



Muchea Industrial Park Land Demand and Economic Assessment

Department of Planning, Lands and Heritage
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ERA

Economic Research Associates Pty Ltd



SMCo

Syme Marmion & Co

15 Royal Street, East Perth
Western Australia - 6004

phone: +61 (0) 412 167 294

email: admin@smco.com.au

web: www.smco.com.au

abn: 13 267 625 066

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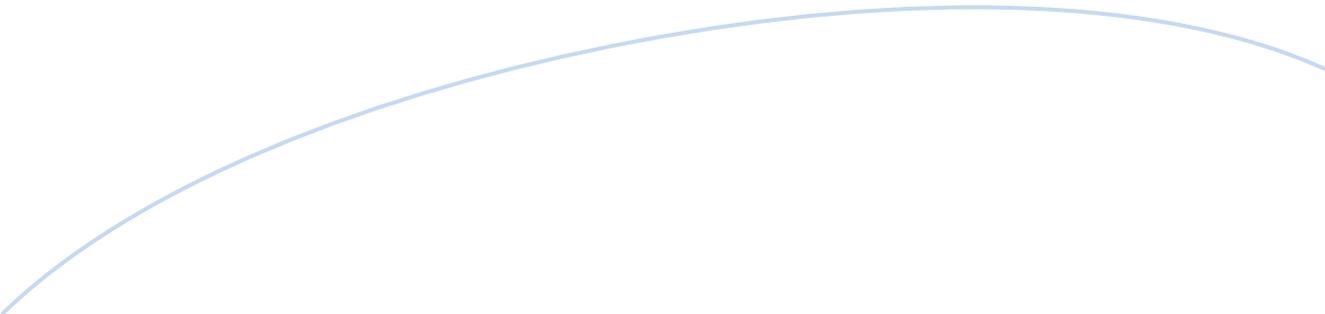
15 Royal Street, East Perth
Western Australia - 6004

phone: +61 (0) 412 167 294

email: admin@smco.com.au

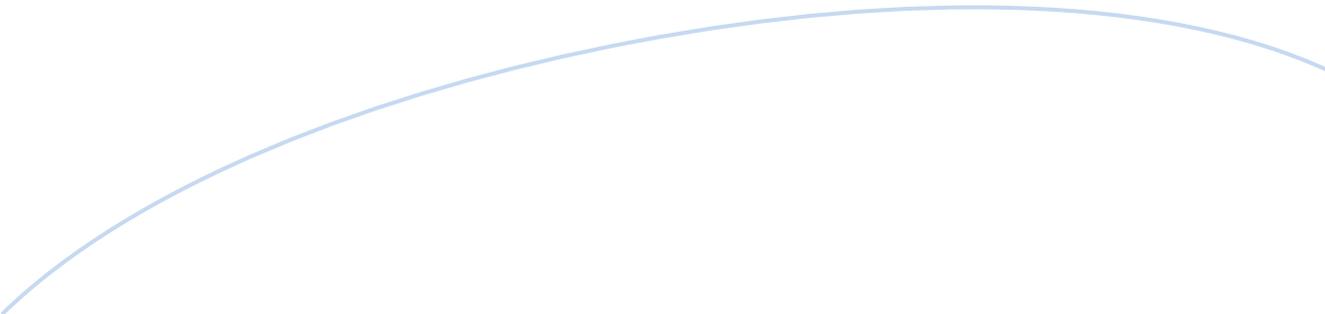
web: www.smco.com.au

abn: 13 267 625 066



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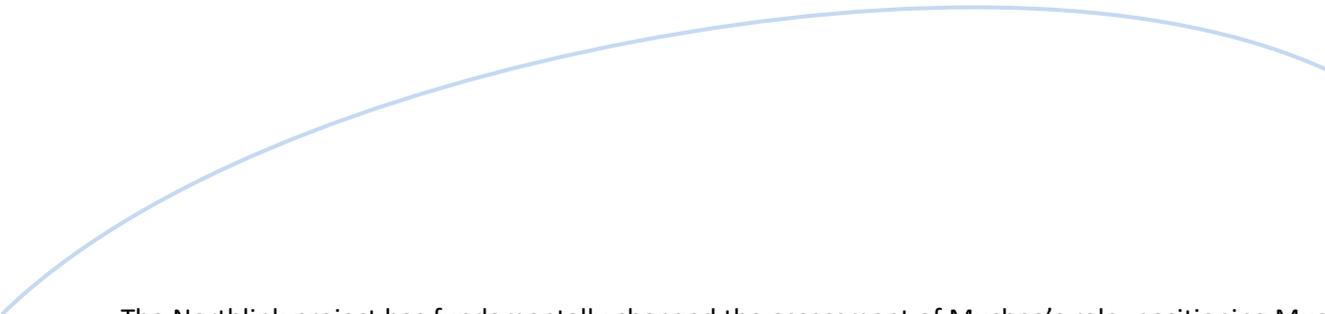


Executive Summary

Key points

- There is a surplus provision of future of light and general industrial land in the North East and North West sub-regions and a substantial deficit in provision in the Metro South / Peel sub-region.
- This is partly due to the effective inclusion of Muchea into the North East sub-region industrial land supply equation, made possible by the Northlink project.
- The population of the North East sub-region is projected to grow by 241,430 from 209,150 at 2011 to 450,580 by 2050. Depending on the analysis used, this implies a demand for new industrial land of between 2,580 and 3,444 ha (net). Potential new supply identified in the North East Sub-regional Framework for long term development is 3,580 ha (gross – around 2,680 ha net) excluding Muchea. With the addition of Muchea to the prospective land supply, and allowing for gross area to net industrial land adjustments and the different time scales for each of the above demand estimates, overall this would suggest a surplus provision in the planning framework for the sub-region of around 625 ha (net) or 830 ha (gross) for the period 2015 - 2050.
- The implication is that development on one of the major estates in the North East sub-region will delay or curtail development on others. Not all land in Bullsbrook /North Ellenbrook and Muchea will be developed to its short and medium term schedule, or even meet long term development expectations.
- There is a range of potential supply of industrial land in the Perth metro area overall, demand estimates for any part of it need to consider:
 - Population factors:
 - Access to skilled labour;
 - Access to customers and end uses;
 - Location factors – access to:
 - Import /export transport routes;
 - Local distribution and servicing transport routes;
 - Agglomeration economies, i.e. access to goods and services in the value chain.
- Muchea scores well on some transport-related location factors, but not as well as locations closer to population centres in the Perth metropolitan area for population factors. This reinforces the likely focus for Muchea as long-haul transport and agricultural products and livestock handling.

Muchea has not been as visible or accessible as other industrial areas closer to Perth in the north-east corridor, resulting in some uncertainty over the role Muchea would play in the industrial land market. From a broader metropolitan development perspective, it lacked visibility and accessibility compared to the large areas prospectively available at Bullsbrook and North Ellenbrook.



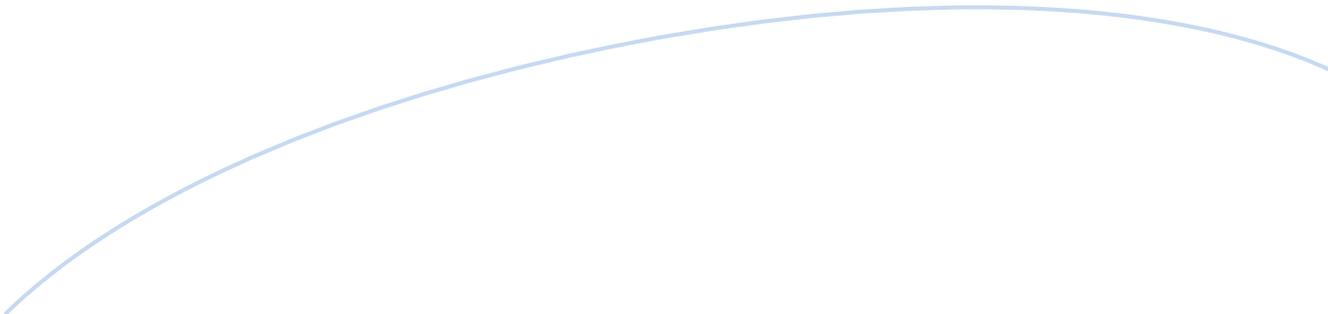
The Northlink project has fundamentally changed the assessment of Muchea's role, positioning Muchea directly within the broader metropolitan industrial land market. Northlink will render Muchea visible and will have a significant effect on the accessibility of Muchea to the Perth metro area. Muchea will now be seamlessly connected to the Perth metropolitan transport system with an interchange providing direct access to the estate. To add to this, transport connections to the Mid West and North West will be improved with RAV10 access to Muchea.

Muchea has a gross area of 1,167 ha, with a net area of 896 ha after allowing for 221 ha for conservation reserves, environmental protection areas and drainage and 50 ha for roads. Of the 1,167ha of industrial land, 302 ha is taken up by WAMIA. In addition, there are several projects (for transport depot and for grain handling) either existing or in very advanced planning adjacent to but outside of the Muchea Industrial Park area which add to the industrial and rural product processing operations in the area.

There is a general surplus provision of potential industrial land in the North East sub region and this is increased by the effective inclusion of Muchea into the North East sub-region industrial land supply equation. The population of the North East sub-region is projected to grow by 241,430 from 209,150 at 2011 to 450,580 by 2050. Depending on the analysis used, this implies a demand for new industrial land of between 2,580 and 3,444 ha (net). Potential new supply identified in the North East Sub-regional Framework for long term development is 3,580 ha (gross – around 2,680 ha net) excluding Muchea. With the addition of Muchea to the prospective land supply, and allowing for gross area to net industrial land adjustments and the different time scales for each of the above demand estimates, overall this would suggest a surplus provision in the planning framework for the sub-region of around 625 ha (net) or 830 ha (gross) for the period 2015 - 2050. This is supply for many years after 2050.

The development projects already planned and underway are likely sufficient to meet all short and medium term demand for land at Muchea, including for local uses, and possibly for the long term. The expected over-provision of industrial land supply in the North East inclusive of Muchea means that take-up of land at Muchea will be dependent on individual projects that can take advantage of Muchea's location and improved connectivity based on the combined Northlink and RAV10 access. For more general requirements (e.g. road transport operations and local demand) and for specialised processing (e.g. feed mills), there is likely to be already enough land in development with the combined Precinct 3, Harvis, CBH and Linfox developments (the latter two are outside of the Muchea Industrial Park area) to satisfy short and medium term demand. Together these account for a gross land area of 505 ha and might be expected to yield total net development sites of around 380 ha. Of this, transport-related uses are likely to account for around one-third to one-half of all demand. Depending on the outcome of development at Bullsbrook / North Ellenbrook, it might also be sufficient for long term needs.

It needs to be emphasized that some of these projects and their land uses (e.g. CBH, feed mill, concrete batching) are still in the planning/assessment stages. However, if they do happen, there is adequate land to accommodate their plans. Moreover, beyond these projects, further demand will likely emerge only slowly. Full development will likely be outside of the planning timeframe.



Recommendations

Based on the analysis and consultations there are a number of things that could be done to facilitate Muchea developments:

- Clarify the long term relationship between Muchea and Bullsbrook / North Ellenbrook, particularly with regards to priorities for services supply. It is possible that gas supply is viable for Muchea, but not Bullsbrook. This would enable some gas-dependent activities at Muchea (e.g. feed mills) but it might make necessary some other upgrades, e.g. better access to water supply.
- Confirm Muchea as the most southern point of RAV 9 and RAV10 access (current planning has proceeded on this basis).
- Allow or facilitate RAV10 access to all sites throughout the estate.
- Expand services and security at the common user road train assembly facility. Even with precinct wide access, this facility is still needed and basic services are required beyond just a hardstand.
- Review gas and general services access.
- Ensure local government policies for industrial development at the Muchea Industrial Park are commensurate with its role as a general industrial estate.

1. Introduction

The Muchea Industrial Park is located approximately 55 km north of Perth at the intersection of the Great Northern Highway and the Brand Highway. The area encompasses 1,167 ha in total, across five precincts, including 896 ha of developable land (refer Map 1.1).

The majority of Precinct 1B is occupied by the Muchea Livestock Centre and owned by the Western Australian Meat Industry Authority (WAMIA). Precinct 1A is majority owned by Harvis, a real estate fund manager, currently developing the area as part of the Northern Gateway Industrial Park. A local structure plan and preliminary subdivision approval for 12 industrial lots have been approved. A development application for a large BP service centre and truck stop as part of the Northern Gateway development was approved in June 2019. A Local Structure Plan and Scheme Amendment for industrial zoning has recently been lodged with the Shire of Chittering on behalf of landowners in Precinct 3 and is currently under assessment.

Table 1.1 Muchea Industrial Estate, Land Use by Area (ha)

Use	Area (ha)
Industrial Land	896
Conservation reserves, environmental protection areas and drainage	221
Roads	50
Total	1,167

The purpose of this report is to provide the Department of Planning, Lands and Heritage, on behalf of the WAPC, a Land Demand and Economic Assessment that can inform an update of the Muchea Industrial Park (MIP) Structure Plan.

This assessment is informed by:

- A review of previous demand studies for Muchea and other relevant industrial areas;
- A review of available data;
- Individual consultation and meetings with key stakeholders, including:
 - Key users and potential users;
 - Landowners and developers;
 - Infrastructure and regulatory agencies;
 - Transport industry representative bodies;
 - Transport industry operators.



2. Planning background and context

2.1. Muchea Industrial Park

The current position and configuration of the Muchea Industrial Park reflects the history of planning studies and policy decisions affecting the outer North East metropolitan area.

The North East Corridor was originally identified in the 1990 Metroplan (Department of Planning and Urban Development, 1990), including regional open space, rural/non-urban uses, major industry and future urban development. Subsequently, the North-East Corridor Structure Plan (Ministry for Planning, 1994) provided more detail and guidance on planning in the corridor. In 1996, the State Planning Strategy (Western Australian Planning Commission, 1996) identified an extension to the North-East Corridor as a core area for future structure planning. This incorporated an urban settlement of 5,000 to 10,000 people in the general vicinity of Bullsbrook, a strategic industrial site/employment node, a new town near Bindoon and a possible extension to the combined Strategic Freight and Tourist Road Network.

More recent strategies have formalized details of planning for the area and embodied employment planning for the area.

- **WAPC: North-East Corridor Extension Strategy (2003)**

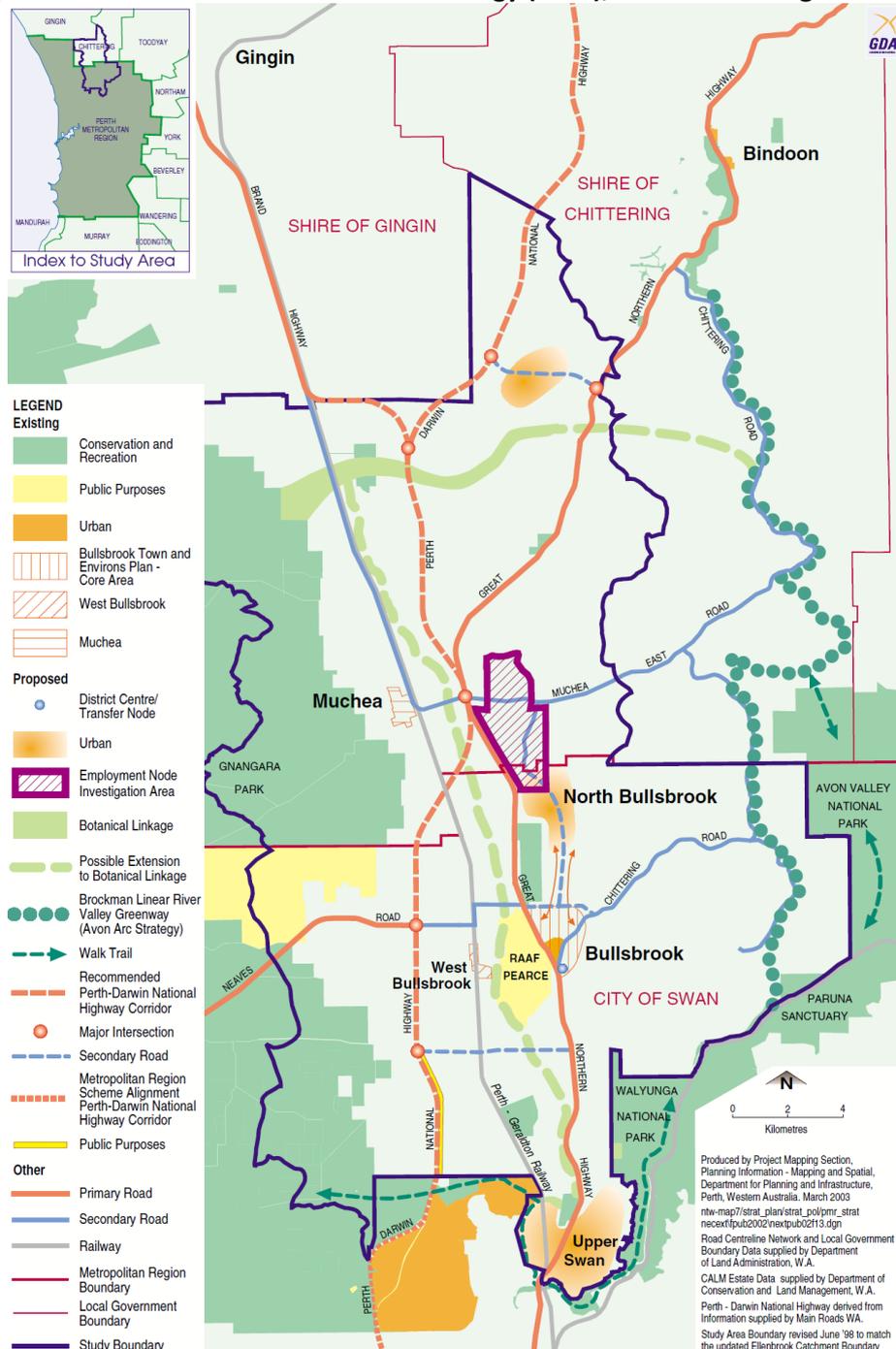
The Western Australian Planning Commission released the North-East Corridor Extension Strategy in 2003. This Strategy identified an Employment Node Investigation Area located on the Chittering and Swan local government borders. (See Figure 2.1) The previous planning documents had indicated the need to make provision for a strategic general industrial site/employment node within the southern portion of the study area between the Gngangara Groundwater Mound and Great Northern Highway, possibly in the southern vicinity of RAAF Base Pearce. An employment node was identified in the draft North-East Corridor Extension Strategy to the south-west of RAAF Base Pearce. However, public submissions on the draft strategy, including comment from the Environmental Protection Authority, indicated a lack of support for the proposed site due to environmental concerns.

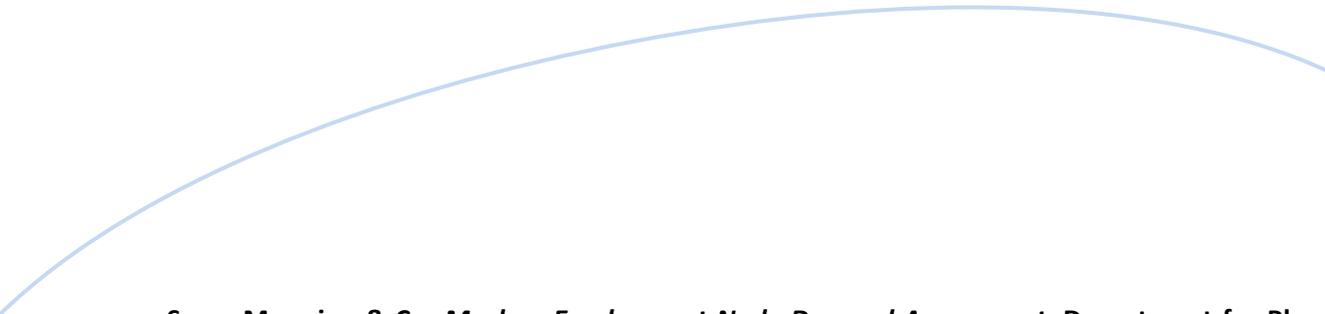
A site for the employment node investigation area was ultimately identified in the middle of the study area on the Chittering and Swan local government borders to the east of Muchea and the Great Northern Highway. The employment node identified in the final strategy was predominantly service based, including commercial, warehousing and wholesaling industries. Heavy industry or noxious industries were not to be accommodated. The area was intended to provide 550ha (net) of general industrial employment area for the residents of Ellenbrook, Egerton and The Vines as well as the future residents of the study area. A general area of 1,172ha (gross) was identified to accommodate this and other proposed land uses.

No detailed rationale is given in the Strategy for the precise boundaries of the Employment Node Investigation Area. However, it is noted that preparation of the Land Use Management Plan (shown in Figure 2.1) was guided by an Opportunities and Constraints Map, based on 106 variables grouped into 10 categories. The Employment Node Investigation Area, and an adjacent potential urban area to the south, is in an area with relatively few development constraints.

Around this time the WA Meat Industry Authority (WAMIA) began implementing the relocation of the livestock centre in Midland to a portion of the Employment Node Investigation Area, north of Muchea East Road. It was thought possible that relocating the livestock centre to Muchea would provide the opportunity for complementary uses to be located in the area. The WA Meat Industry Authority (WAMIA) opened the Muchea Livestock Centre in May 2010 on a 302 ha site. To date, the anticipated complementary uses have not materialised.

Fig 2.1: North-East Corridor Extension Strategy (2003), Land Use Management Plan



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- **Syme Marmion & Co, *Muchea Employment Node Demand Assessment*, Department for Planning and Infrastructure, October 2007; and**
 - **Syme Marmion & Co and Connell Wagner, *Demand Assessment Muchea Employment Node*, November 2007**

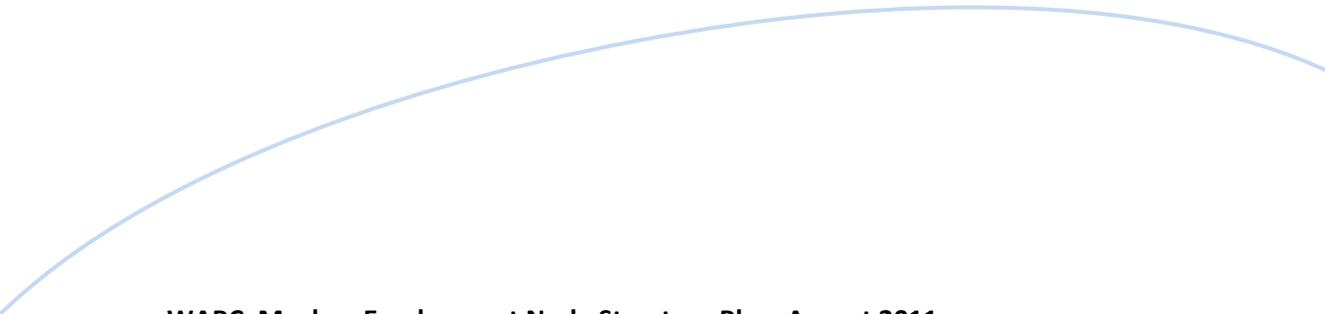
This demand study, undertaken in 2007, assessed the potential future demand for appropriately zoned employment land within the Employment Node Investigation Area. The analysis assessed the likely base demand generated by the projected population in the region, primarily the local population in the Shire of Chittering. It also estimated additional demand likely to result from metropolitan “spill-over” uses complementary to existing and planned uses and uses likely to take advantage of the strategic location of the site adjacent to major transport routes.

The area was not regarded as a premium location for industrial land. It was seen as being poorly located compared with other existing and potential industrial locations to the south in the Perth metro area. At that time, the only rationale for development, in the short and medium terms, was the anchor of the WAMIA operations and the site’s location at the intersection of Brand and Great Northern Highways. There was also the remote possibility of a brickworks being developed to take advantage of the clay mining on the site.

The analysis showed demand in several categories:

- Local Demand for up to 60 - 70 ha of local level industrial land in the short term and up to an additional 70 - 80 ha over the subsequent 30 years, to a total of up to 139 ha over a 30 year timeframe.
- Complementary Uses to Existing and Planned Uses: It was considered that additional uses associated with the WAMIA operations could locate to the area, but be predominantly on the WAMIA site. There was the possibility of some commercial operators wishing to locate near the WAMIA site, but in a more visible location (on Great Northern Highway) with approximately 10 ha sufficient to cater for these businesses.
- The Midland Brick clay extraction activities in the area and the sites relative proximity to the rapidly growing north-west metropolitan development corridor, raised the possibility of a brickworks operation in the region at some time in the future, albeit Midland Brick had no plans for a brickworks in the foreseeable future and therefore the likely demand for a brickworks located at Muchea was seen as uncertain.
- Transport: There was evidence to suggest that the Muchea location would provide an advantage for businesses involved in transporting large equipment and other goods to locations in the Mid West and North West region. The likely lower cost of the land would enable some businesses involved in manufacturing and storage of equipment used in mining operations to the north to manufacture, store, service and maintain goods and equipment for the mining regions. Up to 95 ha of land was anticipated to be required for these businesses over a medium to long term timeframe.
- The anticipated price advantages of the land at Muchea was seen as likely to attract metropolitan “spill-over” for industrial land uses, with that up to 50 ha of land required to cater for this demand

The overall level of demand for industrial land in the Muchea area was anticipated in the study to be up to 294 ha of general industrial and service commercial land for all purposes, in addition to the WAMIA site of 302 ha to arrive at a total of 596 ha of land.



- **WAPC, Muchea Employment Node Structure Plan, August 2011**

The Muchea Employment Node Structure Plan was released in 2011. This provided a 20 year land use planning framework. It draws on the demand analysis contained in the 2007 Connell Wagner / Syme Marmion report. It is noted in the Plan that the Shire of Chittering's preference is that industries that would impact on the amenity of Muchea and surrounds should not be allowed to set up in the employment node. However, complementary agri-industry businesses that would not impact on the amenity should be encouraged.

The Structure Plan includes as 'Proposed Industrial Development' all the land identified as Employment Node Investigation Area in the North-East Corridor Extension Strategy (2003) – Precincts 1, 2 and 4 east of Great Northern Highway - and adds land to the west of the Highway (Precinct 3), Precinct 1A (the Harvis site) to that category and removed the area of land in the City of Swan from the Structure Plan area. (Figure 2.2).

The Structure Plan notes the following services availability:

- Stormwater: On-site management of stormwater will occur in a staged manner concurrent with subdivision and development.
- Sewerage: The preferred option for the structure plan area is for treatment in a centralised wastewater treatment plant. The provision of deep sewerage and a wastewater treatment plant could be considered in conjunction with the demand for new or additional capacity in the Shire and wider area such as at the Bullsbrook wastewater treatment plant. A suitable site for a wastewater treatment plant was to be identified as part of local structure planning.
- Water supply: Local water resources are considered as a source of reticulated water supply on a site specific and land use basis. Local surface water supplies are not suitable due to a lack of consistency of supply and water quality issues. Rainwater tanks and hardstand harvesting are available for supplementary supply but would not be sufficient for a primary supply. There is groundwater available through bulk water suppliers. Preliminary discussions with suppliers and utility service providers indicated they are prepared to supply water for a potable scheme – via water trading – and this source is the recommended option for supply of potable water for the employment node.
- Electricity: Western Power advised that to supply power to the employment node in the short-term, new 22 kV feeders out of the Muchea substation would be constructed. This would only be suitable to supply initial developments and would be conditional on sufficient substation capacity existing at the time of development. Initial predictions by Western Power were that two new 132/22 kV zone substations with three 33 MVA transformers per zone substation, would ultimately be required to service the industrial area
- Gas: There are no plans for the provision of reticulated gas to the Muchea structure plan area. The cost of installing a connection to the Dampier to Bunbury natural gas pipeline was significant. The demand for gas by the type of development expected in the structure plan area was not expected to justify the cost of installation.



- **Shire of Chittering, Local Planning Strategy 2018, DRAFT**

The Shire of Chittering Local Planning Strategy (2019) was approved by the Western Australian Planning Commission in July 2019. The Strategy supports industrial development within the Muchea Industrial Park and seeks to limit the introduction of further sensitive land uses within one kilometre of the estate, to allow development of the Park with a range of industrial uses and to ensure that any amenity impacts from the estate do not affect sensitive land uses. By containing the Shire's industrial activity within the Muchea Industrial Park, the aim is for rural land to be retained for primary production, rural based activities and natural resource management, while retaining the Shire's natural and rural landscape character and rural amenity.

- **Lucid Economics, Muchea Industrial Estate Demand Assessment, Shire of Chittering, September 2018**

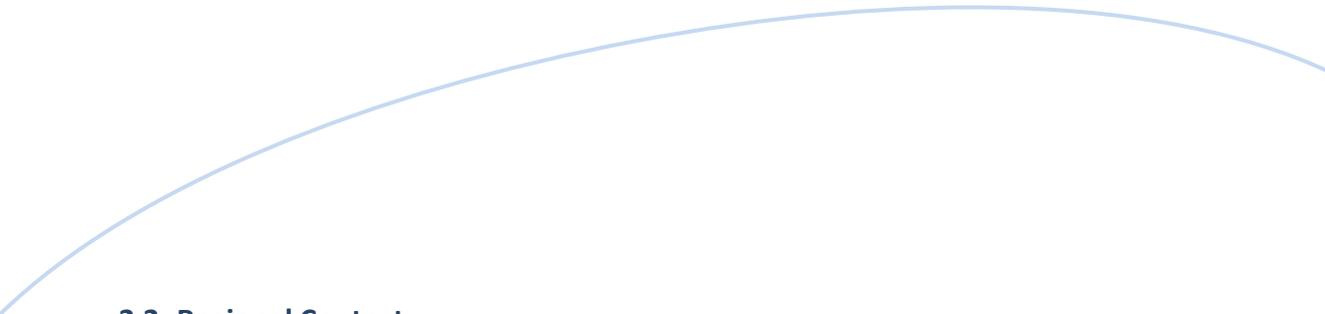
The Shire of Chittering engaged Lucid Economics to conduct a demand assessment for the Muchea Industrial Estate in 2018. The Lucid report identifies the following attributes making the Muchea Industrial Estate potentially attractive as an industrial area:

- NorthLink.
- Cost Advantages compared with other industrial areas in Perth.
- Access to Great Northern Highway.
- Muchea Road Train Assembly Area.
- Muchea Livestock Centre.
- Availability of utilities.
- Existing Industries.
- Growing Future Workforce Pool.

It suggests that the Muchea Industrial Estate is attractive for transport and logistics operators, some large-scale manufacturing operations and firms engaged in agricultural equipment sales and service and that demand for the Estate will be driven by a number of factors, including:

- Mining and agricultural activity in Western Australia;
- General economic conditions in Western Australia;
- Transport efficiencies created through the delivery of NorthLink;
- Cost advantages that the area can provide to developers and tenants;
- General lack of large industrial sites within the Perth Metropolitan region.

The report estimates demand for industrial land in the Estate by 2046 at a gross area of 800 ha, including roads, infrastructure corridors, buffers and environmental corridors. No detail is given on the breakdown of this estimate.



2.2. Regional Context

The future development of the Muchea Industrial Park now needs to be evaluated as part of the general development of industrial land within the Perth metropolitan area, particularly in the northern sectors. Northlink is the catalyst for changing the planning view of Muchea.

Previous demand analysis was undertaken on the assumption that the Northlink project (formerly called the Perth – Darwin Highway) would be a long term project and would only have a large influence on the Park in the very long term. On this basis, development was seen as relying on local factors – local demand, the presence of the WAMIA facility and the road train assembly area – with only a small amount of long term metropolitan “spill-over” development. Land at Muchea was seen as less attractive than land available closer to the Perth metropolitan area, particularly the large areas prospectively available at Bullsbrook and North Ellenbrook. From a broader metropolitan perspective, it lacked visibility and accessibility and, in the event, there has been little new development in Muchea since the construction of the WAMIA facility.

However, Northlink is now under construction, ahead of previous timeframes, fundamentally changing the positioning of Muchea within the broader industrial land market. Most importantly, Northlink will greatly increase the visibility of Muchea and it will have a significant effect on the accessibility of Muchea to the Perth metro area. It will now be seamlessly connected to the Perth metropolitan transport system.

The travel time reductions are substantial. For example, current travel times to Malaga (at the main Reid Highway / Tonkin Highway interchange) is now at least 40 -50 minutes, with multiple light controlled intersections. When Northlink is opened, this time will reduce to less than 30 minutes, with no controlled intersections. Suppliers operating from Muchea will be well connected to the Metro area, Mid West and North West with improvements to Great Northern Highway and construction of the Bindoon Bypass. Similarly, access to a large labour force at Ellenbrook will be 15 – 20 minutes and to the North West Corridor (e.g. Neerabup industrial estate and the nearest residential areas of the North West Corridor) around 30 minutes.

For a range of activities, Muchea is now emerging as a viable alternative for existing and planned industrial land in the metropolitan area, particularly the Bullsbrook / North Ellenbrook industrial precinct. Its improved connectivity and lower land prices make it potentially attractive for a range of activity relocations when firms currently occupying high value land but engaged in lower value land intensive activities come to make reinvestment or relocation decisions in the future.

Muchea is currently outside of the Perth Metropolitan area and as such has never been formally included in any supply and demand analysis of industrial land in the Perth metropolitan area. However, Northlink changes the economics of Muchea, such that it now should be seen within the broader Metro land market.

It is thus necessary to now review relevant research and policy for Perth metropolitan industrial land, and place Muchea in that context.



- **WAPC, Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions, 2012 (EELS)**

Base planning and demand analysis for light and general industrial land in Perth and Peel was completed 10 years ago¹ as part of the Industrial Land Needs Study (ILNS). This was the first time in many years that a comprehensive demand analysis of industrial land in the Perth metropolitan area had been undertaken. The subsequent key WAPC policy document, the *Economic and Employment Lands Strategy (EELS)*², is supported by demand modelling undertaken in the ILNS. However, it plans industrial land supply and demand in detail only to 2031.

For the **North East Corridor** there was a forecast total demand in the EELS of 1,646 ha by 2031. The region was expected to have a deficit of 117 ha by 2031, if no additional land were released to the market. A total of 3,400 ha of potential medium and long-term new land supply was identified, primarily in the Bullsbrook / North Ellenbrook area.

For the **North West Corridor** there was a forecast total demand of 2,442 ha by 2031, and the region was expected to have a deficit of 438 ha by 2031, if no additional land was released to the market. A total of 3,040 ha of potential medium and long-term land supply was identified, primarily in the Nowergup / Pinjar area.

Based on research and analysis, the demand modelling for the Industrial Land Needs Study and for the EELS used regional workforce size as the best predictor for non-heavy industrial land demand. However, it is apparent that the nexus between industrial land and workforce size is now weaker. This reflects the rapid incorporation of automated systems in freight and logistics, manufacturing and other industrial land uses.

The nexus between total population and industrial land demand endures and now appears more relevant. While employment densities in industrial estates that contain a high proportion of freight and logistics and manufacturing are declining, the economic activity being undertaken there is still essential to support the population and the land is required to accommodate that activity.

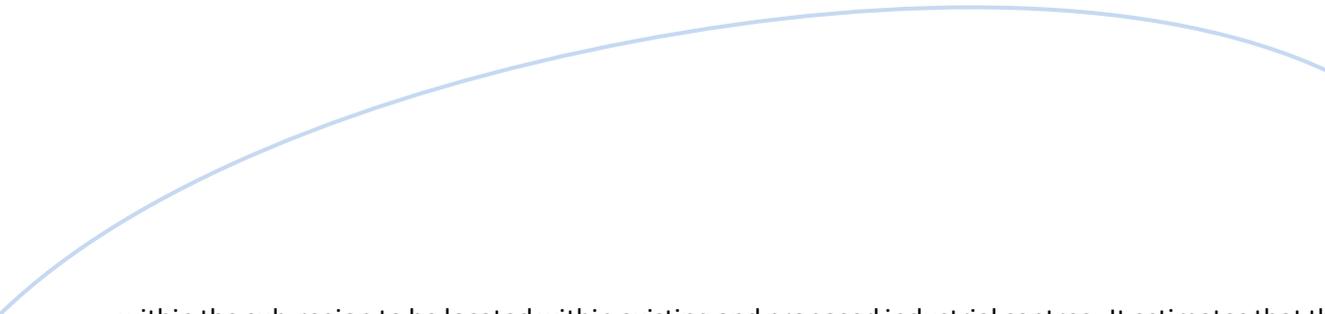
Thus, just as the population of the North-East sub-region area is expected to increase by a factor of 2.15 between 2011 and 2050, so the provision of industrial land in the area should approximately double. This is explored in more detail in Section 4.

North-East Sub-regional Planning Framework (WAPC, 2018)

The North-East Sub-regional Planning Framework (NESRPF) is an element of the Towards Perth and Peel @ 3.5 million suite of documents. The Framework expects a significant amount of future employment

¹ Syme Marmion & Co, Industrial Land Needs Study, LandCorp and DPI, 2008

² WAPC, Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions, April 2012



within the sub-region to be located within existing and proposed industrial centres. It estimates that there is approximately 760 ha of undeveloped industrial zoned land available within the sub-region.

The most significant industrial land provision in the Framework is an area of over 2,500 ha located at Bullsbrook and North Ellenbrook (generally to the south and west of the Pearce Airbase), which expands upon the Bullsbrook (South) industrial centre that is zoned industrial in the MRS. Of this 1,450 ha of land is classified Industrial Investigation in the Framework and this will require further planning to confirm its suitability for industrial use in the longer term. An intermodal (road–rail) freight terminal is proposed at Bullsbrook in the medium to long term, subject to future investigations.

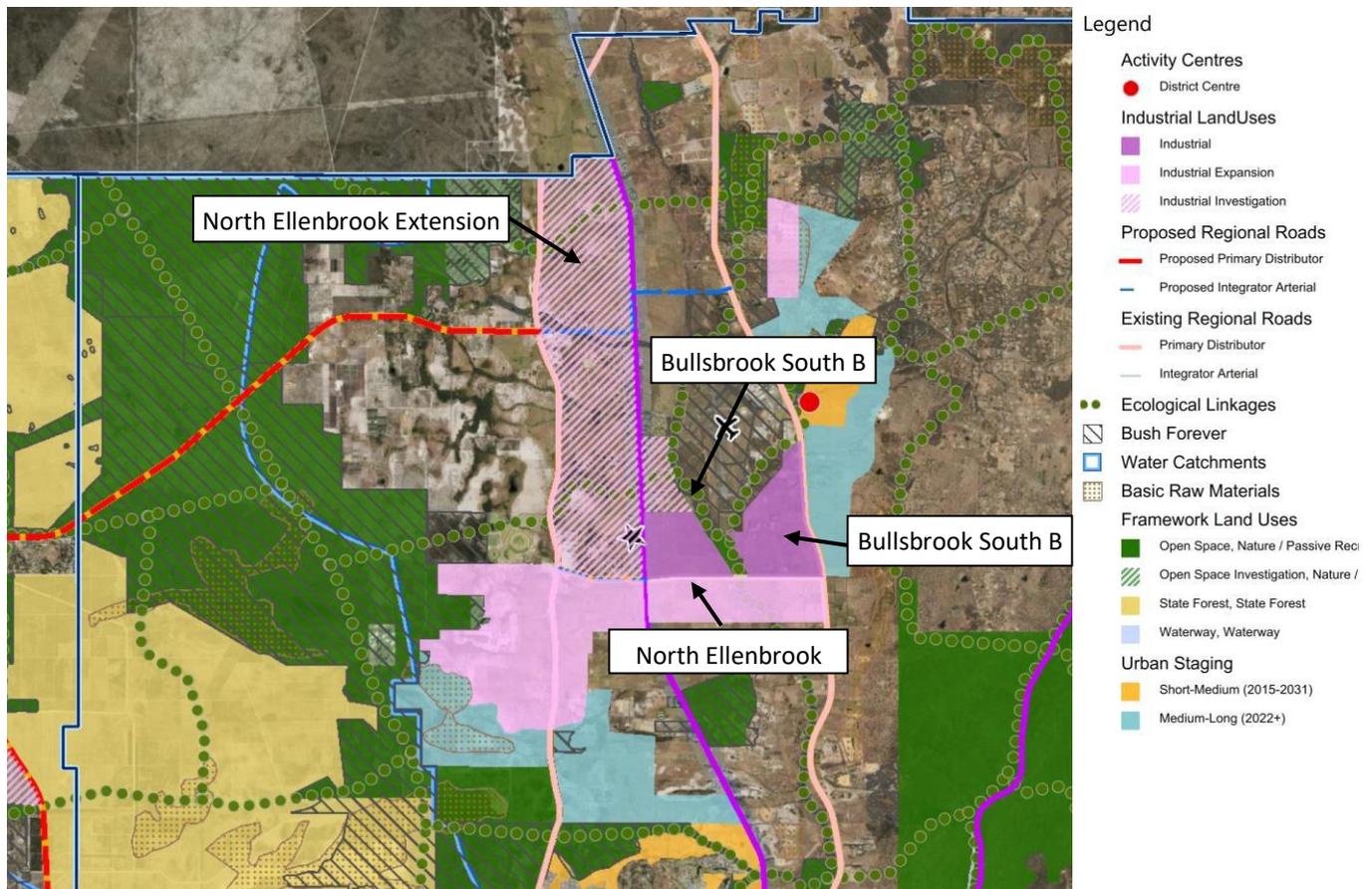
The amount of additional land identified for industry is based on projections in the draft framework scenario which indicate an overall demand for new land of approximately 2,810 ha to 2050. The projected demand for industrial land is based on average demand of 78.2 ha (gross) per annum that was adopted in the draft (2015) Framework. The basis of this take-up figure is not clear, but it appears to be based on historic take-up levels. The Framework estimates 3,580 ha (gross) of potential industrial land supply in the sub-region at 2015.

There is some interaction of industrial land demand between the North-East sub-region and the North-West subregion, particularly for the Bullsbrook / North Ellenbrook land. The North-West Sub-regional Planning Framework shows 3,260 ha (gross) of potential industrial land supply in the sub-region at 2015, with land demand of 1,770 ha to 2050. This is based on average demand of 49.2 ha (gross) per annum that was adopted in the draft (2015) Framework and indicates an ample supply of potential industrial land in the North-West sub-region. There is no reconciliation in the documents of the substantially different take-up rates assumed between the North-East sub-region and the North-West subregion.

MacroplanDimasi / GHD, Bullsbrook Freight and Industrial Market Needs Assessment, March 2019

The Bullsbrook / North Ellenbrook industrial area is in the City of Swan approximately 32km from the Perth CBD and around 15 km (or less than 10 minutes travel time on Northlink) south of Muchea. It covers a gross land area of 2,650 ha across four major precincts:

- Bullsbrook South Extension A: 300 ha gross (shown as ‘industrial expansion’ in the Framework)
- Bullsbrook South Extension B: 100 ha gross (‘industrial investigation’)
- North Ellenbrook: 900 ha gross (‘industrial expansion’)
- North Ellenbrook Extension: 1,350 ha gross (‘industrial investigation’).



Source: Department of Planning, Lands and Heritage

MacroPlan estimates that environmental constraints and infrastructure requirements in the area mean that the likely development yield may be around 50-70 per cent of the gross area or between 1,325 and 1,855 ha. It considers that the Bullsbrook Freight and Industrial Area could have two development fronts catering to different industrial needs, focusing on freight and logistics and the other providing land for general and light industrial uses. MacroPlan considers these combined could potentially achieve an average take-up of up to 20 ha per annum. This would imply a development timeframe of at least 70 years across the whole area, although increases in economic land use intensity over that timeframe might extend the supply beyond 2100. It uses similar take-up rates and methodology to those used in the WAPC Framework to arrive at these estimates.

As with Muchea, the timing of its development and the types of land uses are constrained by lack of services infrastructure, particularly water, sewer and telecommunications. MacroPlan proposes a typology of industrial estates, shown in Table 2.1 below and considers that all except heavy industry (category 1) are potentially applicable to Bullsbrook / North Ellenbrook. They could all also be applicable to Muchea.

Table 2.1: Industrial Land Typologies and Possible Application to Bullsbrook

	Industry	Size and description	Opportunity
1	Heavy / Noxious / Offensive (5-50ha)	Heavy industries. e.g. Oil refinery, aluminium smelter	Not a consideration for the subject site
2	Transport/ Warehouse/ Storage (2ha+)	Trend in manufacturing/ importing to outsourcing storage - distribution combined. Major transport routes emerging as transport and distribution hub for increased efficiency and delivery.	Proximity to rail network, major existing and planned arterial roads make this segment a key candidate for the subject site.
3	Manufacturing / Component Assembly	Component assembly manufacturers vary from extensive land areas to less than 2 hectares.	Based on the worker profile, this may be a target market for the subject site
4	Light Industrial & Trade Park	In this sector, greatest demand is for smaller blocks between 500sqm and 1,000sqm ranging up to 1 ha for light industrial/ small local businesses. Examples include engineering and mechanical workshops. Less attention is paid to aspects such as landscaping, signage and setbacks. Lots and buildings tend to be at the more affordable end of the market.	The location attributes of the site in relation to transport and heavy haulage would suggest there is an opportunity to target mechanical workshops and related services.
5	Service Business Park (SBP)	SBP's attract a wide range of service providers and can include manufacturing and processing/ packaging/ distribution industries seeking a high amenity location as well as equipment hiring, places of worship, funeral directors and police and emergency services. Land parcel sizes 1000sqm to 2000sqm (up to 5000sqm).	This is the eventual evolution of the estate and could facilitate such uses once a critical mass is established. Manufacturing and distribution would be the target market segments.
6	Technology Parks	Similar block sizes to SBP, but high amenity values with high standards of landscaping and built form more akin to an office park. Land parcel sizes 1000 – 2000sqm (up to 5000sqm).	Not a consideration for the subject site in its initial stages.
7	Specific Uses	Restricted retail - large scale homemaker centres and showrooms Highway uses – car, boat and truck sale yards Recreation/entertainment - indoor complexes e.g. tennis, squash, basketball/netball, indoor cricket stadiums & outdoor activities such as motor sports e.g. go-carts Agri-business– packaging and processing, including for interstate and overseas exports.	There is an opportunity in this segment to provide for the rural sector. In the way of production, storage and distribution of rural products due to its location and historic land use.

Source: MacroPlanDimasi

MacroPlan provides a breakdown of the land uses at various development stages for Bullsbrook and North Ellenbrook. These are shown in Table 2.2.

Table 2.2: Industrial Land Typologies and Possible Application to Bullsbrook

Precincts	Initial land development and uses	Additional growth phase development and uses	Additional mature development and uses
Bullsbrook South Extension A & B	Freight and logistics - road Value-added industry (packaging, processing)	<i>Potential</i> for intermodal facility (small scale)	Enterprise / business park including technology and training precinct
North Ellenbrook	Small-scale service commercial and light industry	General industry	Business/office park
North Ellenbrook Extension	Mining industry autonomous vehicle 'test-bed'	Logistics- road freight and warehousing	Freight and logistics- rail intermodal with full customs and quarantine services

Source: MacroPlanDimasi



3. Current Uses and Projects

Notwithstanding the various demand analyses already carried out, until recently Muchea has experienced no significant developments post WAMIA. However, largely reflecting the accessibility improvements due to Northlink, new activities are now being planned. They have the potential to change Muchea substantially. An examination of the current projects underway and in prospect at Muchea gives a good indication of its short, medium and even long term future. There are four main facilities and projects in and around the Muchea Industrial Park. They are shown on Map 3.1.

- **WAMIA**

The WA Meat Industry Authority (WAMIA) opened the Muchea Livestock Centre in May 2010 on its 302 ha site. It was a replacement for saleyards at Midland. Muchea Livestock Centre is the largest dual species undercover livestock selling facility in Australia. Annually, it currently handles around 100,000 head of cattle (mainly from the north) and 600,000 sheep. There is likely to be little change to the WAMIA operations in the short to medium term.

WAMIA is currently considering excavating and selling sand from a hill at the northern end of the property. The resulting level area could be a site for a feedlot to allow for resting of cattle prior to sale. There may be other opportunities for small scale developments on the property. The WAMIA Board is happy to allow further developments as long as it does not interfere with current operations.

RAV 10 access is seen as a major planning issue for WAMIA. With the upgrade of the Wubin-Muchea road, allowing RAV10 access to Muchea, WAMIA is seeking RAV 10 access to the site with an upgrade of Muchea East Road. Uncoupling trucks at the road train assembly common user facility near the BP service station is seen as unacceptable, because of animal welfare and security issues. Direct RAV 10 access would also reduce truck movements by 10-15 per week.

- **Precinct 3 (RTA / IPG)**

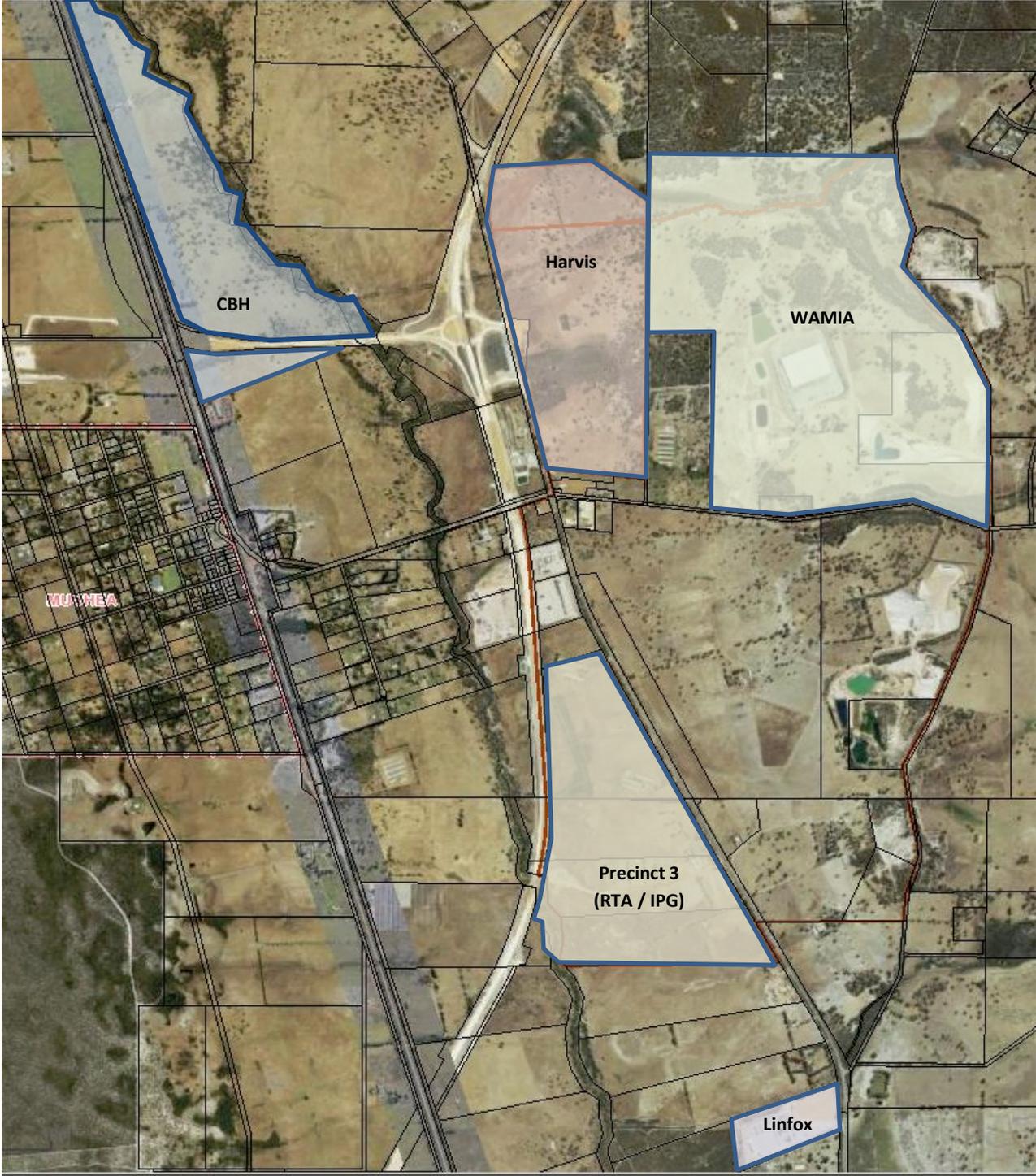
Precinct 3 is currently subject to structure planning by the landowners to facilitate industrial development. The lots are owned by Road Trains Australia (RTA), represented by Tomahawk Property, and by the Ingham Property Group (IPG). These have a gross area of 206 ha and might yield around 155 ha (net) of developed sites. The plans are for a loop road with RAV10 capability to link all lots developed in the Precinct. The first stage in the southern-most lots is now in preparation. Developed lots will be 3 ha – 5 ha., with capacity for provision of larger sites. The sites will initially be used by the developer (RTA) as a transport yard for its own purposes (RTA carts cattle, fuel, cement and crude oil). They plan to operate cement silos to hold bulk cement and are seeking permission to build a concrete batching plant.

Second stage development is not likely within 5 years.

The developers report interest from other transporters, shed builders and machinery suppliers, and clients of fuel suppliers. Their aim is to attract businesses that service transporters. They identify the main competitive advantages for Muchea to the transport industry as land price and the availability of

large lots, with Northlink as the main catalyst. Water and gas availability (lack thereof) are identified as key land use constraints.

Map 3.1: Muceha: Main Projects

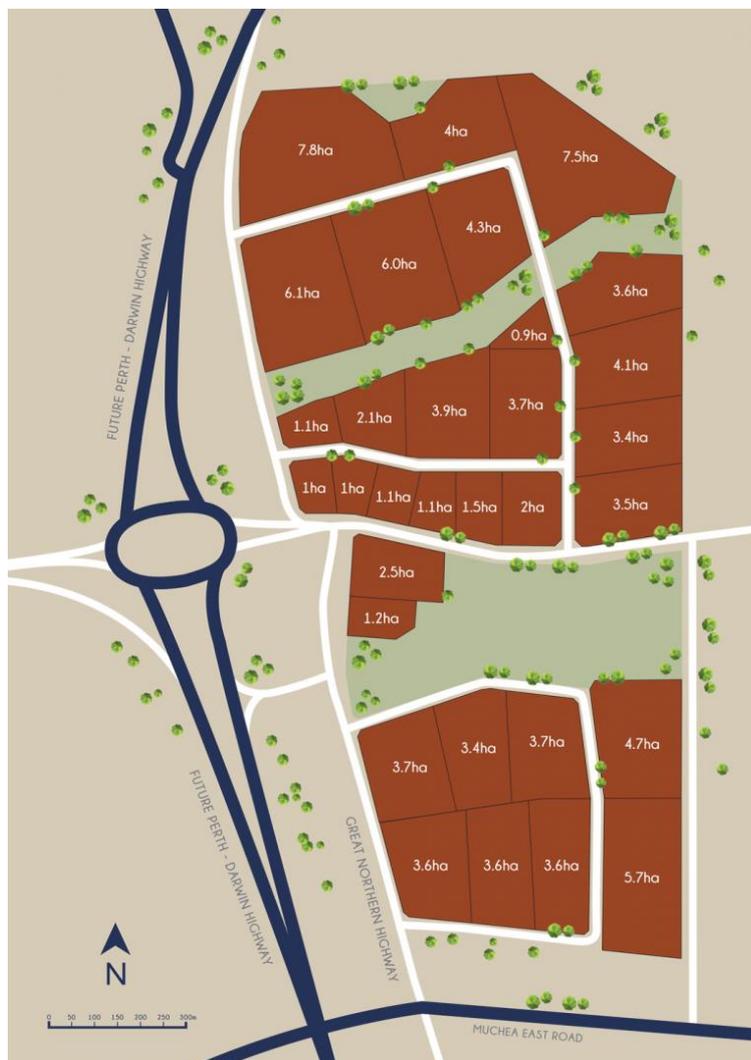


- **Harvis**

Harvis Capital is developing a key site at the relocated main intersection of Great Northern Highway and Brand Highway in Precinct 1A. It has a gross area of 147 ha. Lots available range from 0.5 ha to 17 ha, with most at 3 ha – 5ha (see map 3.2). Roads are configured for RAV10 access. Preliminary subdivision approval was issued in May 2018 with works proceeding to clear conditions of approval.

A water source is arranged from a private potable water supplier, with storage and dosage on the property. There is no wastewater plant at present. Anticipated land uses include freight (transport), mining and drilling contractors and dump truck trays. 2.5 ha of land has been pre-sold to BP for a diesel cellar.

Harvis estimates it would cost around \$1 million to get gas to the Muchea site and this is within the capability of an individual developer to provide, if demand justifies it. Proximity to the main gas tap is important as it is prohibitively expensive to install a new tap. Bullsbrook is further away and it is consequently seen as less viable for an individual developer to provide gas there.



Map 3.2: Harvis Development Subdivision Plan

Feed mills are an obvious candidate for gas use on this site. However, there may be a question of the odour conditions of feed mills to be addressed and its impact, if any, on other users. It is not known whether the proximity of the WAMIA saleyards would deter the establishment of a feed mill on the Harvis land.

Harvis are also developing a 200 ha site at Bullsbrook on Stock Road with railway access. The main objective for this site is as an intermodal transport depot and assembly point for containerised inbound goods for assembly and packaging for north-west markets. Gas will not be available for this development.



- **CBH**

CBH has acquired 132 ha of land at Muchea with rail frontage. This is close to, but outside of the Muchea Industrial Park area. This is part of an overall CBH Network strategy to rationalise older less efficient upcountry sites:

- To optimise the time from the paddock to receival site delivery rotations;
- By building larger receival sites and phasing out smaller sites; and
- Seeking productivity improvements.

Grain production in the CBH Areas 3 and 4, including Eneabba to Moora and south to Muchea, are generating improved yields from advanced agronomic practices, resulting in greater grain movements. The current facilities at CBH Forrestfield are for the purpose of value adding and cannot be accessed by RAV10 vehicles. CBH would prefer rail movements for any agri-business precinct. The CBH Muchea site will allow a greater capacity of grain to be moved to the Kwinana port via rail and this will reduce the number of trucks carting grain from the northern corridor across the city bypass roads to the port.

Current CBH plans for Muchea land are for a rail-based inter-modal agri-business precinct with:

- Segregated grain bulk receival and storage for approximately 400,000 tonne of grain for hubbing on rail for delivery to the CBH Kwinana port terminal then for export.
- Receival of containerised hay for export, involving up to 4,000 containers annually.
- Out-turn of grain for the domestic feed market.

CBH envisages co-location of complementary industries. These might include:

- Container loading (20Ft and 40Ft).
- Grain value-adding, including cleaning, drying, grading and bagging for different grain types. This might involve approximately 5,000 containers annually.
- Feed milling. These would require access to gas, water and power. This appears to be achievable on this site.
- A renewable energy group is interested in converting various agricultural waste materials to provide a micro-grid energy service across the precinct development.
- Consolidation of industrial bulk materials onto rail to Kwinana. This may also have gas and water requirements.
- Truck & transport freight services, including refuelling and convenience facilities.

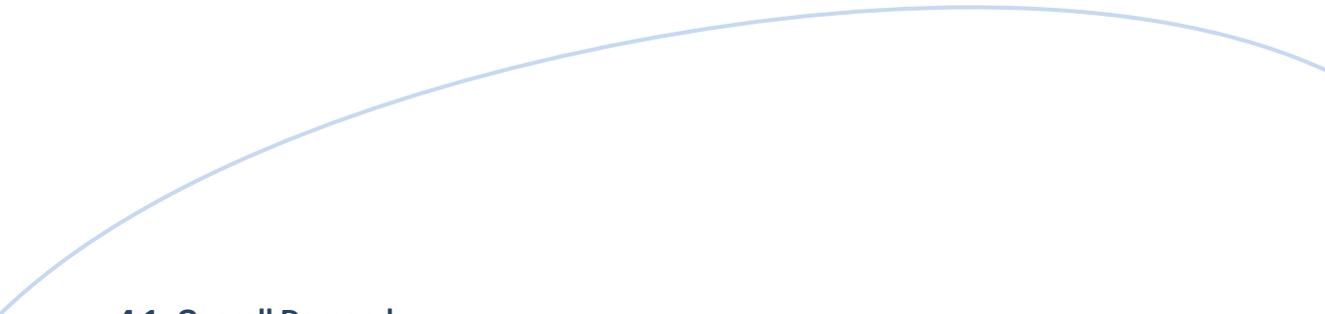
- **Linfox**

Linfox has a 19.8 ha site at 3241 Great Northern Highway, in the City of Swan and immediately south of the Muchea Industrial Park area. The site contains 60,000 m² of sealed industrial hardstand and 37,347 m² of unsealed laydown area. It is used as a transport yard and freight load assembly area for loads to the north-west and for storage of large items such as dump truck tyres. Their intention is to use it a road train assembly point when RAV 10 access is available.

4. Assessment and analysis

Key points

- There is a surplus provision of future of light and general industrial land in the North East and North West sub-regions and a substantial deficit in provision in the Metro South / Peel sub-region.
- This is partly due to the effective inclusion of Muchea into the North East sub-region industrial land supply equation, made possible by the Northlink project.
- The population of the North East sub-region is projected to grow by 241,430 from 209,150 at 2011 to 450,580 by 2050. Depending on the analysis used, this implies a demand for new industrial land of between 2,580 and 3,444 ha (net). Potential new supply identified in the North East Sub-regional Framework for long term development is 3,580 ha (gross – around 2,680 ha net) excluding Muchea. With the addition of Muchea to the prospective land supply, and allowing for gross area to net industrial land adjustments and the different time scales for each of the above demand estimates, overall this would suggest a surplus provision in the planning framework for the sub-region of around 625 ha (net) or 830 ha (gross) for the period 2015 - 2050.
- The implication is that development on one of the major estates in the North East sub-region will delay or curtail development on others. Not all land in Bullsbrook /North Ellenbrook and Muchea will be developed to its short and medium term schedule, or even meet long term development expectations.
- There is a range of potential supply of industrial land in the Perth metro area overall, demand estimates for any part of it need to consider:
- Population factors:
 - Access to skilled labour;
 - Access to customers and end uses;
- Location factors – access to:
 - Import /export transport routes;
 - Local distribution and servicing transport routes;
- Agglomeration economies, i.e. access to goods and services in the value chain.
- Muchea scores well on some transport-related location factors, but not as well as locations closer to population centres in the Perth metropolitan area for population factors. This reinforces the likely focus for Muchea as long-haul transport and agricultural products and livestock handling.



4.1. Overall Demand

4.1.1 Metropolitan Context – Industrial Land Supply

The North East Sub-Regional Framework shows a total of 3,580 ha (gross) of vacant land identified for industrial use (i.e. already zoned industrial or categorised as Industrial Expansion or Industrial Investigation) in the sub-region. At around 2,760 ha., the Bullsbrook / N Ellenbrook complex (including the Bullsbrook Town-Site Precinct North) is the largest component of this. The Framework also shows an estimated 760 ha of undeveloped land that is zoned industrial in the North East sub-region. This does not include existing zoned land which has already been developed.

Table 4.1 provides an examination of the sub-regional industrial land supply and the potential but unzoned industrial land between the EELS and the Sub-regional Framework:

- at 2011/2012 (from the 2012 Economic and Employment Lands Strategy - EELS³); and
- the potential but unzoned industrial land at 2018 (i.e. Industrial Expansion and Industrial Investigation in the Framework); plus
- land that had been identified as potential in the EELS and has since been zoned industrial.

It shows that in 2011/12 the EELS estimated a total of 5,165 ha of land in the sub-region either zoned for industrial use (of which 1,458 ha was developed for this use in 2011 /12) or assessed as having the location and land characteristics to make it suitable for industrial development in the short, medium or longer term.

In the 2018 Framework, some parcels of land previously identified in EELS with industrial potential have been zoned urban (chiefly those near the new Forrestfield rail station), some new parcels have been added and the potential of some has been refined. However, there is little difference from the 2012 EELS estimate. Using the data in the Framework shows an estimated gross total of 5,141 ha of land either currently zoned industrial or with the location and land characteristics to make it suitable for industrial development in the short, medium or longer term.

³ WAPC, Economic and Employment Lands Strategy: non-heavy industrial, Perth metropolitan and Peel regions, April 2012

Table 4.1: Industrial Land Estimates

	EELS (2012)	NESRPF (2018)	
<i>Zoned Industrial</i>	<i>Ha.</i>	<i>Ha.</i>	
Developed	1,458		
short term	37		
medium	100		
long term	170		
Zoned Industrial (at 2011 /12)	1,765	1,765	
<i>Additional (includes land yet to be zoned industrial plus land zoned for industrial land use since 2011/12)</i>			
Forrestfield 1	71	-	Now zoned urban
Hazelmere S	100	50	
Wattle Grove		10	
Whiteman	85	85	Now zoned industrial (not in NESRPF)
North Ellenbrook	2,428	2,250	
Forrestfield 2	22	-	Now zoned urban
Forrestfield 3	108	-	Now zoned urban
Bullsbrook S	471	471	Now zoned industrial (not in NESRPF)
Bullsbrook S Extension		400	
Bullsbrook townsite	115	110	
Total Additional	3,400	3,376	
Total Zoned and Potential	5,165	5,141	

Source: EELS, NESRPF, SMCo

4.1.2 Sub-regional Industrial Land: Demand Factors

The North East Sub-regional Framework estimates a total ‘gross demand’ of 2,810 ha of industrial land in the sub-region by 2050. This estimate appears to be calculated on the assumption of a linear average increase in land demand from 2015 to 2050. This estimate and its context are worthy of examination.

Forecasting industrial land demand is a tricky business. Base planning and demand analysis for industrial land in Perth and Peel was completed over 10 years ago for the Industrial Land Needs Study⁴ (undertaken by SMCo for LandCorp and the WAPC). This demand modelling formed the basis for the subsequent key WAPC policy document, the Economic and Employment Lands Strategy (EELS), which included supply and demand analysis to 2031. Based on considerable research and analysis, the demand modelling used projected sub-regional workforce size as the best predictor for non-heavy industrial land demand.

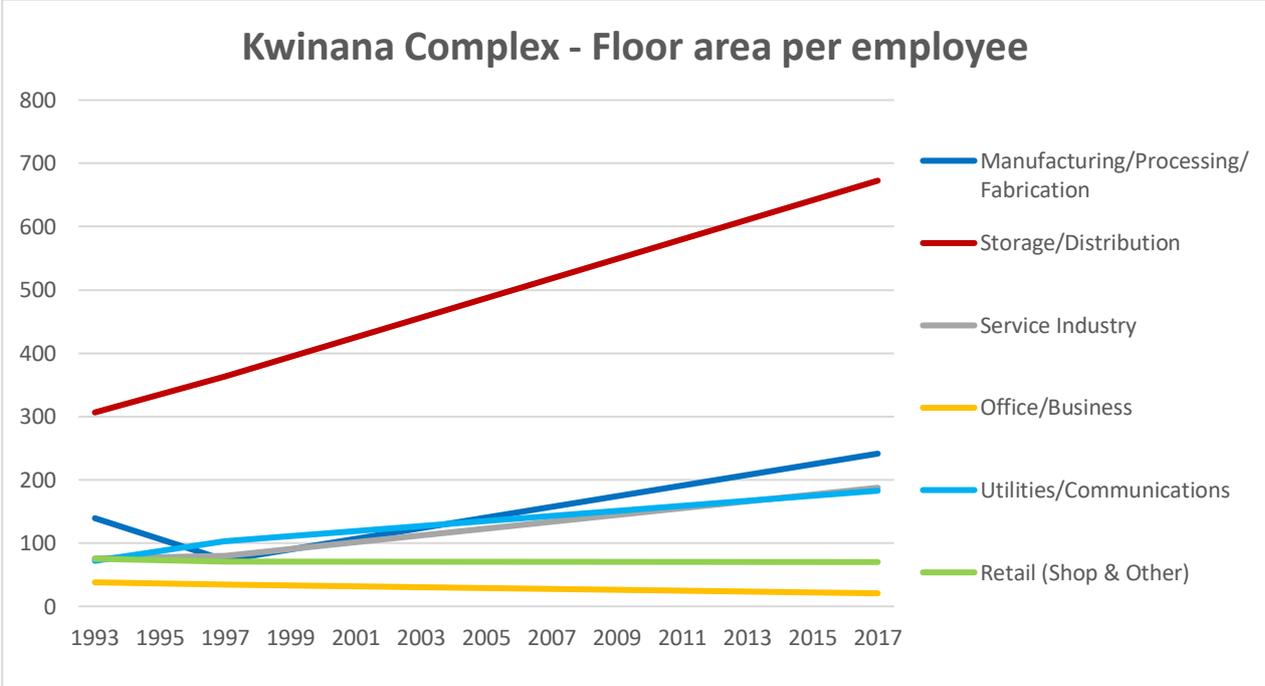
However, as noted previously, this relationship between industrial land and workforce is almost certainly changing. With the rapid incorporation of automated systems for some categories of industrial land use,

⁴ Syme Marmion & Co, Industrial Land Needs Study, LandCorp and DPI, 2008

particularly freight and logistics and some categories of manufacturing, it is apparent the nexus between industrial land and workforce size is now weaker. Although there are few research studies of the demand for industrial land this idea is being recognized. For example, a recent study of industrial land demand in the Netherlands has found that the relationship between employment and industrial land demand is non-linear but that overall, employment is not a reliable indicator for forecasting long term industrial land demand.⁵

To illustrate, the changes in floorspace employment densities in the Western Trade Coast (including the Kwinana Industrial Complex and Henderson) are shown in Figure 4.1. Similar patterns have emerged in other major industrial areas.

Fig 4.1: Western Trade Coast – Floorspace Employment Density

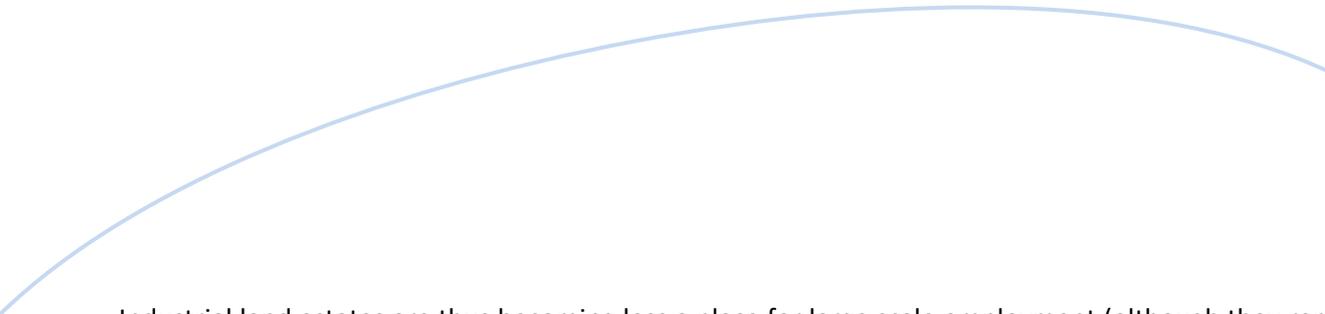


Source: WAPC Land Use and Employment Surveys, 1993, 1997, 2017.

While the most marked decrease in employment density has been in storage/distribution uses, only retail and office / business uses have not shown a decrease in floorspace employment density.

However, it is likely that the nexus between total population and industrial land demand endures. While employment densities in industrial estates that contain a high proportion of freight and logistics and manufacturing (East Rockingham is a good example) are declining, the economic activity being undertaken there is still essential to support the population and the land is required to accommodate that activity.

⁵ Beckers, P. and Schuur, J. (2015) ‘The Future Demand for Industrial Sites in the Netherlands: Is Employment a Good Predictor?’, *Regional Studies*, 49(9), pp. 1535–1547. doi: 10.1080/00343404.2013.838320.



Industrial land estates are thus becoming less a place for large scale employment (although they remain important employment locations) and more a location for economic activity to serve the wider economy.

The underlying land demand and economic activity to accommodate the increase in floorspace remains. A recent review of industrial land forecasting models has concluded that incorporating economic output measures such as gross value added (GVA)⁶ will improve forecasts compared to linear extrapolation of land use (e.g. using take up rates). However, that data is not always readily available.⁷

Using a regional population-based predictor for industrial land demand is closely aligned to the workforce model that was previously used in the ILNS and EELS and it has some correlation with economic activity. It has the advantage over other predictive models (for example using growth projections based on historic take-up rates) in that it can better reflect the underlying general economic activity in a region or sub-region. Predictive models based on historical take-up rates assume the conditions in the future will be much like those in the past. However, in a region or sub-region where population growth departs from previous trends (either faster – as is currently the case in the South-West and Peel - or slower) industrial land demand is likely to not match past take-up rates.

Similarly, past-oriented predicative models cannot account for the effects of industrial land supply on local demand: sub-regional demand will appear to be high if local land availability and cost factors have led to a disproportionately large release of industrial land over an extended period. This has been the case in the north-east corridor over the past 10 – 15 years, with substantial development at Malaga and Hazelmere.

Thus, linear demand modelling based on historic take-up rates risks confusing relatively recent local industrial land supply with underlying economic demand. Note that this applies only to light and general industrial land – demand for heavy and strategic land requires more specific project and capability analysis.

4.1.3 Sub-regional Industrial Land: Overall Demand Estimates

The EELS identified 8,929 ha of developed industrial land across the Perth metropolitan area and Peel in 2011. The population was 1.838 million. This means there was 49 m² of industrial land per person overall. It was distributed reasonably evenly by population, ranging from 38 m² per person in the Central sub-region to 70 m² per person in the North-East sub-region. (See table 4.2). This was the actual supply industrial land supply at that time and, in the absence of any overwhelming constraints on supply, can also be taken as a good indication of demand at that time.

⁶ Gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy

⁷ Batista E Silva, F. et al. (2014) 'Estimating demand for industrial and commercial land use given economic forecasts', PLoS ONE, 9(3). doi: 10.1371/journal.pone.0091991.

Table 4.2: Perth and Peel Industrial Land, 2011

	South West	South East	Peel	Total (SM/Peel)	North West	North East	Central	Overall
Zoned Industrial	Ha.	Ha.	Ha.	Ha.	Ha.	Ha.	Ha.	
Developed	1,346	1,212	304	2,862	1,596	1,458	3,013	8,929
short term	97	70	34	201	25	37	96	359
medium	50	120	18	188	117	100		405
long term	57			57	266	170		493
Zoned Industrial at 2011 /12	1,550	1,402	356	3,308	2,004	1,765	3,109	10,186
Population 2011	235,160	196,340	91,930	523,430	322,490	209,150	782,970	1,838,040
Ratio (Developed land area m² per person)	57	62	33	55	49	70	38	49

Source: EELS, ABS Census

Industrial land demand and supply was remodelled for the Perth and Peel @ 3.5 Million Sub-regional Frameworks. Demand estimates are generally based on linear demand modelling based on historic take-up rates, with wide variations between the sub-regions. The combined Sub-regional Frameworks show an estimated 9,650 ha of additional industrial land demand across Perth and Peel between 2015 and 2050, to cater for an additional population of 1.869 million. This increase is at the rate of 51.6 m² per head of additional population across the period. However, the growth is spread unevenly, ranging from 42.4 m² per head of additional population in the metro North West to 116.4 m² per head of additional population in the metro North East, with no new land supply available in the Central sub-region.

4.1.4 Variations to Supply and Demand Estimates – Sub-Regional Framework Methodology

The Sub-regional Frameworks provide an estimate of potentially available industrial land (both zoned and undeveloped and not yet zoned industrial) for the 2015 – 2050 period. This is illustrated in table 4.3. The supply figures in the Frameworks have been modified in the Table 4.3 analysis as follows:

- Latitude 32 is excluded as potentially available light and general industrial land supply for the South metro / Peel sub-region. The buffer protected heavy and strategic land in the Western Trade Coast is in very short supply. It is an unusual and scarce resource – amongst the most crucial pieces of economic infrastructure in Western Australia – and cannot be easily replicated. The undeveloped land at Latitude 32 allows a relatively straightforward extension of the integrated Kwinana Industrial Area heavy and strategic industrial complex and it must be preserved for that use.
- The Mueha Industrial Park is included as potential industrial land supply for the North East sub-region. With the imminent completion of the Northlink major road project, this will functionally become part of the Perth metropolitan area and can be assumed into potential industrial land supply.

The gross area of potential industrial land supply is reported in the Sub-regional Frameworks. The base (2011 and earlier) data and take-up projections are reported as the area of net developed land. To account for this an efficiency factor of 75% is assumed to allow for roads, utilities, environmental requirements and public open space.

Table 4.3: Perth and Peel Industrial Land, 2015 – 2050 (Sub-Regional Frameworks Methodology)

Sub-regional Framework	SM/P Western	SM/P Eastern	SM/P Peel	South Metro/Peel	North West	North East	Central	Overall
Additional Population 2011 - 2050	242,980	259,430	238,610	741,020	417,800	241,430	468,900	1,869,150
Assumed Demand 2015 - 2050	2,390	1,725	955	5,070	1,770	2,810	0	9,650
Rate (ha / pa)	164.5	164.5	164.5	164.5	49.2	78.2	0	
Rate (m2 pp)	98.4	66.5	40.0	68.4	42.4	116.4	0.0	51.6
Identified Supply*				3190	3260	4580	0	11,030
Adjustment (gross to net @ 75%)				2393	2445	3435	0	8,273
Net Supply (Shortfall) to meet demand)				(2,677)	675	625	0	(1,377)

Ref: Perth and Peel @ 3.5 million Sub-regional Frameworks

The results show a comfortable surplus of potential industrial land supply identified in the North East (625 ha net, or around 830 ha gross) and North West sub-regions, but a considerable under provision of future industrial land in the Metro South / Peel sub-region and a net overall Perth and Peel future supply deficit of 1,377 ha. Note that the Central area is assumed to have no capacity for additional industrial land supply.

4.1.5 Variations to Supply and Demand Estimates – Population-Based Methodology

An alternative analysis can be provided by considering population as the primary driver of light and general industrial land at the sub-regional level. Table 4.4 shows this analysis. Using the population multiplier of 49 m2 of developed industrial land per person (that applied in 2011) to the forecast population growth between 2011 and 2050, a total of 9,080 ha of developed industrial land will be required across Perth and Peel over that period. This demand is adjusted for each sub-region to allow for the assumption that no new supply will be available in the Central area to cater for the implied demand of that population, distribution this demand on a per capita basis across the other regions.

Potential supply is as identified in the EELS for zoned but undeveloped industrial land, adjusted for those areas that have since been developed plus those identified in the sub-regional frameworks as potentially available in the future. The supply analysis thus includes Jandakot and Munster in the South West and Hazelmere South, Bullsbrook and Muchea in the North East in addition to the unzoned land identified in the respective sub-regional frameworks. The results are broadly similar to the previous analysis, showing a surplus provision in the North West (in particular) and the North East (around 417 ha net or around 555 ha gross) – noting that some of those estates would be largely functionally interchangeable – and a

substantial deficit in provision in the Metro South / Peel sub-region. This analysis allows us to pinpoint where that under-provision is mostly located – namely mostly in the South West and in Peel.

Table 4.4: Perth and Peel Industrial Land, 2011 – 2050 (Population-based Analysis)

	South West	South East	Peel	Total (SM/Peel)	North West	North East	Central	Overall
Total Demand 2050 at population ratio (2011/12 EELS ref)	2,323	2,214	1,606	6,143	2,189	3,596	6,081	18,009
Population Increase 2011 - 2050	242,980	259,430	238,610	741,020	128,090	531,140	468,900	1,869,150
Increased demand at population ratio	1,180	1,260	1,159	3,600	622	2,580	2,278	9,080
Adjustment (allow for no Central supply)	17%	19%	17%	53%	9%	38%		100%
Adjusted regional demand 2011 - 2050	1,576	1,682	1,547	4,805	831	3,444	0	9,080
<i>Of which, total in land yet to be zoned</i>	<i>1,372</i>	<i>1,492</i>	<i>1,495</i>	<i>4,359</i>	<i>423</i>	<i>3,137</i>		7,823

Supply

Identified: Sub-regional Framework plus EELS - developed since 2011)	198	1,832	1395	3425	3260	5151	0	11836
Adjusted Supply (gross to net @75%)	149	1374	1046	2569	2445	3863	0	8877
Net Supply (Shortfall) to meet demand	(1,427)	(308)	(501)	(2,237)	1,614	419	0	(203)

4.1.6 Industrial Land: Location Factors

There is quite some logic to this demand analysis. Industrial land demand by location has many drivers. For a large metropolitan area, population is a dominant one. In Perth, a high proportion of land use in industrial estates overall is for regional and local services – for example, retail, including large format and large footprint retail (e.g. Bunnings stores), local construction, automotive and household services, entertainment (e.g. dance studios and churches), local and regional storage and distribution. This requires close access to customers and service users.

A substantial component is also influenced by access to major transport routes, particularly for manufacturing, fabrication and large scale logistics. With Northlink and the future Hepburn Ave link to the North West sub-region industrial estates, Tonkin Highway becomes the main north-south structuring

element for the Perth metro area. There will be significant advantage for businesses located in areas accessible to this main transport spine. This will be reinforced if Outer Harbour becomes a container and general cargo port. Access from the Outer Harbour to Tonkin Highway will become increasingly important, effectively shifting the locus of industrial activity in Perth to the south and west and away from the north and east. This will further increase demand for light and-general industrial land in areas accessible to the Outer Harbour – Tonkin Highway access routes.

As an example, if motor vehicle import unloading transfers from Fremantle to Outer Harbour, each major vehicle importer will consider relocating their wholesale new vehicle preparation, storage and warehousing and associated activities (e.g. parts processing, staff and dealer training and development) to be nearer the port. Each distributor would have a land requirement of around 12 – 15 ha for these purposes. These should be on light industrial (not heavy industrial) zoned land. This would create demand for industrial land at a location such as Mandogalup or North East Baldivis.

4.1.7 Application to the North East sub-region

These implied demand estimates for the North East sub-region are worthy of further analysis by exploring the relationship between the North East sub-regional population and industrial land supply at 2011 and demand estimates at 2031 and 2050. These are shown in table 4.5 below. It shows that there was around 1,458 ha of developed industrial land in the sub-region in 2011, for a regional population of 209,150. This is a ratio of 69.7 m² of industrial land per person. In the EELS there is a demand estimate of 1,646 ha of industrial land in the region by 2031, around 50.1 m² per person of the forecast population. Applying NESRPF take-up rates and adding them to 2011 supply gives a total industrial land estimate of 4,508 ha by 2050, for a forecast population of 450,580, a ratio of 100.0 m² per person. This is considerably outside the high and low range implied by the 2011 and 2031 figures and can be considered further evidence of a potential sub-regional future over-provision, or an over-estimation of demand.

Table 4.5: North East Sub-region, Demand Estimates and Population

Year	2011	2031	2050
Population			
Swan	114,300	207,515	290,400
Kalamunda	56,940	71,933	103,260
Mundaring	38,360	48,862	56,920
Total Region Population	209,600	328,310	450,580
Industrial land	1,458 ha	1,646 ha	4,508 ha
	<i>Developed</i>	<i>Demand estimate: EELS</i>	<i>Developed 2011 plus NESRPF assumed take-up</i>
Ratio land m2/person	69.6	50.1	100.0

Source: .id forecast, ABS, EELS, NESRPF, SMCo

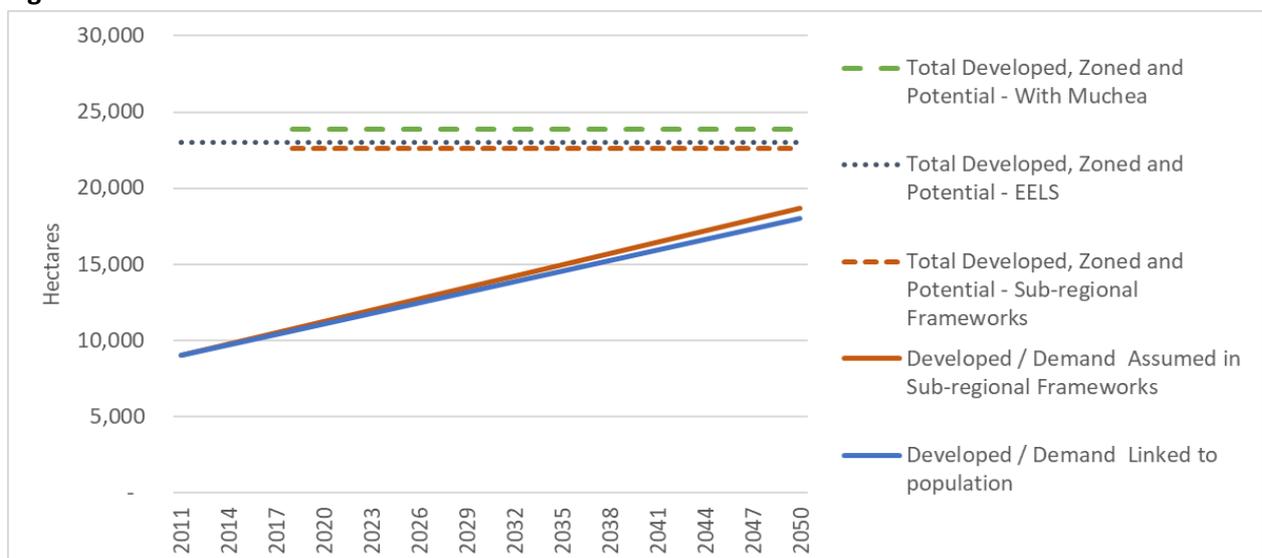
4.1.8 Planning Implications

Several points emerge:

- The total developed and potential land assumed in the EELS and the Sub-regional Frameworks are similar – around 23,500 ha (gross). However, in passing, it is worth noting that the components of these totals are different and in different locations. For example, the EELS included a large parcel of potential industrial land in the South West sub-region at North East Baldivis. The Sub-regional Frameworks excluded this land, but greatly increased the potential scale in the Bullsbrook / North Ellenbrook location. Given the discussion on population and other demand factors, these parcels are not good substitutes for each other. A local over-provision of potential industrial land in the North East is balanced by an under-provision in the South West sub-region.
- When the Muchea land is added as effectively now belonging in overall metropolitan potential supply, the total at 2050 becomes almost 25,000 ha. (gross) which, compared with the estimated total demand at that time, is either a comfortable surplus (high demand scenario) or a considerable over-provision (medium demand scenario).
- The conclusion is that there are choices to be made at the strategic metropolitan-wide level on industrial land development priorities and timing which are only partly informed by modelling and more informed by a range of planning and economic factors.

This analysis can be expanded by investigating the amount of land that is identified for potential industrial development across the Perth metropolitan area and Peel and comparing it to the various demand estimates. Figure 4.2 shows the total industrial land that would be developed in Perth and Peel to 2050 under the two demand scenarios discussed above (i.e. a population-linked demand estimate and historic take-up rate estimates used in the Sub-regional Frameworks). It also shows the total developed land at 2011 or 2018 (est.) plus the amount identified as potential in the EELS and the Sub-regional Frameworks.

Fig 4.2: Perth and Peel Industrial Land





Given the large potential supply of industrial land in the Perth metro area overall, demand estimates for any part of it thus need to it thus need to consider:

- Population factors:
 - Access to skilled labour;
 - Access to customers and end uses;
- Location factors – access to:
 - Import /export transport routes;
 - Local distribution and servicing transport routes;
 - Agglomeration economies, i.e. access to goods and services in the value chain.

These are all important when considering demand and land use for Muecha. It scores well on some transport-related location factors, but not as well as locations closer to population centres in the Perth metropolitan area for population factors. This reinforces the likely focus for Muecha as long-haul transport and agricultural products and livestock handling.

4.2. The Effect of Northlink

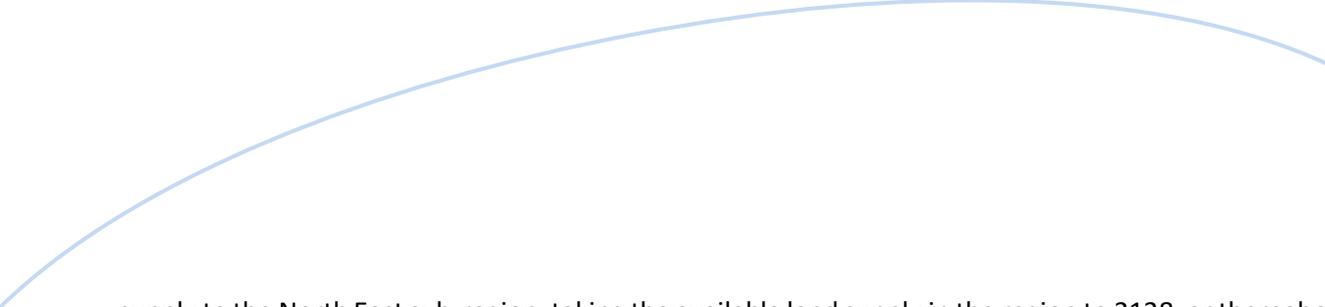
The Northlink project brings Muecha into Perth metropolitan area industrial land supply. Northlink is now the key element in the future of Muecha. In this context, Muecha could attract activities which may otherwise locate in Bullsbrook / North Ellenbrook and effectively adds to the potential land supply in the North East sub-region.

With Northlink, Muecha is around 10 minutes travel time away from Bullsbrook / North Ellenbrook. It is around 15 – 20 minutes to the residential areas of Ellenbrook. Travel time to Malaga (at the main Reid Highway / Tonkin Highway intersection) reduces from the current 40 – 50 minutes for a heavy vehicle to less than 30 minutes. The North West corridor (Neerabup industrial precincts and the eastern residential areas of the North West Corridor) will be 30 minutes travel time.

The analysis in Table 4.1 indicates that at 2050 there is a capacity of at least 5,141 ha (gross area) of industrial land in the North-East sub-region, not counting Muecha, against a modelled demand of around 2,810 ha. This would give surplus land capacity of 2,331 ha at 2050. If the growth rate assumed between the developed land at 2011 and the demand estimate at 2050 is extrapolated, this is sufficient land for another 67 years beyond 2050, or out to 2117.

Muecha has a gross area of 1,167ha⁸, with a net area of 896 ha, allowing for roads, conservation reserves, environmental protection areas and drainage, of which 302 ha is already occupied by the WAMIA saleyards. If the remainder were added to the stock of potential industrial land, at the take-up assumed for the North East sub-regional land in the NESRPF this would add another 11 years of industrial land

⁸ The Muecha Employment Node Structure Plan shows a combined short, medium and long term total net area of 659 ha of developed land, not including the WAMIA site, but including long term availability of land currently subject to resource extraction licences.



supply to the North East sub-region, taking the available land supply in the region to 2128, or thereabouts. If the CBH development were formally in the metropolitan area it would be in an industrial zone and this further adds to the overall count of industrial land stock.

The implication is that development on one of these estates will delay or curtail development on the other. Clearly, not all land in Bullsbrook /North Ellenbrook and Muchea will be developed to its short and medium term schedule, or even meet long term development expectations.

However, there are some differences that indicate different development trajectories for each. Bullsbrook / North Ellenbrook has larger scale, closer access to labour, slightly better services availability and may become more suitable for a wider range of light and general industrial uses.

On the other hand, Muchea has better access to the regional (country) road system, with direct RAV10 access, existing WAMIA operations and the potential for very large lots, remote from residential development, meaning uses requiring buffer zones will be easier to accommodate. Land prices are currently also much lower than alternatives. It also appears to have more viable access to reticulated gas than Bullsbrook.

4.3. The Role of Services Supply

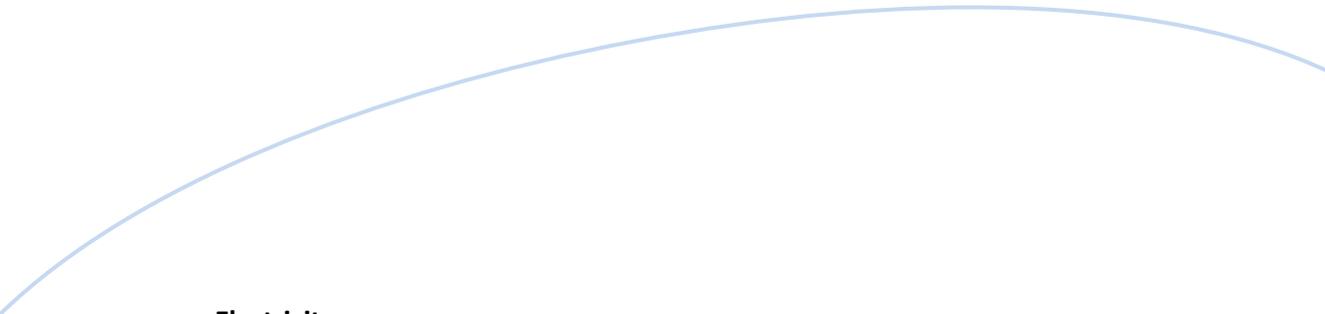
Consultation with existing and potential users of land at Muchea and existing and potential land developers indicate that the availability of services is a key determinant of land use.

- **Water**

There is limited water availability. Groundwater is only available via water trading. This is uncertain and expensive. Some developers of sites in Precincts 1 and 3 are negotiating to access a privately operated water supply which has some (limited) capacity. Only low water land uses are being considered. This restricts many potential industrial uses. For example, it makes any meat or food processing (e.g. red meat or white meat abattoir) unlikely. With water and gas availability Muchea would be a potential site in the longer term for chicken or pork processing.

- **Gas**

Lack of access to reticulated gas is a main barrier to some potential and otherwise viable land uses, for example, feed mills. It is understood that there is at least one new feed mill planned in the vicinity of Muchea, but to the west on rural land much closer to the gas main, not in the Muchea industrial precinct. The planned CBH development west of the Muchea industrial area also has room for feed mills and these would make a good fit logistically. It is assumed that if they were to be developed at the CBH precinct, or on the Harvis land, extension of the gas supply to that site would be sought. This appears to be viable.



- **Electricity**

Although there is currently limited capacity, this is not seen as a major barrier, with acknowledgment of plans for future expansion. However, its availability could affect projects in the shorter term.

Bullsbrook has similar services constraints, with lack of reticulated sewer and remote from any trunk main; restricted water supply; no gas reticulation. However, It is closer to main services supply (water and sewer) than Muchea and this might affect future land uses.

A conclusion is that the range of possible land uses in either location site will be constrained by services availability. Services are now being taken to basic levels by land developers to allow development.

Lack of services beyond basic levels, especially water and gas, can only be overcome by appropriate investment in the required infrastructure. Absent such investment in either location, land uses will only be developed to the extent that developers provide services. Further development of activities dependent on water or gas availability or those requiring more sophisticated waste treatment will be prevented. One consequence is that where the general North East sub-region location makes sense, proponents will push for developments closer to key services, such as gas, even if they are away from the designated industrial zones. It will also deter potential relocations away from higher valued inner area industrial land to Muchea or to Bullsbrook / North Ellenbrook.

It is apparent that, given the relatively large amount of potential industrial land in the region, higher level services are not required in both Muchea and the Bullsbrook / North Ellenbrook industrial precinct. A full benefit cost analysis is needed to determine if the service expansion is warranted and in what time frame, and what options exist for private sector provision/funding.

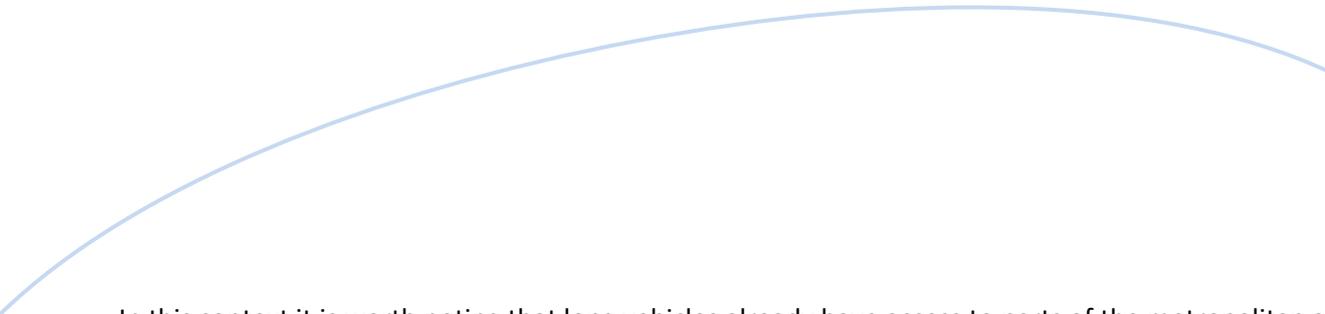
4.4. Land Use Themes

Three land use themes can be identified:

4.4.1. Transport

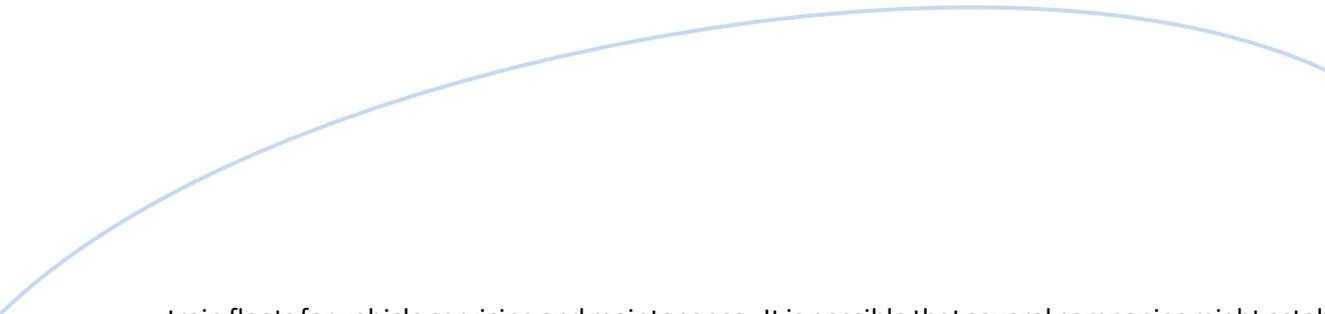
Commercial traffic on Northlink is overwhelmingly linked to the resources economy in the Pilbara, with large scale transportation of general cargo, bulk goods (e.g. ammonium nitrate and fuel) and mining equipment. This is a main determinant of land use at Bullsbrook / North Ellenbrook and at Muchea. For Muchea, the other important driver of land use is its position on main transport links to agricultural land and pastoral areas, for transportation of livestock and grain.

RAV 9 and RAV 10 vehicles (vehicles between 36.5 and 53.5 m in length) currently terminate at Wubin, where they are broken up for transport further south. The road between Wubin and Muchea is now being upgraded to enable these vehicles to get to Muchea. There is clear indication from MRWA that Muchea is the furthest south that RAV 9 and RAV 10 vehicles will be allowed. Any further south (e.g. on Northlink to Bullsbrook) risks these very long vehicles being caught in higher traffic and is not preferred.



In this context it is worth noting that long vehicles already have access to parts of the metropolitan area. For example, RAV 7 vehicles (i.e. vehicles up to 36.5 m, such as a prime mover towing a semi-trailer and B double and a B double towing a dog trailer) can access Roe Highway, parts of Tonkin Highway and Kwinana Freeway south of Roe Highway, giving access to Hazelmere, Forrestfield, Perth Airport and the Kwinana Industrial area. This reduces the scale of any impact that providing access to vehicles up to RAV 10 to Muchea might have. Key elements in assessing any impact are:

1. Not all RAV 9 and RAV 10 vehicles are the same. They have different end destination requirements. They include, for example transports of:
 - Livestock: Their source is the mid-west agricultural area and the north west pastoral regions. The WAMIA saleyards are their end destination. They require direct access to the saleyards. There are too many animal welfare and security issues to make even a slightly remote location (e.g. near the Great Northern Highway / Muchea E Road intersection) completely unacceptable.
 - Bulk grains: The planned CBH facility will handle bulk grains and hay, sourced from mid-west agricultural areas. Direct access to the CBH facility is required.
 - General freight, including bulk and containerised freight: This is generally sourced from processors, factories, distribution centres and transport yards in the Perth metropolitan area. These have their own individual rationale for their location (e.g. access to labour, access to the value chain of suppliers and customers) and the additional cost of transporting trailers a relatively short distance to Muchea to assemble a northern-bound road train is generally not a sufficient reason to relocate. Evidence is that some larger general cargo operators have greater economies in more central locations (e.g. Hazelmere) and may not establish at Muchea in the short and medium term. However, one large operator, Linfox, already has an operational transport yard in the area on a 20 ha site and it is possible that others may follow. Evidence is that some smaller and specialised operators might also find the establishment of a transport yard at Muchea attractive. One (RTA) is already in operation.
 - Specialist mining equipment: This generally requires specialist labour to prepare and assemble and, as with general freight, the cost of transporting to a Muchea to be part of a road train is not sufficient reason to move whole company operations. They are unlikely to locate at Muchea.
2. There is a need for a common user road train facility (around 6ha, as current, is a good size) for general freight operators. Issues are security and access to driver facilities (toilets, bathrooms, food). This is an OHS as well as a convenience issue. The ideal configuration would be for it to be anchored by a retail fuel outlet–operator, which would then be responsible for security and overall yard management and supply facilities and would capture trade in return. The existing road train assembly area could be expanded in this way.
3. If the RAV10 network were anchored at Muchea, there is some evidence that some transport yards for major transport companies would be established. If no access were provided further south (to Bullsbrook / Ellenbrook), Muchea could be the preferred location for companies that operate road



train fleets for vehicle servicing and maintenance. It is possible that several companies might establish a transport yard for some of their operations and for road train assembly, but at this stage the evidence is variable. These would be large land users (each site around 20 ha). This might be most applicable to storage and load assembly of large low tech objects (e.g. dump truck tyres and refurbished parts) and not higher tech equipment (e.g. major items of machinery) or general cargo. There are, at most, 5 or 6 major transport companies that this applies to. This would indicate a maximum land demand for this purpose of around 150 ha.

4. Implications for roads and planning:

- Precinct-wide access is required for RAV10 vehicles.

4.4.2. WAMIA

WAMIA is a long term anchor for the precinct, but no expansion outside the current property is anticipated. There is some prospect of further development on the site (e.g. small scale and short term feed lots) but little prospect of other complementary land uses, with the possible exception of heavy vehicle servicing.

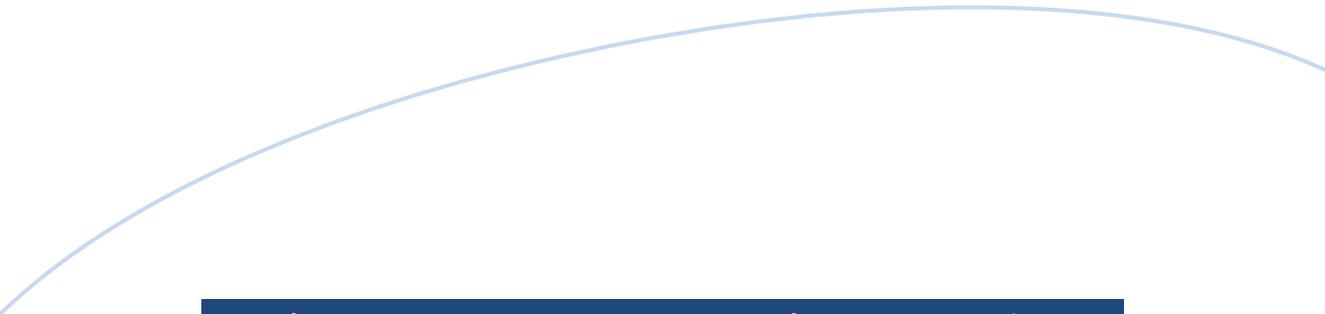
4.4.3. CBH Precinct

The CBH development would be a specialist grain-related intermodal agri-precinct. There is high likelihood of uses complementary to the core CBH activities. It will effectively free up land at Forrestfield, representing an example of the transfer of a land use from a high demand, high cost inner area to a low cost outer area.

The Muceha Industrial Park does not have direct rail access. However, the nearby planned CBH development does. This is an essential element of its operations on that site and of the development of a grain-related intermodal agri-business precinct. The development cannot be contemplated on land currently identified in the Muceha Industrial Park Structure Plan boundary.

4.5. Potential Land Use Mix

Once fully developed the Muceha Industrial Park is likely to have a high proportion of land uses with low employment density such as transport and logistics. However, it is a large estate and will have substantial overall employment capacity. The land use mix and employment can be estimated by reference to some existing estates that show some similar characteristics. Taking estates at Hazelmere and Forrestfield as references, a potential land use mix for Muceha at full build out is:



Land Use	Floorspace Proportion
Storage/Distribution	50%
Manufacturing/Processing/Fabrication	15%
Service Industry	15%
Office/Business	10%
Utilities/Communications	5%
Entertainment/Recreation/Culture	1%
Health/Welfare/Community Services	1%
Primary/Rural	1%
Other Retail	1%
Shop/Retail	1%

These estimates are for the Muchea Industrial Park generally, excluding the WAMIA site.

4.6. Employment

If Muchea were to develop in a form similar to estates such as Hazelmere and Forrestfield, it would have total employment of 2,300 – 2,500. This can be assumed as a best estimate at full build-out.



5. Conclusion and Recommendations

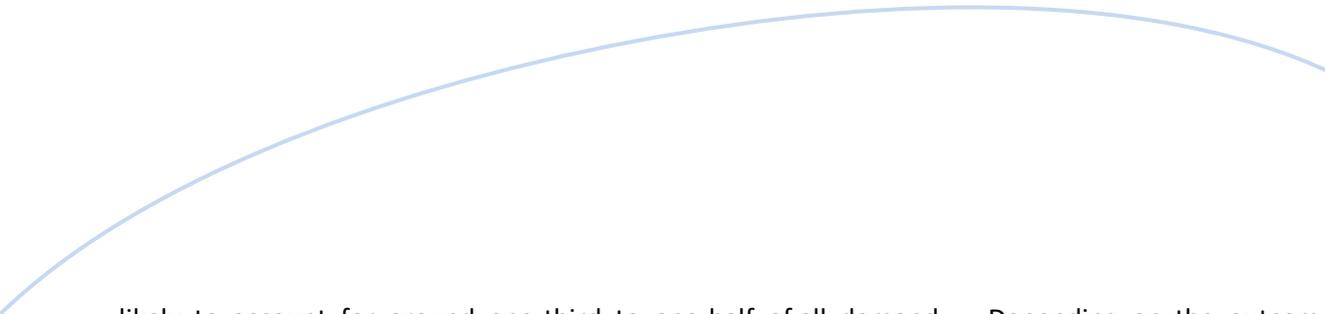
Muchea has not been as visible or accessible as other industrial areas closer to Perth in the north-east corridor, resulting in some uncertainty over the role Muchea would play in the industrial land market. From a broader metropolitan development perspective, it lacked visibility and accessibility compared to the large areas prospectively available at Bullsbrook and North Ellenbrook.

The Northlink project has fundamentally changed the assessment of Muchea's role, positioning Muchea directly within the broader metropolitan industrial land market. Northlink will render Muchea visible and will have a significant effect on the accessibility of Muchea to the Perth metro area. Muchea will now be seamlessly connected to the Perth metropolitan transport system with an interchange providing direct access to the estate. To add to this, transport connections to the Mid West and North West will be improved with RAV10 access to Muchea.

Muchea has a gross area of 1,167 ha, with a net area of 896 ha after allowing for 221 ha for conservation reserves, environmental protection areas and drainage and 50 ha for roads. Of the 1,167ha of industrial land, 302 ha is taken up by WAMIA. In addition, there are several projects (for transport depot and for grain handling) either existing or in very advanced planning adjacent to but outside of the Muchea Industrial Park area which add to the industrial and rural product processing operations in the area.

There is a general surplus provision of potential industrial land in the North East sub region and this is increased by the effective inclusion of Muchea into the North East sub-region industrial land supply equation. The population of the North East sub-region is projected to grow by 241,430 from 209,150 at 2011 to 450,580 by 2050. Depending on the analysis used, this implies a demand for new industrial land of between 2,580 and 3,444 ha (net). Potential new supply identified in the North East Sub-regional Framework for long term development is 3,580 ha (gross – around 2,680 ha net) excluding Muchea. With the addition of Muchea to the prospective land supply, and allowing for gross area to net industrial land adjustments and the different time scales for each of the above demand estimates, overall this would suggest a surplus provision in the planning framework for the sub-region of around 625 ha (net) or 830 ha (gross) for the period 2015 - 2050. This is supply for many years after 2050.

The development projects already planned and underway are likely sufficient to meet all short and medium term demand for land at Muchea, including for local uses, and possibly for the long term. The expected over-provision of industrial land supply in the North East inclusive of Muchea means that take-up of land at Muchea will be dependent on individual projects that can take advantage of Muchea's location and improved connectivity based on the combined Northlink and RAV10 access. For more general requirements (e.g. road transport operations and local demand) and for specialised processing (e.g. feed mills), there is likely to be already enough land in development with the combined Precinct 3, Harvis, CBH and Linfox developments (the latter two are outside of the Muchea Industrial Park area) to satisfy short and medium term demand. Together these account for a gross land area of 505 ha and might be expected to yield total net development sites of around 380 ha. Of this, transport-related uses are



likely to account for around one-third to one-half of all demand. Depending on the outcome of development at Bullsbrook / North Ellenbrook, it might also be sufficient for long term needs.

It needs to be emphasized that some of these projects and their land uses (e.g. CBH, feed mill, concrete batching) are still in the planning/assessment stages. However, if they do happen, there is adequate land to accommodate their plans. Moreover, beyond these projects, further demand will likely emerge only slowly. Full development will likely be outside of the planning timeframe.

5.1. Recommendations

Based on the analysis and consultations there are a number of things that could be done to facilitate Muchea developments:

- Clarify the long term relationship between Muchea and Bullsbrook / North Ellenbrook, particularly with regards to priorities for services supply. It is possible that gas supply is viable for Muchea, but not Bullsbrook. This would enable some gas-dependent activities at Muchea (e.g. feed mills) but it might make necessary some other upgrades, e.g. better access to water supply.
- Confirm Muchea as the most southern point of RAV 9 and RAV10 access (current planning has proceeded on this basis).
- Allow or facilitate RAV10 access to all sites throughout the estate.
- Expand services and security at the common user road train assembly facility. Even with precinct wide access, this facility is still needed and basic services are required beyond just a hardstand.
- Review gas and general services access.
- Ensure local government policies for industrial development at the Muchea Industrial Park are commensurate with its role as a general industrial estate.



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