

SOUTHERN REGION INDUSTRIAL LAND

Future State Assessment

STAGE 2 FINAL REPORT

20 December 2018

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_Executive Summary

About this Study

This paper was prepared by MacroPlan Dimasi for the Department of Environment, Land, Water & Planning (DELWP). It follows an earlier Stage 1 research paper, which describes the current state of industrial and commercial land supply and demand within Melbourne's Southern Region, specifically three State Significant Industrial Precincts (SSIPs) relative to metropolitan Melbourne.

Stage 1 Findings

The Stage 1 paper presented the following key findings:

- The total Gross Regional Product (GRP) or value of economic output produced in the Southern Region was **\$48.9 billion** in 2016. This is equivalent to 15.2% of total metropolitan Melbourne GRP during the same period.
- As at 2017, the Southern Region comprised **9,513 gross hectares** zoned industrial land of which **2,463.5 hectares** (26%) are available for future industrial use / development. This is equivalent to around 36.9% of total available industrial land available within metropolitan Melbourne.
- Industrial land consumption rates range from the highest in Dandenong (**54.1 hectares a year**) to the lowest in Casey (**2.5 hectares a year**). Total annual consumption of industrial land within the Southern Region averages around 91.7 hectares per annum.
- Current consumption rates suggest industrial land stocks **may be exhausted** in Frankston in the short-term (i.e. 2-3 years) and in Kingston and Greater Dandenong during the next 10-12 years.
- There were at least **350,000 jobs** based in Melbourne's Southern Region in 2016, of which **120,924** (35%) were employed in industries typically using industrial land such as manufacturing, construction, wholesale trade, freight and logistics and warehousing.
- Traditional industries such as manufacturing, construction, wholesale trade, transport postal and warehousing all experienced growth in **output per worker**. This demonstrates the continuing importance of traditional industries as a source of economic value both in terms of output and employment and value-adding potential and highlights the need for appropriate land use planning to support these industries.

Stage 2 Report

The following Stage 2 paper presents an analysis of several scenarios relating to the likely exhaustion of industrial land stocks within the Southern SSIP and possible implications for total employment and output within the Southern Region, assuming limited potential for industrial demand transfer to other SSIPs and beyond the Southern Region.

The results of both papers will assist DELWP is preparing a plan that will guide the future development of industrial and commercial land across metropolitan Melbourne.

_Executive Summary

Scenarios

Three scenarios were explored in this paper. The scenarios relates to the potential implications for employment and output within the Southern Region in circumstances where available zoned vacant industrial and commercial land stocks are exhausted within the Southern SSIP during 2026-31, with limited demand transfer to other SSIPs within the Southern Region. A sensitivity analysis was also undertaken for each of the scenarios to test possible impacts from the improvement of productivity of each industry.

The definition and assumptions for all scenarios are outlined in the table below.

Scenarios & Assumptions

SCENARIO	DESCRIPTIONS	ASSUMPTIONS	SENSITIVITY ANALYSIS
BUSINESS AS USUAL (BAU)	Trend growth under an unchanged economy / policy basis with unconstrained land supply.	- Accept VIF 2018 as the basis of population growth during the forecast period; - Adopt the current employment servicing ratios for the six LGAs within the Southern Region as at Census 2016 and hold these ratios constant during the forecast period; - Adopt the current relative shares of employment by industry for the six LGAs and assume historic industrial shift-share remains on trend during the forecast period; - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	Adopt historic trend of output per worker by industry as a proxy to reflect the change of productivity of each industries in the six LGAs within the Southern Region.
SCENARIO 1	The rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops reflecting the exhaustion of zoned vacant industrial / commercial land stocks, with no net transfer of industrial employment to other LGA / SSIPs.	Scenario 1A: assumes employment in manufacturing and wholesale trade in Greater Dandenong continues to decline on trend whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031; Scenario 1B: assumes employment in manufacturing and wholesale trade in Greater Dandenong continues to decline more aggressively after 2026-31 (assuming at 20% less than trend for analysing purposes) whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031; - Assume no net transfer of employment to other LGAs and/or SSIPs during the forecast period; - For employment in other industries, assume trend growth during the forecast period (refer to BAU); - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	
SCENARIO 2	The rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops reflecting the exhaustion of zoned vacant industrial / commercial land stocks, with at least 50% of lost industrial employment growth within the Southern SSIP created within the Officer-Pakenham and Hastings SSIPs.	- Assume employment in manufacturing and wholesale trade in Greater Dandenong continues to decline more aggressively at 20% less than trend after 2026-31; - Assume the growth of employment in Transport Postal and Warehousing in Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031; - Assume 50% of the loss of industrial employment growth transfers to Officer-Pakenham SSIP (Cardinia LGA) and Port of Hastings SSIP (Mornington Peninsula LGA), among which 90% is assumed to be picked up by Officer-Pakenham and 10% by Hastings; - For employment in other industries, assume trend growth during the forecast period (refer to BAU); - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	

Executive Summary

Key Findings

The modelling outputs indicate the following key findings:

The **BAU** scenario models a hypothetical trendline growth under an unchanged economy / policy basis and unconstrained land supply. Under this scenario, both employment and output are expected to grow / decline on trend in the six LGAs within the Southern Region. With Manufacturing and Wholesale Trade continuing to decline, the Transport Postal and Warehousing sector appears to be the major consumer of industrial land within the Southern SSIP as well as the wider Southern Region.

With trend growth assumed under this scenario, Greater Dandenong / the Southern SSIP is expected to maintain its position as the most significant contributor in terms of industrial employment and output to the economy of the region during the forecasting period.

Scenario 1 (A&B) attempts to simulate possible implications on employment and output when zoned vacant industrial land is exhausted in the Southern SSIP during 2026-31 at current consumption rate, with no net demand transfer towards other SSIPs within the Southern Region.

With the exhaustion of zoned vacant industrial land, the employment growth in Transport Postal and Warehousing is likely to slow down and eventually stop within Greater Dandenong, whilst employment in Manufacturing and Wholesale Trade continue to decline on trend (Scenario 1A) and more aggressively (Scenario 1B).

With no net demand transfer towards other SSIPs within the region assumed (noting some demand may possibly transfer to other regions), there is estimated between 3,670 industrial jobs (Scenario 1A) and up to 7,588 industrial jobs (Scenario 1B) lost within Greater Dandenong and the region by 2046 compared to the trendline growth (BAU scenario).

The relative share of industrial employment and output within Greater Dandenong and the wider Southern Region is expected to shrink during the forecasting period.

Greater Dandenong's contribution to the overall Southern Region is also expected to decrease. However, Greater Dandenong still remains the largest local economy within the region compared to the other five LGAs.

Scenario 2 builds on Scenario 1B and assumes 50% of the loss of the industrial employment growth will be accommodated within the Officer-Pakenham SSIP and Port of Hastings SSIP where zoned vacant industrial land supply is relatively abundant to simulate the effects of industrial demand transfers.

Under this scenario, the industrial employment and output in Greater Dandenong is forecast to continue to decline as in Scenario 1B. However the industrial employment and output growth in Cardinia and Mornington Peninsula will be accelerated at above-trend growth and consumption rates with some businesses possibly relocating to these locations for the availability of large parcels of industrial land. Greater Dandenong's relative share is expected to further decrease.

This scenario demonstrates the underlying capacity for the Southern Region to retain its industrial employment and output by utilising currently available industrial land within the Officer-Pakenham SSIP and Port of Hastings SSIP, albeit some levels of industrial employment and output growth may still be lost to other regions.

Executive Summary

Key Findings (Cont.)

The **sensitivity analysis** revealed output per worker in Information Media and Telecommunications, Wholesale Trade, and Financial and Insurance Services has increased the most significantly, whilst other industries such as Mining, Electricity, Gas, Water and Waste Services have seen a decrease in output per worker.

The sensitivity analysis also indicates that in spite of the decline in industrial employment, the industrial output in Greater Dandenong and the wider Southern Region is forecast to grow significantly. This reflects the influence from the advancement of technology such as the utilisation of highly automated machinery in the traditionally labour-intensive industries.

Whilst the assumptions adopted in the sensitivity analysis appear to be conservative, it implies the following possible future trend in relation to industrial sectors:

- Reliance on technology and innovation will be greater;
- Requirement for labour will be further reduced;
- Requirement for land may or may not change;
- Employment density on industrial land will decrease;
- Productivity of industrial land and productivity of industrial workers will be significantly enhanced.

The sensitivity analysis also indicates the relative share of industrial sectors (in terms of both employment and output) appear to be largely on par with the modelling outcomes when assuming output per worker is unchanged. This is because a number of other non-industrial related sectors have also significantly benefited from the improvement of productivity, such as Information Media and Telecommunications, and Financial and Insurance Services. Whilst the industrial output in the Southern Region is forecast to grow (albeit with a decline in industrial employment), both employment and output in these non-industrial sectors indicate significant growth in the sensitivity analysis.

This may have some implications on 'employment land' where there is greater capacity to support more employment, higher job density and greater productivity and output compared to 'industrial land'. The possible land requirement of those growing sectors should be further explored by DELWP going forward.

The summary of modelling outcomes and sensitivity analysis is presented in the table overleaf.

_Executive Summary

Modelling Output & Sensitivity Analysis Summary, All Scenarios

	SOUTHERN REGION						GREATER DANDENONG LGA					
BAU	Industrial Employment (#)	2016 80,486 2046 72,963	2016-46 -7,523 -0.3% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 54,403	2016-46 +14,606 +1.0% p.a.	Industrial Employment (#)	2016 36,100 2046 33,532	2016-46 -2,568 -0.2% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 26,247	2016-46 +5,969 +0.9% p.a.
	Total Employment (#)	2016 328,739 2046 527,851	2016-46 +199,112 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 234,186	2016-46 +129,721 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 139,425	2016-46 +50,244 +1.5% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 74,908	2016-46 +39,246 +2.5% p.a.
SCENARIO 1A	Industrial Employment (#)	2016 80,486 2046 69,293	2016-46 -11,193 -0.5% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 52,820	2016-46 +13,024 +0.9% p.a.	Industrial Employment (#)	2016 36,100 2046 29,862	2016-46 -6,238 -0.6% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 24,664	2016-46 +4,368 +0.7% p.a.
	Total Employment (#)	2016 328,739 2046 524,182	2016-46 +195,443 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 232,604	2016-46 +128,139 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 135,755	2016-46 +46,554 +1.4% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 73,325	2016-46 +37,663 +2.4% p.a.
SCENARIO 1B	Industrial Employment (#)	2016 80,486 2046 65,375	2016-46 -15,111 -0.7% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 48,773	2016-46 +8,977 +0.7% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 20,617	2016-46 +340 +0.1% p.a.
	Total Employment (#)	2016 328,739 2046 520,264	2016-46 +191,525 +1.5% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 228,557	2016-46 +124,092 +2.6% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 69,279	2016-46 +33,616 +2.2% p.a.
SCENARIO 2	Industrial Employment (#)	2016 80,486 2046 69,169	2016-46 -11,317 -0.5% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 51,172	2016-46 +11,375 +0.8% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 20,617	2016-46 +340 +0.1% p.a.
	Total Employment (#)	2016 328,739 2046 524,058	2016-46 +195,319 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 230,955	2016-46 +126,490 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 69,279	2016-46 +33,616 +2.2% p.a.

Note: Industrial employment / output includes jobs / output generated in Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing
Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, REMPLAN 2018, UPD 2005-2017, VIF 2018, MacroPlan Dimasi

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_Glossary

ABS	Australian Bureau of Statistics
DELWP	Department of Environment, Land, Water and Planning
GRP	Gross Regional Product which is a measure of economic production and output
Industrial Land	As defined within the UDP and in Chapter 1 of this report
MSS	Municipal Strategic Statements
NEIC	National Employment & Innovation Cluster
REMPAN	An economic and land use tool
SSIP	State Significant Industrial Precinct
SPPF	State Planning Policy Framework
UDP	Urban Development Program
VIF	Victoria in Future
VPPs	Victorian Planning Provisions

1_Introduction

1.1_About this Report

The following paper presents an analysis of several scenarios relating to the future exhaustion of industrial land stocks within the Southern State Significant Industrial Precinct (SSIP) and likely implications for industrial employment and total gross regional output within the Southern Region, assuming limited industrial land demand transfer to other SSIPs and beyond the Southern Region.

This paper follows an earlier Stage 1 research paper, which described the current state of industrial and commercial land supply and demand within Melbourne's Southern Region, specifically three SSIPs relative to metropolitan Melbourne.

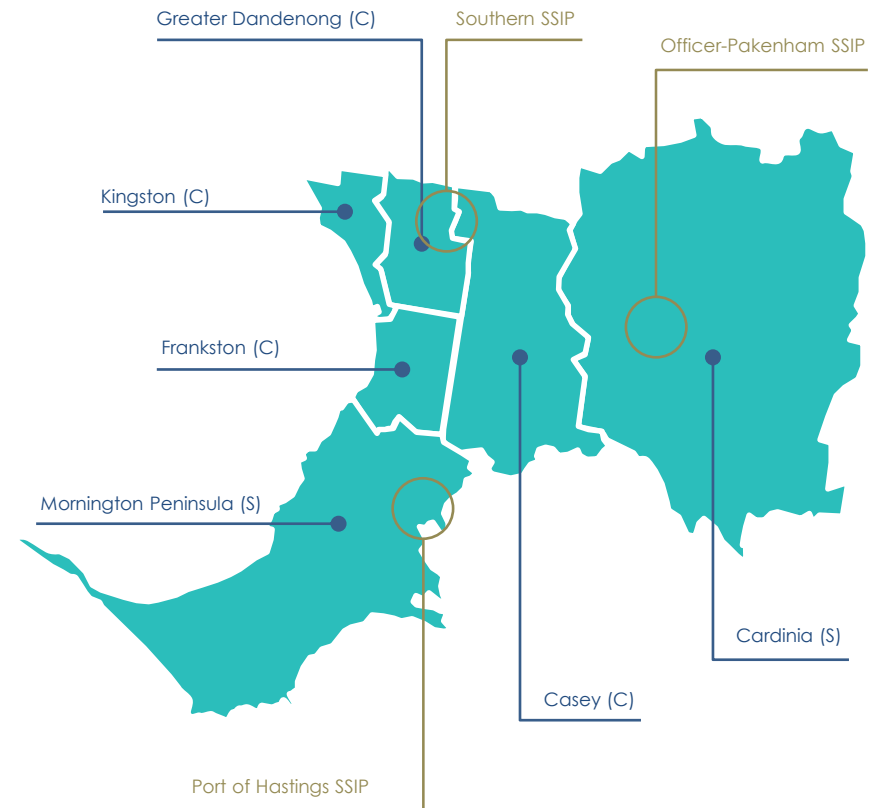
The results of this analysis will assist DELWP in preparing a plan that will guide the future development of industrial and commercial land across metropolitan Melbourne.

The Southern Region comprises six Local Government municipal areas – **City of Kingston, City of Casey, City of Frankston, City of Greater Dandenong, Cardinia Shire and Mornington Peninsula Shire**.

Melbourne's resident population was reported to be 4.65 million at Census 2016, with approximately 1.03 million residents (around 22%) living in Melbourne's Southern Region. There were approximately 350,300 jobs located in the Southern Region (around 17% of the metropolitan total), highlighting the relative importance of the Southern Region, particularly the SSIPs as a major focus for employment within this region.

- There are three SSIPs within the Southern Region namely: **Southern** (Dandenong LGA with a small portion in Casey LGA), **Port of Hastings** (Mornington Peninsula LGA) and **Officer-Pakenham** (Cardinia Shire Council).
- There are several other industrial precincts (separate to the SSIPs) with the largest being Carum Downs (Frankston), Braeside (Kingston) and Cranbourne West (Casey). Each of the LGAs also contain smaller, discrete industrial nodes, some of which are quite old and/or fragmented with limited available land.
- The focus of this paper is on employment growth within the Southern SSIP, Officer/Pakenham and Hastings SSIPs and implications for total employment and output within the six LGAs that make up the Southern Region study area.

Map 1_Southern Subregion



1_Introduction

1.2_Study Approach

The Stage 1 paper presented information about industrial land supply and demand including gross hectares occupied and available supply by zone; industrial land consumption rates and prices; employment by industry and output by industry within each of the six municipalities, three SSIPs and other selected areas.

Information relating to current estimated output by industry for the six LGAs was drawn from REMPLAN, including employment and output at a small area Destination Zone (DZ) basis. REMPLAN is useful for presenting current and historic employment and estimated output by industry. It allows users to assess the impacts of interventions (or shocks) to employment and/or output for specific study area geographies within the current year data. However, REMPLAN lacks the capability to forecast employment and output beyond the current year within the economy module.

This paper reports the findings of analysis for the periods 2016 and 2046 using an employment forecast model and an industry shift-share module relating to the six LGAs and three SSIPs. This model incorporates VIF2018 population forecasts for the six study area LGAs as the basis for developing employment forecasts by industry, holding present employment servicing ratios (i.e. total employed persons per resident) constant within each LGA. REMPLAN output per worker ratios reflecting ABS input-output multipliers are used as the basis for estimating output by industry.

With a Business As Usual (BAU) scenario established upfront assuming unchanged policy and economic contexts, three alternative scenarios are explored relating to the implications for employment and output within the Southern Region in circumstances where available zoned vacant industrial and commercial land stocks are exhausted within the Southern SSIP by 2031, with or without demand transfer to other SSIPs within the Southern Region.

An intervention involving slowing the rate of growth in industrial employment in the Southern SSIP after 2026 to zero by 2036 is used to simulate the exhaustion of industrial and commercial land within the Southern SSIP from 2026, whilst allowing for some industrial land recycling and rezoning activities in this area during the forecast period to 2046.

Separate interventions involving accelerating the rate of growth in industrial employment in the Officer/Pakenham and Hastings SSIPs from 2026 is used to simulate the effects of industrial demand transfer within these locations after 2026, resulting in above-trend industrial and commercial land consumption within these SSIPs during the forecast period to 2046.

A sensitivity analysis is also conducted to test possible impacts from the improvement of productivity of each industry. Further comments relating to the potential impacts of technological change in the industrial sector, particularly in freight, logistics and warehousing are presented in **Part 4_ General Commentary**.

The earlier Stage 1 report indicates the Southern SSIP represents the vast majority of Greater Dandenong's industrial / commercial land stock (noting a small portion is located within the Casey LGA) and industrial employment. In this case, modelling exhaustion of zoned industrial / commercial land supply and slowdown of industrial employment in the Southern SSIP can be largely represented by modelling on the Greater Dandenong LGA level. Considering the availability of small area data and the alignment between SSIPs and DZs, modelling of the LGA level will be used to approximate the three SSIPs within the Southern Region for analysing purposes.

The modelling of all scenarios is on LGA level involving the following outputs:

- Total employment (i.e. employed persons / workers / jobs at place of work) for each LGA and Southern Region;
- Employment by industry for each LGA;
- Total output for each LGA and Southern Region;
- Output by industry for each LGA.

1_Introduction

1.3_References

ABS Census (2011, 2016)
ABS Catalogue 3218, 5260, 6291
Casey Planning Scheme Amendment C219
Economic.id (2017)
NearMap (2018)
Plan Melbourne 2017-2050
REMPAN (2018)
Urban Development Program 2005-2017
Victoria in Future (2018)

2_Scenarios & Assumptions

2.1_Overview

The modelling undertaken in this report has used REMPLAN employment and economic output forecasts. It is increasing difficult to use these employment forecasts as a basis for projecting demand for industrial land. For this reason, forecasts of industrial land demand for the SSIPs or individual precincts have not been prepared.

Three scenarios are explored relating to the implications for employment and output within the Southern Region in circumstances where available zoned vacant industrial and commercial land stocks are exhausted within the Southern SSIP by 2031, with limited demand transfer to other SSIPs within the Southern Region.

A Business As Usual (BAU) scenario has also been established before modelling the three scenarios defined. The BAU scenario will set up the baseline on the growth of employment and output under unchanged economy / policy basis with unconstrained land supply.

This section describes details of the BAU scenario and three scenarios including key assumptions and computational approach.

2.2_Scenarios

Business AS Usual

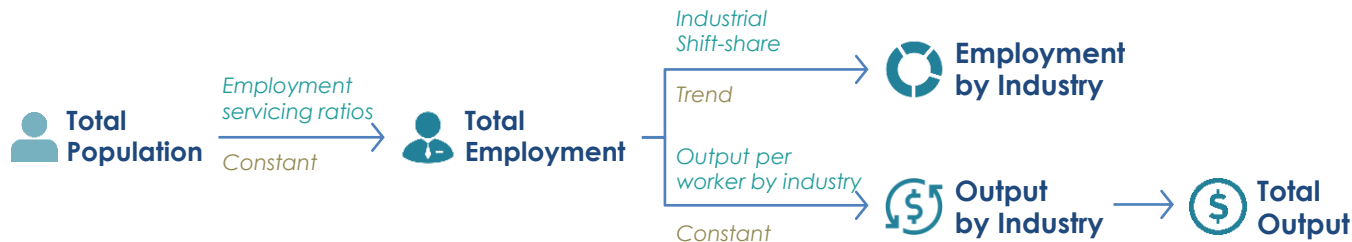
The BAU scenario establishes a baseline on the growth of employment and output under unchanged economy / policy basis with unconstrained land supply. The BAU scenario describes a hypothetical trendline growth scenario.

Key assumptions for the BAU scenario include the following:

- Accept VIF 2018 as the basis for population growth during the forecast period;
- Adopt the current employment servicing ratios (i.e. the ratios of workers by place of work to residents within an area) for all LGAs within the Southern Region as at Census 2016 and hold these ratios constant during the forecast period;
- Adopt the current relative shares of employment by industry for all LGAs within the Southern Region and assume historic industrial shift-share remains on trend during the forecast period;
- Adopt the current output by worker by industry for all LGAs within the Southern Region and hold them constant during the forecast period.

Chart 1 illustrates the computational approach for the BAU scenario.

Chart 1_Computational Approach, BAU



2_Scenarios & Assumptions

2.2_Scenarios

Scenario 1 (A&B)

This scenario assumes the rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops by 2031, reflecting the exhaustion of zoned vacant industrial / commercial land stocks. It allows for some recycling of existing zoned industrial land reflecting recent trends, with no net transfer of industrial employment to other SSIPs within the Southern Region or elsewhere.

Industrial employment is identified as employment in industries which are the main consumers of industrial / commercial land stocks in the context of the Southern Region particularly the Greater Dandenong LGA and the Southern SSIP. These industries include the following:

- Manufacturing,
- Wholesale Trade, and
- Transport, Postal and Warehousing.

The *Stage 1 report* indicates that employment in Manufacturing and Wholesale Trade in Greater Dandenong and the overall Southern Region has been declining during the past two intercensal periods between 2006 and 2016. This means the net land requirement from these industries has been declining accordingly despite some recycling of existing zoned industrial / commercial land. Meanwhile, employment in Transport Postal and Warehousing in Greater Dandenong and the overall Southern Region has seen continuous increase during the same period, implying the Transport Postal and Warehousing sector is the major consumer of zoned vacant industrial land in the area.

Under this circumstance, two sub-scenarios have been assumed to model the likely growth of industrial employment and requirement for industrial / commercial land during the forecast period including:

- **Scenario 1A:** assumes employment in Manufacturing and Wholesale trade in Greater Dandenong continues to decline on trend whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031 reflecting no further growth in industrial employment due to the exhaustion of zoned vacant industrial / commercial land stocks in the Southern SSIP;
- **Scenario 1B:** assumes employment in Manufacturing and Wholesale trade in Greater Dandenong continues to decline more aggressively after 2026-31 (assumed at 20% over trend for analysing purposes) whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031 reflecting exacerbate negative impacts on growth in industrial employment due to the exhaustion of zoned vacant industrial / commercial land stocks in the Southern SSIP.

Other key assumptions for Scenario 1 include the following:

- Assume no net transfer of employment to other LGAs and/or SSIPs during the forecast period;
- For employment in other industries than those three identified above, assume trend growth during the forecast period, meaning adoption of all assumptions from the BAU;
- Adopt the current output by worker by industry for all LGAs within the Southern Region and hold them constant during the forecast period.

2_Scenarios & Assumptions

2.2_Scenarios

Scenario 1 (Cont.)

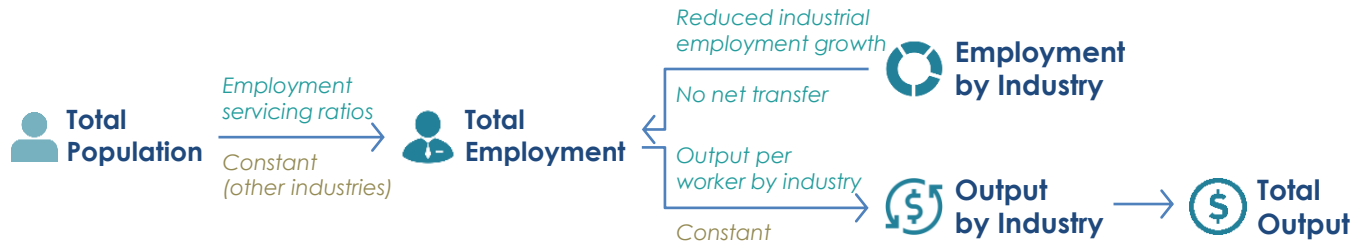
Based on these assumptions, the convention of holding a number of ratios constant as in the BAU for those three industrial / commercial land related industries in Greater Dandenong and the overall Southern Region would no longer exist, including:

- The employment servicing ratios in those three industries in Greater Dandenong and the overall Southern Region would be changed;
- The relative shares of industries in Greater Dandenong and the overall Southern Region would be changed;
- The total output per worker in Greater Dandenong and the overall Southern Region would be changed.

As this scenario assumes no net transfer of employment to other LGAs and/or SSIPs, there would be less employment growth in Greater Dandenong and the overall Southern Region compared to the BAU.

Chart 2 illustrates the computational methodology for Scenario 1.

Chart 2_Computational Approach, Scenario 1



2_Scenarios & Assumptions

2.2_Scenarios

Scenario 2

This scenario assumes the rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops by 2031 reflecting the exhaustion of zoned vacant industrial / commercial land stocks. It allows for some recycling of existing zoned industrial land. However at least 50% of lost industrial employment growth within the Southern SSIP is created within the Officer/Pakenham and Hastings SSIPs, partly offsetting this impact on total employment.

This scenario builds on Scenario 1B whilst assuming some net transfer of industrial employment to other SSIPs where industrial / commercial land is available.

The *Stage 1 report* reveals the following implications in relation to possible demand transfer patterns:

- There is limited available land supply for future uses / development in the Southern SSIP as well as the wider Dandenong LGA together with other industrial precincts outside of the SSIPs in Frankston and Kingston where industries with large land use requirement might need to relocate elsewhere with sufficient vacant land supply;
- There appears to be sufficient land supply in the Officer-Pakenham SSIP and the Port of Hastings SSIP as well as other industrial precincts outside of the SSIPs in Casey LGA, Cardinia LGA and Mornington LGA which appear to have capacity to accommodate the demand transfer from the established precincts with tightening land supply;
- Demand transfer is likely to occur firstly at the closest industrial areas such as Cranbourne West (noting that approximately 133 ha of available zoned industrial land is currently proposed to be rezoned by the City of Casey for residential purposes under Casey Planning Scheme Amendment C219) and then progressively to Officer-Pakenham SSIP where future industrial land supply is relatively abundant;

- Land in the Port of Hastings SSIP is primarily reserved for port related uses according to current planning policies, meaning the practical accessibility and developability of vacant industrial land for general industrial uses within the Port of Hastings SSIP may be limited.

This indicates the Officer-Pakenham SSIP appears to have significant capacity to accommodate possible demand transfer from the Southern SSIP and other established precincts with tightening land supply, whilst the Port of Hastings SSIP has limited capacity to pick up this demand transfer. Demand transfer may also occur outside of SSIPs in other industrial precincts which is close to the established areas.

There may also be demand transfer towards the other regions in the Melbourne Metropolitan area such as the Northern Region and the Western Regions where vacant and proposed industrial land is more sufficient.

The modelling focuses on the three SSIPs (represented by their corresponding LGAs) within the Southern Region with the Officer-Pakenham SSIP presenting greater capacity to accommodate possible future demand transfer whilst limited demand transfer to be picked up by the Port of Hastings SSIP. Any possible demand transfer to outside of the Southern Region is assumed to be lost within the Region.

Key assumptions for Scenario 2 include the following:

- Employment in Manufacturing and Wholesale trade in Greater Dandenong continues to decline more aggressively at 20% less than trend after 2026-31 for analysing purposes;
- Growth in employment in Transport Postal and Warehousing in Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031 reflecting no further growth in industrial employment due to the exhaustion of zoned vacant industrial / commercial land stocks in the Southern SSIP;

2_Scenarios & Assumptions

2.2_Scenarios

Scenario 2 (Cont.)

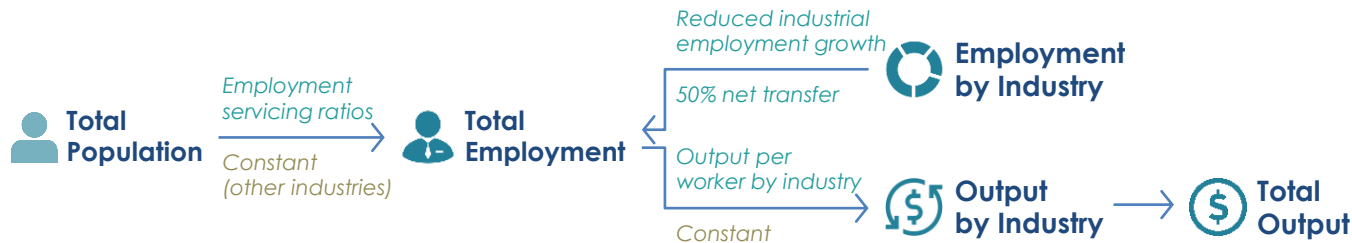
- Approximately 50% of the loss of the industrial employment growth transfers to Officer-Pakenham SSIP (Cardinia LGA) and Port of Hastings SSIP (Mornington Peninsula LGA), of which 90% is assumed to be picked up by Officer-Pakenham and 10% to be picked up by Hastings;
- For employment in other industries, assume trend growth during the forecast period, meaning adoption of all assumptions from the BAU;
- Adopt the current output by worker by industry for all LGAs within the Southern Region and hold them constant during the forecast period.

Based on these assumptions, there would be similar changes in employment servicing ratios, relative shares of industries and total output per worker in Greater Dandenong and the overall Southern Region as in Scenario 1.

With some level of net transfer of industrial employment assumed, Scenario2 would expect continuing slowdown of industrial employment growth in the Southern SSIP / Greater Dandenong LGA and acceleration of industrial employment growth in Officer-Pakenham SSIP / Cardinia LGA and Hastings SSIP / Mornington Peninsula LGA.

Chart 3 illustrates the computational methodology for Scenario 2.

Chart 3_Computational Approach, Scenario 2



2_Scenarios & Assumptions

2.3_Sensitivity Analysis

Methodology

All scenarios defined in Section 2.2 are based on unchanged output per worker ratios for each industry and for all LGAs within the Southern Region. This means the correlation between employment and economic output by industry is linear – when employment in a certain industry increases economic output from this industry also increases and when employment in another industry decreases economic output from that industry also decreases.

This does not reflect the reality where economic output is influenced by a variety of factors including not only labour but also capital, technology, productivity and other investment. This is particularly evident in manufacturing. With the investment of capital and improvement of technology, a significant proportion of labour intensive work can be replaced by automation. This leads to substantial increase in industry productivity whilst less employment is required.

However, due to the limitation of the model, only the impact of the labour factor is measured.

In order to simulate the possible influence of increased productivity, a sensitivity analysis is conducted for all scenarios defined. In the sensitivity analysis, historic GSP by industry and labour force by industry are used to derive output per worker ratios by industry which are used to reflect the change of productivity historically for each of the industries on State level. The historic trend of output per worker ratios by industry is adopted as a proximity to reflect the change of productivity of each industries in the six LGAs within the Southern Region.

With changing output per worker ratios, the linear correlation between employment and economic output will no longer exist. When employment in a certain industry increases / decreases, economic output from this industry may increase or decrease, no longer in line with employment.

Important Notes

Employment and output in the manufacturing sector is declining as a relative share of total employment and output within the Southern region. This coincides with continued declines in the relative demand for zoned broad hectare industrial land within manufacturing and wholesale trade as a share of total industrial floor space consumption.

This owes to an increased propensity and capacity for recycling of land and buildings to better accommodate the changing needs of these industries. The level of industrial land recycling is difficult to accurately measure and information about recycling is not reported consistently.

Conversely, freight, logistics, postal and warehousing now accounts for the largest relative share of broad hectare industrial land consumption, owing in large part to the growing average size of warehouses and related plant and machinery. Feedback from industrial property specialists, investors and tenants, particularly third-party logistics operators, suggests this trend is set to continue.

As floor space ratios involving population, employment and output are typically used as key variables in forecasting floor space demand across several sectors including industrial land, this highlights a potential issue.

The relationships between employment, output and floor space demand is constantly changing in the industrial sector, particularly in freight, logistics, postal and warehousing.

The impacts of automation / robotics and the emergence of dark stores is dramatically reducing employment requirements. In some cases, the change in industrial floor space demand is positive whilst FTE employment and the total relative share of output within freight, logistics and warehousing is negative.

It is therefore increasingly difficult to use ratios of employment and/or output as key variables in forecasting floor space demand, particularly in the case of logistics.

2_Scenarios & Assumptions

Impacts of Productivity Methodology

Sensitivity analysis considers changes of output per worker in each industry instead of holding them constant in order to simulate possible influence from improvement of productivity.

Statistics on GSP by industry and labour force by industry have been reviewed and used to derive historic output per worker for each industry on the State level basis. Output per worker for each industry changes over time, however the long-term growth in output per worker indicates the following characteristics:

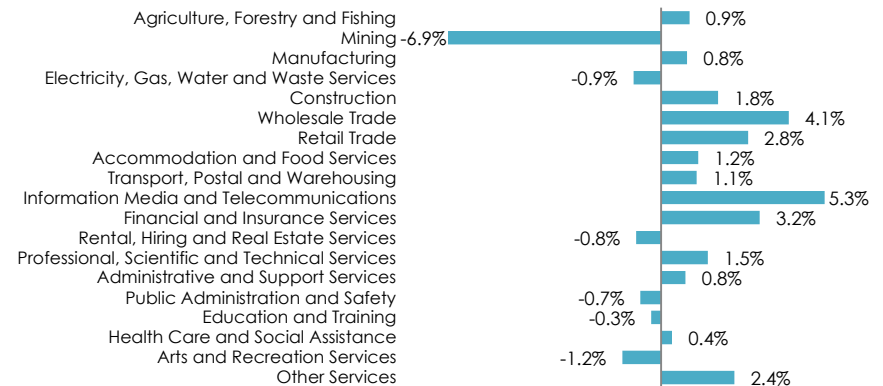
- There appears to be limited significant changes in output per worker in Manufacturing over the long term – albeit constant fluctuations year by year the long-term average growth is at approximately 0.8% p.a.;
- The long-term average growth in output per work in Wholesale Trade is 4.1% p.a. and that in Transport, Postal and Warehousing is 1.1% p.a. respectively;
- During the past 20 years, the most significant growth in output per worker was in Information Media and Telecommunications at 5.3% p.a., followed by Wholesale Trade (4.1% p.a.) and Financial and Insurance Services (3.2% p.a.);
- During the past 20 years, the least significant growth in output per worker was Mining (-6.9% p.a.), followed by Arts and Recreation Services (-1.2% p.a.) and Electricity, Gas, Water and Waste Services (-0.9% p.a.).

The long-term growth rates in output per worker by industry have been adopted to approximate possible changes in productivity during forecasting period. This assumption appears to be conservative considering increasingly fast advancement in technology and innovation in future.

It is also noted that due to fluctuations in output per worker over time, the modelling outcomes are likely to be impacted by the rates adopted.

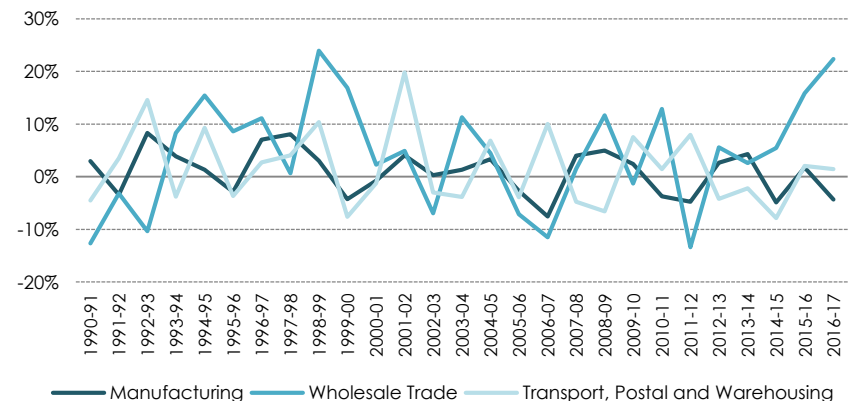
The modelling outputs of sensitivity analysis are contained in Section 3_Key Findings.

Chart 4_Long-term Growth of Output per Worker, VIC, 1996-2016



Source: ABS 5260, 6291

Chart 5_Industrial Output per Worker Growth, VIC, 1990-91 – 2016-17



Source: ABS 5260, 6291

2_Scenarios & Assumptions

2.4_Summary

A summary of all scenarios and their assumptions is presented in *Table 1*.

Table 1_Scenarios & Assumptions, All Scenarios

SCENARIO	DESCRIPTIONS	ASSUMPTIONS	SENSITIVITY ANALYSIS
BUSINESS AS USUAL (BAU)	Trend growth under an unchanged economy / policy basis with unconstrained land supply.	- Accept VIF 2018 as the basis of population growth during the forecast period; - Adopt the current employment servicing ratios for the six LGAs within the Southern Region as at Census 2016 and hold these ratios constant during the forecast period; - Adopt the current relative shares of employment by industry for the six LGAs and assume historic industrial shift-share remains on trend during the forecast period; - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	Adopt historic trend of output per worker by industry as a proxy to reflect the change of productivity of each industries in the six LGAs within the Southern Region.
SCENARIO 1	The rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops reflecting the exhaustion of zoned vacant industrial / commercial land stocks, with no net transfer of industrial employment to other LGA / SSIPs.	Scenario 1A: assumes employment in manufacturing and wholesale trade in Greater Dandenong continues to decline on trend whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031; Scenario 1B: assumes employment in manufacturing and wholesale trade in Greater Dandenong continues to decline more aggressively after 2026-31 (assuming at 20% less than trend for analysing purposes) whilst the growth of employment in Transport Postal and Warehousing in the same LGA slows down after 2026 and reduces to zero (0) after 2031; - Assume no net transfer of employment to other LGAs and/or SSIPs during the forecast period; - For employment in other industries, assume trend growth during the forecast period (refer to BAU); - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	
SCENARIO 2	The rate of growth in industrial employment within the Southern SSIP slows down after 2026 and eventually stops reflecting the exhaustion of zoned vacant industrial / commercial land stocks, with at least 50% of lost industrial employment growth within the Southern SSIP created within the Officer-Pakenham and Hastings SSIPs.	- Assume employment in manufacturing and wholesale trade in Greater Dandenong continues to decline more aggressively at 20% less than trend after 2026-31; - Assume the growth of employment in Transport Postal and Warehousing in Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031; - Assume 50% of the loss of industrial employment growth transfers to Officer-Pakenham SSIP (Cardinia LGA) and Port of Hastings SSIP (Mornington Peninsula LGA), among which 90% is assumed to be picked up by Officer-Pakenham and 10% by Hastings; - For employment in other industries, assume trend growth during the forecast period (refer to BAU); - Adopt the current output by worker by industry for the six LGAs and hold constant during the forecast period.	

3_Key Findings

3.1_Overview

The section presents the key findings of the likely implications for employment and output within the Southern Region reflecting three possible scenarios as outlined in *Section 2*.

The modelling outputs include the following for the forecast period from 2016 to 2046 for all six LGAs in the Southern Region:

- Total employment for each LGA and Southern Region;
- Employment by industry for each LGA and Southern Region;
- Total output for each LGA and Southern Region;
- Output by industry for each LGA and Southern Region; and
- Sensitivity analysis in relation to output reflecting possible changes of productive by industry.

Detailed model outputs are contained in the Annexure *A1_Scenario Model Summary*.

3_Key Findings

3.2_BAU

Employment Growth

The BAU scenario establishes a hypothetical trend line growth scenario under an unchanged economy / policy basis with unconstrained land supply.

VIF 2018 projects the total estimated resident population (ERP) within the Southern Region to reach 1.7 million by 2046 from 1.0 million in 2016. Assuming unchanged servicing ratios for each of the LGAs, it is projected the total employment will increase to **527,851 jobs** by 2046 within the Southern Region. This averages at approximately 1.6% annual growth rate during 2016-46, largely in line with the ERP average annual growth rate (AAGR) during the same period.

Total employment in the Greater Dandenong LGA is projected to increase to **139,425 jobs** by 2046, at an average growth rate of 1.5% p.a. Under an unchanged economy / policy basis with unconstrained land supply, the Greater Dandenong LGA is expected to largely maintain its employment share at approximately 26.4% out of total Southern Region at 2046.

Table 2 presents historic and forecast employment for each LGA in the Southern Region under the BAU scenario.

Table 2_Employment Growth, Southern Region by LGA, BAU

Employment (#) LGA	HISTORIC / CURRENT			CHANGE		FORECAST						CHANGE	
	2006	2011	2016	2006-16	AAGR	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	13,668	16,108	22,026	8,358	4.9%	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)	42,030	47,659	60,946	18,916	3.8%	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)	33,561	36,623	40,571	7,010	1.9%	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)	73,379	75,407	89,201	15,822	2.0%	97,046	104,439	111,641	119,842	128,784	139,425	50,224	1.5%
Kingston (C)	66,669	65,538	68,681	2,012	0.3%	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)	37,667	42,177	47,314	9,647	2.3%	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%
Southern Region	266,974	283,512	328,739	61,765	2.1%	364,164	397,381	430,077	462,007	494,124	527,851	199,112	1.6%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018

BAU

2016

2046

Change 2016-46

Southern Region



Total
Employment
(#)

328,739

527,851

+199,112
+1.6% p.a.

Greater Dandenong LGA



Total
Employment
(#)

89,201

139,425

+50,224
+1.5% p.a.

3_Key Findings

3.2_BAU

Employment by Industry

Historic employment by industry statistics indicate that total industrial employment has been declining within the Southern Region – employment in Manufacturing and Wholesale has declined significantly whilst employment in Transport, Postal and Warehousing has experienced some levels of increase. Manufacturing was the largest employing sector in the Southern Region representing approximately 25.4% of the total jobs within the region as at 2006. It has declined dramatically to 14.4% as at 2016. Wholesale Trade jobs declined from 7.5% in 2006 to 5.3% in 2016 whilst Transport, Postal and Warehousing jobs increased from 4.7% in 2006 to 4.8% in 2016. Other industries particularly the services sectors generally show employment growth.

Similar trend has also been observed in most LGAs within the Southern Region. This reflects the overall industrial structural transition from manufacturing to a services economy.

Based on historic industrial shift-share trends for each LGA, it is projected that the total industrial employment within the Southern Region will continue to decline during the forecast period, albeit some levels of growth in Transport, Postal and Warehousing. Total industrial employment is estimated at **72,963 jobs** by 2046, a decline of 7,523 jobs compared to 2016. The relative share of industrial employment out of total employment within the Southern Region is expected to decline from 24.5% at 2016 to 13.8% at 2046.

Similar to the wider Southern Region, the Greater Dandenong LGA is projected to experience continuing decline in the industrial employment to reach **33,532 jobs** by 2046, which is a decline of 2,568 jobs from 2016. The relative share of industrial employment out of total employment in Greater Dandenong is expected to decline from 40.5% at 2016 to 24.1% at 2046.

However, Greater Dandenong is still expected to maintain its significance in industrial employment in the Southern Region, accounting for approximately 46.0% of all industrial jobs within the region at 2046 (currently 44.9% as at 2016).

BAU

Southern Region

	2016	2046	Change 2016-46
 Industrial Employment (#)	80,486	72,963	-7,523 -0.3% p.a.
 Other Employment (#)	248,253	454,889	+206,636 +2.0%

Greater Dandenong LGA

	2016	2046	Change 2016-46
 Industrial Employment (#)	36,100	33,532	-2,568 -0.2% p.a.
 Other Employment (#)	53,101	105,893	+52,792 +2.3%

3_Key Findings

Table 3 presents historic and forecast employment by industry within the Southern Region with highlights on the three main industrial land related sectors.

Table 3_Employment by Industry, Southern Region, BAU

Employment by Industry (#)	HISTORIC / CURRENT			CHANGE		FORECAST						CHANGE	
Southern Region	2006	2011	2016	2006-16	AAGR	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Agriculture, Forestry and Fishing	3,543	3,413	4,776	1,233	3.0%	5,213	5,549	5,954	6,329	6,682	7,011	2,235	1.3%
Mining	373	374	529	156	3.6%	603	647	703	756	808	861	332	1.6%
Manufacturing	57,511	53,822	47,323	-10,188	-1.9%	41,401	36,857	33,239	31,825	31,262	31,143	-16,180	-1.4%
Electricity, Gas, Water and Waste Services	2,255	3,220	3,742	1,487	5.2%	4,248	4,731	5,060	5,392	5,736	6,117	2,375	1.7%
Construction	19,063	22,410	31,920	12,857	5.3%	38,042	44,592	51,000	56,270	61,442	66,614	34,694	2.5%
Wholesale Trade	20,104	20,542	17,345	-2,759	-1.5%	15,739	14,947	14,553	14,379	14,333	14,300	-3,045	-0.6%
Retail Trade	37,868	37,701	43,801	5,933	1.5%	49,446	54,402	59,163	63,757	68,197	72,732	28,931	1.7%
Accommodation and Food Services	14,378	15,884	21,328	6,950	4.0%	25,315	28,755	32,107	34,957	37,749	40,620	19,292	2.2%
Transport, Postal and Warehousing	12,429	12,631	15,818	3,389	2.4%	18,287	20,299	22,264	24,015	25,719	27,520	11,702	1.9%
Information Media and Telecommunications	2,429	2,337	2,738	309	1.2%	2,991	3,240	3,512	3,777	4,065	4,365	1,627	1.6%
Financial and Insurance Services	4,651	5,059	5,459	808	1.6%	5,979	6,663	7,330	8,002	8,761	9,651	4,192	1.9%
Rental, Hiring and Real Estate Services	4,030	4,330	5,189	1,159	2.6%	5,802	6,350	6,886	7,408	7,934	8,556	3,367	1.7%
Professional, Scientific and Technical Services	10,297	11,843	14,844	4,547	3.7%	17,502	19,810	21,821	23,687	25,527	27,511	12,667	2.1%
Administrative and Support Services	6,450	6,989	9,861	3,411	4.3%	11,886	13,579	15,000	16,419	17,867	19,427	9,566	2.3%
Public Administration and Safety	10,775	11,822	13,770	2,995	2.5%	15,262	16,639	17,969	19,354	20,720	22,184	8,414	1.6%
Education and Training	19,858	23,040	28,379	8,521	3.6%	33,453	38,064	42,448	46,646	50,543	54,536	26,157	2.2%
Health Care and Social Assistance	26,242	31,805	41,305	15,063	4.6%	49,152	55,672	61,880	67,415	72,754	78,229	36,924	2.2%
Arts and Recreation Services	3,349	3,879	5,565	2,216	5.2%	6,776	7,685	8,533	9,339	10,118	10,913	5,348	2.3%
Other Services	11,369	12,411	15,047	3,678	2.8%	17,068	18,900	20,655	22,279	23,906	25,561	10,514	1.8%
Southern Region	266,974	283,512	328,739	61,765	2.1%	364,164	397,381	430,077	462,007	494,124	527,851	199,112	1.6%

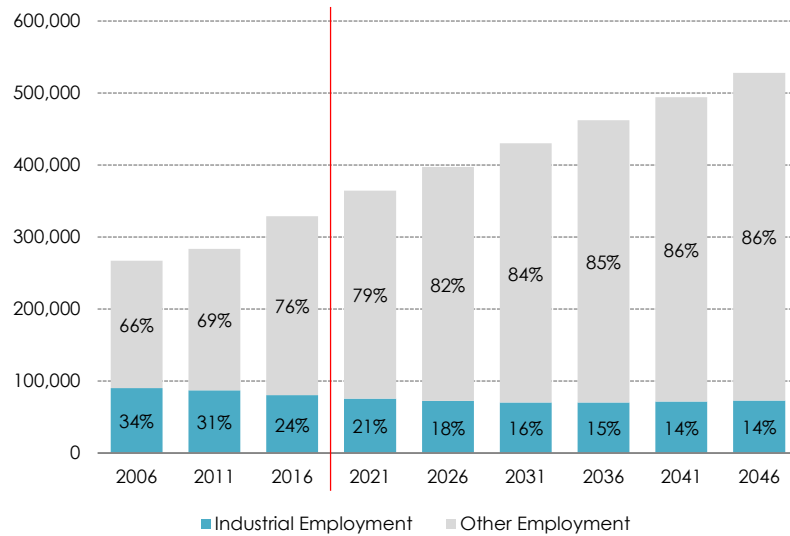
Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

BAU

Chart 4 illustrates historic and forecast employment within the Southern Region with relative share between industrial land related employment and other employment.

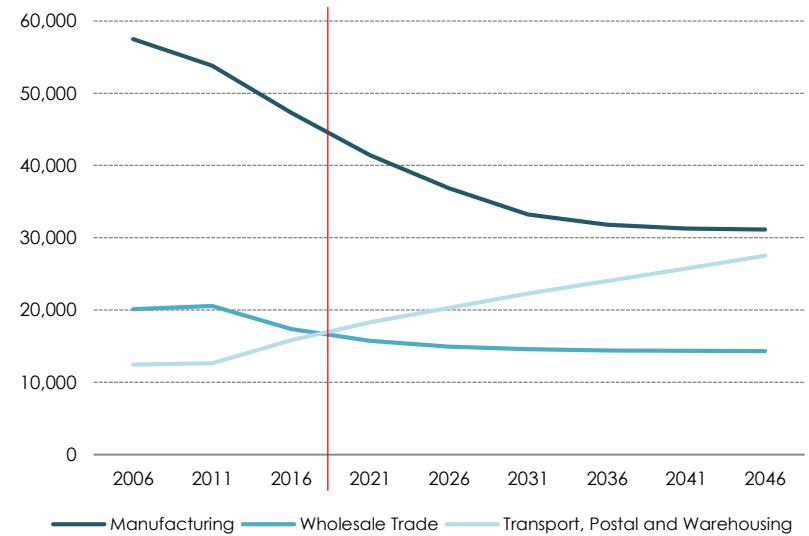
Chart 6_Employment Growth & Share, Southern Region, BAU



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 5 shows the historic and forecast numbers of employment in the three main industrial sectors.

Chart 7_Industrial Employment, Southern Region, BAU



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Table 4 presents historic and forecast employment by industrial employment and other employment for the six LGAs.

Table 4_Employment by Industry, Southern Region by LGA, BAU

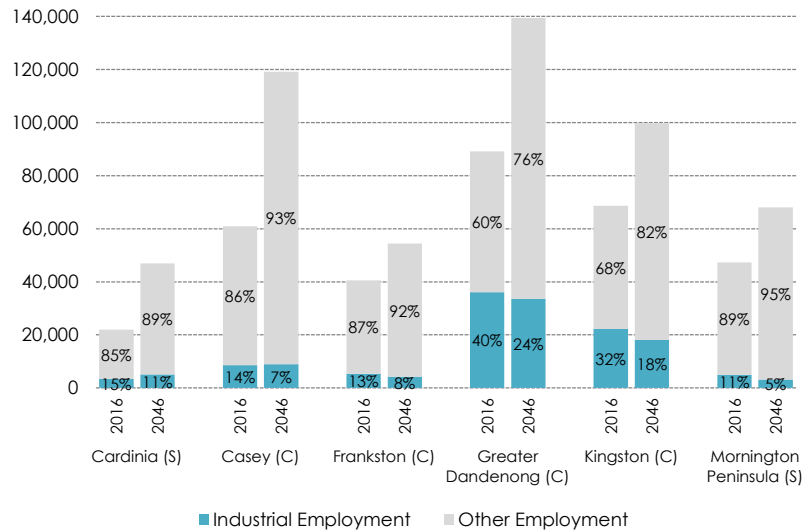
Employment by Industry (#)	HISTORIC / CURRENT			CHANGE		FORECAST						CHANGE	
	2006	2011	2016	2006-16	AAGR	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)													
Industrial	2,982	2,990	3,345	363	1.2%	3,816	4,228	4,548	4,770	4,950	5,076	1,731	1.4%
Other	10,686	13,118	18,681	7,995	5.7%	24,142	29,065	33,354	36,706	39,445	41,920	23,239	2.7%
Total Cardinia (S)	13,668	16,108	22,026	8,358	4.9%	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)													
Industrial	9,020	9,148	8,524	-496	-0.6%	8,342	8,270	8,402	8,552	8,711	8,881	357	0.1%
Other	33,010	38,511	52,422	19,412	4.7%	64,517	74,849	84,954	94,480	102,969	110,323	57,901	2.5%
Total Casey (C)	42,030	47,659	60,946	18,916	3.8%	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)													
Industrial	6,088	6,128	5,319	-769	-1.3%	4,630	4,427	4,269	4,132	4,169	4,216	-1,103	-0.8%
Other	27,473	30,495	35,252	7,779	2.5%	37,851	40,066	42,385	44,767	47,299	50,189	14,937	1.2%
Total Frankston (C)	33,561	36,623	40,571	7,010	1.9%	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)													
Industrial	36,591	35,907	36,100	-491	-0.1%	35,082	33,473	31,818	31,818	32,518	33,532	-2,568	-0.2%
Other	36,788	39,500	53,101	16,313	3.7%	61,964	70,966	79,823	88,024	96,266	105,893	52,792	2.3%
Total Greater Dandenong (C)	73,379	75,407	89,201	15,822	2.0%	97,046	104,439	111,641	119,842	128,784	139,425	50,224	1.5%
Kingston (C)													
Industrial	29,406	26,973	22,226	-7,180	-2.8%	19,409	18,110	17,755	17,759	17,833	18,163	-4,063	-0.7%
Other	37,263	38,565	46,455	9,192	2.2%	53,831	60,289	65,994	70,813	76,027	81,634	35,179	1.9%
Total Kingston (C)	66,669	65,538	68,681	2,012	0.3%	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)													
Industrial	5,957	5,849	4,972	-985	-1.8%	4,147	3,594	3,265	3,190	3,133	3,095	-1,877	-1.6%
Other	31,710	36,328	42,342	10,632	2.9%	46,431	50,043	53,510	56,996	60,803	64,929	22,587	1.4%
Total Mornington Peninsula (S)	37,667	42,177	47,314	9,647	2.3%	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%

Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing; 'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services
Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 6 illustrates employment in 2016 and 2046 for the six LGAs with relative share between industrial employment and other employment.

Chart 8_Employment Growth & Share, Southern Region by LGA, BAU



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.2_BAU

Total Output

The Southern Region totals approximately \$104,465 million output as at 2016. Assuming unchanged output per worker for each industry for each of the six LGAs, it is projected that the total output will reach **\$150,855 million** by 2046 within the Southern Region, which is at an average growth rate of 1.2% p.a. during 2016-46.

Total output within the Greater Dandenong LGA is forecast to increase to **\$47,339 million** by 2046, at an average growth rate of 0.9% p.a. during 2016-46. Greater Dandenong represents approximately 34.1% of the total output in the Southern Region and its share is expected to shrink slightly to 31.4% in 2046. This is largely attributed to the continuous decline of Manufacturing which is the major pillar industry in Greater Dandenong and the increasingly fast growth in the South-East Growth Corridors i.e. Cardinia and Casey.

Table 5 presents current and forecast output for each LGA in the Southern Region under the BAU scenario.

BAU

2016

2046

Change 2016-46

Southern Region



Total Output (\$M)

104,465

150,885

+46,390
+1.2% p.a.

Greater Dandenong LGA



Total Output (\$M)

35,662

47,339

+11,676
+0.9% p.a.

Table 5_Ouput Growth, Southern Region by LGA, BAU

Output (\$M)	CURRENT	FORECAST						CHANGE	
LGA	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	6,173	7,631	8,956	10,125	11,023	11,772	12,422	6,249	2.4%
Casey (C)	15,187	17,707	20,019	22,255	24,366	26,254	27,900	12,713	2.0%
Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)	35,662	36,781	37,961	39,223	41,358	44,020	47,339	11,676	0.9%
Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,295	18,457	19,726	5,742	1.2%
Southern Region	104,465	110,917	117,925	125,211	133,140	141,626	150,855	46,390	1.2%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.2_BAU

Output by Industry

Assuming unchanged output per worker by industry, the correlation between employment and economic output for each industry in each of the LGAs is linear.

With declining industrial employment projected, the industrial output is also expected to decrease during 2016-46. Total industrial output within the Southern Region is estimated at **\$32,133 million** in 2046, a decrease of 0.7% p.a. from 2016. The relative share of industrial output out of total output in the Southern Region is projected to shrink from 38.1% in 2016 to 21.3% in 2046.

Similarly, the industrial output within the Greater Dandenong LGA is forecast to decline with decreasing industrial employment, from \$20,278 million in 2016 to **\$15,785 million** in 2046. The relative share of industrial output out of total output in Greater Dandenong is expected to decline from 56.9% in 2016 to 33.3% in 2046.

However, Greater Dandenong is still expected to maintain its position in industrial output in the Southern Region, accounting for 49.1% of total industrial output within the region in 2046 (currently 51.0% as at 2016).

It is noted that the level of decline in industrial output is more significant than the level of decline in industrial employment within the region. This is largely because output per work in these industries particularly Manufacturing is higher than most of the other industries. Therefore, the negative impact on industrial output from the decline of industrial employment is likely to be greater than other industries.

BAU

Southern Region

	2016	2046	Change 2016-46
 Industrial Output (\$M)	39,796	32,133	-7,664 -0.7% p.a.
 Other Output (\$M)	64,669	118,722	+54,054 +2.0%

Greater Dandenong LGA

 Industrial Output (\$M)	20,278	15,785	-4,493 -0.8% p.a.
 Other Output (\$M)	15,385	31,554	+16,170 +2.4%

3_Key Findings

Table 6 presents current and forecast output by industry within the Southern Region with highlights on the three main industrial sectors.

Table 6_Ouput by Industry, Southern Region, BAU

Output by Industry (\$M)	CURRENT	FORECAST						CHANGE	
Southern Region	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Agriculture, Forestry and Fishing	2,164	2,355	2,508	2,694	2,863	3,020	3,163	999	1.3%
Mining	409	434	462	495	528	563	600	192	1.3%
Manufacturing	27,280	23,856	21,047	18,655	17,758	17,446	17,383	-9,896	-1.5%
Electricity, Gas, Water and Waste Services	2,058	2,318	2,568	2,747	2,923	3,103	3,299	1,241	1.6%
Construction	17,368	20,677	24,342	27,979	30,977	33,896	36,807	19,439	2.5%
Wholesale Trade	7,543	6,744	6,357	6,181	6,115	6,093	6,076	-1,468	-0.7%
Retail Trade	5,253	5,941	6,546	7,126	7,681	8,221	8,771	3,519	1.7%
Accommodation and Food Services	2,492	2,943	3,333	3,713	4,040	4,362	4,697	2,205	2.1%
Transport, Postal and Warehousing	4,973	5,741	6,375	6,997	7,551	8,094	8,673	3,700	1.9%
Information Media and Telecommunications	1,428	1,538	1,655	1,782	1,906	2,041	2,184	756	1.4%
Financial and Insurance Services	3,158	3,422	3,785	4,155	4,533	4,972	5,500	2,342	1.9%
Rental, Hiring and Real Estate Services	9,195	10,240	11,176	12,102	13,017	13,952	15,081	5,885	1.7%
Professional, Scientific and Technical Services	3,941	4,651	5,259	5,785	6,272	6,754	7,278	3,337	2.1%
Administrative and Support Services	2,536	3,049	3,478	3,836	4,197	4,567	4,971	2,435	2.3%
Public Administration and Safety	3,093	3,408	3,699	3,980	4,274	4,567	4,884	1,792	1.5%
Education and Training	3,103	3,625	4,106	4,567	5,010	5,425	5,856	2,753	2.1%
Health Care and Social Assistance	5,042	5,989	6,774	7,521	8,187	8,832	9,497	4,454	2.1%
Arts and Recreation Services	1,177	1,431	1,622	1,799	1,968	2,131	2,298	1,121	2.3%
Other Services	2,251	2,554	2,832	3,096	3,340	3,585	3,836	1,585	1.8%
Southern Region	104,465	110,917	117,925	125,211	133,140	141,626	150,855	46,390	1.2%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, VIF 2018, MacroPlan Dimasi

3_Key Findings

Table 7 presents current and forecast output by industrial output and other output for the six LGAs.

Table 7_Output by Industry, Southern Region by LGA, BAU

Output by Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)									
Industrial	1,223	1,392	1,535	1,646	1,724	1,788	1,833	610	1.4%
Other	4,950	6,239	7,421	8,479	9,299	9,983	10,589	5,638	2.6%
Total Cardinia (S)	6,173	7,631	8,956	10,125	11,023	11,772	12,422	6,249	2.4%
Casey (C)									
Industrial	2,917	2,802	2,755	2,782	2,812	2,845	2,886	-30	0.0%
Other	12,270	14,905	17,264	19,473	21,554	23,410	25,014	12,743	2.4%
Total Casey (C)	15,187	17,707	20,019	22,255	24,366	26,254	27,900	12,713	2.0%
Frankston (C)									
Industrial	2,722	2,301	2,186	2,091	2,004	2,008	2,015	-707	-1.0%
Other	9,156	10,021	10,720	11,388	12,052	12,781	13,611	4,454	1.3%
Total Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)									
Industrial	20,278	18,981	17,370	15,743	15,361	15,485	15,785	-4,493	-0.8%
Other	15,385	17,799	20,591	23,479	25,997	28,536	31,554	16,170	2.4%
Total Greater Dandenong (C)	35,662	36,781	37,961	39,223	41,358	44,020	47,339	11,676	0.9%
Kingston (C)									
Industrial	10,202	8,822	8,175	7,980	7,962	7,973	8,092	-2,110	-0.8%
Other	11,378	13,050	14,548	15,905	17,078	18,360	19,750	8,373	1.9%
Total Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)									
Industrial	2,455	2,043	1,759	1,591	1,561	1,535	1,521	-934	-1.6%
Other	11,529	12,561	13,601	14,654	15,734	16,922	18,205	6,676	1.5%
Total Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,295	18,457	19,726	5,742	1.2%

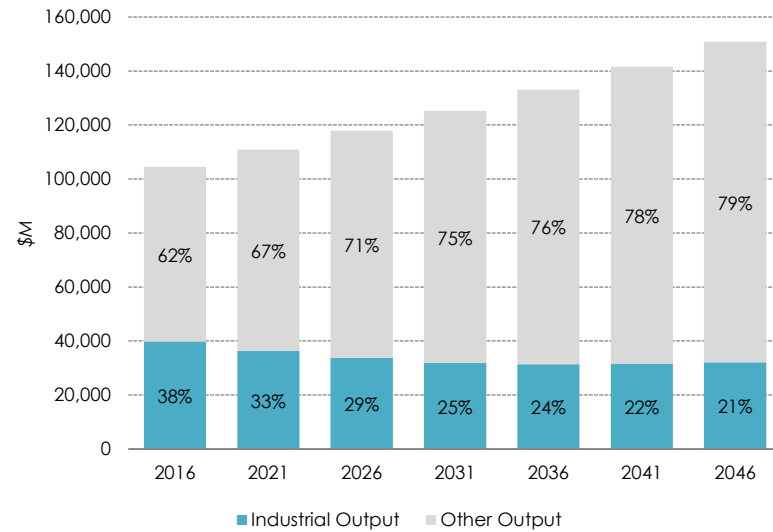
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
 'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 7 illustrates current and forecast output within the Southern Region with relative share between industrial output and other output.

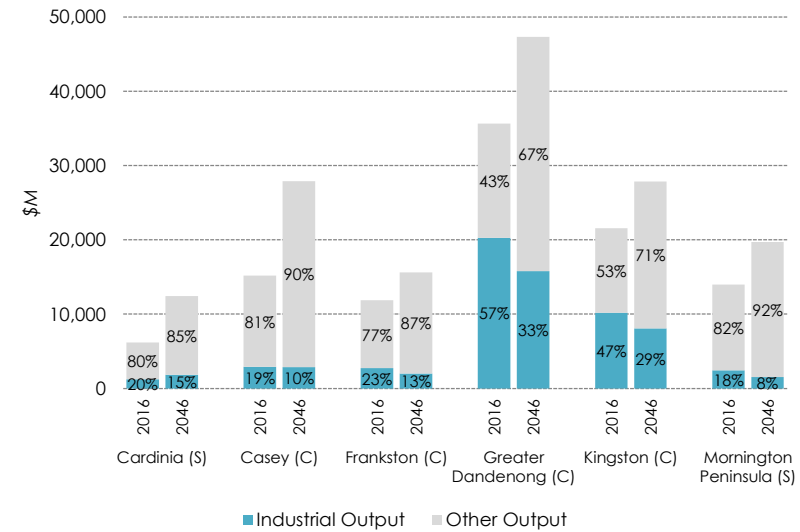
Chart 9_Output Growth & Share, Southern Region, BAU



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 8 illustrates output in 2016 and 2046 for the six LGAs with relative share between industrial output and other output.

Chart 10_Output Growth & Share, Southern Region by LGA, BAU



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.2_BAU

Sensitivity Analysis

The adjacent infographics presents the summary of the modelling outcomes in the sensitivity analysis.

With the increasing productivity in Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing, the industrial output in the Southern Region is projected to increase to **\$54,403 million** by 2046, an average growth of 1.0% p.a. from 2016, albeit continuous decline in industrial employment. Together with growth in other industries, the total output in the Southern Region is estimated to reach **\$234,186 million** by 2046. The average annual growth rate is 2.7% p.a. during 2016-46, which is largely consistent with Victoria's current GSP growth (3.3% during 2016-17).

However, with continuing employment growth and greater productivity growth (particularly in Information Media and Telecommunications and Financial and Insurance Services), the output growth in other industries is more significant than that of the industrial sectors.

Similarly, in the Greater Dandenong LGA, with increasing productivity, the industrial output is forecast to grow to **\$26,247 million** by 2046 and the total output in Greater Dandenong is expected to reach **\$74,908 million**. Greater Dandenong is expected to represent approximately 48.2% of the industrial output within the Southern Region and 32.0% of the total output within the Southern Region in 2046.

<u>BAU – Sensitivity</u>	2016	2046	Change 2016-46
<u>Southern Region</u>			
 Industrial Output (\$M)	39,796	54,403	+14,606 +1.0% p.a.
 Other Output (\$M)	64,669	179,784	+115,115 +3.5%
 <u>Total Output (\$M)</u>	<u>104,465</u>	<u>234,186</u>	<u>+129,721</u> <u>+2.7%</u>
<u>Greater Dandenong LGA</u>			
 Industrial Output (\$M)	20,278	26,247	+5,969 +0.9% p.a.
 Other Output (\$M)	15,385	48,661	+33,277 +3.9%
 <u>Total Output (\$M)</u>	<u>35,662</u>	<u>74,908</u>	<u>+39,246</u> <u>+2.5%</u>

3_Key Findings

Table 8 presents the sensitivity analysis on output by industrial output and other output for the Southern Region and the six LGAs reflecting changing productivity for each industry under the BAU scenario.

Table 8_Output by Industry, Southern Region by LGA, BAU – Sensitivity

Output by Industry (#)	CURRENT	FORECAST						CHANGE	
	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	39,134	39,406	40,562	43,883	48,571	54,403	14,606	1.0%
Other	64,669	78,744	94,449	112,104	131,252	153,391	179,784	115,115	3.5%
Total Southern Region	104,465	117,879	133,854	152,666	175,135	201,962	234,186	129,721	2.7%
Cardinia (S)									
Industrial	1,223	1,497	1,793	2,106	2,433	2,805	3,224	2,001	3.3%
Other	4,950	6,605	8,363	10,212	12,015	13,903	15,958	11,008	4.0%
Total Cardinia (S)	6,173	8,102	10,155	12,317	14,448	16,708	19,182	13,009	3.9%
Casey (C)									
Industrial	2,917	3,066	3,318	3,702	4,148	4,670	5,304	2,387	2.0%
Other	12,270	15,812	19,553	23,669	28,276	33,344	38,924	26,653	3.9%
Total Casey (C)	15,187	18,879	22,871	27,371	32,423	38,014	44,227	29,041	3.6%
Frankston (C)									
Industrial	2,722	2,456	2,487	2,532	2,580	2,762	2,963	242	0.3%
Other	9,156	10,510	11,851	13,326	15,011	17,040	19,534	10,377	2.6%
Total Frankston (C)	11,878	12,967	14,338	15,858	17,590	19,802	22,497	10,619	2.2%
Greater Dandenong (C)									
Industrial	20,278	20,322	20,084	19,879	21,214	23,436	26,247	5,969	0.9%
Other	15,385	18,821	23,204	28,429	33,955	40,431	48,661	33,277	3.9%
Total Greater Dandenong (C)	35,662	39,144	43,288	48,308	55,169	63,867	74,908	39,246	2.5%
Kingston (C)									
Industrial	10,202	9,620	9,731	10,416	11,476	12,742	14,350	4,148	1.1%
Other	11,378	13,893	16,579	19,509	22,667	26,518	31,219	19,841	3.4%
Total Kingston (C)	21,580	23,513	26,310	29,925	34,143	39,260	45,569	23,989	2.5%
Mornington Peninsula (S)									
Industrial	2,455	2,172	1,993	1,927	2,032	2,156	2,315	-141	-0.2%
Other	11,529	13,102	14,899	16,959	19,329	22,155	25,489	13,960	2.7%
Total Mornington Peninsula (S)	13,984	15,274	16,892	18,887	21,361	24,312	27,803	13,819	2.3%

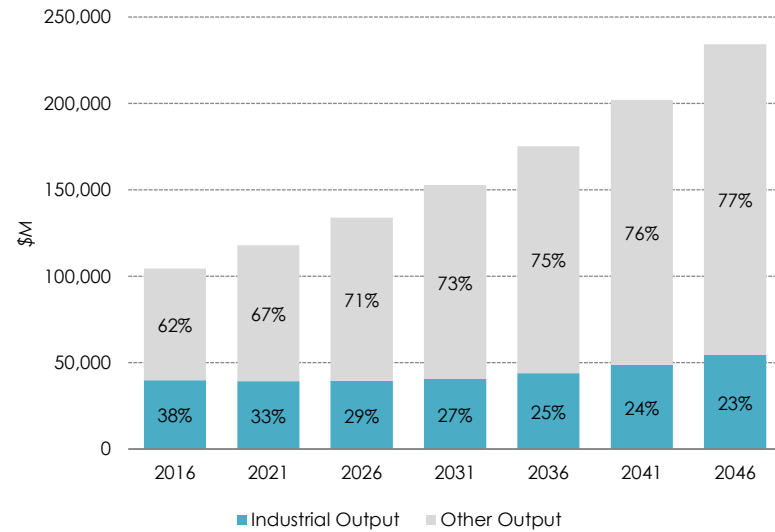
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing; 'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 11 illustrates the sensitivity analysis on output within the Southern Region with relative share between industrial output and other output.

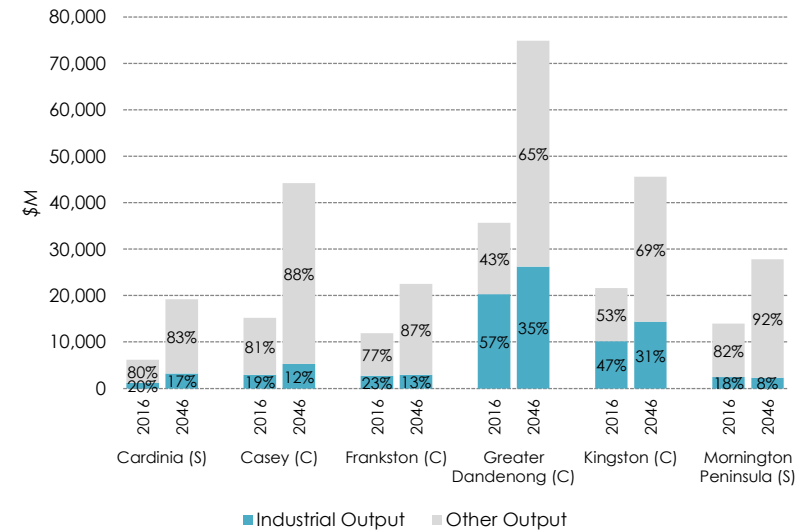
Chart 11_Output Growth & Share, Southern Region, BAU – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 12 illustrates the sensitivity analysis on output for the six LGAs with relative share between industrial output and other output.

Chart 12_Output Growth & Share, Southern Region by LGA, BAU – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.3_Scenario 1A

Employment Growth

Scenario 1A assumes the rate of employment growth in Transport Postal and Warehousing within Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031 whilst employment in Manufacturing and Wholesale Trade continues to decline on trend, reflecting the exhaustion of zoned vacant industrial / commercial land stocks at current consumption rate, with no net transfer of industrial employment to other LGA / SSIPs.

Scenario 1A forecasts a total of **524,182 jobs** in the Southern Region and **135,755 jobs** in Greater Dandenong by 2046. With the potential exhaustion of zoned vacant industrial / commercial land stock and slowdown of industrial employment in Greater Dandenong, there will be 3,670 less industrial jobs projected compared to the BAU scenario in the LGA by 2046. Greater Dandenong's relative share of the overall Southern Region in terms of total employment is expected to shrink slightly to 25.9% by 2046, compared to 26.4% in the BAU scenario and the current level of 27.5% at 2016.

Table 9 presents current and forecast employment for each LGA in the Southern Region under Scenario 1A.

Table 9_Employment Growth, Southern Region by LGA, Scenario 1A

Employment (#) LGA	CURRENT	FORECAST						CHANGE	
	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	22,026	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)	89,201	97,046	104,439	111,029	118,191	126,178	135,755	46,554	1.4%
Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)	47,314	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%
Southern Region	328,739	364,164	397,381	429,465	460,356	491,518	524,182	195,443	1.6%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018

Scenario 1A

2016

2046

Change 2016-46

Southern Region



Total
Employment
(#)

328,739

524,182

+195,443
+1.6% p.a.

Greater Dandenong LGA



Total
Employment
(#)

89,201

135,755

+46,554
+1.4% p.a.

3_Key Findings

1A

3.3_Scenario 1A

Employment by Industry

With zoned vacant industrial / commercial land in the SouthernSSIP theoretically exhausted during 2026-31, the number of industrial employment in Greater Dandenong is expected to decline more significantly compared to the BAU scenario. This results in a total of **69,293 industrial jobs** projected in the Southern Region and **29,862 industrial jobs** in the Greater Dandenong LGA by 2046. This is a decline of 11,193 jobs in the Southern Region and 6,238 jobs in Greater Dandenong respectively from 2016.

Within the wider Southern Region, the relative share of industrial employment of total employment is forecast to drop from 24.5% at 2016 to 13.2% by 2046, compared to 13.8% in the BAU scenario. The relative share of industrial employment in Greater Dandenong is forecast to fall from 40.5% at 2016 to 22.0% by 2046, compared to 24.1% in the BAU scenario.

Greater Dandenong's relative share of the overall Southern Region in terms of industrial employment is also expected to drop, representing 43.1% of total industrial jobs in the region as forecast in 2046, compared to 46.0% in the BAU scenario, shrinking from the current level of 44.9% as at 2016.

Scenario 1A		2016	2046	Change 2016-46
<u>Southern Region</u>				
	Industrial Employment (#)	80,486	69,293	-11,193 -0.5% p.a.
	Other Employment (#)	248,253	454,889	+206,636 +2.0%
<u>Greater Dandenong LGA</u>				
	Industrial Employment (#)	36,100	29,862	-6,238 -0.6% p.a.
	Other Employment (#)	53,101	105,893	+52,792 +2.3%

3_Key Findings

Table 10 presents current and forecast employment by industrial employment and other employment for the Southern Region and six LGAs.

Table 10_Employment by Industry, Southern Region by LGA, Scenario 1A

Employment by Industry (#)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	80,486	75,427	72,102	69,351	68,288	68,709	69,293	-11,193	-0.5%
Other	248,253	288,736	325,278	360,115	392,067	422,809	454,889	206,636	2.0%
Total Southern Region	328,739	364,164	397,381	429,465	460,356	491,518	524,182	195,443	1.6%
Cardinia (S)									
Industrial	3,345	3,816	4,228	4,548	4,562	4,950	5,076	1,731	1.4%
Other	18,681	24,142	29,065	33,354	36,914	39,445	41,920	23,239	2.7%
Total Cardinia (S)	22,026	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)									
Industrial	8,524	8,342	8,270	8,309	8,449	8,711	8,881	357	0.1%
Other	52,422	64,517	74,849	85,048	94,583	102,969	110,323	57,901	2.5%
Total Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)									
Industrial	5,319	4,630	4,427	4,269	4,132	4,169	4,216	-1,103	-0.8%
Other	35,252	37,851	40,066	42,385	44,767	47,299	50,189	14,937	1.2%
Total Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)									
Industrial	36,100	35,082	33,473	31,205	30,167	29,912	29,862	-6,238	-0.6%
Other	53,101	61,964	70,966	79,823	88,024	96,266	105,893	52,792	2.3%
Total Greater Dandenong (C)	89,201	97,046	104,439	111,029	118,191	126,178	135,755	46,554	1.4%
Kingston (C)									
Industrial	22,226	19,409	18,110	17,755	17,759	17,833	18,163	-4,063	-0.7%
Other	46,455	53,831	60,289	65,994	70,813	76,027	81,634	35,179	1.9%
Total Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)									
Industrial	4,972	4,147	3,594	3,265	3,220	3,133	3,095	-1,877	-1.6%
Other	42,342	46,431	50,043	53,510	56,966	60,803	64,929	22,587	1.4%
Total Mornington Peninsula (S)	47,314	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%

Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

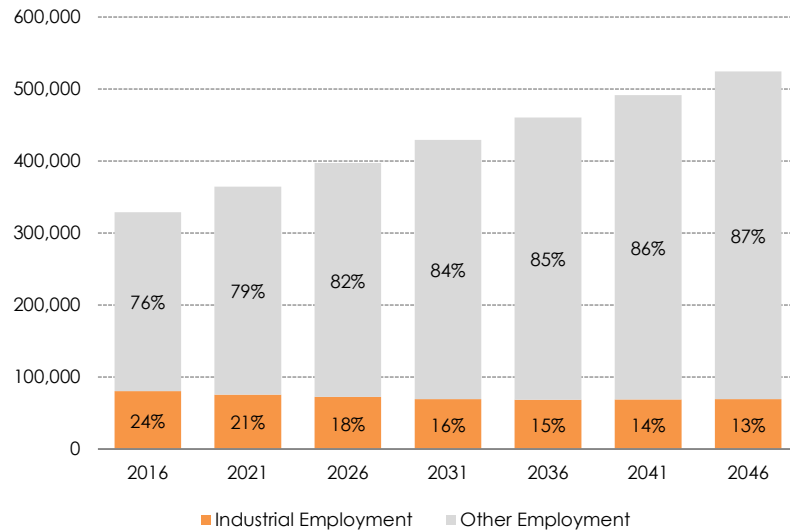
Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1A

Chart 13 illustrates current and forecast employment within the Southern Region with relative share between industrial employment and other employment.

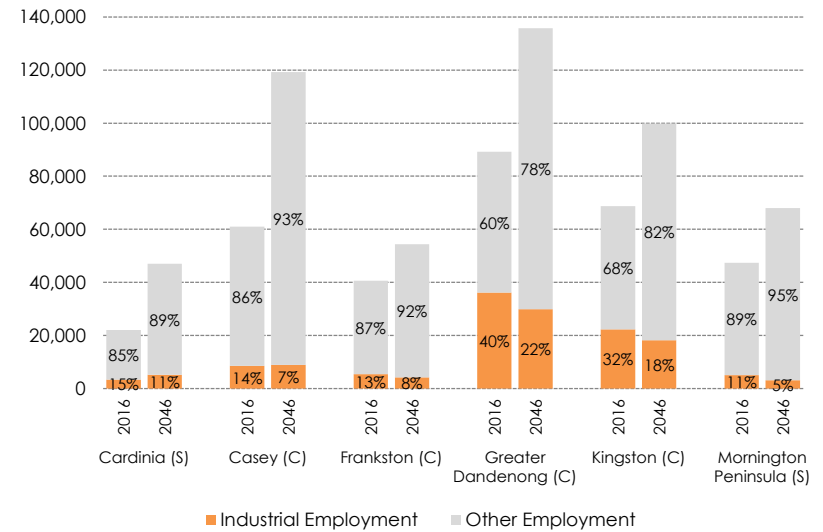
Chart 13_Employment Growth & Share, Southern Region, Scenario 1A



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 14 illustrates employment in 2016 and 2046 for the six LGAs with relative share between industrial employment and other employment.

Chart 14_Employment Growth & Share, Southern Region by LGA, Scenario 1A



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.3_Scenario 1A

Total Output

Assuming unchanged output per worker for each industry for each of the six LGAs, the total output within the Southern Region is estimated to be approximately **\$149,715 million** at 2046 and the total output within Greater Dandenong is estimated to be **\$46,199 million** at 2046. This is about \$1,140 million less than projected in the BAU scenario due to the slowdown in industrial employment in Greater Dandenong.

Greater Dandenong's relative share of the overall Southern Region in terms of total output is expected to drop slightly to 30.7% by 2046, compared to 31.4% in the BAU scenario and the current level of 34.1% at 2016.

Table 11 presents current and forecast output for each LGA in the Southern Region for Scenario 1A.

Scenario 1A

2016

2046

Change 2016-46

Southern Region



Total Output (\$M)

104,465

149,715

+45,250
+1.2% p.a.

Greater Dandenong LGA



Total Output (\$M)

35,662

46,199

+10,536
+0.9% p.a.

Table 11_Ouput Growth, Southern Region by LGA, Scenario 1A

Output (\$M)	CURRENT	FORECAST						CHANGE	
LGA	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	6,173	7,631	8,958	10,129	10,972	11,772	12,422	6,249	2.4%
Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)	35,662	36,781	37,961	39,033	40,845	43,211	46,199	10,536	0.9%
Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,301	18,457	19,726	5,742	1.2%
Southern Region	104,465	110,917	117,927	125,004	132,566	140,816	149,715	45,250	1.2%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.3_Scenario 1A

Output by Industry

Scenario 1A also forecasts up to **\$30,993 million** of industrial output for the Southern Region and **\$14,645 million** of industrial output for Greater Dandenong in 2046. This is approximately 20.7% and 31.7% of the total output of the region and the LGA respectively, both slightly lower than the BAU scenario.

Greater Dandenong's relative share of the Southern Region in terms of industrial output is also forecast to reduce in this scenario with the decrease of industrial employment, at 47.3% in 2046 compared to 49.1% in the BAU scenario and the current level of 51.0% at 2016.

<u>Scenario 1A</u>		2016	2046	Change 2016-46
<u>Southern Region</u>				
	Industrial Output (\$M)	39,796	30,993	-8,804 -0.8% p.a.
	Other Output (\$M)	64,669	118,722	+54,054 +2.0%
<u>Greater Dandenong LGA</u>				
	Industrial Output (\$M)	20,278	14,645	-5,633 -1.1% p.a.
	Other Output (\$M)	15,385	31,554	+16,170 +2.4%

3_Key Findings

Table 12 presents current and forecast output by industrial output and other output for the Southern Region and six LGAs.

Table 12_Output by Industry, Southern Region by LGA, Scenario 1A

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	36,341	33,779	31,610	30,806	30,824	30,993	-8,804	-0.8%
Other	64,669	74,576	84,148	93,394	101,761	109,992	118,722	54,054	2.0%
Total Southern Region	104,465	110,917	117,927	125,004	132,566	140,816	149,715	45,250	1.2%
Cardinia (S)									
Industrial	1,223	1,392	1,535	1,646	1,641	1,788	1,833	610	1.4%
Other	4,950	6,239	7,423	8,483	9,331	9,983	10,589	5,638	2.6%
Total Cardinia (S)	6,173	7,631	8,958	10,129	10,972	11,772	12,422	6,249	2.4%
Casey (C)									
Industrial	2,917	2,802	2,755	2,749	2,780	2,845	2,886	-30	0.0%
Other	12,270	14,905	17,264	19,485	21,571	23,410	25,014	12,743	2.4%
Total Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)									
Industrial	2,722	2,301	2,186	2,091	2,004	2,008	2,015	-707	-1.0%
Other	9,156	10,021	10,720	11,388	12,052	12,781	13,611	4,454	1.3%
Total Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)									
Industrial	20,278	18,981	17,370	15,553	14,848	14,675	14,645	-5,633	-1.1%
Other	15,385	17,799	20,591	23,479	25,997	28,536	31,554	16,170	2.4%
Total Greater Dandenong (C)	35,662	36,781	37,961	39,033	40,845	43,211	46,199	10,536	0.9%
Kingston (C)									
Industrial	10,202	8,822	8,175	7,980	7,962	7,973	8,092	-2,110	-0.8%
Other	11,378	13,050	14,548	15,905	17,078	18,360	19,750	8,373	1.9%
Total Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)									
Industrial	2,455	2,043	1,759	1,591	1,570	1,535	1,521	-934	-1.6%
Other	11,529	12,561	13,601	14,654	15,730	16,922	18,205	6,676	1.5%
Total Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,301	18,457	19,726	5,742	1.2%

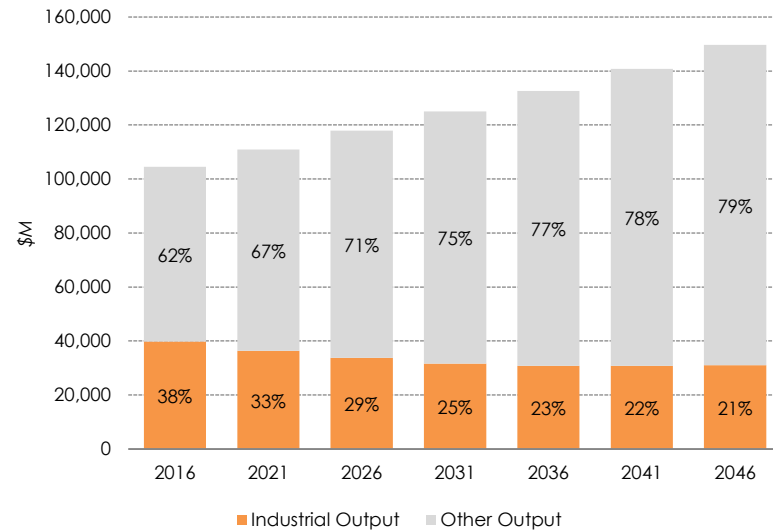
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 15 illustrates current and forecast output within the Southern Region with relative share between industrial output and other output.

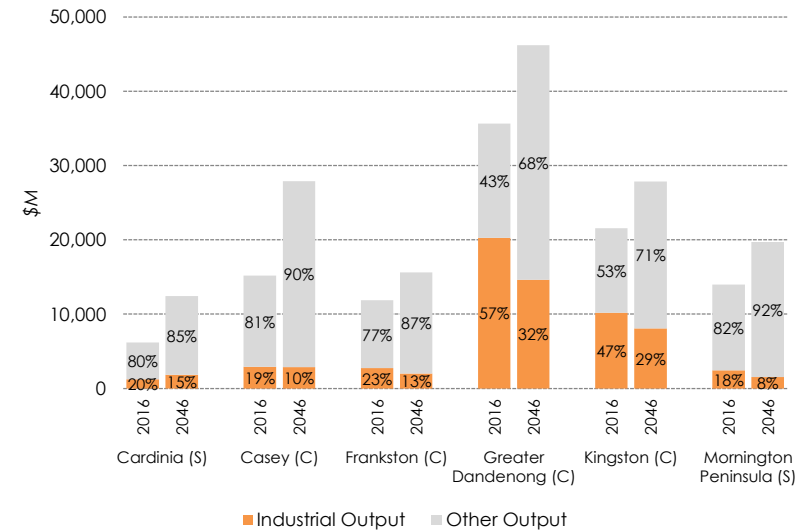
Chart 15_Output Growth & Share, Southern Region, Scenario 1A



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 16 illustrates output in 2016 and 2046 for the six LGAs with relative share between industrial output and other output.

Chart 16_Output Growth & Share, Southern Region by LGA, Scenario 1A



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1A

3.3_Scenario 1A

Sensitivity Analysis

The sensitivity analysis for Scenario 1A adopts the same assumptions in relation to the changes of output per worker for each industry and each LGA.

With improvement in industrial productivities, the industrial output in the Southern Region is forecast to increase to **\$52,820 million** by 2046 and the total output in the region is estimated to reach **\$232,604 million** by 2046.

For the Greater Dandenong LGA, the industrial output is projected to grow to **\$24,664 million** by 2046 and the total output is expected to reach **\$73,325 million** by 2046. This represents approximately 46.7% of the total industrial output within the Southern Region and 31.5% of the total output within the Southern Region at 2046.

<u>1A – Sensitivity</u>	2016	2046	Change 2016-46
<u>Southern Region</u>			
 Industrial Output (\$M)	39,796	52,820	+13,024 +0.9% p.a.
 Other Output (\$M)	64,669	179,784	+115,115 +3.5%
 Total Output (\$M)	<u>104,465</u>	<u>232,604</u>	<u>+128,139</u> <u>+2.7%</u>
<u>Greater Dandenong LGA</u>			
 Industrial Output (\$M)	20,278	24,664	+4,386 +0.7% p.a.
 Other Output (\$M)	15,385	48,661	+33,277 +3.9%
 Total Output (\$M)	<u>35,662</u>	<u>73,325</u>	<u>+37,663</u> <u>+2.4%</u>

3_Key Findings

Table 13 presents the sensitivity analysis on output by industrial output and other output for the Southern Region and the six LGAs reflecting changing productivity for each industry under Scenario 1A.

Table 13_Output by Industry, Southern Region by LGA, 1A – Sensitivity

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	39,134	39,406	40,300	43,120	47,507	52,820	13,024	0.9%
Other	64,669	78,744	94,456	112,145	131,355	153,391	179,784	115,115	3.5%
Total Southern Region	104,465	117,879	133,862	152,445	174,475	200,898	232,604	128,139	2.7%
Cardinia (S)									
Industrial	1,223	1,497	1,793	2,106	2,336	2,805	3,224	2,001	3.3%
Other	4,950	6,605	8,370	10,234	12,092	13,903	15,958	11,008	4.0%
Total Cardinia (S)	6,173	8,102	10,163	12,340	14,428	16,708	19,182	13,009	3.9%
Casey (C)									
Industrial	2,917	3,066	3,318	3,664	4,109	4,670	5,304	2,387	2.0%
Other	12,270	15,812	19,553	23,687	28,306	33,344	38,924	26,653	3.9%
Total Casey (C)	15,187	18,879	22,871	27,352	32,415	38,014	44,227	29,041	3.6%
Frankston (C)									
Industrial	2,722	2,456	2,487	2,532	2,580	2,762	2,963	242	0.3%
Other	9,156	10,510	11,851	13,326	15,011	17,040	19,534	10,377	2.6%
Total Frankston (C)	11,878	12,967	14,338	15,858	17,590	19,802	22,497	10,619	2.2%
Greater Dandenong (C)									
Industrial	20,278	20,322	20,084	19,655	20,576	22,372	24,664	4,386	0.7%
Other	15,385	18,821	23,204	28,429	33,955	40,431	48,661	33,277	3.9%
Total Greater Dandenong (C)	35,662	39,144	43,288	48,084	54,530	62,803	73,325	37,663	2.4%
Kingston (C)									
Industrial	10,202	9,620	9,731	10,416	11,476	12,742	14,350	4,148	1.1%
Other	11,378	13,893	16,579	19,509	22,667	26,518	31,219	19,841	3.4%
Total Kingston (C)	21,580	23,513	26,310	29,925	34,143	39,260	45,569	23,989	2.5%
Mornington Peninsula (S)									
Industrial	2,455	2,172	1,993	1,927	2,043	2,156	2,315	-141	-0.2%
Other	11,529	13,102	14,899	16,959	19,325	22,155	25,489	13,960	2.7%
Total Mornington Peninsula (S)	13,984	15,274	16,892	18,887	21,368	24,312	27,803	13,819	2.3%

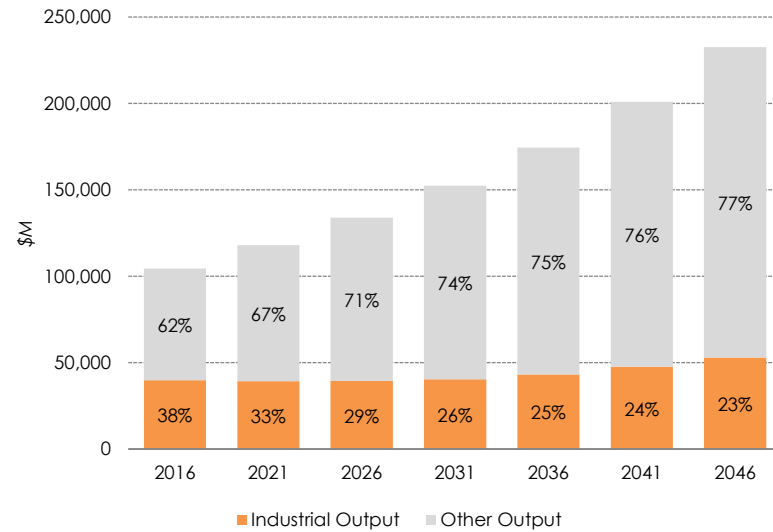
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 17 illustrates the sensitivity analysis on output within the Southern Region with relative share between industrial output and other output.

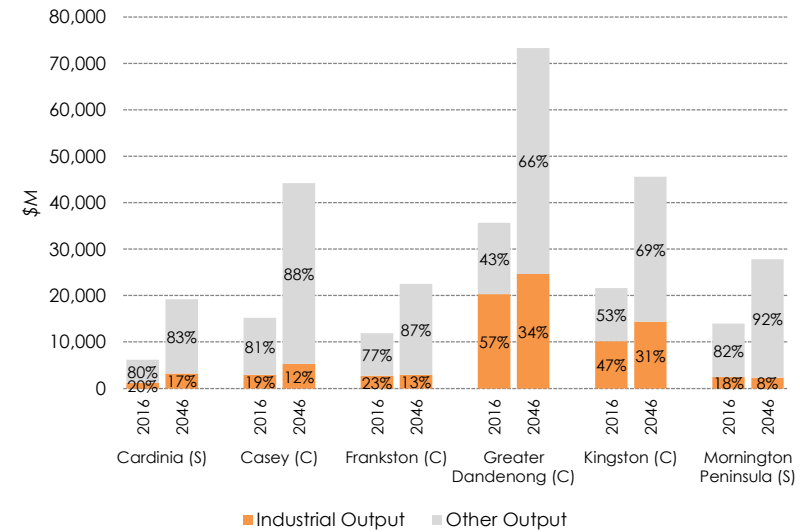
Chart 17_Output Growth & Share, Southern Region, 1A – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 18 illustrates the sensitivity analysis on output for the six LGAs with relative share between industrial output and other output.

Chart 18_Output Growth & Share, Southern Region by LGA, 1A – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1B

3.4_Scenario 1B

Employment Growth

Scenario 1B assume the rate of employment growth in Transport Postal and Warehousing within Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031 whilst employment in Manufacturing and Wholesale Trade continues to decline more aggressively, reflecting the exhaustion of zoned vacant industrial / commercial land stocks at current consumption rate, with no net transfer of industrial employment to other LGA / SSIPs.

Under this assumption, Scenario 1B forecasts further decline in industrial employment in Greater Dandenong as well as the wider Southern Region during the forecasting period. By 2046, there is estimated to be a total of **520,264 jobs** in the Southern Region, of which **131,837 jobs** (or 25.3%) in Greater Dandenong. This is 3,918 less jobs compared to Scenario 1A and 7,588 less jobs compared to the BAU scenario for both the Southern Region and Greater Dandenong.

Table 14 presents current and forecast employment for each LGA in the Southern Region under Scenario 1B.

Table 14_Employment Growth, Southern Region by LGA, Scenario 1B

Employment (#) LGA	CURRENT	FORECAST						CHANGE	
	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	22,026	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)	89,201	97,046	104,439	108,935	114,212	122,250	131,837	42,636	1.3%
Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)	47,314	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%
Southern Region	328,739	364,164	397,381	427,372	456,377	487,590	520,264	191,525	1.5%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018

Scenario 1B

2016

2046

Change 2016-46

Southern Region



Total
Employment
(#)

328,739

520,264

+191,525
+1.5% p.a.

Greater Dandenong LGA



Total
Employment
(#)

89,201

131,837

+42,636
+1.3% p.a.

3_Key Findings

3.4_Scenario 1B

Employment by Industry

The industrial employment in the Southern Region under Scenario 1B is forecast at **65,375 jobs** by 2046. This accounts for 12.6% of total employment in the Southern Region – lower compared to both the BAU scenario and Scenario 1A.

The industrial employment in Greater Dandenong is projected to decline to **25,944 jobs** by 2046, or 19.7% of total employment in the LGA. Greater Dandenong's relative share of the overall Southern Region in terms of industrial employment is estimated at 39.7% in 2046 under Scenario 1B. This is a further drop compared to 43.1% in Scenario 1A, 46.0% in the BAU scenario and the current level of 44.9% at 2016.

<u>Scenario 1B</u>		2016	2046	Change 2016-46
<u>Southern Region</u>				
	Industrial Employment (#)	80,486	65,375	-15,111 -0.7% p.a.
	Other Employment (#)	248,253	454,889	+206,636 +2.0%
<u>Greater Dandenong LGA</u>				
	Industrial Employment (#)	36,100	25,944	-10,156 -1.1% p.a.
	Other Employment (#)	53,101	105,893	+52,792 +2.3%

3_Key Findings

Table 15 presents current and forecast employment by industrial employment and other employment for the Southern Region and six LGAs.

Table 15_Employment by Industry, Southern Region by LGA, Scenario 1B

Employment by Industry (#)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	80,486	75,427	72,102	67,257	64,309	64,781	65,375	-15,111	-0.7%
Other	248,253	288,736	325,278	360,115	392,067	422,809	454,889	206,636	2.0%
Total Southern Region	328,739	364,164	397,381	427,372	456,377	487,590	520,264	191,525	1.5%
Cardinia (S)									
Industrial	3,345	3,816	4,228	4,548	4,562	4,950	5,076	1,731	1.4%
Other	18,681	24,142	29,065	33,354	36,914	39,445	41,920	23,239	2.7%
Total Cardinia (S)	22,026	27,959	33,293	37,902	41,476	44,395	46,996	24,970	2.6%
Casey (C)									
Industrial	8,524	8,342	8,270	8,309	8,449	8,711	8,881	357	0.1%
Other	52,422	64,517	74,849	85,048	94,583	102,969	110,323	57,901	2.5%
Total Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)									
Industrial	5,319	4,630	4,427	4,269	4,132	4,169	4,216	-1,103	-0.8%
Other	35,252	37,851	40,066	42,385	44,767	47,299	50,189	14,937	1.2%
Total Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)									
Industrial	36,100	35,082	33,473	29,112	26,188	25,984	25,944	-10,156	-1.1%
Other	53,101	61,964	70,966	79,823	88,024	96,266	105,893	52,792	2.3%
Total Greater Dandenong (C)	89,201	97,046	104,439	108,935	114,212	122,250	131,837	42,636	1.3%
Kingston (C)									
Industrial	22,226	19,409	18,110	17,755	17,759	17,833	18,163	-4,063	-0.7%
Other	46,455	53,831	60,289	65,994	70,813	76,027	81,634	35,179	1.9%
Total Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)									
Industrial	4,972	4,147	3,594	3,265	3,220	3,133	3,095	-1,877	-1.6%
Other	42,342	46,431	50,043	53,510	56,966	60,803	64,929	22,587	1.4%
Total Mornington Peninsula (S)	47,314	50,578	53,637	56,775	60,186	63,936	68,024	20,710	1.2%

Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

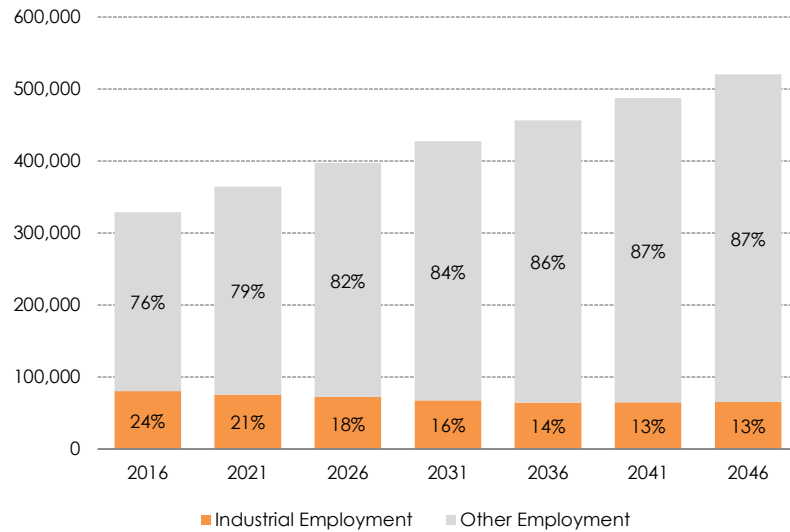
Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1B

Chart 19 illustrates current and forecast employment within the Southern Region with relative share between industrial employment and other employment.

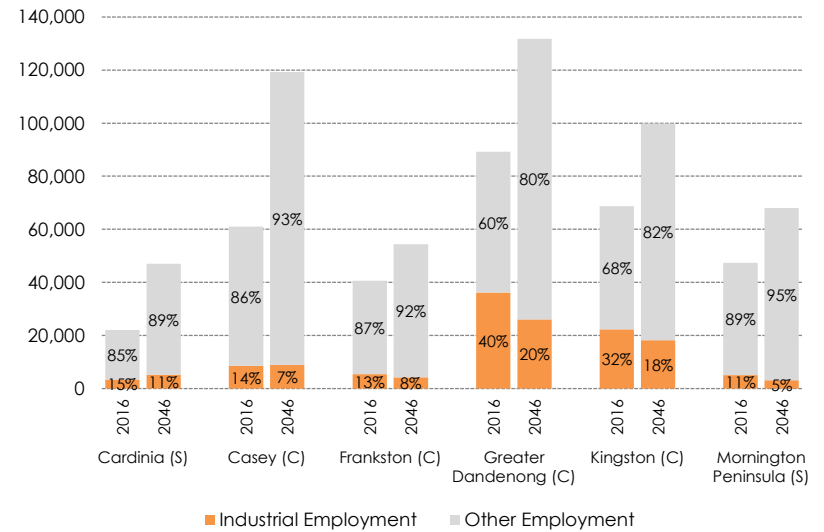
Chart 19_Employment Growth & Share, Southern Region, Scenario 1B



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 20 illustrates employment in 2016 and 2046 for the six LGAs with relative share between industrial employment and other employment.

Chart 20_Employment Growth & Share, Southern Region by LGA, Scenario 1B



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1B

3.4_Scenario 1B

Total Output

Total output within the Southern Region under Scenario 1B is estimated at **\$147,424 million** at 2046 and total output within Greater Dandenong is estimated at **\$43,908 million** at 2046. This is \$2,291 million less compared to Scenario 1A and \$3,431 million less compared to the BAU scenario for both the Southern Region and Greater Dandenong.

Greater Dandenong's relative share of the overall Southern Region in terms of total output is estimated at 29.8% in 2046, which is a further decline compared to 30.7% in Scenario 1A, 31.4% in the BAU scenario and the current level of 34.1% at 2016.

Table 16 presents current and forecast output for each LGA in the Southern Region for Scenario 1B.

Scenario 1B

2016

2046

Change 2016-46

Southern Region



Total Output (\$M)

104,465

147,424

+42,959
+1.2% p.a.

Greater Dandenong LGA



Total Output (\$M)

35,662

43,908

+8,246
+0.7% p.a.

Table 16_Ouput Growth, Southern Region by LGA, Scenario 1B

Output (\$M)	CURRENT	FORECAST						CHANGE	
LGA	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	6,173	7,631	8,958	10,129	10,972	11,772	12,422	6,249	2.4%
Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)	35,662	36,781	37,961	37,796	38,514	40,914	43,908	8,246	0.7%
Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,301	18,457	19,726	5,742	1.2%
Southern Region	104,465	110,917	117,927	123,768	130,235	138,519	147,424	42,959	1.2%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.4_Scenario 1B

Output by Industry

With further decline in industrial employment, Scenario 1B also forecasts further reduction in industrial output. It is estimated the industrial output within the Southern Region will decrease to **\$28,702 million** by 2046 and the industrial output within Greater Dandenong will decrease to **\$12,354 million** in the same years, representing 19.5% and 28.1% of total output within the region and the LGA respectively.

Greater Dandenong's relative share of the Southern Region in terms of industrial output is also forecast to reduce in this scenario at 43.0% in 2046 compared to 47.3% in Scenario 1A, 49.1% in the BAU scenario and the current level of 51.0% at 2016.

<u>Scenario 1B</u>	2016	2046	Change 2016-46
<u>Southern Region</u>			
 Industrial Output (\$M)	39,796	28,702	-11,095 -1.1% p.a.
 Other Output (\$M)	64,669	118,722	+54,054 +2.0%
<u>Greater Dandenong LGA</u>			
 Industrial Output (\$M)	20,278	12,354	-7,924 -1.6% p.a.
 Other Output (\$M)	15,385	31,554	+16,170 +2.4%

3_Key Findings

Table 17 presents current and forecast output by industrial output and other output for the Southern Region and six LGAs.

Table 17_Output by Industry, Southern Region by LGA, Scenario 1B

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	36,341	33,779	30,374	28,474	28,527	28,702	-11,095	-1.1%
Other	64,669	74,576	84,148	93,394	101,761	109,992	118,722	54,054	2.0%
Total Southern Region	104,465	110,917	117,927	123,768	130,235	138,519	147,424	42,959	1.2%
Cardinia (S)									
Industrial	1,223	1,392	1,535	1,646	1,641	1,788	1,833	610	1.4%
Other	4,950	6,239	7,423	8,483	9,331	9,983	10,589	5,638	2.6%
Total Cardinia (S)	6,173	7,631	8,958	10,129	10,972	11,772	12,422	6,249	2.4%
Casey (C)									
Industrial	2,917	2,802	2,755	2,749	2,780	2,845	2,886	-30	0.0%
Other	12,270	14,905	17,264	19,485	21,571	23,410	25,014	12,743	2.4%
Total Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)									
Industrial	2,722	2,301	2,186	2,091	2,004	2,008	2,015	-707	-1.0%
Other	9,156	10,021	10,720	11,388	12,052	12,781	13,611	4,454	1.3%
Total Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)									
Industrial	20,278	18,981	17,370	14,317	12,517	12,378	12,354	-7,924	-1.6%
Other	15,385	17,799	20,591	23,479	25,997	28,536	31,554	16,170	2.4%
Total Greater Dandenong (C)	35,662	36,781	37,961	37,796	38,514	40,914	43,908	8,246	0.7%
Kingston (C)									
Industrial	10,202	8,822	8,175	7,980	7,962	7,973	8,092	-2,110	-0.8%
Other	11,378	13,050	14,548	15,905	17,078	18,360	19,750	8,373	1.9%
Total Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)									
Industrial	2,455	2,043	1,759	1,591	1,570	1,535	1,521	-934	-1.6%
Other	11,529	12,561	13,601	14,654	15,730	16,922	18,205	6,676	1.5%
Total Mornington Peninsula (S)	13,984	14,604	15,359	16,245	17,301	18,457	19,726	5,742	1.2%

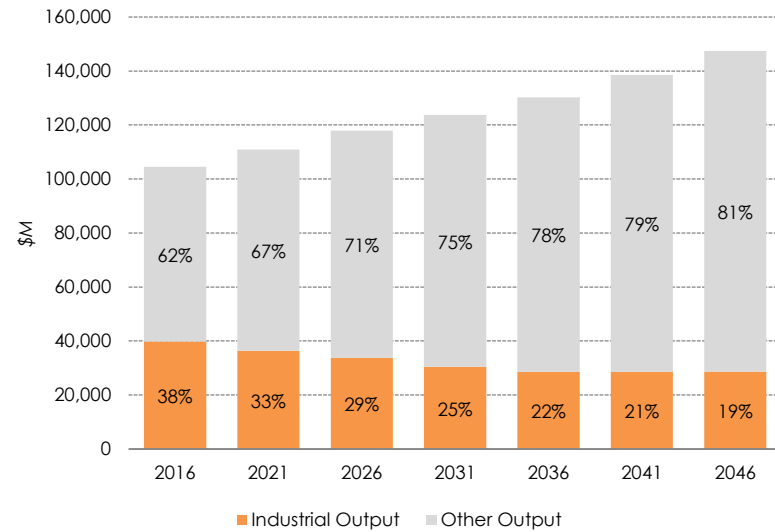
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 21 illustrates current and forecast output within the Southern Region with relative share between industrial output and other output.

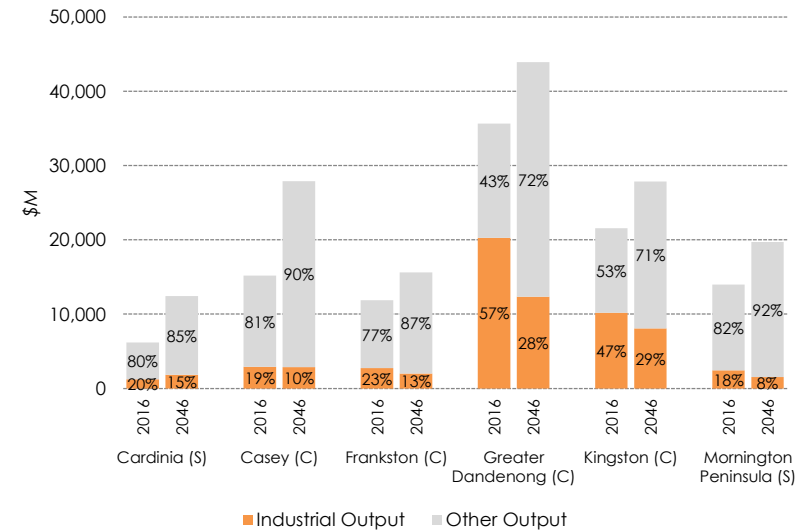
Chart 21_Output Growth & Share, Southern Region, Scenario 1B



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 22 illustrates output in 2016 and 2046 for the six LGAs with relative share between industrial output and other output.

Chart 22_Output Growth & Share, Southern Region by LGA, Scenario 1B



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1B

3.4_Scenario 1B

Sensitivity Analysis

The sensitivity analysis reflecting changes of productivity under Scenario 1B indicates that the industrial output in the Southern Region is projected to increase to **\$48,773 million** by 2046 and the total output in the region will reach **\$228,557 million** in the same year.

The industrial output in Greater Dandenong is forecast at **\$20,617 million** in 2046 and the total output in the LGA is projected at **\$69,279 million** in the same year. This represents approximately 42.3% of the total industrial output within the Southern Region and 30.3% of the total output within the Southern Region at 2046.

<u>1B – Sensitivity</u>	2016	2046	Change 2016-46
<u>Southern Region</u>			
 Industrial Output (\$M)	39,796	48,773	+8,977 +0.7% p.a.
 Other Output (\$M)	64,669	179,784	+115,115 +3.5%
 Total Output (\$M)	<u>104,465</u>	<u>228,557</u>	<u>+124,092</u> +2.6%
<u>Greater Dandenong LGA</u>			
 Industrial Output (\$M)	20,278	20,617	+340 +0.1% p.a.
 Other Output (\$M)	15,385	48,661	+33,277 +3.9%
 Total Output (\$M)	<u>35,662</u>	<u>69,279</u>	<u>+33,616</u> +2.2%

3_Key Findings

1B

Table 18 presents the sensitivity analysis on output by industrial output and other output for the Southern Region and the six LGAs reflecting changing productivity for each industry under Scenario 1B.

Table 18_Output by Industry, Southern Region by LGA, 1B – Sensitivity

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	39,134	39,406	38,711	39,799	43,872	48,773	8,977	0.7%
Other	64,669	78,744	94,456	112,145	131,355	153,391	179,784	115,115	3.5%
Total Southern Region	104,465	117,879	133,862	150,855	171,154	197,263	228,557	124,092	2.6%
Cardinia (S)									
Industrial	1,223	1,497	1,793	2,106	2,336	2,805	3,224	2,001	3.3%
Other	4,950	6,605	8,370	10,234	12,092	13,903	15,958	11,008	4.0%
Total Cardinia (S)	6,173	8,102	10,163	12,340	14,428	16,708	19,182	13,009	3.9%
Casey (C)									
Industrial	2,917	3,066	3,318	3,664	4,109	4,670	5,304	2,387	2.0%
Other	12,270	15,812	19,553	23,687	28,306	33,344	38,924	26,653	3.9%
Total Casey (C)	15,187	18,879	22,871	27,352	32,415	38,014	44,227	29,041	3.6%
Frankston (C)									
Industrial	2,722	2,456	2,487	2,532	2,580	2,762	2,963	242	0.3%
Other	9,156	10,510	11,851	13,326	15,011	17,040	19,534	10,377	2.6%
Total Frankston (C)	11,878	12,967	14,338	15,858	17,590	19,802	22,497	10,619	2.2%
Greater Dandenong (C)									
Industrial	20,278	20,322	20,084	18,066	17,255	18,736	20,617	340	0.1%
Other	15,385	18,821	23,204	28,429	33,955	40,431	48,661	33,277	3.9%
Total Greater Dandenong (C)	35,662	39,144	43,288	46,494	51,209	59,168	69,279	33,616	2.2%
Kingston (C)									
Industrial	10,202	9,620	9,731	10,416	11,476	12,742	14,350	4,148	1.1%
Other	11,378	13,893	16,579	19,509	22,667	26,518	31,219	19,841	3.4%
Total Kingston (C)	21,580	23,513	26,310	29,925	34,143	39,260	45,569	23,989	2.5%
Mornington Peninsula (S)									
Industrial	2,455	2,172	1,993	1,927	2,043	2,156	2,315	-141	-0.2%
Other	11,529	13,102	14,899	16,959	19,325	22,155	25,489	13,960	2.7%
Total Mornington Peninsula (S)	13,984	15,274	16,892	18,887	21,368	24,312	27,803	13,819	2.3%

Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

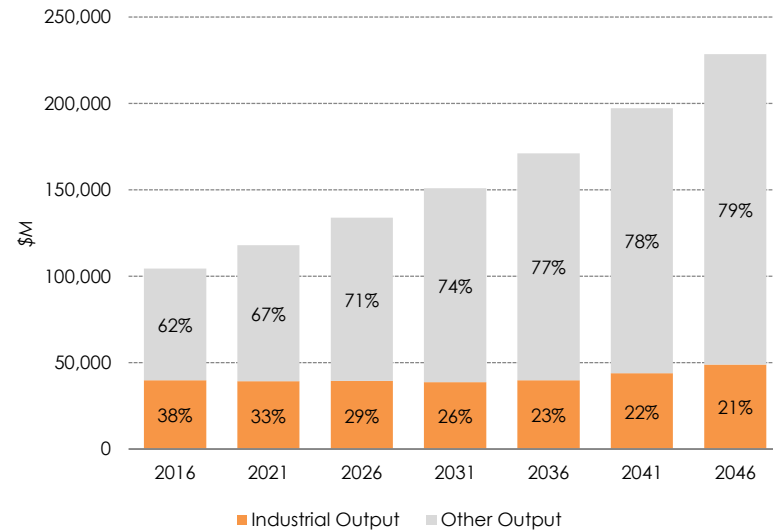
Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

1B

Chart 23 illustrates the sensitivity analysis on output within the Southern Region with relative share between industrial output and other output.

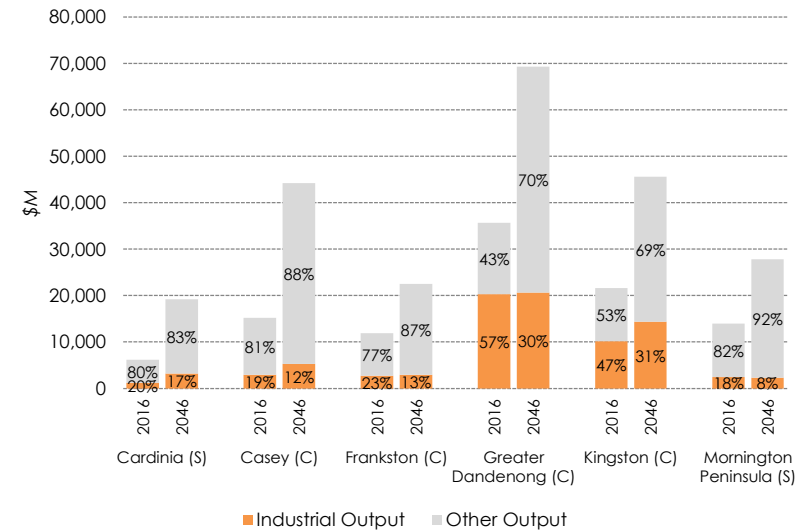
Chart 23_Output Growth & Share, Southern Region, 1B – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 24 illustrates the sensitivity analysis on output for the six LGAs with relative share between industrial output and other output.

Chart 24_Output Growth & Share, Southern Region by LGA, 1B – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.5_Scenario 2

Employment Growth

Scenario 2 builds on Scenario 1B, assuming the rate of employment growth in Transport Postal and Warehousing within Greater Dandenong slows down after 2026 and reduces to zero (0) after 2031 whilst employment in Manufacturing and Wholesale Trade continues to decline more aggressively, reflecting the exhaustion of zoned vacant industrial land stocks, with at least 50% of lost industrial employment growth within the Southern SSIP created within the Officer-Pakenham and Hastings SSIPs.

Under Scenario 2, the total employment in the Southern Region is forecast at **524,058 jobs** in 2046. Whilst the total employment projected in Greater Dandenong in Scenario 2 is the same as in Scenario 1B, Cardinia and Mornington Peninsula are expected to have more significant employment growth during the forecasting period compared to other scenarios, reflecting some levels of net demand transfer towards the Officer-Pakenham and Hastings SSIPs.

Table 19 presents current and forecast employment for each LGA in the Southern Region under Scenario 2.

Table 19_Employment Growth, Southern Region by LGA, Scenario 2

Employment (#) LGA	CURRENT	FORECAST						CHANGE	
	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	22,026	27,959	33,293	39,119	44,010	47,335	50,410	28,384	2.8%
Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)	89,201	97,046	104,439	108,935	114,212	122,250	131,837	42,636	1.3%
Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)	47,314	50,578	53,637	56,910	60,468	64,263	68,403	21,089	1.2%
Southern Region	328,739	364,164	397,381	428,725	459,192	490,857	524,058	195,319	1.6%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018

Scenario 2

2016

2046

Change 2016-46

Southern Region



Total
Employment
(#)

328,739

524,058

+195,319
+1.6% p.a.

Greater Dandenong LGA



Total
Employment
(#)

89,201

131,837

+42,636
+1.3% p.a.

3_Key Findings

3.5_Scenario 2

Employment by Industry

With some levels of industrial land demand transfer towards the Officer-Pakenham and Hastings SSIPs, the Southern Region is expected to retain some levels of industrial employment within the region compared to Scenario 1A and 1B.

The industrial employment in the Southern Region under Scenario 2 is forecast at **69,169 jobs** in 2046, which is higher than Scenario 1B. This represents 13.2% of the total employment within the region in 2046, slightly higher than Scenario 1B (12.6%) and largely on par with Scenario 1A (13.2%).

The industrial employment in Greater Dandenong is estimated at **25,944 jobs** in 2046, or 19.7% of the total employment in the LGA, which is the same as Scenario 1B.

However, Scenario 2 assumes some levels of demand transfer towards the Officer-Pakenham and Hastings SSIPs, resulting in increasing level of industrial employment growth in Cardinia and Mornington Peninsula. It is forecast there will be approximately 8,490 industrial jobs in Cardinia by 2046 and 3,474 industrial jobs in Mornington Peninsula – both higher than the other scenarios.

With continuous decline in industrial employment in Greater Dandenong and some levels of industrial employment growth in Cardinia and Mornington Peninsula, the relative share of Greater Dandenong of the overall Southern Region in terms of industrial employment is expected to fall, at 37.5% in 2046 compared to 39.7% in Scenario 1B and above 40% in the other scenarios as well as the current level.

Scenario 2

Southern Region

	2016	2046	Change 2016-46
 Industrial Employment (#)	80,486	69,169	-11,317 -0.5% p.a.
 Other Employment (#)	248,253	454,889	+206,636 +2.0%

Greater Dandenong LGA

	2016	2046	Change 2016-46
 Industrial Employment (#)	36,100	25,944	-10,156 -1.1% p.a.
 Other Employment (#)	53,101	105,893	+52,792 +2.3%

3_Key Findings

Table 20 presents current and forecast employment by industrial employment and other employment for the Southern Region and six LGAs.

Table 20_Employment by Industry, Southern Region by LGA, Scenario 2

Employment by Industry (#)	CURRENT 2016	FORECAST						CHANGE	
		2021	2026	2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	80,486	75,427	72,102	68,610	67,302	68,048	69,169	-11,317	-0.5%
Other	248,253	288,736	325,278	360,115	391,890	422,809	454,889	206,636	2.0%
Total Southern Region	328,739	364,164	397,381	428,725	459,192	490,857	524,058	195,319	1.6%
Cardinia (S)									
Industrial	3,345	3,816	4,228	5,766	7,303	7,890	8,490	5,145	3.2%
Other	18,681	24,142	29,065	33,354	36,706	39,445	41,920	23,239	2.7%
Total Cardinia (S)	22,026	27,959	33,293	39,119	44,010	47,335	50,410	28,384	2.8%
Casey (C)									
Industrial	8,524	8,342	8,270	8,309	8,449	8,711	8,881	357	0.1%
Other	52,422	64,517	74,849	85,048	94,583	102,969	110,323	57,901	2.5%
Total Casey (C)	60,946	72,860	83,120	93,356	103,032	111,680	119,204	58,258	2.3%
Frankston (C)									
Industrial	5,319	4,630	4,427	4,269	4,132	4,169	4,216	-1,103	-0.8%
Other	35,252	37,851	40,066	42,385	44,767	47,299	50,189	14,937	1.2%
Total Frankston (C)	40,571	42,482	44,493	46,654	48,899	51,468	54,406	13,835	1.0%
Greater Dandenong (C)									
Industrial	36,100	35,082	33,473	29,112	26,188	25,984	25,944	-10,156	-1.1%
Other	53,101	61,964	70,966	79,823	88,024	96,266	105,893	52,792	2.3%
Total Greater Dandenong (C)	89,201	97,046	104,439	108,935	114,212	122,250	131,837	42,636	1.3%
Kingston (C)									
Industrial	22,226	19,409	18,110	17,755	17,759	17,833	18,163	-4,063	-0.7%
Other	46,455	53,831	60,289	65,994	70,813	76,027	81,634	35,179	1.9%
Total Kingston (C)	68,681	73,240	78,400	83,749	88,572	93,860	99,797	31,116	1.3%
Mornington Peninsula (S)									
Industrial	4,972	4,147	3,594	3,400	3,471	3,460	3,474	-1,498	-1.2%
Other	42,342	46,431	50,043	53,510	56,996	60,803	64,929	22,587	1.4%
Total Mornington Peninsula (S)	47,314	50,578	53,637	56,910	60,468	64,263	68,403	21,089	1.2%

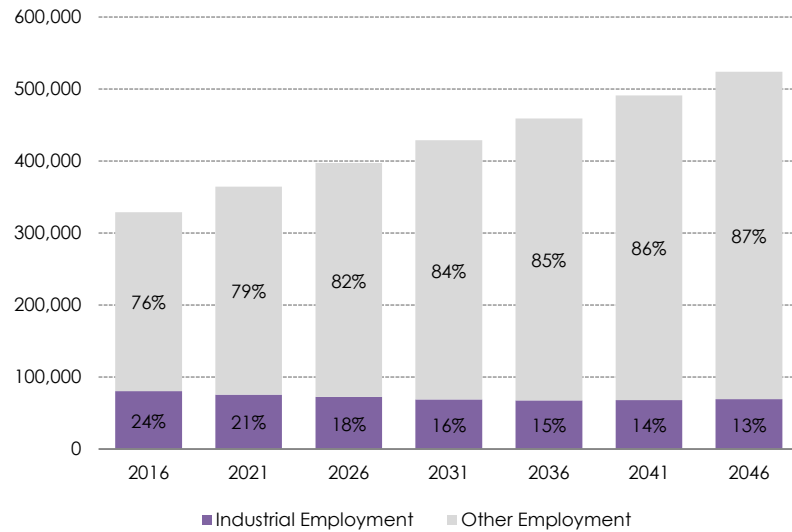
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
 'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 25 illustrates current and forecast employment within the Southern Region with relative share between industrial employment and other employment.

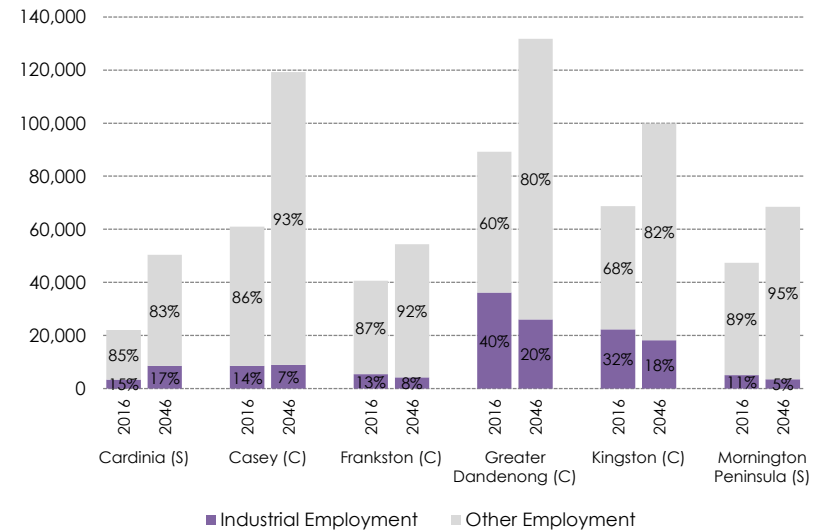
Chart 25_Employment Growth & Share, Southern Region, Scenario 2



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 26 illustrates employment in 2016 and 2046 for the six LGAs with relative share between industrial employment and other employment.

Chart 26_Employment Growth & Share, Southern Region by LGA, Scenario 2



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.5_Scenario 2

Total Output

Under scenario 2, the total output within the Southern Region is estimated at **\$148,755 million** at 2046 and total output within Greater Dandenong is estimated at **\$43,908 million** at 2046 – the same as Scenario 1B.

With some levels of demand transfer assumed, total output in Cardinia and Mornington Peninsula is expected to grow at a higher rate compared to the other scenarios.

Greater Dandenong's relative share of the overall Southern Region in terms of total output is estimated at 29.5% in 2046, which is a further decrease compared to the other scenarios and the current level.

Table 21 presents current and forecast output for each LGA in the Southern Region for Scenario 2.

Scenario 2

2016

2046

Change 2016-46

Southern Region



Total Output (\$M)

104,465

148,755

+44,290
+1.2% p.a.

Greater Dandenong LGA



Total Output (\$M)

35,662

43,908

+8,246
+0.7% p.a.

Table 21_Ouput Growth, Southern Region by LGA, Scenario 2

Output (\$M)	CURRENT	FORECAST						CHANGE	
LGA	2016	2021	2026	2031	2036	2041	2046	2016-46	AAGR
Cardinia (S)	6,173	7,631	8,958	10,587	11,963	12,820	13,600	7,427	2.7%
Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)	35,662	36,781	37,961	37,796	38,514	40,914	43,908	8,246	0.7%
Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)	13,984	14,604	15,359	16,307	17,419	18,594	19,879	5,894	1.2%
Southern Region	104,465	110,917	117,927	124,288	131,345	139,705	148,755	44,290	1.2%

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.5_Scenario 2

Output by Industry

The industrial output within the Southern Region is forecast at **\$30,032 million** at 2046 and industrial output within Greater Dandenong is forecast at **\$12,354 million** in the same year, representing 20.2% and 28.1% of the total output within the region and the LGA respectively.

Consistent with industrial employment growth, Cardinia and Mornington Peninsula are both expected to have relatively higher growth in industrial output as well.

Greater Dandenong's relative share of the overall Southern Region in terms of industrial output is estimated at 41.1% in 2046, which is a further decrease compared to the other scenarios and the current level.

Scenario 2

Southern Region

	2016	2046	Change 2016-46
 Industrial Output (\$M)	39,796	30,032	-9,764 -1.1% p.a.
 Other Output (\$M)	64,669	118,722	+54,054 +2.0%

Greater Dandenong LGA

 Industrial Output (\$M)	20,278	12,354	-7,924 -1.6% p.a.
 Other Output (\$M)	15,385	31,554	+16,170 +2.4%

3_Key Findings

Table 22 presents current and forecast output by industrial output and other output for the Southern Region and six LGAs.

Table 22_Output by Industry, Southern Region by LGA, Scenario 2

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	36,341	33,779	30,898	29,612	29,713	30,032	-9,764	-0.9%
Other	64,669	74,576	84,148	93,390	101,732	109,992	118,722	54,054	2.0%
Total Southern Region	104,465	110,917	117,927	124,288	131,345	139,705	148,755	44,290	1.2%
Cardinia (S)									
Industrial	1,223	1,392	1,535	2,109	2,664	2,837	3,011	1,788	3.0%
Other	4,950	6,239	7,423	8,479	9,299	9,983	10,589	5,638	2.6%
Total Cardinia (S)	6,173	7,631	8,958	10,587	11,963	12,820	13,600	7,427	2.7%
Casey (C)									
Industrial	2,917	2,802	2,755	2,749	2,780	2,845	2,886	-30	0.0%
Other	12,270	14,905	17,264	19,485	21,571	23,410	25,014	12,743	2.4%
Total Casey (C)	15,187	17,707	20,019	22,234	24,351	26,254	27,900	12,713	2.0%
Frankston (C)									
Industrial	2,722	2,301	2,186	2,091	2,004	2,008	2,015	-707	-1.0%
Other	9,156	10,021	10,720	11,388	12,052	12,781	13,611	4,454	1.3%
Total Frankston (C)	11,878	12,322	12,907	13,479	14,057	14,789	15,625	3,747	0.9%
Greater Dandenong (C)									
Industrial	20,278	18,981	17,370	14,317	12,517	12,378	12,354	-7,924	-1.6%
Other	15,385	17,799	20,591	23,479	25,997	28,536	31,554	16,170	2.4%
Total Greater Dandenong (C)	35,662	36,781	37,961	37,796	38,514	40,914	43,908	8,246	0.7%
Kingston (C)									
Industrial	10,202	8,822	8,175	7,980	7,962	7,973	8,092	-2,110	-0.8%
Other	11,378	13,050	14,548	15,905	17,078	18,360	19,750	8,373	1.9%
Total Kingston (C)	21,580	21,872	22,723	23,885	25,041	26,333	27,843	6,262	0.9%
Mornington Peninsula (S)									
Industrial	2,455	2,043	1,759	1,653	1,685	1,672	1,674	-781	-1.3%
Other	11,529	12,561	13,601	14,654	15,734	16,922	18,205	6,676	1.5%
Total Mornington Peninsula (S)	13,984	14,604	15,359	16,307	17,419	18,594	19,879	5,894	1.2%

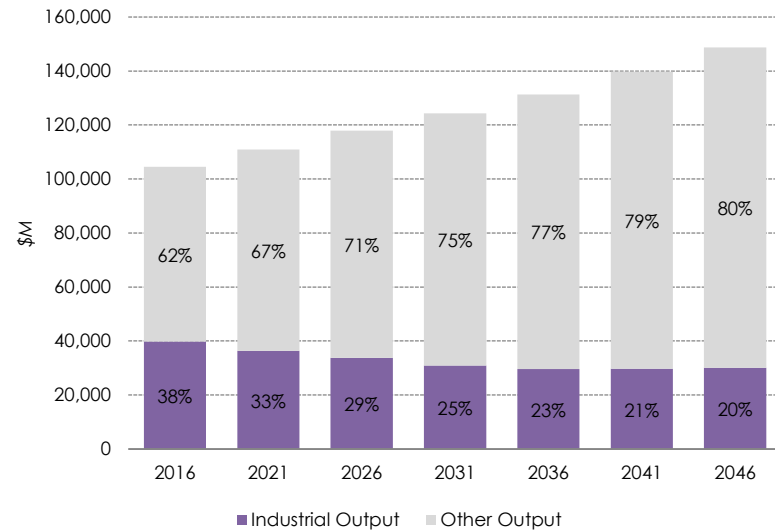
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 27 illustrates current and forecast output within the Southern Region with relative share between industrial output and other output.

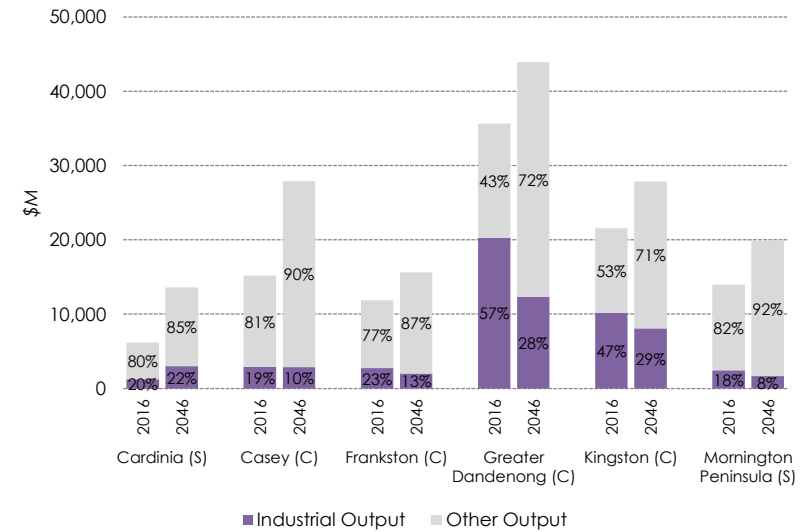
Chart 27_Output Growth & Share, Southern Region, Scenario 2



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 28 illustrates output in 2016 and 2046 for the six LGAs with relative share between industrial output and other output.

Chart 28_Output Growth & Share, Southern Region by LGA, Scenario 2



Source: ABS 3218, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.5_Scenario 2

Sensitivity Analysis – Output by Industry

The sensitivity analysis under Scenario 2 indicates that industrial output in the Southern Region is projected to increase to **\$51,172 million** by 2046 and the total output in the region will reach **\$230,955 million** in the same year.

The industrial output in Greater Dandenong is forecast at **\$20,617 million** in 2046 and the total output in the LGA is projected at **\$69,279 million** in the same year. Similarly, the outputs remain the same as the sensitivity analysis under Scenario 1B. However, with the output growth in Cardinia and Mornington Peninsula which are assumed to accommodate some levels of demand transfer, Greater Dandenong's relative share is expected to drop. Under Scenario 2, Greater Dandenong represents approximately 40.3% of the industrial output within the Southern Region and 30.0% of the total output within the Southern Region at 2046.

2 – Sensitivity

Southern Region

	2016	2046	Change 2016-46
 Industrial Output (\$M)	39,796	51,172	+11,375 +0.8% p.a.
 Other Output (\$M)	64,669	179,784	+115,115 +3.5%
 Total Output (\$M)	104,465	230,955	+126,490 +2.7%

Greater Dandenong LGA

 Industrial Output (\$M)	20,278	20,617	+340 +0.1% p.a.
 Other Output (\$M)	15,385	48,661	+33,277 +3.9%
 Total Output (\$M)	35,662	69,279	+33,616 +2.2%

3_Key Findings

Table 23 presents the sensitivity analysis on output by industrial output and other output for the Southern Region and the six LGAs reflecting changing productivity for each industry under Scenario 2.

Table 23_Output by Industry, Southern Region by LGA, 2 – Sensitivity

Output Industry (\$M)	CURRENT 2016	2021	2026	FORECAST				CHANGE	
				2031	2036	2041	2046	2016-46	AAGR
Southern Region									
Industrial	39,796	39,134	39,406	39,418	41,484	45,827	51,172	11,375	0.8%
Other	64,669	78,744	94,456	112,122	131,282	153,391	179,784	115,115	3.5%
Total Southern Region	104,465	117,879	133,862	151,540	172,766	199,218	230,955	126,490	2.7%
Cardinia (S)									
Industrial	1,223	1,497	1,793	2,733	3,856	4,549	5,366	4,143	5.1%
Other	4,950	6,605	8,370	10,212	12,015	13,903	15,958	11,008	4.0%
Total Cardinia (S)	6,173	8,102	10,163	12,945	15,871	18,451	21,324	15,151	4.2%
Casey (C)									
Industrial	2,917	3,066	3,318	3,664	4,109	4,670	5,304	2,387	2.0%
Other	12,270	15,812	19,553	23,687	28,306	33,344	38,924	26,653	3.9%
Total Casey (C)	15,187	18,879	22,871	27,352	32,415	38,014	44,227	29,041	3.6%
Frankston (C)									
Industrial	2,722	2,456	2,487	2,532	2,580	2,762	2,963	242	0.3%
Other	9,156	10,510	11,851	13,326	15,011	17,040	19,534	10,377	2.6%
Total Frankston (C)	11,878	12,967	14,338	15,858	17,590	19,802	22,497	10,619	2.2%
Greater Dandenong (C)									
Industrial	20,278	20,322	20,084	18,066	17,255	18,736	20,617	340	0.1%
Other	15,385	18,821	23,204	28,429	33,955	40,431	48,661	33,277	3.9%
Total Greater Dandenong (C)	35,662	39,144	43,288	46,494	51,209	59,168	69,279	33,616	2.2%
Kingston (C)									
Industrial	10,202	9,620	9,731	10,416	11,476	12,742	14,350	4,148	1.1%
Other	11,378	13,893	16,579	19,509	22,667	26,518	31,219	19,841	3.4%
Total Kingston (C)	21,580	23,513	26,310	29,925	34,143	39,260	45,569	23,989	2.5%
Mornington Peninsula (S)									
Industrial	2,455	2,172	1,993	2,007	2,208	2,368	2,571	115	0.2%
Other	11,529	13,102	14,899	16,959	19,329	22,155	25,489	13,960	2.7%
Total Mornington Peninsula (S)	13,984	15,274	16,892	18,967	21,537	24,524	28,059	14,075	2.3%

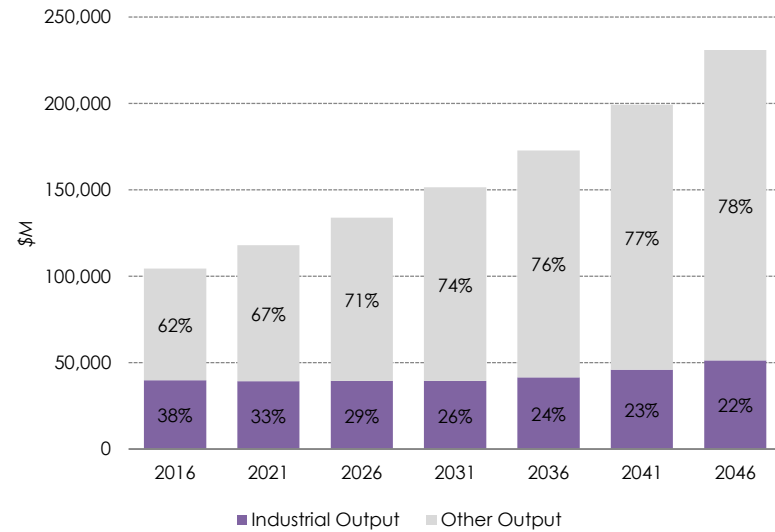
Note: 'Industrial' includes Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing;
 'Other' includes Agriculture, Forestry and Fishing, Mining, Electricity, Gas, Water and Waste Services, Construction, Retail Trade, Accommodation and Food Services, Information Media and Telecommunications, Financial and Insurance Services, Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services

Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

Chart 29 illustrates the sensitivity analysis on output within the Southern Region with relative share between industrial output and other output.

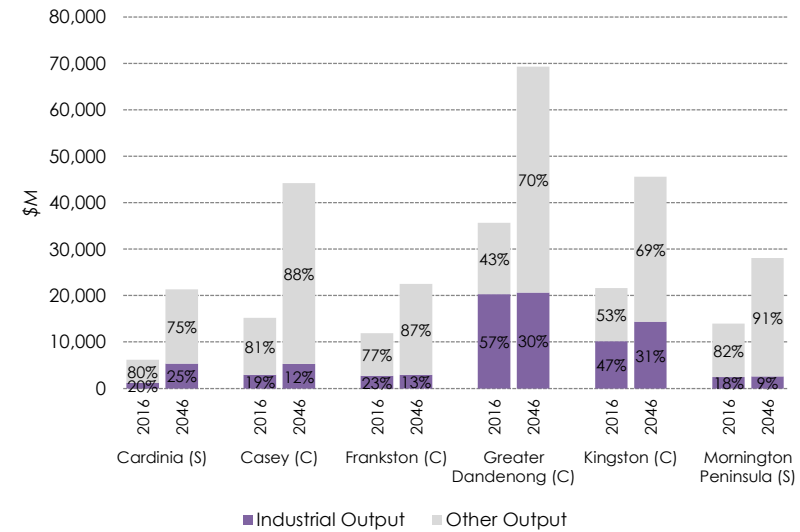
Chart 29_Output Growth & Share, Southern Region, 2 – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

Chart 30 illustrates the sensitivity analysis on output for the six LGAs with relative share between industrial output and other output.

Chart 30_Output Growth & Share, Southern Region by LGA, 2 – Sensitivity



Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, VIF 2018, MacroPlan Dimasi

3_Key Findings

3.6_Summary

This section tests a number of possible scenarios and models the likely employment and output outcomes within the Southern Region with a focus on the three SSIPs (represented by the corresponding LGAs).

The modelling outputs indicate the following key findings.

The **BAU** scenario models a hypothetical trendline growth under an unchanged economy / policy basis and unconstrained land supply. Under this scenario, both employment and output are expected to grow / decline on trend in the six LGAs within the Southern Region. With Manufacturing and Wholesale Trade continuing to decline, the Transport Postal and Warehousing sector appears to be the major consumer of industrial land within the Southern SSIP as well as the wider Southern Region.

With trend growth assumed under this scenario, Greater Dandenong / the Southern SSIP is expected to maintain its position as the most significant contributor in terms of industrial employment and output to the economy of the region during the forecasting period.

Scenario 1 (A&B) attempts to simulate possible implications on employment and output when zoned vacant industrial land is exhausted in the Southern SSIP during 2026-31 at current consumption rate, with no net demand transfer towards other SSIPs within the Southern Region.

With the exhaustion of zoned vacant industrial land, the employment growth in Transport Postal and Warehousing is likely to slow down and eventually stop within Greater Dandenong, whilst employment in Manufacturing and Wholesale Trade continue to decline on trend (Scenario 1A) and more aggressively (Scenario 1B).

With no net demand transfer towards other SSIPs within the region assumed (noting some demand may possibly transfer to other regions), there is estimated between 3,670 industrial jobs (Scenario 1A) and up to 7,588 industrial jobs (Scenario 1B) lost within Greater Dandenong and the region by 2046 compared to the trendline growth (BAU scenario).

The relative share of industrial employment and output within Greater Dandenong and the wider Southern Region is expected to shrink during the forecasting period.

Greater Dandenong's contribution to the overall Southern Region is also expected to decrease. However, Greater Dandenong still remains the largest local economy within the region compared to the other five LGAs.

Scenario 2 builds on Scenario 1B and assumes 50% of the loss of the industrial employment growth will be accommodated within the Officer-Pakenham SSIP and Port of Hastings SSIP where zoned vacant industrial land supply is relatively abundant to simulate the effects of industrial demand transfers.

Under this scenario, the industrial employment and output in Greater Dandenong is forecast to continue to decline as in Scenario 1B. However the industrial employment and output growth in Cardinia and Mornington Peninsula will be accelerated at above-trend growth and consumption rates with some businesses possibly relocating to these locations for the availability of large parcels of industrial land. Greater Dandenong's relative share is expected to further decrease.

This scenario demonstrates the underlying capacity for the Southern Region to retain its industrial employment and output by utilising currently available industrial land within the Officer-Pakenham SSIP and Port of Hastings SSIP, albeit some levels of industrial employment and output growth may be still lost to other regions.

A **sensitivity analysis** was also undertaken for all scenarios to test possible impacts from the improvement of productivity roughly measured by output per worker by industry.

Historic data reveals output per worker in Information Media and Telecommunications, Wholesale Trade, and Financial and Insurance Services has increased the most significantly, whilst other industries such as Mining, Electricity, Gas, Water and Waste Services have seen a decrease in output per worker.

3_Key Findings

3.6_Summary

The sensitivity analysis indicates that in spite of the decline in industrial employment, the industrial output in Greater Dandenong and the wider Southern Region is forecast to grow significantly. This reflects the influence from the advancement of technology such as the utilisation of highly automated machinery in the traditionally labour-intensive industries.

Whilst the assumptions adopted in the sensitivity analysis appear to be conservative, it implies the following possible future trends in relation to industrial sectors:

- Reliance on technology and innovation will be greater;
- Requirement for labour will be further reduced;
- Requirement for land may or may not change;
- Employment density on industrial land will decrease;
- Productivity of industrial land and productivity of industrial workers will be significantly enhanced.

The sensitivity analysis also indicates the relative share of industrial sectors (in terms of both employment and output) appear to be largely on par with the modelling outcomes when assuming output per worker is unchanged.

This is because a number of other non-industrial related sectors have also significantly benefited from the improvement of productivity, such as Information Media and Telecommunications, and Financial and Insurance Services. Whilst the industrial output in the Southern Region is forecast to grow (albeit with a decline in industrial employment), both employment and output in these non-industrial sectors indicate significant growth in the sensitivity analysis.

This may have some implications on 'employment land' where there is greater capacity to support more employment, higher job density and greater productivity and output compared to 'industrial land'. The possible land requirement of those growing sectors should be further explored by DELWP going forward.

The summary of modelling outcomes is presented in *Table 24* and the summary of sensitivity analysis is presented in *Table 25* on the following pages.

3_Key Findings

Table 24_Modelling Output Summary, All Scenarios

	SOUTHERN REGION						GREATER DANDENONG LGA					
BAU	Industrial Employment (#)	2016 80,486 2046 72,963	2016-46 -7,523 -0.3% p.a.	Industrial Output (\$M)	2016 39,796 2046 32,133	2016-46 -7,664 -0.7% p.a.	Industrial Employment (#)	2016 36,100 2046 33,532	2016-46 -2,568 -0.2% p.a.	Industrial Output (\$M)	2016 20,278 2046 15,785	2016-46 -4,493 -0.8% p.a.
	Total Employment (#)	2016 328,739 2046 527,851	2016-46 +199,112 +1.6% p.a.	Total Output (\$M)	2016 104,465 2046 150,855	2016-46 +46,390 +1.2% p.a.	Total Employment (#)	2016 89,201 2046 139,425	2016-46 +50,244 +1.5% p.a.	Total Output (\$M)	2016 35,662 2046 47,339	2016-46 +11,676 +0.9% p.a.
SCENARIO 1A	Industrial Employment (#)	2016 80,486 2046 69,293	2016-46 -11,193 -0.5% p.a.	Industrial Output (\$M)	2016 39,796 2046 30,990	2016-46 -8,804 -0.8% p.a.	Industrial Employment (#)	2016 36,100 2046 29,862	2016-46 -6,238 -0.6% p.a.	Industrial Output (\$M)	2016 20,278 2046 14,645	2016-46 -5,633 -1.1% p.a.
	Total Employment (#)	2016 328,739 2046 524,182	2016-46 +195,443 +1.6% p.a.	Total Output (\$M)	2016 104,465 2046 149,715	2016-46 +45,250 +1.2% p.a.	Total Employment (#)	2016 89,201 2046 135,755	2016-46 +46,554 +1.4% p.a.	Total Output (\$M)	2016 35,662 2046 46,119	2016-46 +10,536 +0.9% p.a.
SCENARIO 1B	Industrial Employment (#)	2016 80,486 2046 65,375	2016-46 -15,111 -0.7% p.a.	Industrial Output (\$M)	2016 39,796 2046 28,702	2016-46 -11,095 -1.1% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	Industrial Output (\$M)	2016 20,278 2046 12,354	2016-46 -7,924 -1.6% p.a.
	Total Employment (#)	2016 328,739 2046 520,264	2016-46 +191,525 +1.5% p.a.	Total Output (\$M)	2016 104,465 2046 147,424	2016-46 +42,959 +1.2% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	Total Output (\$M)	2016 35,662 2046 43,908	2016-46 +8,246 +0.7% p.a.
SCENARIO 2	Industrial Employment (#)	2016 80,486 2046 69,169	2016-46 -11,317 -0.5% p.a.	Industrial Output (\$M)	2016 39,796 2046 30,032	2016-46 -9,764 -0.9% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	Industrial Output (\$M)	2016 20,278 2046 12,354	2016-46 -7,924 -1.6% p.a.
	Total Employment (#)	2016 328,739 2046 524,058	2016-46 +195,319 +1.6% p.a.	Total Output (\$M)	2016 104,465 2046 148,755	2016-46 +44,290 +1.2% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	Total Output (\$M)	2016 35,662 2046 43,908	2016-46 +8,246 +0.7% p.a.

Note: Industrial employment / output includes jobs / output generated in Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing

Source: ABS 3218, ABS Census 2006, 2011 & 2016, REMPLAN 2018, UPD 2005-2017, VIF 2018, MacroPlan Dimasi

3_Key Findings

Table 25_Sensitivity Analysis Summary, All Scenarios

	SOUTHERN REGION						GREATER DANDENONG LGA					
BAU	Industrial Employment (#)	2016 80,486 2046 72,963	2016-46 -7,523 -0.3% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 54,403	2016-46 +14,606 +1.0% p.a.	Industrial Employment (#)	2016 36,100 2046 33,532	2016-46 -2,568 -0.2% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 26,247	2016-46 +5,969 +0.9% p.a.
	Total Employment (#)	2016 328,739 2046 527,851	2016-46 +199,112 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 234,186	2016-46 +129,721 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 139,425	2016-46 +50,244 +1.5% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 74,908	2016-46 +39,246 +2.5% p.a.
Scenario 1A	Industrial Employment (#)	2016 80,486 2046 69,293	2016-46 -11,193 -0.5% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 52,820	2016-46 +13,024 +0.9% p.a.	Industrial Employment (#)	2016 36,100 2046 29,862	2016-46 -6,238 -0.6% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 24,664	2016-46 +4,368 +0.7% p.a.
	Total Employment (#)	2016 328,739 2046 524,182	2016-46 +195,443 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 232,604	2016-46 +128,139 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 135,755	2016-46 +46,554 +1.4% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 73,325	2016-46 +37,663 +2.4% p.a.
Scenario 1B	Industrial Employment (#)	2016 80,486 2046 65,375	2016-46 -15,111 -0.7% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 48,773	2016-46 +8,977 +0.7% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 20,617	2016-46 +340 +0.1% p.a.
	Total Employment (#)	2016 328,739 2046 520,264	2016-46 +191,525 +1.5% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 228,557	2016-46 +124,092 +2.6% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 69,279	2016-46 +33,616 +2.2% p.a.
Scenario 2	Industrial Employment (#)	2016 80,486 2046 69,169	2016-46 -11,317 -0.5% p.a.	SENSITIVITY Industrial Output (\$M)	2016 39,796 2046 51,172	2016-46 +11,375 +0.8% p.a.	Industrial Employment (#)	2016 36,100 2046 25,944	2016-46 -10,156 -1.1% p.a.	SENSITIVITY Industrial Output (\$M)	2016 20,278 2046 20,617	2016-46 +340 +0.1% p.a.
	Total Employment (#)	2016 328,739 2046 524,058	2016-46 +195,319 +1.6% p.a.	SENSITIVITY Total Output (\$M)	2016 104,465 2046 230,955	2016-46 +126,490 +2.7% p.a.	Total Employment (#)	2016 89,201 2046 131,837	2016-46 +42,636 +1.3% p.a.	SENSITIVITY Total Output (\$M)	2016 35,662 2046 69,279	2016-46 +33,616 +2.2% p.a.

Note: Industrial employment / output includes jobs / output generated in Manufacturing, Wholesale Trade, and Transport, Postal and Warehousing
Source: ABS 3218, 5260, 6291, ABS Census 2006, 2011 & 2016, REMPLAN 2018, UPD 2005-2017, VIF 2018, MacroPlan Dimasi

4_General Commentary

Land Availability, Exhaustion & Demand Transfer

As at 2017, the Southern Region comprised 9,513 gross hectares of zoned industrial land of which 2,463.5 hectares (26%) are currently available for future industrial use / development. This is equivalent to around 36.9% of total available industrial land available within metropolitan Melbourne. Mornington accounts for 1,039 hectares of vacant supply, however 975 hectares of this is zoned specifically for port related uses and not available for general industrial purposes. In addition to this, just over 1,225 hectares are proposed through growth corridor plans in Casey (288 hectares) and Cardinia (938 hectares).

Of the zoned vacant land approximately 1,580 hectares are located within the Southern SSIP (642 ha), Officer-Pakenham SSIP (363 ha) and Port of Hastings SSIP (574 ha). Of the remaining 885 hectares of zoned vacant land in the region, Mornington has approximately 465 hectares, of which just over 400 hectares is zoned as SUZ1. Outside of the SSIPs, Casey has the largest supply of zoned land for industrial purposes (approx 255 ha), followed by Kingston (approx. 105 ha).

The UDP identifies there is limited available zoned land supply for future uses in the Southern SSIP (approx. 642 ha at 2017) and suggested there will be theoretically 11-12 years supply based on historic average consumption rate in the Southern SSIP (55 ha p.a.). Feedback from industries suggests available zoned industrial land in the Southern SSIP may exhaust faster i.e. 5-10 years.

The UDP indicates that there is sufficient available zoned industrial land supply in the SSIPs at Officer-Pakenham (363 ha) and Port of Hastings (574 ha). Using historic and current consumption rates in these locations to model supply indicates that these locations appear to have substantial capacity to accommodate potential future demand for industrial land from the Southern SSIP. However, as has previously been noted, the Port of Hastings SSIP has significant limitations in relation to allowing industrial development and the amount of land available within the Officer-Pakenham could expect a higher rate of consumption over time as the growth corridor fills.

As land supply tightens in the Southern SSIP, demand transfer is likely to occur firstly at the closest industrial areas such as industrial precincts in Casey and Kingston and then progressively to Officer-Pakenham SSIP.

The exhaustion of industrial land stocks within the Southern SSIP within the next decade will likely direct future demand for large-format, regionally significant industrial uses into neighbouring areas, such as Cranbourne West and Braeside, where there are relatively large contiguous tracts of vacant industrial land with main road access for large heavy vehicles and access to existing supply chains and distribution networks.

The extensive Special Use Zone 1 land within the Port of Hastings SSIP and Mornington Peninsula, while relatively abundant, are unable to accommodate this demand transfer due to the limitations of the zone for port purposes under current planning controls. Considering the physical distance and the lack of access to key supply chains / distribution networks and labour pools supporting business needs, and the inability of vacant land being suitable for general industrial uses it is limited without significant investment in infrastructure and changes to planning policies and controls.

Most large-scale, regionally significant industrial land users, particularly in freight and logistics, currently operating in the Southern Region will continue to invest in the region and seek appropriate business expansion opportunities that meet long term investment priorities and customer requirements throughout the region. Given continued strong population growth in the municipalities of Casey and Cardinia it is more than likely there will be continued investment in and development of industrial land in these areas. With this growth and investment, demand for industrial land in these areas is likely to increase over time.

4_General Commentary

Vacant industrial land located near the Southern SSIP in locations such as Braeside, Carrum Downs and Cranbourne West is also likely to be attractive to a mix of mid-scale uses (e.g. freight, logistics, warehousing) as well as smaller format industrial uses (e.g. workspace lofts / flexible warehouses) targeting the needs of more locally based logistics / distribution including niche import / export and specialised / advanced manufacturing.

Anecdotal feedback from large national industrial REITs such as Goodman, Investa, Charter Hall and Salta suggesting national head-office investment decisions will likely target Melbourne's **north** and **west** in the future as these areas will be the focus for future infrastructure and distribution centre locations to service the largest share of Melbourne's future population growth.

With ready access to major supply routes and infrastructure across Melbourne's western suburbs, including areas such as Geelong and regional Victoria, this location is clearly preferred for new large-scale industrial investors.

Feedback from these groups and local real estate agents suggests large scale industrial REITs are less likely to make further investments beyond the Southern SSIP into areas as far east as Officer/Pakenham and are more likely to invest in Melbourne's northern and western growth fronts.

This shift in focus will have implications for future investment levels within the Southern Region, particularly considering forecast land availability within the Southern SSIP.

However, a future North East Link would improve accessibility to the Officer/Pakenham SSIP and could more readily open it to future industrial investment.

Supply Side Influences

Some of the supply-side factors that will continue to influence take-up and transaction volumes in the Southern Region are listed here:

Key Points:

- **Access to supply chains** – larger institutional investors are focusing heavily on land with access to strategic markets and supply chains in Melbourne's growing western sub-region.
- **Availability of land and services** – an abundance of relatively affordable zoned industrial land with services is driving take-up rates and competition in Melbourne's west, particularly those seeking parcels comprising a minimum 20 hectares or more.
- **Infrastructure and supply chains** – larger institutional investors are focusing investment around new and planned infrastructure supporting freight movements in Melbourne's growing northern and western sub-regions, particularly around the Western Intermodal Freight Terminal (WIFT) with access to Port of Melbourne via a dedicated West Gate Tunnel; and areas around Beveridge in Melbourne's north to be connected to WIFT via the planned Outer Metropolitan Ring Road (OMR) and south via the planned North East Link due to commence construction in 2020.
- **New technology** – the impacts of automation through emerging technology including robotics is transforming the logistics and warehousing landscape, with dark stores / robotic processing and automated handling resulting in significant reductions in FTE staff required on site, reducing variable operational costs. Anecdotally, a dark store totalling 50,000m² NLA may only require 3-5 staff to operate.

4_General Commentary

Demand Side Influences

Important factors in attracting new tenants to the Southern Region include price, lease terms, incentives, size of sites, quality of spaces, access to supply chains including major ports and intermodal facilities and types of services. Equally significant for existing tenants are the terms of ongoing / encumbered lease arrangements, termination costs, embedded infrastructure, willingness to pay higher rents and the potential costs of relocation and potential loss of staff.

A summary of some of the demand-side factors that are influencing take-up and transaction volumes in the Southern Region include:
Key Points:

- **Competition risk** – cheaper land with more direct access to Port of Melbourne and major intermodal facilities is attracting freight and logistics operators, particularly Third-Party Logistics (TPL) operators such as TOLL, Linfox, Austpac.

This is evidenced by several recent TPL relocations to Melbourne's western industrial areas, reflecting land availability and cheaper rents. Overall Melbourne's west is regarded as the most competitive location for freight, logistics and warehousing.
- **Incentives to relocate** – in some cases there is little incentive to relocate and pay higher rents – historic factors such as ownership and/or embedded lease arrangements, high set-up costs and highly specialised infrastructure mean there can be little incentive for tenants / investors to relocate to new / prime grade premises, particularly from older estates to newer areas located outside existing supply networks, unless there are overall constraints on access and space.

Larger freight/logistics operators seeking minimum 20ha or more would generally relocate to areas within Melbourne's west with better access to Port of Melbourne / Western Intermodal and supply networks.

- **Availability of Services** – land needs to be serviced to attract tenants - serviced land is obviously more attractive to investors and tenants looking for speed to market outcomes through turn-key spaces.

In Casey and Cardinia, there is a large volume of vacant industrial land either still in planning and/or without services required to bring this land into the market and this will impact the timing of take-up within these locations relative to the Southern SSIP and surrounding areas including Carrum Downs.

Consequently, despite the theoretical presence of supply in Casey and the Officer/Pakenham corridor, without planning certainty and/or infrastructure and services there is currently a low demand for this land.

- **Transformation within the manufacturing sector** – the decline in traditional manufacturing such as automotive and associated component manufacturing is being offset partly by the emergence of more specialised manufacturing including building/construction, furniture and high-tech manufacturing, often in partnership with research institutions and Universities.

Anecdotally, there is a strong preference for highly specialised start-ups to locate close to Melbourne CBD fringe locations such as Port Melbourne, Brunswick, Maribyrnong and Sunshine. These groups have little interest in locating in Melbourne's southern fringes.

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