the new port terminals in New York and Vancouver that took 12 and 19 years, respectively, to gain approval and complete construction. The processes of gaining community permission and negotiating offsets to port impacts were perhaps the most challenging elements of this process.

Discussion and pre-feasibility work regarding options for a second container port have been underway since 1999 in Victoria, when the need was identified through the Victorian Ports Strategic Study (Victorian Department of Infrastructure & Department of Treasury and Finance, 2000).

We are now coming to a watershed period, when the realities of exceeding capacity at the first container port are in the foreseeable future. Given these long lead times involved in port development and articulation with land transport networks, the time should be allocated to undertake thorough planning and preparation.

Government is responsible for the long-term strategic planning of the state and its trade gateways. The horizon for this activity is around 25 years, in which transport infrastructure projects and the shorter horizons of port master planning and infrastructure project delivery can be conducted. An example of the importance of this long-term strategic planning is the reservation of buffer areas for Melbourne Airport, where planning commenced in the 1980s and was legislated in 1993 to protect the airport that is still benefitting Victorians today.

“Operators of ports and freight distributors need certainty and predictability for commercial decision-making. For the ports sector, long term plans visible to those who need to make commercial decisions or career choices, to regulators and to the community, are recommended as the cornerstone. It is considered that this is largely achievable within the existing jurisdictional frameworks.” (Infrastructure Australia, 2011, p. 14)

The current new owners of the Port of Melbourne believe the port will not reach capacity for another 50 years (i.e. the entire duration of its new lease) and the Victorian Government is committed to not sponsoring a new port for the first 15 years of the lease. Over the next few decades, however, the decision on the location of the new port will be critical to guide private and public sector investment to support supply chain and logistics efficiency, productivity and Victoria's economic development.

Potential negative impacts on Victoria if the decision is postponed

A range of negative impacts on Victoria could arise if the decision on where and when to build the second port is postponed. Three key factors – the economy, social factors and the environment – are important drivers to consider in making a decision, and all will be compromised in the medium to long term if the decision is delayed. Furthermore, uncertainty will add complexity to investment, production, employment and trade-related private and public policy decision-making in Victoria.

A clear decision is needed now to positively encourage investment in Victoria's supply chain industries, and to end the current climate of investment uncertainty due to the drawn-out debate over the location and timing of the next container port.

Investment uncertainty

Continuation of investment uncertainty in Victoria will adversely affect our comparative and competitive advantage and will hinder intra- and interstate integration, thus inhibiting economic growth and lowering living standards of Victorians. The downside costs of postponing the port decision include more congestion at existing port facilities and lack of access to additional port services when required. This issue is particularly relevant to supply chains most affected by greater traffic congestion around the Port of Melbourne.

Critical areas of investment that could be affected by uncertainty around the port location include:

- Road and rail upgrades required to meet capacity in future port facilities and increasing population growth and traffic flows.
- Intermodal facilities in Melbourne: key interstate competitors have integrated intermodal facilities but Melbourne is falling behind in port efficiency without such a facility; and rail infrastructure into the port is currently underused.
- Disruptive technologies such as advanced distribution technology and transportation (e.g. driverless vehicles) could enable greater economies of scale and productivity, whilst reducing cost and congestion.
- Large-scale equipment such as automated handling systems for containers to improve efficiency of landside port operations and vessel turnaround, without which the competitiveness of exporters with overseas may be compromised.

Impacts on growth in economic and employment activity

There is a symbiotic relationship between the performance of the Victorian economy and its ports. Well-designed and adequate port infrastructure reduces maritime transport related costs and promotes freight specialisation and efficiency in delivering tradable goods. Investment in the second port infrastructure can stimulate economic activity through direct jobs created through construction, and indirect jobs in the construction supply chain, including manufacturing, transport and logistics and professional services.

The strong growth in Victoria's population, expected to reach 9.4 million people in the next 30 years, makes the decision on the location and timing of the new port imperative. Growth across Victoria is uneven and centred in metropolitan Melbourne. This trend is expected to continue, with the main growth corridors in Melbourne's west and north-west. Recent projections indicate that the workforce will increase most in Melbourne-inner (2.25%) followed by Melbourne-west (1.75%) and Melbourne-south-east (1.5%) (Deloitte, 2016).

The areas of employment predicted to grow most in Victoria over the coming decades are business services (professional, scientific and technical services, and finance and insurance services) and construction; at least a proportion of these business services will be linked to movement of goods within and outside Victoria using the port.

A timely decision on the second port will encourage job development in the port construction and associated industries, which could go some way to mitigating unemployment in the most economically disadvantaged areas of Melbourne.

Impacts on imports and exports

With a rapidly increasing population comes growth in demand for imported consumables and manufacturing inputs, all relying on efficient port services. The recent reduction in relative prices of imported consumables such as clothes, motor vehicles, electrical appliances and computing equipment due to technological improvements and low wage costs in Asia has also encouraged greater consumption. The transition towards e-commerce and the growth in large volume online retailers will continue to exert pressure on supporting infrastructure for imports, including port facilities. Lack of planning for adequate port infrastructure to manage this increased demand could put upward pressure on the price of imported consumables.

To leverage opportunities to maximize economic prosperity, and to develop its position as a key agricultural exporter, Victoria will need to maintain international competitiveness. This means being efficient in the way goods are produced and exported overseas, in particular with adequate multi-model port infrastructure. Victoria is in a strong position to increase exports to emerging economies in the Asian region but this will be hampered by uncertainties around future port infrastructure and what these delays mean to relative cost.

Given the potential gap between current port capacity and potential demand in the future, the second port will be needed to facilitate international trade. This means increased demand for related transport infrastructure that allows freight to be efficiently moved around the state in metropolitan Melbourne and in regional Victoria.

A decision is needed in 2017/2018

The Victorian Government needs to make a clear decision in 2017/2018 in favour of Bay West as the site of Melbourne's next or complementary container port in preparation for when the current port reaches capacity. Deferring the decision would be detrimental to Victoria's importers and exporters and freight dependent supply chain and logistics businesses. Good planning requires the procurement and protection of land corridors as well as allied infrastructure investment to enhance landside logistics efficiency.

3. Why

3.1 Vessel size and port capacity

Vessel size now and in the future

The size of container vessels visiting Australia has increased over the years with the average vessel size now about 4,500 TEU. In Australia, container vessels do not call at one port only, but usually three or four. Vessels are sent to markets, not ports, so the port with the most restricted infrastructure determines the size of vessel used for a particular national market. Consequently, the Australian port with the most restricted infrastructure limits the size of vessels coming to Australia; currently that is the Port of Melbourne. The ports of Brisbane and Sydney (Port Botany) are able to accept vessels in the 8,000 to 10,000 TEU range. For vessels larger than 10,000 TEU there would need to be major infrastructure upgrades by the port owner, such as dredging and wharf strengthening, and by the container terminal operators, such as larger quay cranes and more container handling equipment. As these ports and the container operators are privately owned, it is unlikely that these upgrades will occur in the near future as the owners won't see a reasonable return on investment for the large capital outlays required to handle these larger vessels.

Air draught restrictions under the West Gate Bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future, affecting the capacity of Melbourne to continue as Australia's leading container port.

We expect these restrictions will become a major impediment in 10 to 15 years when the majority of container vessels will be unable to pass under West Gate Bridge or access Swanson Dock.

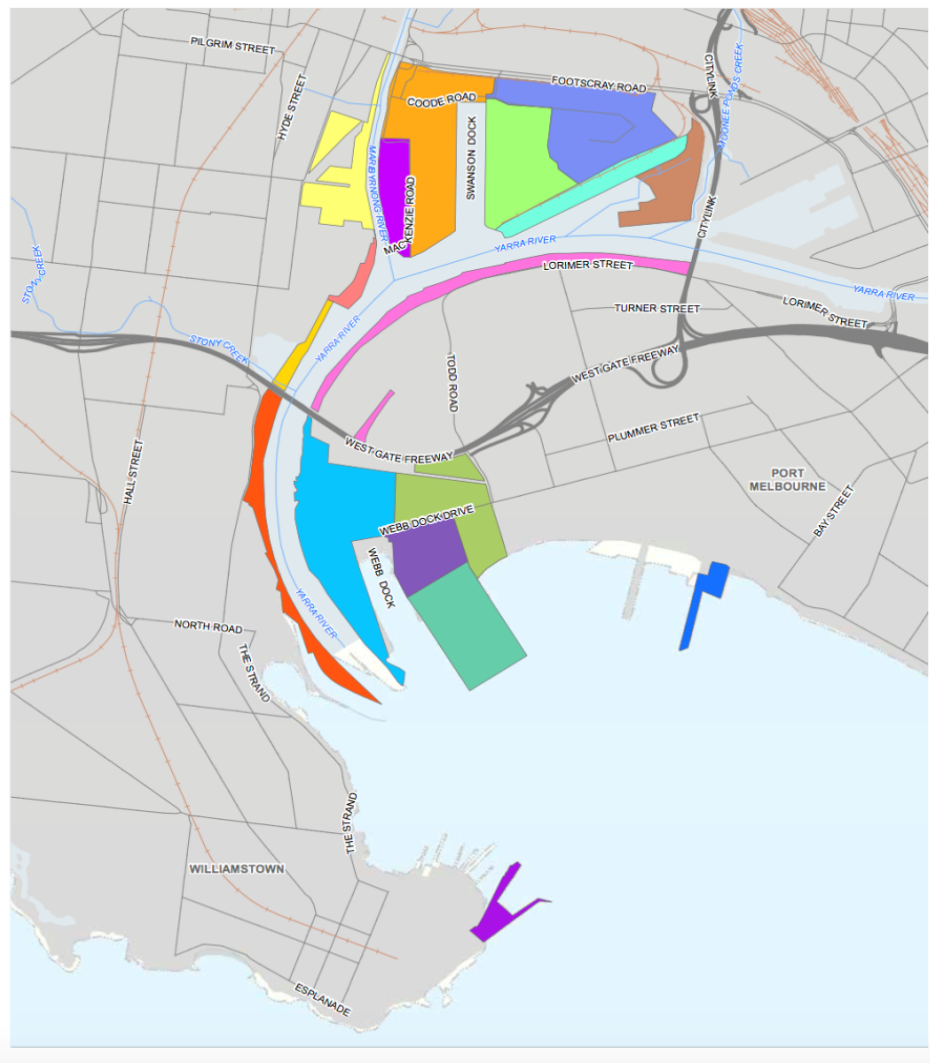
Globally, vessel size is increasing. With a lower unit cost, shipping lines are looking to send larger vessels to Australian ports. In global terms Australia is currently a small market (approximately 7.5 million TEU per year across all ports) and even if this triples, these large vessels would still be travelling half empty. Therefore, we will most likely see vessels of only 8,000 to 10,000 TEU coming to Australia on a regular basis in the foreseeable future. Infrastructure Victoria considers it possible that vessels of 14,000 TEU will call here (Infrastructure Victoria, 2017), but we believe this could only be in the very distant future if ever. These large vessels currently operate in the East West trades where they call at ports servicing large populace markets, in the order of 250 million people, both at origin and destination. The total Australian population in 2016 was 24 million people. By 2050, the population should reach 37.6 million. The total Victorian market was 5.9 million people in 2016 and is predicted to reach 10 million in 2050. Neither market now or in the future is likely to be served by the world's largest container vessels.

The Port of Melbourne in 2017

Figure 4 shows the Port of Melbourne as it is today. Swanson Dock, which is currently handling 95 per cent of the international container traffic, is located up-river and vessels must pass under the West Gate Bridge. Air draught restrictions under the bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future.

The largest vessel to currently visit the Port of Melbourne on a regular basis is the E.R Long Beach (300 metres long and a design draught of 15 metres), with a capacity of 7,500 TEU. It normally berths at East Swanson Dock under strict conditions, including daylight berthing, taking on additional ballast and only when a limited number of other vessels are berthed there. However, for the most recent visit (March 2017) E.R. Long Beach had to berth at the new container terminal at Webb Dock East as the ship was too high out of the water to fit safely under the West Gate Bridge.

Figure 4: The Port of Melbourne, 2017



Legend

- | | | |
|---|---|---|
| Urban Areas | South Wharf Precinct (Break Bulk Cement Tugs) | Webb Dock - East (Containers) |
| Freeway | Station Pier (Passengers) | Webb Dock - East (Bass Strait) |
| Arterial | Swanson Dock - East (Containers) | Webb Dock - West (Automobiles) |
| Port of Melbourne Existing Uses | Swanson Dock - West (Containers) | Webb Dock Precinct |
| Appleton Dock Precinct - (Break Bulk & Grain) | Swanson/Appleton/Victoria Dock Precinct | Breakwater & Gellibrand Piers (Bulk Liquid) |
| Coode Island / Maribyrnong (Bulk Liquid) | Victoria Dock (General Cargo) | Yarraville Berths (Bulk) |
| Holden Dock (Bulk Liquid) | | Yarraville Precinct |
| Newport Precinct | | |

Source: Adapted by Infrastructure Victoria from GHD, Infrastructure Victoria Second Container Port Advice – Estimated Capacity of the Port of Melbourne (Infrastructure Victoria, 2017)

As described in section 2.1, five million TEU is generally accepted as the upper limit of capacity at the Port of Melbourne using the current quay line (including the new container terminal at Webb Dock East) and some enhancements to Swanson Dock. With enhancements to Webb Dock, IV states that a capacity of nine million TEU (8 million TEU at the expanded Webb Dock and the remaining 1 million TEU at Swanson Dock) for the Port of Melbourne would be achievable (Infrastructure Victoria, 2017). However, as stated earlier the use of Swanson Dock will be restricted by the limited access for larger vessels.

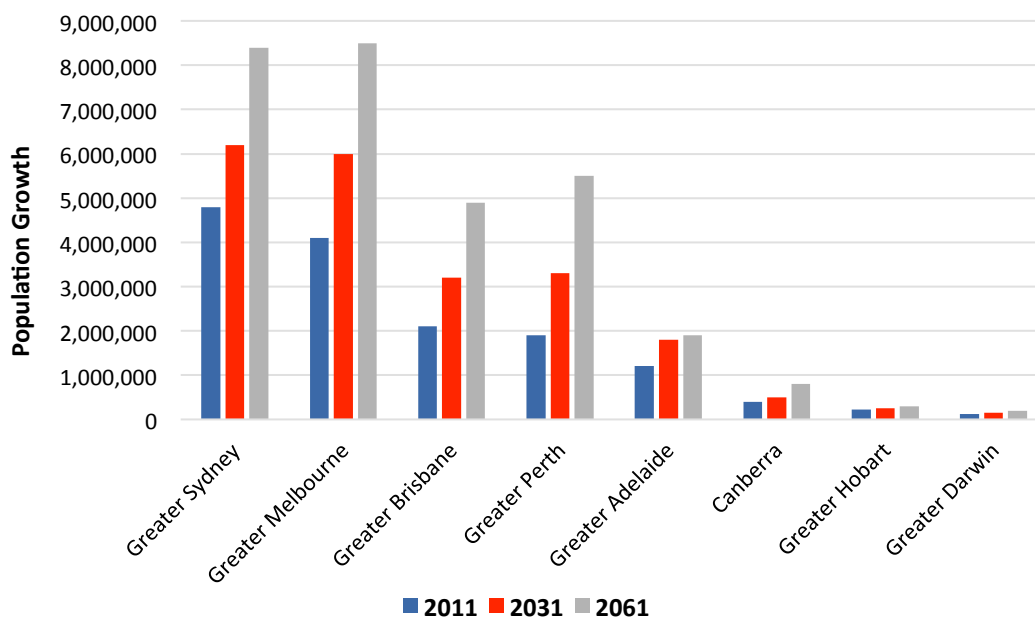
Swanson Dock could potentially be enlarged and upgraded, at great cost and severe disruption, but the height of the West Gate Bridge would still prevent large vessels accessing Swanson Dock and will severely limit access of future larger container vessels.

For the Port of Melbourne to manage nine million TEU, IV indicates that at least eight million TEU would be handled at Webb Dock. This poses risk for Victoria’s supply chain industries given that the only proposed rail option is problematic. Trucks will need to negotiate West Gate Bridge, the Monash Freeway and local residential traffic pressures. Extending Webb Dock to handle more ships would require significant dredging and maritime construction in the bay, with environmental and social issues and concerns potentially preventing a license to build.

3.2 Population growth and shifts to the north-west of Melbourne

Melbourne is Australia’s fastest growing city with the population increasing by around 100,000 per year. With the reputation as the world’s most liveable city (for the sixth year running), over the coming decades this trend will continue. It is likely that the population of Melbourne will grow to equal that of Sydney and will exceed Sydney’s rate of growth over a 40-year generational period (Figure 5). Similarly, Infrastructure Australia and the Australian Bureau of Statistics anticipate the regional cities of Geelong, Ballarat and Bendigo will exhibit strong population growth to 2031, increasing their respective populations by upwards of 35 per cent (Infrastructure Australia, 2015).

Figure 5: Australian capital city population expansion



Source: Infrastructure Australia analysis of ABS (2013b) – Series B data (Infrastructure Australia, 2015, p. 22)

Economic activity in Victoria is highly dependent on this projected population growth. The key industry sectors to benefit are construction, retail and service industries with construction and retail increasingly dependent on imported materials. From 1990 to 2015, the value of articles of apparel and clothing accessories imported increased from \$82 million to \$831 million (2015 AUD), and the value of imported prefabricated buildings and sanitary, plumbing, heating and lighting fixtures and fittings increased from \$11 million to \$142 million (2015 AUD). Both sets of imported products experienced a tenfold increase in value over this 25-year period (Australian Bureau of Statistics, 2015).

Future population growth has direct implications for the Port of Melbourne. The Victorian Government is planning for an increased residential population density in inner Melbourne. With the increased competition for land, port rents will rise and urban encroachment may threaten future port operations.

Demand for affordable housing will encourage settlement in the north and west of metropolitan Melbourne and in the regional centres within a 100-kilometre radius of central Melbourne. Future population growth forecasts indicate a likely shift in population distribution between the south-east and western and northern metropolitan areas. By 2031, IV suggests the shift will be of the order of 3.4 per cent from the south-east to the north and west. Based on these forecasts, it is reasonable to assume that the distribution of the additional containers to service future demand will also reflect the population shift, particularly for import containers.

Table 1 indicates the significance of the western and northern metropolitan areas for Melbourne’s forecast residential development over the next 25 years. The growth in population will be accompanied by an increase in freight and the consumption of goods.

Table 1: Housing distribution between established areas and growth area greenfields

Scenario 1: Based on Victoria in Futures 2016 projections			
Net dwelling additions 2015-2051			
Region	Total	Established	Greenfields
Inner metro	215,000	215,000	0
Western	385,000	150,000	235,000
Northern	355,000	175,000	180,000
Inner south-east	110,000	110,000	0
Eastern	175,000	175,000	0
Southern	310,000	185,000	125,000
Total Melbourne	1,550,000	1,010,000	540,000
	100%	65%	35%

Scenario 2: Aspirational scenario based on 70/30 split			
Net dwelling additions 2015-2051			
Region	Total	Established	Greenfields
Inner metro	230,000	230,000	0
Western	365,000	160,000	205,000
Northern	340,000	180,000	160,000
Inner south-east	125,000	125,000	0
Eastern	190,000	190,000	0
Southern	300,000	195,000	105,000
Total Melbourne	1,550,000	1,080,000	470,000
	100%	70%	30%

Source: Plan Melbourne 2017-2050, Metropolitan Planning Strategy
Victorian Department of Environment, Land, Water and Planning, 2017

Our assessment of container growth, and that of Infrastructure Victoria, indicates that future growth could be of the order of two to three per cent per year. In this scenario, the net ‘shift’ in containers

towards the north-west of Melbourne will be relatively small by 2031, perhaps one to two per cent or approximately one million TEU per year. Despite this relatively small shift, however, the differences in the increases in estimated travel time, travel costs and externality costs between Hastings and Bay West are significant now (Table 2), and will only increase in the future. Moreover, the population shift to the west and north could cause container logistics facilities to locate further northward and westward with associated increases in travel costs to the Port of Melbourne and reductions in travel costs to Bay West.

Table 2: Estimated road-based container transport travel times and costs for alternative port locations, FY2016

Item	Port of Melbourne	Port of Hastings	Change from Port of Melbourne	Bay West	Change from Port of Melbourne
Travel time (hours)	609	1299	113%	852	40%
Travel cost ¹	\$91,304	\$194,861	113%	\$127,753	40%
Toll cost	\$8,417	\$8,937	6%	\$6,628	-21%
Total cost	\$99,721	\$203,798	104%	\$134,381	35%
Externality cost ²	\$28,700	\$89,765	213%	\$53,556	87%

¹ Times and costs are in '000 units. Costs are in 2017 values

² Externalities are for container destinations and origins in the Melbourne metropolitan area

3.3 Demand and trade growth

Consumption and housing construction

Immigration and natural population growth will increase household consumption. Immigration has been found to increase household size and the additional 1.5 million households in Melbourne by 2051 (Table 1) will need an efficient supply of goods.

The construction of new suburbs in growth corridors and suburban infill housing requires building materials. Much of this will be manufactured overseas and require shipment and storage, typically in the west or north of Melbourne, where 740,000 homes are to be built, compared to 485,000 in the south and east of Melbourne during the same period (Table 1). Transport of construction materials is a cost paid for by the home purchaser, so it becomes a factor in housing affordability from a Victorian Government policy perspective. Any reduction in cost for the supply of materials should be pursued, which is directly related to the port location and transport costs.

Trade regulation

Australia's trade is increasingly benefiting from the implementation of free trade agreements (FTAs), particularly in growing Asia Pacific markets. There are currently 10 FTAs in force with another seven under negotiation. Victoria, as a producer and processor of food and manufactured goods, stands to benefit from export opportunities as a result of these agreements. For example, the 25 per cent reduction on beef tariffs to China will assist Victorian beef producers to increase exports. However, as FTAs are reciprocal and access to Australian consumers motivates trading partners, we can also anticipate an acceleration of the flow of products into Australia through our ports as tariffs are decreased.

The removal of duties from shipments valued below \$1,000, which comes into force in July 2017, is a policy measure aimed at levelling the playing field between domestic and international online retailers. This regulatory change will support the entry of global online suppliers in Australia, using their

transaction platforms to harness significant economies of scale. These retailers and suppliers are now also major logistics operators. Agglomeration of less than full container load shipments by major online retailers such as Amazon and Alibaba, will result in shipment of freight by sea becoming more competitive than air freight for online purchases. These global retailers are creating significant trade through Australia's container terminals. They supply business to business (B2B) and business to consumer (B2C) transactions, and provide logistics services for general merchandise, fast moving consumer goods (FMCG) and fresh food.

Asia-Pacific market growth

The Victorian Government has identified the growth of the Asia-Pacific market as a key factor influencing the future Victorian economy. The majority (73%) of Australia's trade is with Asia-Pacific Economic Cooperation (APEC) nations, and our top five import and export markets are APEC members. In the past five years, China has grown to become our most significant trading partner with exports to China growing by an annual average of 5.8 per cent. Short and long term planning is required for these new and growing trade opportunities.

3.4 An optimised port system

Traditionally the concept of a port system is limited to shipping channels and activities confined to port land such as stevedoring and road and rail connections up to the point of the port gate. World-class ports, however, recognise the need to fully integrate activity within the port precinct with the physical movement of goods along commercially constructed supply chains beyond the port gate. Road and rail networks, freight terminals, the management of empty containers, information technology (such as vehicle and container booking systems) and government regulation are all involved in the port system and optimisation is required to deliver import and export supply chain efficiency along the logistics chain. World-class ports are ambitious and invest in innovative and high-quality facilities and services both within and beyond the port gate to ensure development of an optimal port system.

Problems with developing an optimised port system in Victoria

In Victoria, developing an optimised port system is limited primarily by the close proximity of the port to the city, where competing land use and amenity issues are ever present. Despite the last 15 years of strategic endeavour on the part of the previous port owners, the Port of Melbourne Corporation and the Victorian Government, Melbourne's optimal port system has not yet eventuated. They do, however, exist elsewhere in Australia; for example, Port Botany in NSW is making significant progress towards achieving this goal. It has a dedicated freight rail network connecting the port to large intermodal facilities away from the port in the main industrial areas of Sydney as well as the rest of NSW and interstate.

Optimised landside logistics only becomes possible when importers, exporters and their transport and logistics service providers are able to use reliable, well-functioning, road and/or rail networks linking the port to the hinterland. For various reasons, most notably: the port's inner city location; Melbourne's congested inner city and arterial road network; and the location of empty container parks (ECPs) away from the port in Melbourne's western suburbs, the landside transport and logistics task at the Port of Melbourne remains sub-optimal. There is no on-dock rail connection to the container terminals at Swanson Dock; Webb Dock has no rail connection and the probability of it being constructed is low; and the road networks leading to and from the port precinct are increasingly congested with inner-city traffic. While the Victorian Government should be congratulated for its ongoing investment in Melbourne's road and rail networks, its priority is commuter transportation and the port's location in the heart of a large, rapidly growing urban area is its greatest disadvantage.

The new port – an opportunity for an optimal port system

The development of the next port provides an opportunity to create the optimal port system for Victoria's exporters, importers and the society's economic future. Road and rail infrastructure development and connectivity to the hinterland are high priorities, and the protection of road, rail and port-related freight corridors is essential. A greenfield site in the right location provides the opportunity for freight terminals and road/rail network development to cater for the efficient and effective transport of existing and forecast freight volumes to and from the port across the hinterland.

More than 80 per cent of the Port of Melbourne's import containers are destined for locations within Melbourne metropolitan area. These containers are transported directly from the port to importers, or 'staged' via transport depots, before being transported to their final destination. Staging is necessary as there is a mismatch of operating hours between the container terminals and the receivers of the cargo. Many transport depots, distribution centres and importers are located to the north and west of Melbourne and they require efficient road access to the metropolitan arterial network (i.e. Monash Freeway and the Western Ring Road) and to the port. These are highly congested roads.

Forty per cent of the export container freight originates from regional Victoria or interstate (i.e. Riverina, South Australia). Currently around 50 per cent of export containers are transported via the major regional arterial corridors from the north and west of Melbourne to the port. They are either transported directly to the port (via the Hume, Calder, and Western Highways) or staged in metropolitan transport depots in the west of Melbourne. Reliable, regular and cost-effective transport of export products (mainly perishable agricultural products) to the port is essential to ensure exporters remain competitive in a global market.

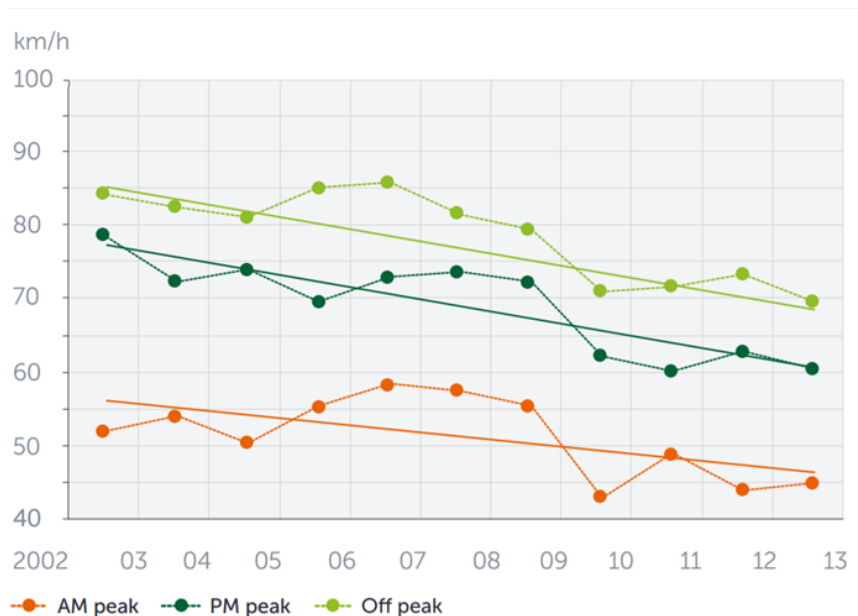
A small proportion of empty containers 'exported' or repositioned for use overseas originates from the importers, transport depots and distribution centres, but most come from ECPs. These parks should ideally be located in or close to the port with good road and rail access, so they are able to operate 24 hours, seven days a week, to efficiently transport containers to the port.

More than 95 per cent of container freight to and from the Port of Melbourne including all metropolitan container freight is transported by road. Over time the quality of road access has been a significant factor in the success and cost-competitive position of the present Port of Melbourne. However, road congestion in the port precinct and surrounding road networks is increasing, particularly in peak periods (Figure 6), and the system is vulnerable to the impacts of road incidents.

An efficient port system includes effective road networks with:

- Unfettered access to freeway/tollway corridors and intermodal terminals serving the port
- Mass limits on the road network that permit access by high productivity freight vehicles (HPFVs) of more than 30 metres long and capable of carrying more than 100 tonnes.
- Improved transport management strategies and systems, including capacity enhancement, time based tolling to manage demand by both light and heavy vehicles, and priority lanes for high value freight vehicles.
- Proximity of the port to key intermodal terminals and logistics businesses. This limits transport costs and increases the flexibility of transport operator services.
- Proximity to the freight rail network and intermodal terminals to facilitate the transfer of import/export containers. To be effective, intermodal terminals need direct links to the road network.

Figure 6: Average travel speed on inner freeways, 2012 to 2013



Source: Traffic Monitor 2012-13 (VicRoads, 2014)

The limitations of the roads servicing the Port of Melbourne

We agree with the findings of the *IV Discussion Paper* that service levels on arterial roads servicing the present port are at a tipping point; however, it is clear that even with possible expensive network enhancements to service both Swanson Dock and Webb Dock, congestion will remain at high or critical levels.

Inter-peak and off-peak usage of the network by trucks servicing the port is feasible, as noted by IV. However, any shift to inter-peak or off-peak usage is limited by the hours of operation of customers, export businesses and other links in the port logistics chain. There is often a mismatch between hours of operation, requiring container staging and other services. Regulations to change usage patterns may succeed where businesses can change operating hours, but for SMEs (both exporters and importers) this is likely to increase costs.

Much of the arterial network to and from the port is subject to tolling, adding to the cost of port related freight. Significant increases in toll charges for heavy vehicles have been proposed and an extension of tolled roads will further add to these costs. ‘Toll avoidance’ by trucks will increase the use of secondary roads, with associated increased travel times and vehicle operating costs, and impact on amenity for people living near these roads.

Capacity enhancement of key arterial roads in Melbourne increasingly involves tolling, as envisaged for the Western Distributor, North East Link and the Outer Metropolitan Ring (OMR) Road. This means the distance travelled between the port and logistics facilities becomes an even more critical determinant of the location of a future port.

Mass limits on the West Gate Bridge and the Bolte Bridge prevent the use of higher mass and greater dimensions HPFVs, increasing the number of trucks needed to service the port, especially for transportation to and from Webb Dock to the west, and causing diversion of HPFVs to other routes including cross-city movements.

Increasing curfews (school peak, night and weekend) on the inner west road network also contribute to trucks having to take longer routes to and from the port or to use routes during sub-optimal times for port operations.

ECPs are also progressively relocating further from the port due to a combination of curfews and mixed land use and conflicting zoning adjacent to the port.

Various relevant government reports have been published over recent years, including the Eddington *Investing in Transport East West Link Needs Assessment* report (2008) and the *Victorian Freight and Logistics Plan* (VFLP, Victorian Department of Transport, Planning and Local Infrastructure, 2013). Whilst policy drivers have varied, there remains a consistent theme that includes:

- Continued capacity enhancement of existing links (e.g. Monash Freeway, Western Ring Road, Tullamarine Freeway), to maintain or increase operating speeds and cater for demand growth.
- Development of a new North East Link connecting the present Western Ring Road to the Eastern Freeway.
- Construction of a second east-west link to the north of the city centre, connecting the Eastern Freeway with the Western Ring Road/Monash Freeway corridor to reduce reliance on the ageing, congested and mass restricted West Gate Bridge.
- Medium to long-term development of a second metropolitan ring road, the OMR, which includes a link to the standard gauge interstate rail corridor. The OMR will connect the Monash Freeway in the west to the regional corridors to the north-west and north, and the Eastern/Monash Freeway corridors in the east. A corridor for the OMR has already been reserved as part of the government planning process.
- The VFLP also proposed a long-term linkage between the Monash Freeway corridor and the Port of Hastings via the existing Western Port Highway. However, unlike the OMR, land has not yet been identified for acquisition.

Short-term government planning provides for the development of a western link from the city (the proposed Western Distributor), and a likely link from the north to the east (the North East Link) connecting the Hume Highway corridor with the Eastern Freeway.

A second cross-city corridor (the eastern arm of the East West Link) has been postponed. This places significant, high-risk dependence on the West Gate Bridge. Congestion and network reliability will require investment in a completed East West Link within a 10 to 15-year time frame to support the development of a second major Victorian container port. Complementary investment in local road corridors to intermodal terminals and logistics facilities will also be required to avoid 'last kilometre' issues, which limit access for freight vehicles.

On occasion the West Gate Bridge becomes unavailable through a range of incidents that cause major traffic flow impacts across Melbourne's entire road network. Severe congestion results in and around the central business district (CBD), the Port of Melbourne, the inner and middle suburbs and along each arterial network to and from the port (Figure 7). Currently no alternative to the West Gate Bridge (including the proposed Western Distributor) can mitigate the risk of this disruption for the city or the Port of Melbourne.

Figure 7: Traffic consequences of lack of access to the West Gate Bridge



Source: Eddington Investment in Transport East West Link Needs Assessment (Eddington, 2008) adapted by CSCL

The proposed expansion of the Port of Melbourne at Swanson Dock and Webb Dock to handle nearly four times the current freight volume would increase traffic risk and escalate the economic impact for supply chain businesses across the hinterland. The consequences include: exports missing planned vessel departures; imports delayed at the port; additional transport costs; the use of alternative routes; and loss of productivity. With or without an alternative to the West Gate Bridge, the Port of Melbourne’s current inner city location ensures its susceptibility to road incidents stopping or delaying traffic and landside port operations.

4. Where

4.1 Defining the requirements for the location of the second port

The *IV Discussion Paper* outlines the current evidence behind the possible new port locations in either Port Phillip to the west of Melbourne at Bay West, or in Western Port to the south-east of Melbourne at Hastings.

The design capacity of Victoria's next port has been set at nine million TEU and is to be built in three stages (depending on container growth), each of three million TEU. The container terminal operator(s), once selected, will need to build equipment capable of handling this capacity.

To be successful, the location of a port needs to meet the following criteria to enable a smooth flow of goods on the waterside and the landside, and resulting in cost-effective supply chain opportunities for customers. Therefore the following is required:

- Sufficient (natural) water depth and shelter to accommodate vessel arrivals/departures and allow for efficient loading and unloading
- Sufficient hinterland and a trade related business case
- Sufficient land and water space for the initial development, growth, maintenance and the future expansion of the port
- Access to efficient transport modes.

The following sections of the report describe the potential for extending capacity at the existing Port of Melbourne and developing the proposed second ports at Hastings and Bay West, to effectively deliver on the following:

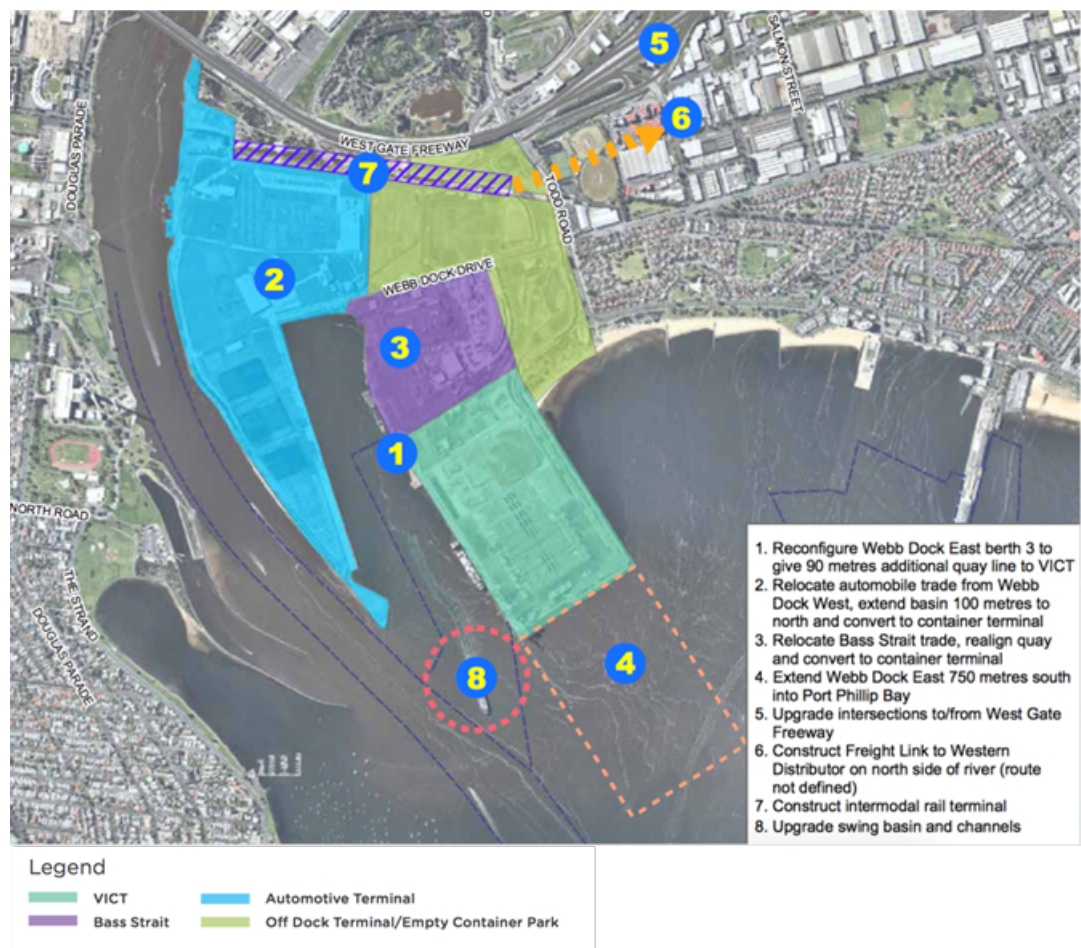
- Land use: supply of industrial land for warehousing and distribution centres; setting aside land and buffers for port related activities; and setting aside land for major road and rail transport corridors
- Connectivity: ship, road and rail
- Externality costs: including transport, emissions and congestions costs
- Access to markets and contestability
- Managing environmental and social impacts.

4.2 An expanded Port of Melbourne

Proposed enhancements to the Port of Melbourne

Given Swanson Dock's limitations for handling the potentially larger vessels of the future, significant expansion of Webb Dock is required and Figure 8 illustrates IV's proposed enhancements to increase Webb Dock's throughput to eight million TEU and to handle vessels up to 14,000 TEU.

Figure 8: Webb Dock layout and possible capacity enhancement measures

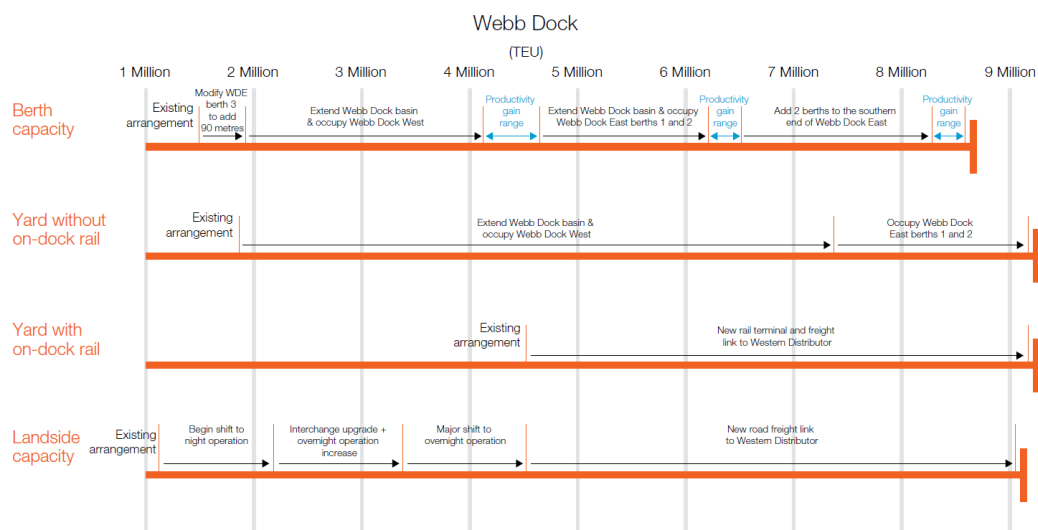


Source: Adapted by Infrastructure Victoria from GHD, *Infrastructure Victoria Second Container Port Advice – Estimated Capacity of the Port of Melbourne*, 2017.

The *IV Discussion Paper* expects considerable expansion in port capacity through port enhancement and productivity gains (Figure 9). However, a throughput of eight million TEU at Webb Dock is highly aspirational and extremely unlikely for the following reasons:

1. The quay line is not contiguous, hampering vessel berthing. A throughput of 2,400 TEU per metre of quay line per year is required but unlikely to be achieved and currently the best practice in Melbourne is only 1,400 TEU per year (and Melbourne is the most efficient port in Australia in this regard).
2. The planned enhancement includes the relocation of the Bass Strait and automotive trades that are currently operating at Webb Dock and the conversion of these vacated areas into container terminal operations. Although this is feasible for the area currently occupied by the Bass Strait trade at Webb Dock East, Webb Dock West has limited land available behind the quay line. This makes it unsuitable for conversion into a container terminal operation as it limits the effective working of container vessels.
3. The suggestion to further increase Webb Dock’s capacity by reclaiming and extending Webb Dock East to the southern end by 750 metres is unlikely due to the significant social and environmental impact of the necessary dredging and land reclamation activity, making it difficult to gain approval.

Figure 9: Infrastructure Victoria’s timeline for the Webb Dock expansion



Source: Infrastructure Victoria, 2017, Figure 21, p. 67

The Webb Dock expansion plans are based on the unlikely scenario that 14,000 TEU vessels will be coming to Melbourne in the foreseeable future. If 14,000 TEU vessels were to make regular calls at a nine million TEU terminal and each vessel exchanged about 60 per cent capacity, there would be only 1,071 vessel calls per year, or just over three vessels calling each day. This would not satisfy the demands of importers nor Victoria or interstate’s main group of exporters (especially those exporting perishable agricultural produce), who need a reliable frequent shipping service to access the global market.

Landside restrictions to Port of Melbourne expansion

Webb Dock’s proposed expansion to replace East and West Swanson Docks is critical to the successful transition for the future Port of Melbourne. However, landside restrictions limit Webb Dock’s capacity to handle eight million TEU. Transporting containers to importers and exporters in Victoria and interstate is severely restricted by the road network and the current lack of rail to Webb Dock. The proposed on-dock rail terminal is situated at the back of the terminal area necessitating a long travel distance from the container yard to the rail terminal. The *IV Discussion Paper* (p. 74) states that an on-dock rail terminal capable of handling containers equal to 30 per cent of mode share, or about three million TEU per year once the port reaches its ultimate capacity of nine million TEU, would require a six-track terminal 100 metres wide, running the length of the berth. Figure 8 does not accurately depict the on-dock rail terminal as described; its present location (as indicated on the map) would negatively impact the efficiency of container stevedoring operations.

To manage the increase in container movements, the *IV Discussion Paper* suggests that building a new landside transport network called ‘Freight Link’ (at an estimated cost of \$3.4 billion) would connect Webb Dock to the existing and proposed road and rail networks. The five-kilometre Freight Link would run through Wirraway (an area recently earmarked by the Government as a family-friendly neighbourhood in Fishermans Bend), cross the Yarra River and join the proposed Western Distributor.

Existing operators at Webb Dock would also need to relocate but this will be costly and may not be feasible; for example, Melbourne International Ro-Ro Automotive Terminal has just signed a 25-year lease and has recently made a substantial investment to create a new automotive facility. Moreover, relocating existing operators and expanding Webb Dock East into the bay would cause major

interruptions to current operations, even if it received the necessary environmental and social approvals to proceed.

The *IV Discussion Paper* also suggests moving 50 per cent (an aspirational figure according to IV) of the road freight to night operations. This means that four million TEU would need to be transported in a 12-hour window per night, 360 days a year. Assuming each truck will carry four TEU (currently the average is less than two TEU), this equates to one million trucks, or 230 trucks per hour travelling across the road network each night every day of the week. Moreover, this would be through a built-up residential area and most of these containers would need to be staged at transport yards to match delivery times to customers who do not operate during the night and weekends, increasing supply chain costs. If a rail link is built to Webb Dock and 10 per cent of the eight million TEU is moved by train, with each train carrying 90 TEU, nearly 9,000 train trips would need to leave the precinct every year, equating to more than 24 trains per day running through a built-up residential area day and night. In its Discussion Paper (p. 68), IV argues that increasing rail mode share may be part of the solution, but even 10 per cent rail mode share (also an aggressive target) is improbable and would have a detrimental effect on urban amenity.

Apart from the unacceptable impact on amenity caused by the increased numbers of containers on Melbourne's road and/or rail, it is unclear how these infrastructure improvements will be funded and implemented. In addition to the \$3.4 billion required for the 'Freight Link', more than \$3 billion would be needed to upgrade Webb Dock East and Webb Dock West.

4.3 A container port at Hastings

The history of Hastings as the site for a new container port

Three thousand hectares of land surrounding the port at Hastings was reserved in the late 1960s for processing, manufacturing and port-related uses. Then Premier Henry Bolte's government reserved the land to attract economic development to Gippsland; it was thought mass production manufacturing at Hastings would enable Gippsland to become Australia's 'Ruhr Valley'. To manage the export of these manufactured goods, a deep-water port would need to be developed.

Since then, successive Victorian governments have supported the development of the port at Hastings to become Victoria's next container port. In May 2013, the newly established Port of Hastings Development Authority was allocated \$110 million for planning the proposed port, with all necessary planning and environmental approvals to be completed by 2017.

The Port of Hastings development project and the development of a new multimodal freight network were key elements in the 2013 VFLP (Victorian Department of Transport, Planning and Local Infrastructure, 2013). While the road and rail corridor between Hastings and Dandenong were included in the plan, land was not set aside for major road transport task and corridors beyond Dandenong. Exporters and importers located across the port hinterland would need to rely on the existing road and rail infrastructure, even though the port was being designed to move nine million TEU landside.

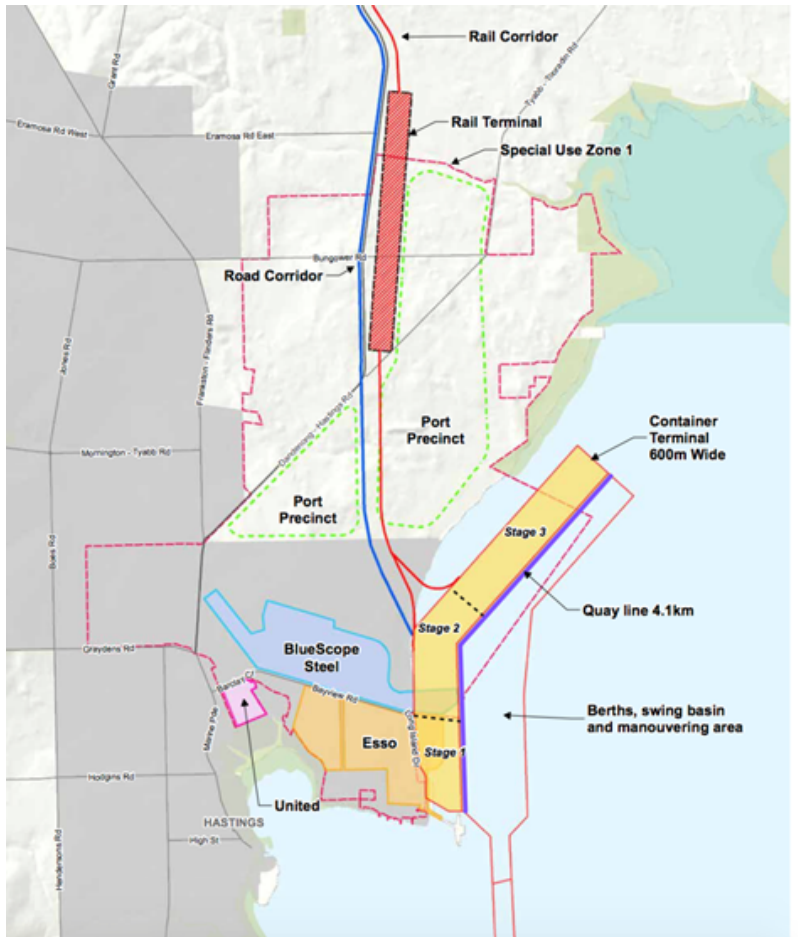
In 2014 the new Victorian Government recognised that the current freight rail network could not cope with the substantial increase in traffic, and developing a port at Hastings was unlikely to succeed. Soon after, the Port of Hastings Development Authority was reduced to a skeleton staff, the consultancy research underpinning design work and the approvals process ended, and the work that had been completed was handed to IV.

With the current proposal for Hastings, the total cost for dredging, road and rail connections to the existing network and construction of the container terminal at Hastings is approximately \$7.9 billion. Total costs including the new Regional Rail East (RRE) are approximately \$12.9 billion.

Maritime considerations

By current national and international shipping standards Hastings is not a 'natural deep water port' and significant construction and ongoing maintenance dredging would be required to enable large container vessels to safely enter the port. Figure 10 identifies the location and layout of the proposed container terminal.

Figure 10: Hastings concept – terminal and port environs



Source: Adapted by Infrastructure Victoria from GHD, *Second Container Port Advice – Concept options – Bay West and Hastings, 2017*

Access to the current Hastings port (a low volume bulk shipping port) is via the Western and North Arm Channels, which would need only minor modifications to accept large container vessels, involving the removal of about 2.6 million cubic metres of dredged material.

To construct the proposed container terminal, a total of 47 million cubic metres of the channel would need to be dredged (with associated environmental impacts), comprising:

- 24 million cubic metres for the channel and port area
- 5 million cubic metres to be removed for the reclamation footprint
- 18 million cubic metres of sand from Bass Strait to build the reclamation.

Strong tidal flows in Western Port could increase the possibility of environmental damage due to dredging, and tidal conditions will require ongoing dredging for port maintenance. The dredging task is further complicated as dredge sediments will need to be transported about 50 kilometres offshore into Bass Strait and the sand required to construct the terminal would also need to be harvested and

transported from Bass Strait. Weather and/or sea state conditions in Bass Strait could severely disrupt the dredging program and add additional costs.

The terminal could be built in three stages and has a design capacity (once completed) in excess of nine million TEU per year. The quay line would be 4,100 metres long (noncontiguous) with a backup area of 250 hectares with on-dock rail. The terminal would be directly connected to the existing and proposed road and rail network. Land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available.

Significantly, the orientation of the quay line and approach channels would be adversely affected by prevailing westerly winds, severely affecting the handling and berthing of large container vessels in the berthing pocket and approach channels. This would be exacerbated by strong tidal flows in Western Port.

There are currently only limited sheltered vessel anchorages available in Western Port and additional dredging would be required (at additional cost and potential environmental damage) to ensure sufficient safe anchorages are available for waiting vessels near the new port. Bass Strait cannot be used for the safe anchoring of vessels.

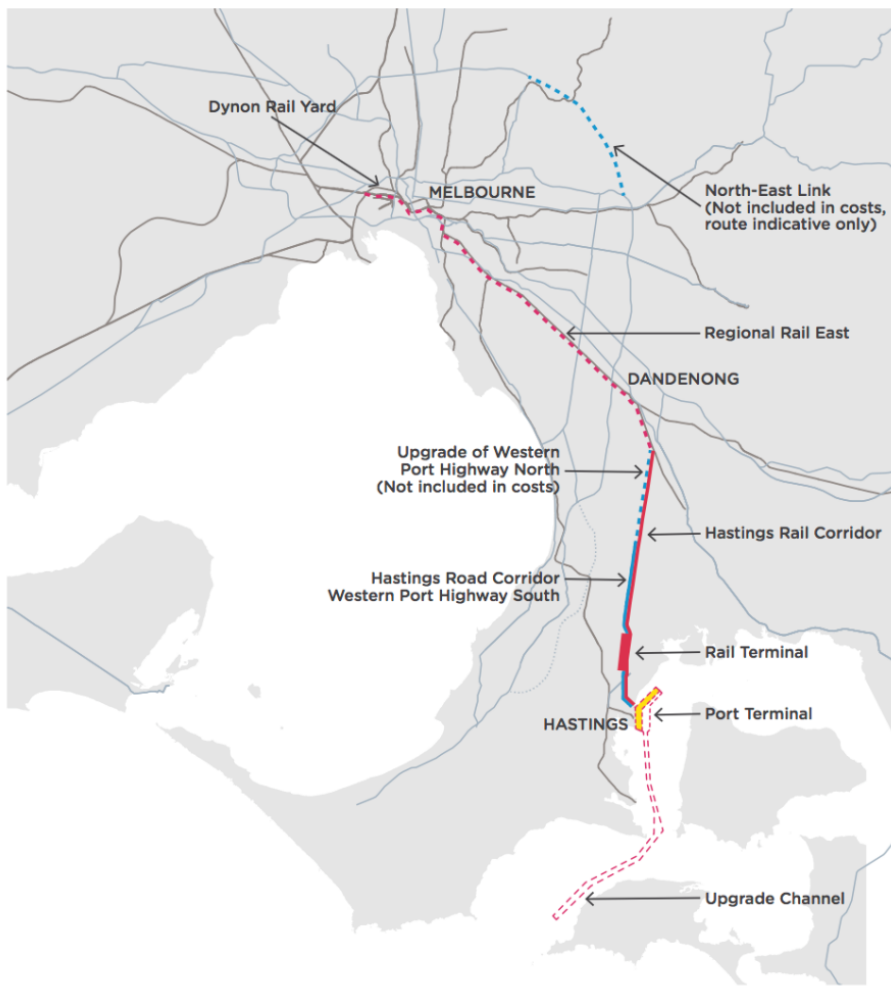
Landside considerations – rail

The efficiency and cost competitiveness of a port are enhanced by having access to an efficient rail network. However, rail networks are expensive to develop and are built for a range of purposes (e.g. passenger services, international freight and domestic freight), and are not usually designed exclusively to service container ports.

The 2013 VFLP (Victorian Department of Transport, Planning and Local Infrastructure, 2013) included the development of the South East Rail Line (SERL) to satisfy the landside logistics task. It was designed to provide a land transport link between Hastings and Melbourne's industrial west and north. The aim was to alleviate congestion on Melbourne's road network, with the associated cost and efficiency implications for Victoria's supply chains and Melbourne's rail commuters. However, SERL was found to be cost prohibitive and not feasible.

More recently the RRE project (Figure 11) to support the development of a container terminal at Hastings has been costed in excess of \$5 billion. The RRE is designed to access the wider intra- and interstate rail network predominantly located to the west of Melbourne. To accommodate a 10 per cent rail mode share at Hastings, an additional one track with passing loops would be required between Dynon (in the Port of Melbourne precinct), the Melbourne CBD, and Dandenong to Lyndhurst. To accommodate the target 30 per cent rail mode share quoted by IV (Infrastructure Victoria, 2017, p. 82), an additional two tracks would be required. This possible upgrade was described in IV's 30-year strategy noting that it is a particularly high-cost solution.

Figure 11: Hastings concept: elements including costing



The cost estimate for the Hastings concept includes:

- Dredging of channels and manoeuvring areas
- Reclamation to create land for container terminal
- Construction of quay and container terminal
- Road corridor to the Western Port Highway and upgrade of the Western Port Highway to the Cranbourne-Frankston Road
- Two track rail corridor to Lyndhurst
- Regional Rail East – two new freight tracks from Dyr to Lyndhurst along the Dandenong corridor.

Legend

- Railways
- Roads
- - - Indicative Extent of Dredging for Navigational Infrastructure
- Reclaimed Container Terminal Footprint
- Indicative 30 metre wide Rail Corridor
- Indicative 70 metre wide Road Corridor
- Possible Future Rail Terminal
- - - Upgrade Rail Network
- - - Upgrade Road Network

Source: Adapted by Infrastructure Victoria from GHD, *Second Container Port Advice – Concept Options – Bay West and Hastings, 2017*

The construction of these railway tracks would need to negotiate the new sky-rail developments between Dandenong and Caulfield stations impacting on historic railway stations and other urban amenity issues through the narrow railway path from Caulfield to Flinders Street and Southern Cross stations in the heart of the city. From Southern Cross Station trains would be able to access the existing rail network to the west of Melbourne as well as Victoria’s major intra-state and Australia’s interstate rail networks. Melbourne’s south-east metropolitan rail corridor is already constrained and adding these new tracks would be expensive and unlikely because of social disruption and amenity impact.

When the proposed container port at Hastings reaches its capacity of nine million TEU, assuming 30 per cent of the freight is transported to and from importers and exporters in Melbourne’s main western

industrial district by rail, this rail proposal would require 30,000 freight train trips (carrying 90 TEU per train) on the RRE per year. One freight train would pass through Flinders Street and Melbourne's other busiest commuter railway stations (Caulfield, Richmond and Southern Cross stations) every 15 minutes, every day and night of the year to move container freight from Hastings to the port hinterland.

If as expected many of the freight related businesses located in the west of Melbourne remain in their current locations, the increased transport and externality costs associated with the movement of freight to and from Hastings would be significant.

Landside considerations – road

Given the difficulties involved in construction of the RRE, the landside task could potentially involve the movement of 4.5 million TEU annually by road to and from Melbourne's main western industrial district to and from the port at Hastings. This would require 1.5 million B-double truck trips annually or over 4,000 trucks moving across Melbourne's road network daily (ISCL, 2014).

A second port at Hastings also poses significant road challenges given its location at the end of a transport corridor:

- The proposed site would require development of new logistics hubs with associated infrastructure, including roads such as the Western Port Freeway and efficient links to the existing EastLink – Mornington Peninsula Freeway – Monash Freeway route, an already congested corridor.
- The historical trend of developing the Melbourne road network to the west (e.g. Western Ring Road) prior to similar development to the east means that Hastings is highly dependent on the Monash Freeway corridor link and exposed to disruption in the event of incidents and closure of the corridor.
- A connection is also required to the proposed North East Link to enable truck access from the Hume and other western corridors.
- A large proportion of freight would still have to travel from the port to the west of Melbourne. This travel would incur significant additional road freight costs and generate additional heavy truck traffic along the present Monash Freeway – West Gate Bridge corridor, and/or the likely future alternative, East-West Link.
- Export and import containers from/to the Riverina, South Australia and Victoria's northern and western regions would have to travel increased distances (about 85 km) compared to the proposed Bay West or the present Port of Melbourne.

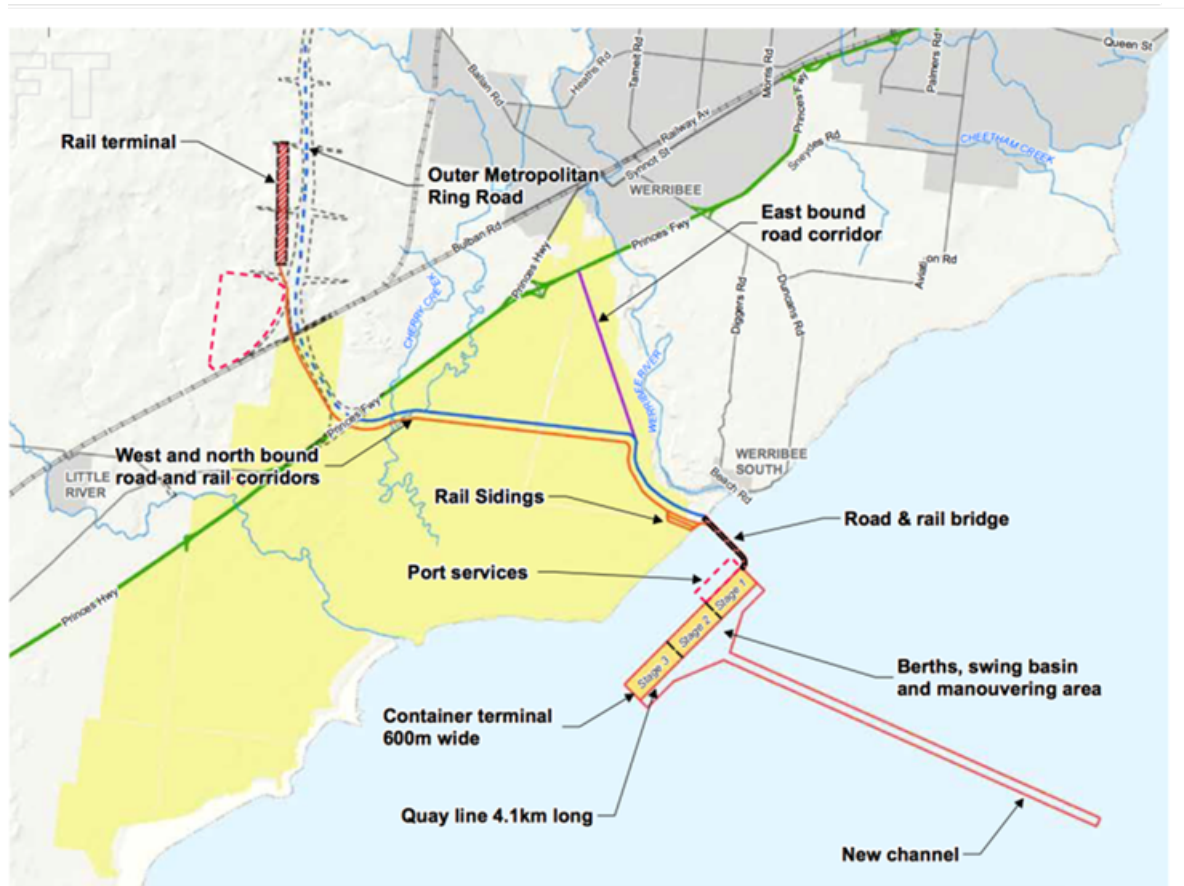
4.4 A container port at Bay West

The proposed location

A location in Port Phillip, south of the Werribee River, is deemed to be the most suitable for a new port. Figure 12 shows the location and layout of the proposed container terminal. A road and rail bridge would connect the proposed 240-hectare container terminal with a 4,100-metre quay line with associated berthing pocket and approach channel. The terminal could be built in stages and has a design capacity (once completed) in excess of nine million TEU per year.

Access to Bay West through the Heads, the Great Ship Channel and Port Phillip (see Figure 1, p. 11) is currently suitable for 8,000 to 10,000 TEU container vessels to enter at most times (and potentially 14,000 TEU container vessels).

Figure 12: Bay West concept – terminal and port environs



Source: Adapted by Infrastructure Victoria from GHD, *Infrastructure Victoria Second Container Port Advice – Concept Options – Bay West and Hastings*, 2017

The advantage of this location is that it requires the least amount of dredging with the least environmental impact. Dredging and reclamation operations will occur in the calmer waters of Port Phillip with less chance of interruptions due to weather and/or sea-state conditions and potential for environmental damage.

A container terminal at Bay West can easily be connected to existing and proposed metropolitan and intra- and interstate road and rail networks. Relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available near the suggested port location. The design provides for a contiguous quay line of 4,100 metres, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line. Given that Bay West is located within the protected waters of Port Phillip, it would be ideal for barge or small vessel container transport operations to other locations such as Geelong, Portarlington and the Port of Melbourne in future.

The orientation of the quay line provides the best protection against the prevailing westerly winds and facilitates the safe berthing of large container vessels. Suitable existing safe vessel anchorages are already available nearby in Port Phillip. To construct the new port in this location would require dredging and reclamation of approximately 29 million cubic metres. The total cost for the dredging, road and rail connections to the existing network and construction of the container terminal has been estimated at approximately \$6.4 billion (Infrastructure Victoria, 2017).

The geography of Victoria favours a port in the west

The topography of Melbourne and Victoria has a major bearing on transport networks to and from the port and the location of import and export businesses.

For Victoria, the Great Dividing Range (including the Yarra and Dandenong Ranges) restricts the road and rail transportation of freight to the state's western and northern transport corridors. The Great Dividing Range constitutes a major physical barrier resulting in most truck and train transportation from rural Victoria accessing Melbourne via the following major transport corridors: the Hume, Calder, Western and Princes Highways (west of the CBD) and the intra- and interstate rail lines.

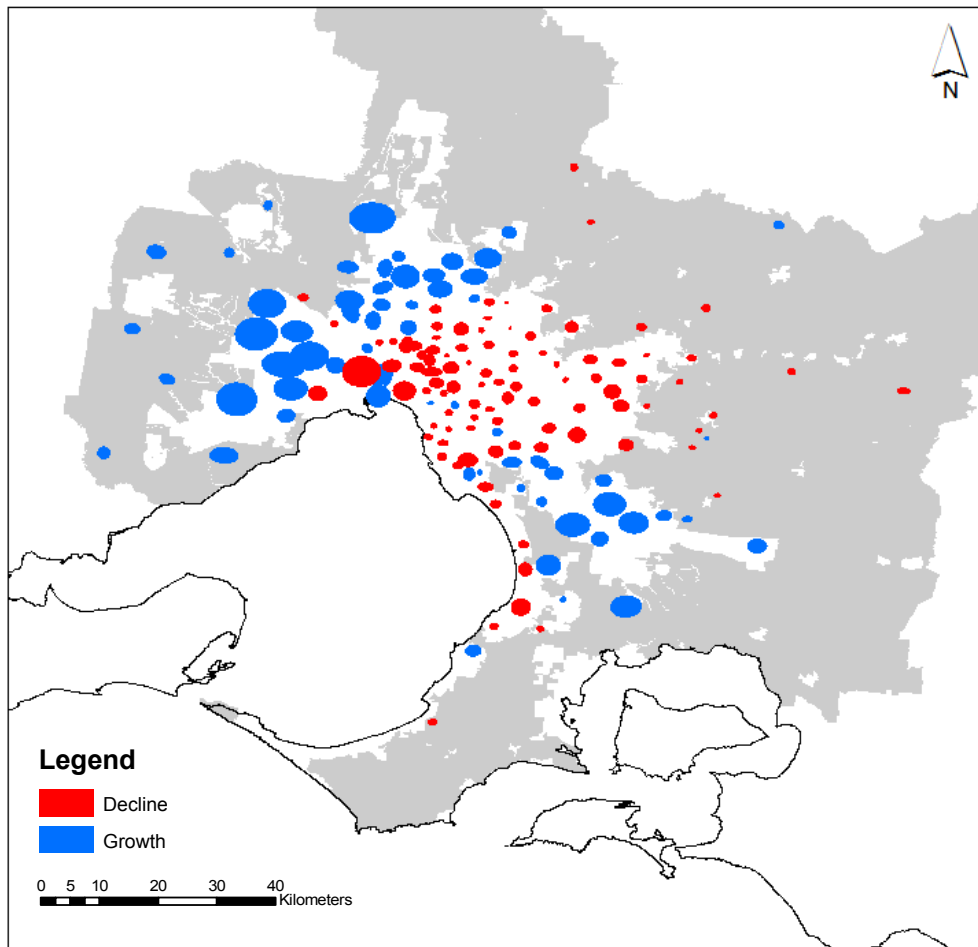
For Melbourne's topography the Dandenong and Yarra Ranges also limit industrial land use and road and rail freight transportation to the west and north of the metropolitan area. In future, the transportation limitations in the east and south-east of Melbourne may be reduced if and when the North East Link is built linking the Western Ring Road, the Eastern Freeway and EastLink.

The western and northern suburbs of Melbourne effectively comprise a single geographic region based on topography, land use and economic activity. The north and west rely on common road and rail infrastructure networks to access the port. Expansion of Melbourne further to the east has been limited by the Yarra (Dandenong) Ranges and therefore the east and south-east of Melbourne have far less industrial activity. Further, freight transport connectivity between the east and west of Melbourne is limited by the lack of suitable road and rail infrastructure.

Importers and exporters in New South Wales, South Australia, rural Victoria and metropolitan Melbourne (i.e. the Port of Melbourne hinterland excluding Tasmania) also must access the port and Melbourne via the road and rail networks passing through the west and north of metropolitan Melbourne. As a result the western and northern suburbs of Melbourne have become Victoria's 'freight heartland' and this investment (including the road and rail infrastructure) can be optimised through a second port at Bay West.

Figure 13 shows that the growth of transport, postal and warehousing industry activity is weighted to the north and west of Melbourne and this growth trend is expected to continue because these areas are better suited to freight and import export business needs.

Figure 13: Transport, Postal and Warehousing investment and growth trajectory in Greater Melbourne, 2011



Source: Victorian Government, *Industry Atlas of Victoria* (Thir et al, 2013)

Land planning

The selected greenfield site at Bay West allows for careful planning of the freight corridor and the port. There are several land use planning and supply chain issues that need particular attention and careful management. The rail terminal location for the Werribee South option is on green-wedge land adjacent to the OMR and outside the urban growth boundary. This area is covered by Public Acquisition and Environmental Significance overlays, the latter relating to the environmental value of, and desire to preserve and rejuvenate, the western grassy plains. Whilst the area in question is three kilometres long, it constitutes a small proportion of the total area of the grassland reserves.

The *IV Discussion Paper* notes that land set aside for manufacturing goods for export is concentrated in Melbourne's north and west, with only small parcels of land in the outer east and south-east. Furthermore, warehousing and distribution activity is also concentrated in Melbourne's north and west due to the proximity to the port and transport networks; supply of suitable (i.e. large and flat), industrially zoned land; proximity to a skilled workforce; and growing markets for the consumption of imported goods.

If a rail terminal were to be built at the proposed location there would be considerable work required to rehabilitate and offset the loss of land to comply with the *Environment Protection and Biodiversity Conservation Act 1999*. However, there are opportunities to comply, and the quality of grasslands is

higher along waterways and in areas further to the north, which would benefit from further rehabilitation and protection. Alternatively, there may be options to relocate the terminal immediately south, between the railway line and the Monash Freeway.

Planning regulations give government the power to reserve land for transport corridors. Long-term planning is being undertaken for the movement of goods and people in Melbourne's north and west with the reservation of land for the outer metropolitan transport corridor. The transport corridor accommodates both rail and road, and connections to proposed intermodal freight terminals at Truganina and Beveridge and various alternatives. The proposed location is situated in a relatively sparsely populated area and should therefore be free from curfews.

Landside considerations – rail

The Bay West location offers several benefits for the development and enhancement of on-dock port rail services. Given its location to nearby existing standard and broad gauge networks, it is well positioned to connect into this network. This will enhance and expand regional, interstate and domestic rail traffic and improves the prospects for the development of a metropolitan intermodal freight shuttle system. The on-dock rail connection on the container terminal would negate the additional truck move currently a feature of the container terminals in the Port of Melbourne.

The proposed port location will allow a relatively easy connection into the proposed OMR road/rail corridor. The construction cost of a port connection to the main line will be modest. The planned OMR corridor is closely aligned to the site of the proposed new Interstate Freight Rail Terminal in the Truganina precinct (the Western Interstate Freight Terminal), which is understood to include provision for a metropolitan intermodal rail connection.

Landside considerations – road

The proposed Bay West site is well located for connection to current and planned road networks. Once new access roads are constructed, the port would have immediate connection to the existing Monash Freeway/Princes Freeway (Melbourne/Geelong) corridor, and the Western Ring Road, servicing the Calder, Western and Hume corridors. The proposed location also provides direct access to the future OMR leading to regional corridors and in close proximity to logistics hubs currently situated in the north and west of Melbourne.

Connection to the east and south-east regions would rely on the present Monash Freeway corridor with the associated mass constraints on the West Gate Bridge. However, construction of a complete East-West Link would provide an alternative corridor for HPFVs to these regions and will facilitate the use of HPFVs with higher mass and greater dimension on new road corridors and on the Monash Freeway corridor west of the West Gate Bridge.

4.5 Comparison of container freight transport costs and externalities

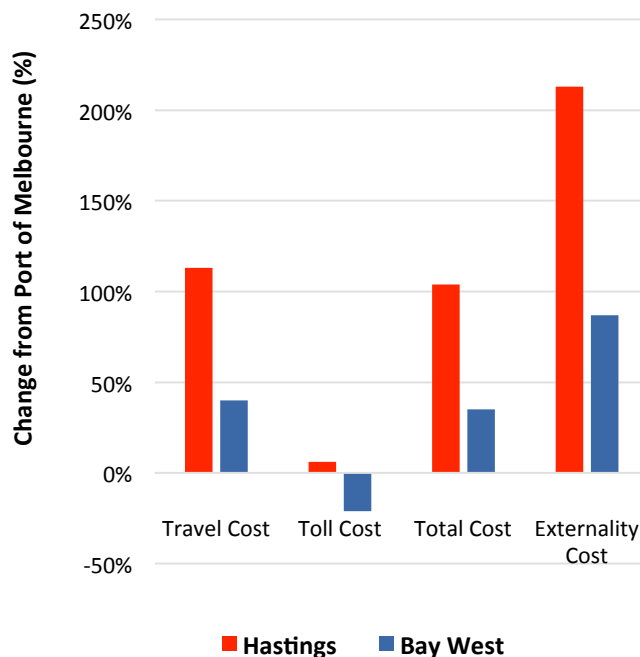
Travel time, transport and externality costs – Hastings compared to Bay West

Travel times (Table 2, p. 23) for container movements to/from a port location at Hastings or Bay West will be higher than for movements to/from the Port of Melbourne, since each of Hastings and Bay West port options are located towards the outer areas of Melbourne. However, the increase in travel time for Bay West is smaller than the increase in travel time for Hastings.

Figure 14 illustrates a comparison of travel, toll and externality costs for container movements in FY2016, for Hastings and Bay West relative to that of the Port of Melbourne. Total transport costs (travel and toll costs) and externality costs for container movements to/from Hastings and Bay West are

higher than for the Port of Melbourne. However, the percentage changes of these cost increases are greater for Hastings than Bay West.

Figure 14: Various costs for the proposed ports compared to the Port of Melbourne (% change)



Source: Based on Transport for NSW (2016) estimates of costs of different externalities

The externality costs reflect the external impact of road-based container movements, in particular noxious emissions (e.g. nitrous oxides), greenhouse gas emissions, noise, and marginal congestion costs for other vehicles (see *Transport Economic Appraisal Guidelines* (Transport for NSW, 2016) for a discussion of externality costs).

Access to markets and contestability

A port’s geographic market or hinterland (i.e. the area from which products are delivered to/from the port) is defined by the set of importers and exporters who use the port for the movement of commodities. The market’s geographic boundary is marked by the outer boundary of the destinations (for importers) and origins (for exporters) for commodities (e.g. bulk grain, containerised products). Critically, the port’s capacity to attract importers and exporters to use its services is influenced by land transport factors, in particular the availability, price and reliability of alternative landside transport modes (e.g. road, rail), and the comparative cost of accessing competing ports.

A number of major ports on the eastern seaboard of Australia, in particular Adelaide and Sydney (Port Botany), are competing for contestable cargoes (mainly exports) with Melbourne. Port of Melbourne plays a significant role in handling export containers from regional Victoria and interstate. These containers account for nearly 40 per cent of export volumes that originate in regional Victoria and interstate entering metropolitan Melbourne from the north and west (Table 3). Bay West is closer to the origins of export volumes and the road/rail corridors linking exporters to the port than Hastings.

Table 3: Estimated import and export containers to/from the Port of Melbourne and other regions, FY2016

Origin or destination of full containers	TEU number	
	Imports	Exports
Regional Victoria (north, west)	26,012	137,544
Interstate	114,042	162,028
Total regional and interstate	140,054	299,572
Total through the Port of Melbourne	1,135,350	795,519
Share of total for regional/interstate containers	12%	38%

Our analysis also indicates that compared to Port of Melbourne, a second port in Hastings will result in increases of about 30 per cent or 10 per cent in container freight transport costs and 60 per cent or 40 per cent toll costs from regional Victoria or interstate, respectively.

4.6 Port and transport related social and environmental impacts

Social impacts relevant to a port and associated infrastructure include noise, air quality, visual amenity, employment and community connectedness. IV (Infrastructure Victoria, 2017) recognises that the mitigation of social impacts will influence the decision about whether to increase capacity at the Port of Melbourne or invest in a second port. If the Port of Melbourne expands its operations there will be significant pressure on transport infrastructure and reduced amenity for those living near the port.

Noise

The proposed RRE, planned as part of the Hastings project, will require noise attenuation initiatives that will not be socially acceptable. The volume of freight needed to be transported by rail from Hastings to distribution centres in Melbourne’s west would result in noise levels exceeding planning guidelines through nearly 60 kilometres of Melbourne’s built-up residential areas. Homes within 200 to 300 metres of the rail corridor would need noise ameliorating measures.

Although the Bay West proposal has a rail corridor next to proposed residential development east of the OMR, there is greater discretion as to the location of the rail line. Moreover, as housing is not yet built for much of the length of the corridor, there is capacity to include the required acoustic performance in new home designs rather than to ‘retrofit’.

In terms of noise from freight transport by road, the Monash Freeway both west and south of the city would likely require further noise attenuation treatments, but this would be for much greater distances in the south-east. In the approach from the west, the transport corridor abuts land with less sensitive farm, institutional and industrial uses than in the south-east.

Air quality

Common harmful air pollutants related to transport are airborne particles, ozone, nitrogen dioxide and carbon monoxide. There has been a deterioration (whilst still remaining in the ‘good’ range) of air quality along the Monash Freeway between Dandenong and the city related to fine airborne particles, of which diesel vehicles are the major emitters (Environment Protection Authority, 2013, p. 23). This is most likely to be further exacerbated if a second port were to be located at Hastings.

Visual amenity

Visual amenity impacts relate to both the port itself, and shipping and transport movements to and from the port. Expanding the Port of Melbourne includes extending Webb Dock further into Port Phillip, which will impact on the city skyline views from Williamstown and be visible from Sandridge to St Kilda.

The construction of noise walls to ameliorate the noise from freight movements on road and rail corridors will be detrimental to the visual amenity of adjoining communities and greater lengths of noise walls required for Hastings than Bay West. The rail corridor between Caulfield and South Yarra is particularly densely populated and contains a number of heritage railway stations. The noise walls necessary if dedicated freight lines are built through this corridor will likely cause an unacceptable detracting to amenity.

Occupation and workforce issues

Considering the social impact of employment availability is important in determining the location of the second port. A higher proportion of people in Melbourne's west and Geelong work in transport and warehousing compared with the south-east. The number of people working in technical and trade occupations in the two regions is comparable. The number of people working as machine operators and drivers is higher in the south-east than the west, but it is most likely this difference is narrowing given the large number of distribution centres being developed in the west, in part to access the intra and interstate road and rail networks.

If Hastings were chosen as the second port, the size of the labour market in Melbourne's south-east would appear to be able to meet labour demand. Notwithstanding the range of difficulties associated with relocating distribution centres from the north and west to the south-east, the social impacts of this major structural adjustment warrants greater consideration than has been afforded to date. The disruption to employment, families' lives and local communities would appear to be far greater with a decision to locate a second port in Hastings, given how important these jobs and industry are to Melbourne's west (and probably north).

Environmental impacts

The two locations canvassed for the second port have high biodiversity and ecological value, and part or all of these areas are recognised under the Ramsar Convention on Wetlands of International Significance, which represents a matter of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act.

The Hastings option is likely to have unacceptable impacts on flora and fauna, in particular with damage to seagrass habitat in Western Port and associated marine and terrestrial fauna.

The western Port Phillip options (i.e. for Bay West) vary greatly in their likely impact on biodiversity and ecosystem value. Seagrass, avian and other biodiversity values increase toward the south-west from Werribee River, and are generally extremely high on the western side of Port Phillip Bay, particularly in the sub-tidal marine, coastal and in the coastal wetlands, south-west from Werribee River. Therefore, the Werribee River option would be likely to cause fewer biodiversity and ecosystem impacts than the other Port Phillip Bay options for the following reasons:

- The proposed location of the port is offshore in an area that offers the potential for minimising impacts on a number of key habitats with significant biodiversity and ecological value (coastal wetlands, mudflats, seagrass beds and rocky reefs).

- The access route is mostly through agricultural land, which is likely to have comparatively low biodiversity values compared with routes further south, particularly the route across the Spit Nature Conservation Reserve.

The development of a port at the Werribee River site should not only consider the immediate impacts of port development, but also ongoing threats and impacts to the surrounding areas once a port has been established. There are some risks that will be acute during the construction phase, but may be less so post-construction (e.g. turbidity), and vice versa (e.g. road/rail/marine traffic). Smart engineering may mitigate these effects and possibly even promote desired biodiversity outcomes.

For more details of the biodiversity and ecosystem impacts, see the technical report in Attachment 2: *A preliminary assessment of biodiversity issues related to Infrastructure Victoria's Discussion Paper on Melbourne's Second Cargo Port, March 2017.*

A 'social licence'

A 'social licence' to build and operate a port refers to broad community acceptance that the sum of benefits of operating and expanding an existing port, or building a new port, outweigh the aggregate of actual or perceived disbenefits. It relates to both activities at the port and getting freight to and from the port. Benefits include trade, economic activity and employment, both direct and indirect. Actual and perceived disbenefits relate to visual amenity, congestion, noise, environmental impacts, business and employment dislocation, and risks to people and the environment of catastrophic events.

Broadly speaking, the community understands that ports provide a critical function for our island nation; most of our imports and exports are transported by ship. Imports form a significant portion of our consumer goods that contribute to our high standard of living, including cars, white goods, electrical goods and clothing. Increasing volumes of exports leave the country in containers, contributing to our economic prosperity and generating substantial employment.

Hastings lacks the required rail connection and a suitable rail connection would cost more than \$5 billion. Most of Western Port, including Hastings, is covered by the Ramsar Wetlands Convention and requires major mitigation measures to avoid damage to the environment. Large volumes of trucks or trains moving along particular corridors have detrimental impacts including visual amenity, noise and air quality. The need to move significant volumes from a port at Hastings to the distribution centres in Melbourne's north and west will create greater impacts than under the Bay West option.

The aggregate of these social and environmental considerations make a new port in Bay West more likely to receive a 'social license' than a port at Hastings.

Conclusion: Bay West – start planning now

The greatest opportunity to develop a world-class port system for Melbourne is at Bay West.

When deciding on the future port for Melbourne and Victoria, all requirements for an optimal port system need to be taken into account. Our analysis of both maritime and landside considerations, now and in the future, shows that the only option is to plan now to develop a new container terminal at Bay West in the next 20 years.

Measured against the requirements of a successful port operation, Bay West ticks many of the boxes, as summarised in a comparative assessment of each potential port location (Table 4). Bay West is easily connected to existing and proposed metropolitan and intra- and interstate road and rail networks. It also has relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the break-up of long interstate trains, available close to the suggested port location.

The design of Bay West provides for a contiguous quay line of 4,100 metres, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line. Access through the Heads, the Great Ship Channel and Port Phillip, is currently suitable for 8,000 to 10,000 TEU vessels to enter at most times.

Compared to other options, Bay West requires the least amount of dredging with the least environmental impact. As for the proposed development site at Hastings, the Bay West area is covered by the Ramsar Convention on Wetlands of International Significance; however, the area likely to be affected is much smaller.

Hastings is on the 'wrong side' of town for exporters, importers and logistics service providers who are mainly located, with their fixed assets, to the west and north of the city and the state. This means that large volumes of container freight would need to cross the congested metropolitan area daily. Hastings is also unlikely to be awarded the social and environmental approvals and social licence to operate. These approvals are mandatory for major construction projects in Victoria and Australia and act to protect amenity and pristine and nationally significant environments, such as those at Western Port.

It is clear that the planned expansion of Webb Dock at the Port of Melbourne and the proposed development of rail at Fisherman's Bend to service the port hinterland until 2066 are highly improbable because each proposal is severely compromised by landside logistics, cost, environmental impact and urban amenity issues. Road-based container transport travel times, transport and externality costs for both Hastings and Bay West are higher than for the Port of Melbourne, but Bay West rates significantly better than Hastings on these measures.

The Port of Melbourne (even in its expanded version) has a limited life span and an alternative should be considered sooner rather than later. Internationally ports have all tended to move away from city locations; for example, the Port of Rotterdam keeps extending further seawards away from its old location close to the city, to ensure that urban encroachment does not interfere with the 24-hour operations required for an efficient port. To avoid negative impacts on the container trade to and from Melbourne and its hinterland, any plan to expand the Port of Melbourne should be discarded.

Table 4: A comparative assessment of each potential port location

Criteria	Port of Melbourne (Expanded)	Hastings	Bay West
1. ECONOMIC			
Victoria meets its economic development objectives	Moderate	Negative	Positive
Port contestability	Moderate	Negative	Positive
Trade expansion	Negative	Negative	Positive
Supply chain investor confidence	Moderate	Negative	Positive
Multi-generation impact	Negative	Negative	Positive
2. PORT AND LANDSIDE LOGISTICS			
Roads	Negative	Moderate	Positive
Truck numbers, truck utilisation	Moderate	Moderate	Positive
Traffic and road congestion impact	Negative	Moderate	Positive
Rail	Negative	Negative	Positive
Intermodal connectivity	Negative	Negative	Positive
Multimodal port shuttling	Negative	Negative	Positive
Integrating the port with an effective land transport system	Negative	Moderate	Positive
Accepting larger vessels (10,000 TEU and possibly 14,000)	Positive	Positive	Positive
Air draught limitations	Moderate	Positive	Positive
Dredging required	Moderate	Negative	Moderate
Importers access	Positive	Moderate	Positive
Exporters access	Positive	Moderate	Positive
Storage and distribution capabilities	Moderate	Positive	Positive
3. SOCIAL AND ENVIRONMENTAL			
Social impact and the license to operate	Negative	Negative	Positive
Urban amenity and preserving Melbourne’s liveability	Negative	Moderate	Moderate
Gaining and retaining the port’s community licence to construct and operate	Negative	Negative	Positive
Environmental impact	Moderate	Negative	Moderate
Vehicle emissions	Moderate	Negative	Moderate
Noise, reverberations	Negative	Negative	Positive
Safety through the clear separation of land use	Negative	Moderate	Positive
Transport accidents impact	Moderate	Negative	Positive
4. PLANNING FOR THE FUTURE			
Freight corridors, freight terminals	Negative	Moderate	Positive
Buffers	Negative	Moderate	Positive
Available and affordable land	Negative	Positive	Positive
Marine berths and channel development capability	Negative	Positive	Positive

Key:

 Negative  Moderate  Positive

Optimising public investment

Governments are responsible for optimising the value derived from investment of public monies. In this submission we propose that while expenditure on port development is largely a private sector investment, the connecting transport network infrastructure tends to be a blend of public and private funding with the associated investment responsibilities.

Investments to build network infrastructure in the south-east of Melbourne, for access to a port at Hastings, will benefit one transport node. However, investment in connecting infrastructure to deliver access to a port at Bay West will provide a shared benefit for the ports of Geelong, Bay West and Melbourne, the airports at Tullamarine and Avalon, and the burgeoning populations of western and northern metropolitan Melbourne. In addition the west of Melbourne will continue to host storage facilities and container staging for businesses located in the south-east of Melbourne.

The total cost for the dredging, road and rail connections to the existing network and construction of the container terminal at Hastings is approximately \$7.9 billion. Total costs (including the new RRE) are approximately \$12.9 billion, nearly twice the amount required for the Bay West option (Infrastructure Victoria, 2017).

The way forward

Infrastructure Victoria, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the 'inconvenient truth' about the Port of Melbourne's prohibitive limitations to building the necessary capacity to last 50 years needs to be recognised.

Commercial arrangements with an existing port operator do not abrogate the responsibility of the Victorian Government to manage sovereign risk and strategic long term planning for Victorians.

Planning and corridor reservation for a second container port at Bay West needs to occur without delay to ensure Victoria's economic and social wellbeing is future-proofed.

Abbreviations

Abbreviation	Definition
APEC	Asia-Pacific Economic Cooperation
ARC	Australian Research Council
AUD	Australian dollars
B2B	Business to Business
B2C	Business to Customer
CAGR	Compound Annual Growth Rate
CBD	Central Business District
CSCL	Centre for Supply Chain and Logistics
ECP	Empty Container Park
FMCG	Fast Moving Consumer Goods
FTA	Free Trade Agreement
FY	Financial Year
HPFV	High Performance Freight Vehicle
IV	Infrastructure Victoria
OMR	Outer Metropolitan Ring Road
RRE	Regional Rail East
SMEs	Small and Medium Enterprises
TEU	Twenty-foot Equivalent Unit(s)
VFLP	Victorian Freight and Logistics Plan

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Attachments

Attachment 1: Institute of Supply Chain and Logistics, Victoria University: Build it – but will they come? 2014 report.

Attachment 2: Centre for Integrative Ecology, Deakin University: Technical report on biodiversity impacts of Melbourne’s second port, 2017.