



# Virginia and Northern Adelaide Horticultural Plains Study State of Play Report

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PLANNING  
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**In collaboration with:**

Econsearch  
Scholefield Robinson  
Avante Mapping Solutions  
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## Document Quality Control

<b>Project Name</b>	Virginia and Northern Adelaide Horticultural Plains Study
<b>Project Number</b>	P6512
<b>Client</b>	City of Playford, District Council of Mallala, Adelaide Mount Lofty Ranges NRM Board, Department of Primary Industries and Regions SA (PIRSA), Barossa Regional Development Australia
<b>Document</b>	Report 1 – State of Play
<b>Document File Name</b>	P6512-V7-StateOfPlay-Virginia-Adelaide-Hort-Plains.November.2013.doc
<b>Author of Document</b>	KF / DJ / PS / JM / AL

Version	Date of Document Release	Name of Person/s document was released to	Method of Release	Authorised By	Authorisation Date
7	18.11.2013	Paul Johnson / Carol Muzyk	Electronic	KF	18.11.2013



**Jensen Planning + Design**  
Unit 6/259 Glen Osmond Road  
Frewville SA 5063

Telephone: 08 8338 5511  
Facsimile: 08 8338 6866

[www.jensenplanning.com.au](http://www.jensenplanning.com.au)

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# Virginia and Northern Adelaide Plains Horticulture Study

## State of Play Report (November 2013)

**Prepared for:** City of Playford  
District Council of Mallala  
Adelaide Mount Lofty Ranges NRM Board  
Department of Primary Industries and Regions SA (PIRSA)  
Barossa Regional Development Australia

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## Executive Summary

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The State of Play Report establishes a comprehensive 'baseline' for the horticulture activities of the Virginia and the Northern Adelaide Plains (VNAP) and informs the VNAP Horticultural Framework. This area is economically significant – contributing approximately 6.5 per cent of the total state economy and employing nearly half of the State's total vegetable industry employees. The VNAP is a premium horticultural region that capitalises on good soils, good climate and existing access to a number of water sources.

In addition to the residential and business communities of Mallala, Virginia, Lewiston, Two Wells, Angle Vale and Penfield (and other communities in between), the VNAP contains a mix of horticultural land uses ranging from broad-acre field cropping to high-tech hydroponic, to low-tech shade houses. The region is home to a variety of cultures and business operational styles. There is significant diversity in how growers adapt to changing market demand and expectations, and the impact of climate change. The region is governed by the Playford and Mallala Councils with diverse policy controls and approaches.

Allotments south of the Gawler River tend to be smaller and substantially more fragmented, lending themselves to more intensive uses such as protected horticulture (i.e. greenhouses, glasses and shadehouses) and hydroponic uses. Field cropping is expected to expand north of Lewiston should additional water become available, capitalising on larger plots, cheaper land and more efficient farming techniques. The supply of water is a major limiting factor to industry expansion, and improved water supply to serve horticultural needs has been highlighted as a major goal by councils and the Barossa Regional Development Authority.

With clear, consistent, and supportive land use policy and a powerful and representative voice, the industry within the VNAP has a strong future. Industry requires land use policy control that provides adequate flexibility to allow it to adapt to new technologies and to a changing climate, while also protecting the prime horticultural areas from further non-productive uses (such as housing and rural living). The industry also needs support through appropriate industry representation that can act on behalf of the industry, build industry capacity, improve the brand of the region and its products, ensure support for traditional, low-tech farmers as well as higher end investment, and facilitate a fair reward for effort of those working within the industry.

The release of this report is timely with the recent State Government's announcement of residential growth within the VNAP region, concentrated around its towns, settlements and the northern Adelaide suburban fringes. The location and design of additional housing growth within the region should ensure that the productive uses of the land are not jeopardised, and that new residential communities embrace the character and vision of the region as the *northern food bowl*.

## The Region... *At a Glance*

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The region's proximity to urban areas places it in a commanding position against other productive areas as it can ensure:

- produce freshness
- short supply chains (reduced food miles)
- traceability, and
- reduced cost to the purchaser.

South Australians strongly value local produce that is fresh, that is grown by people who have interesting stories and cultural backgrounds, and that is grown close to our cities and towns. These are the characteristics of the region.

The region provides a significant economic contribution to South Australia's economy. As a point of comparison:

- it provides double the gross value of production (at the farm gate) than tourists spend on Kangaroo Island
- it generates an equivalent revenue to that of the Barossa horticultural industry, and
- it brings a revenue equivalent to the South Australian wild-catch fishing industry.

Its contribution equates to approximately 6.5 per cent of the total state economy and the region employs nearly half of the State's total vegetable industry employees. The farm gate output is estimated to be at least \$225 million, which is around 31% of the state total.

The top three vegetables produced per annum (as measured by weight) are carrots (34,700 tonnes), tomatoes (26,200 tonnes) and potatoes (24,200 tonnes).

The most valuable of the region's vegetables are tomatoes, contributing over 30% of the region's economic value but yet occupying less than 4% of its area (due to the use of intensive farming techniques such as glasshouses and hydroponics).

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# 1 Introduction

## 1.1 The State of Play Report

This report is the first report for the Virginia and Northern Adelaide Plains (VNAP) Region Horticulture Study.

It summarises the baseline findings related to the social, economic, environmental characteristics of the region (including its infrastructure profile), and it provides some commentary on the implications of these findings.

It informs the second report of the study – the Virginia and Northern Adelaide Plains Horticulture Framework. This Framework recommends land use planning, economic, marketing, capacity building and environmental management approaches that will facilitate a vibrant and sustainable horticultural industry.

This State of Play Report comprises the following baseline information:

- Economic & Social
- Natural Resources
- Physical infrastructure
- Land Use
- Policy Context
- Industry Character & Trends
- Land Use Planning Approaches
- Industry Requirements

## 1.2 Background to the Study

The consultant team, led by Jensen Planning + Design and in collaboration with Econsearch, Scholefield Robinson Horticultural Services, Avante Mapping Solutions and Wallbridge & Gilbert, was commissioned by the City of Playford, District Council of Mallala, Adelaide Mount Lofty Ranges NRM Board, Department of Primary Industries and Regions SA (PIRSA) and the Barossa RDA in October of 2012 to undertake this study.

The study broadly seeks to establish a vision and recommendations for the Virginia and Northern Adelaide Plains Horticulture Region with a particular focus on sustainable horticultural development. The vision and recommendations will inform economic and land use initiatives, investment and policy decisions.

### 1.2.1 The Study Area – the Virginia and Northern Adelaide Plains (VNAP)

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The Study Area is located north of Adelaide within the Council boundaries of both the City of Playford and the District Council of Mallala. It is traversed by the Gawler River, which forms the boundary between the two Councils. The Study Area encompasses a variety of agricultural and horticultural land uses as well as a number of rural townships, settlements and residential growth areas.

The Study Area is shown on the map overleaf (adapted from the 30-Year Plan for Greater Adelaide). The study area has strong economic, infrastructure, social and environmental relationships with the surrounding areas in the Northern Adelaide Plains and Barossa.

Within the City of Playford, the Study Area encompasses the rural townships of Angle Vale and Virginia. Within the District Council of Mallala, the Study Area encompasses the town of Two Wells and the settlements of Lewiston, Lower Light, Redbanks and Fischer.

The northern extent of the Study Area has been derived from the theoretical extent of the potential supply of recycled water into the Northern Adelaide Plains (as identified in the 30-Year Plan), and to take into account potential opportunities for horticultural expansion north of the Gawler River. Nominated growth areas (as identified in the 30-Year Plan) have been excluded from the Study Area.

Within the Study Area, horticulture is largely concentrated adjacent to the Gawler River. The areas around Angle Vale, Virginia and more recently Two Wells collectively form the largest concentration of greenhouse vegetable production in Australia. The areas north of Two Wells are more predominantly field crop productions.

Significant residential expansion will occur within and close to the Study Area, notably Buckland Park (an additional 33 000 people), Virginia, east of the Northern Expressway (between the Northern Expressway and Andrews Road in the suburbs of Andrews Farm and Munno Para Downs), Angle Vale and Two Wells.

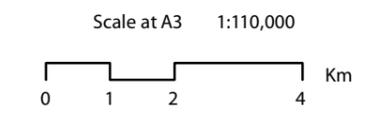
The Study Area is in a strong position geographically as it has easy access to inner-metropolitan Adelaide, arterial roads and freeways for interstate distribution, the Greater Edinburgh Parks employment area and Penfield Intermodal Freight Centre. The Study Area also has suitable climate, soil and existing and potential improved access to water, access to local consumer markets and local employment.

# Virginia and Northern Adelaide Plains Horticulture Study

## Future Planning

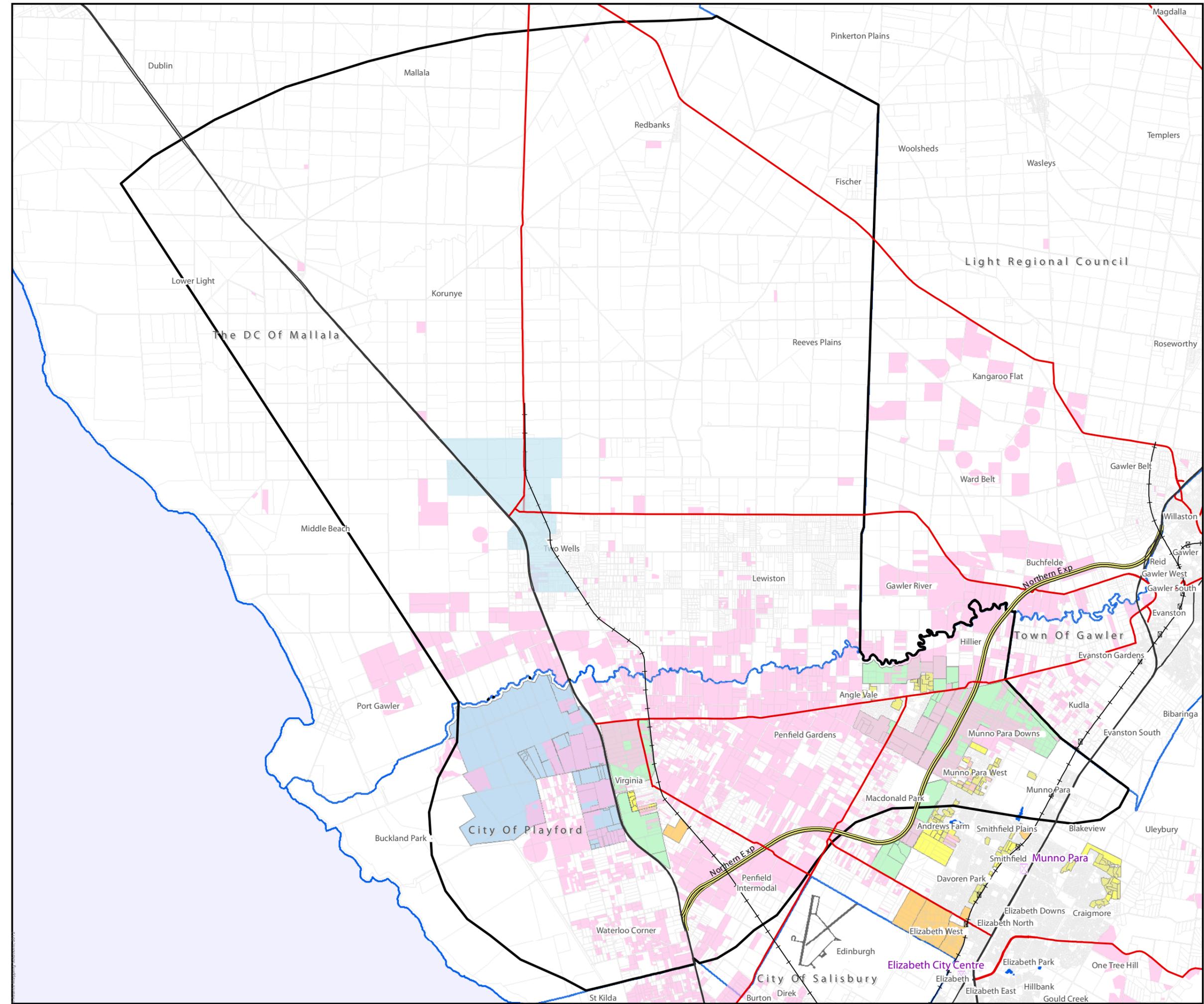
### Legend

- ⊠ Rail Station
- ⊠ Existing Shopping Centre
- ⊠ Existing Hospital
- ▬ Freeway / Expressway
- ▬ Arterial Road
- ▬ Main Road
- ▬ Railway
- Existing Irrigated Agricultural Land
- ▭ Area of Interest
- 30 Year Plan Growth Areas
- Buckland Park
- Industrial Zones
- Subdivision Areas
- Existing Wetland Basins
- ▭ Local Government Areas
- ▭ Airport / Runways
- ▭ Cadastre



GDA 94 - MGA Zone 54  
Map generated December 2012 by  
Avante Mapping Solutions  
Data Source:  
DPTI, DPLG, DEWNR, SA Water, BING Maps

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### 1.3 Production in a Peri-Urban Region: What are the Benefits?

VNAP is located in Adelaide's northern peri-urban region. The advantages of peri-urban farming have long been documented and include:

- freshness
- short supply chains (reduced *food miles*)
- less fossil fuel consumption (more sustainable)
- local produce consumed locally is less likely to require chemicals (i.e. for preservation) and avoids prolonged periods of refrigeration (that has shown to reduce the health benefits of the food)
- traceable – a marketing advantage
- consumer purchase costs can be cheaper as the transport and refrigeration of produce can add considerable cost
- acts as a buffer between urban areas and the surrounding residential area – providing an 'edible landscape'
- continuous opportunities for old and new cultural traditions
- provides peri-urban employment opportunities
- possible tourism drawcard

### 1.4 Why is the Study Needed?

There is widespread concern in many cities that suburban development is encroaching on and alienating viable agricultural lands in close proximity to urban centres. Food security is now a major issue facing the sustainability of communities and cities. These pressures on peri-urban agricultural areas from urban growth and life-style seekers are not unique to Virginia and the Northern Adelaide Plains – it is commonplace in expanding centres around the world, and is increasingly prioritised as a land use planning challenge in North America and Europe, as well as Australia.

The spread of suburbia and growth in the demand for a 'rural living' lifestyle, as well as other forms of urban development, is one of the catalysts for this study. Other catalysts for the study include:

- a concern that the industry is not reaching its full economic potential
- issues with land management (in particular waste management) and illegal development
- unsightliness of some development within the Study Area
- pressure to allow for subdivision of large land holdings in recognition of decreasing space requirements and new farming techniques (hydroponics, glass-houses, soil management, etc)
- stormwater management
- increasing land values as a result of urban sprawl
- water supply limitations and their impact on the future viability and patterns of development of VNAP horticulture

- perceived interface issues and potential for increased pressure when new urban development encroaches further into horticultural areas

Many recent commentators recognise the imperative of not only protecting but also nurturing our prime food producing landscapes by increasing their profile in policy, land use and design considerations. As Trevor Budge, Convener of the Heart Foundation's Food-sensitive Planning and Urban Design Conceptual Framework (FSPUD) aptly states "*... we need to put food on the **planning and urban design menu***" (National Heart Foundation 2011).

Previous research and investigations, including submissions received at the 2012 Parliamentary *Select Committee on Sustainable Farming Practices, the Development of Horticulture Industries on the Adelaide Plains - A Blueprint for 2030* report (prepared by the Lucas Group for Grow SA) and the 1995 *Horticultural Development on the Northern Adelaide Plains* research paper have already recognised this imperative.

This **State of Play Report** is informed by this previous work and investigations, engagement with a number of growers and state agencies, and also introduces up-to-date physical, social and economic data in order to provide the horticultural industry with an up-to-date record of "where are we at".

A list of those consulted during the preparation of this report is found in Appendix 2.

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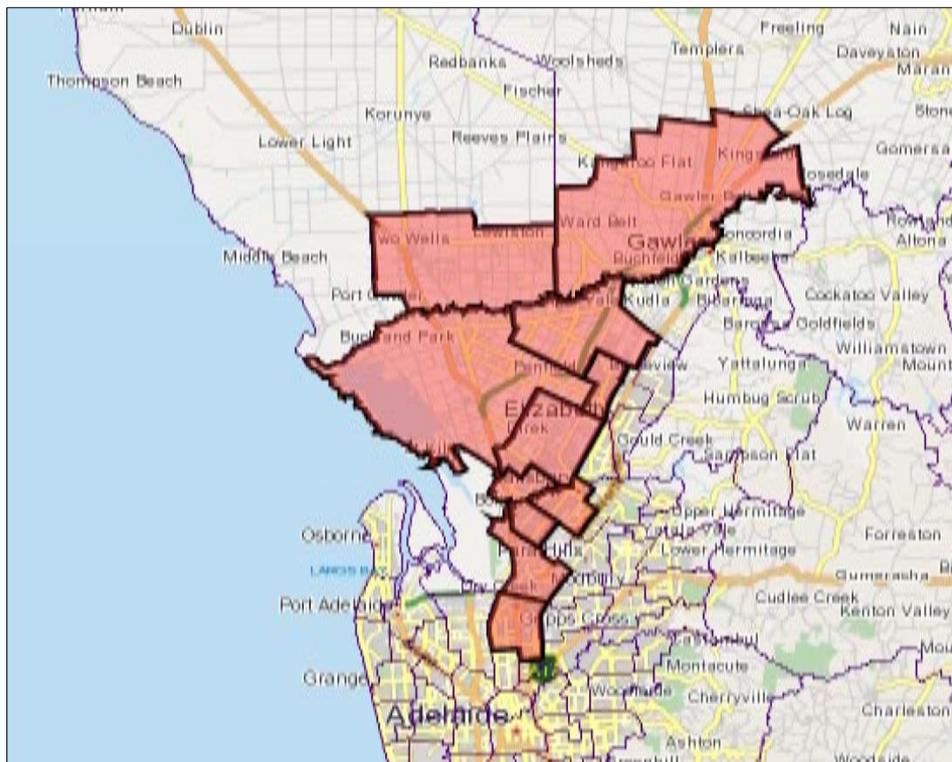


## 2 Economic and Social Baseline Data

### 2.1 The Economic Region

The Economic Region established for the purposes of gathering and analysing economic data relating to the VNAP region includes some areas outside the District Council of Mallala and the City of Playford. This is because this region includes both the horticultural study area (shown in Section 1 Introduction), as well as locations where a significant number of people who work in the horticultural industry live. This gives a more accurate measure of the true economic value of the horticulture industry. The location of the Economic Region was also influenced by the boundaries of the Statistical Area 2 units (determined by the Australian Bureau of Statistics) which are located within the region. The region includes the following statistical areas and is shown in the map below:

Statistical Area 2	Local Government Area
Lewiston – Two Wells	Mallala
Gawler - North	Gawler /Light
Munno Para West- Angle Vale	Playford
Virginia-Waterloo Corner	Playford/Salisbury



The Virginia and Northern Adelaide Plains Economic Region established for this State of Play Study.

## 2.2 Economic Baseline Data

In order to set the context for the estimates of the local economic contribution and economic impact of the horticulture industry on the region and South Australia (which follows), a brief profile of economic activity in the VNAP region in 2011/12 is provided below. The methodology for obtaining and analysing this data is provided in Appendix 1. This data was derived from the I-O database constructed by the consultants specifically for this project.

### 2.2.1 Employment

It was estimated that there were approximately 55,200 jobs (around 55,400 full time equivalent jobs) in the VNAP region in 2011/12. The top five contributors to total jobs in the region in 2011/12 were in the following industries:

- manufacturing (24 per cent);
- public administration and safety (12 per cent);
- retail trade (11 per cent);
- education and training (8 per cent); and
- wholesale trade (7 per cent).

In 2011/12, employment in South Australia was approximately 851,100 (total jobs), which means the VNAP region accounts for approximately 6.5 per cent of the total state employment.

While the region is an important component of the South Australian economy, the structure of the VNAP economy is quite different to that of the state as a whole. For example, manufacturing accounts for 24 per cent of regional employment whereas it contributes just over 11 per cent of total state jobs.

Reflecting the strong logistics and wholesaling activity in the region, the wholesale trade and transport, postal & warehousing sectors together contribute over 15 per cent of total jobs in the region. By contrast, these sectors account for less than 9 per cent of total jobs at the state level.

Another significant point of difference is in the public administration and safety sector. In the VNAP region this sector, with its strong defence industry presence, accounts for 12.5 per cent of regional jobs compared with just 7.4 per cent in the state as a whole.

Industries where the regional employment is substantially below that at the state level include health (5.4 per cent in the VNAP region, 11.9 per cent in the state), professional services (3.0 per cent in the VNAP region, 6.1 per cent in the state) and financial and insurance services (0.8 per cent in the VNAP region, 3.6 per cent in the state). Agriculture is another

sector in which regional employment (3.4 per cent) is well below that for the state as a whole (5.5 per cent). However, for on-farm vegetable production, employment in the VNAP region (1,429 jobs) accounts for 2.6 per cent of regional jobs, compared to less than 0.4 per cent for South Australia as a whole (3,068 jobs). What this tells us is that the vegetable industry is an important employer in the VNAP region and that the region accounts for almost 47 per cent of total state vegetable industry employment.

The farm gate value of output reported in Table 2-1 indicates that vegetable production in the VNAP region in 2011/12 was estimated to be \$225 million, which is around 31 per cent of the state total (\$736 million). It is noted that the \$225 million relates to farm gate value produced in the region. It does not include commissions, transport, packing or any processing/value adding. Produce that is grown outside of the region (but may be packed processed or value added in the region) is not accounted for in this figure.

Table 2-1 Employment and output, NAP region, 2011/12

Sector	Total employment		Employment		Value of output	
	no. of jobs	%	fte	%	\$m	%
Broadacre agriculture	118	0.2%	115	0.2%	12	0.1%
Intensive livestock	71	0.1%	81	0.1%	20	0.2%
Viticulture	41	0.1%	43	0.1%	3	0.0%
Vegetables	1,375	2.5%	1,429	2.6%	225	1.8%
Fruit and nuts	78	0.1%	81	0.1%	7	0.1%
Other agriculture	76	0.1%	80	0.1%	15	0.1%
Services to agriculture	78	0.1%	63	0.1%	19	0.2%
Total Agriculture	1,838	3.3%	1,892	3.4%	301	2.5%
Mining	325	0.6%	459	0.8%	40	0.3%
Manufacturing	13,023	23.6%	14,007	25.3%	3,697	30.2%
Electricity, gas, water and waste services	616	1.1%	738	1.3%	148	1.2%
Construction	3,135	5.7%	3,397	6.1%	1,142	9.3%
Wholesale trade	4,041	7.3%	4,333	7.8%	1,168	9.6%
Retail trade	6,003	10.9%	5,159	9.3%	496	4.1%
Accommodation and food services	1,992	3.6%	1,354	2.4%	190	1.6%
Transport, postal and warehousing	3,605	6.5%	4,098	7.4%	1,001	8.2%
Information media and telecommunications	536	1.0%	513	0.9%	274	2.2%
Financial and insurance services	486	0.9%	452	0.8%	207	1.7%
Ownership of dwellings	0	0.0%	0	0.0%	708	5.8%
Rental, hiring and real estate services	420	0.8%	480	0.9%	181	1.5%
Professional, scientific and technical service	1,663	3.0%	1,646	3.0%	360	2.9%
Administrative and support services	1,109	2.0%	918	1.7%	173	1.4%
Public administration and safety	6,419	11.6%	6,949	12.5%	1,257	10.3%
Education and training	4,147	7.5%	3,895	7.0%	349	2.8%
Health care and social assistance	3,612	6.5%	3,002	5.4%	306	2.5%
Arts and recreation services	291	0.5%	231	0.4%	41	0.3%
Other services	1,939	3.5%	1,876	3.4%	193	1.6%
Total	55,200	100.0%	55,399	100.0%	12,233	100.0%

*The ownership of dwellings sector is a notional sector designed to impute a return to the region's housing stock. Total value of output in this sector is an estimate of rent earned on leased dwellings and imputed rent on the balance of owner-occupied dwellings.*

Source: ABS 2011 Census of Population and Housing, DEWR (2012) and EconSearch analysis.

## 2.2.2 Gross Regional Product (GRP) in the VNAP region

The Gross Regional Product (GRP) in the VNAP region in 2011/12 was estimated to be \$5.98 billion. The contribution of an individual industry to GRP is calculated as the sum of household income, gross operating surplus and gross mixed income and indirect taxes less subsidies. The top five contributors to GRP were:

- manufacturing (19 per cent)
- public administration and safety (11 per cent)
- wholesale trade (10 per cent)
- ownership of dwellings (9 per cent) and
- transport, postal and warehousing (8 per cent)

As noted in Appendix 1, GRP/ gross state product (GSP) is a measure of the net contribution of an activity to the regional economy and is calculated as the sum of household income, other value added and net taxes in final demand. In 2011/12, GSP in South Australia was approximately \$91.9 billion, which means the VNAP region accounts for approximately 6.5 per cent of the total state economy. Estimates of industry by industry contribution to GRP for 2011/2012 are shown below in Table 2-1.

A similar pattern in industry structure can be found with GRP as with employment. Manufacturing contributes 19 percent of GRP in the VNAP region compared to 8.9 percent at the state level. Public administration and safety is also much larger at the regional level (10.8 per cent) than at the State level (5.4 per cent).

Table 2-2 Household income, other value added and gross regional product, VNAP region, 2011/12a

Sector	Household income		Other value added		Gross regional product	
	\$m	%	\$m	%	\$m	%
Broadacre agriculture	4	0.1%	1	0.1%	5	0.1%
Intensive livestock	2	0.1%	8	0.4%	11	0.2%
Viticulture	1	0.0%	0	0.0%	1	0.0%
Vegetables	46	1.4%	52	2.4%	99	1.7%
Fruit and nuts	3	0.1%	1	0.0%	3	0.1%
Other agriculture	3	0.1%	4	0.2%	7	0.1%
Services to agriculture	3	0.1%	4	0.2%	7	0.1%
<b>Total Agriculture</b>	<b>62</b>	<b>1.9%</b>	<b>71</b>	<b>3.2%</b>	<b>132</b>	<b>2.2%</b>
Mining	8	0.2%	10	0.5%	18	0.3%
Manufacturing	777	23.5%	362	16.4%	1,140	19.1%
Electricity, gas, water and waste services	52	1.6%	40	1.8%	92	1.5%
Construction	282	8.5%	57	2.6%	339	5.7%
Wholesale trade	349	10.5%	219	9.9%	568	9.5%
Retail trade	201	6.1%	96	4.3%	297	5.0%
Accommodation and food services	56	1.7%	31	1.4%	87	1.5%
Transport, postal and warehousing	278	8.4%	190	8.6%	468	7.8%
Information media and telecommunications	36	1.1%	100	4.5%	136	2.3%
Financial and insurance services	62	1.9%	91	4.1%	154	2.6%
Ownership of dwellings	0	0.0%	539	24.4%	539	9.0%
Rental, hiring and real estate services	37	1.1%	30	1.4%	67	1.1%
Professional, scientific and technical service	121	3.7%	50	2.3%	172	2.9%
Administrative and support services	81	2.4%	5	0.2%	85	1.4%
Public administration and safety	386	11.7%	258	11.7%	645	10.8%
Education and training	232	7.0%	25	1.1%	257	4.3%
Health care and social assistance	200	6.0%	15	0.7%	215	3.6%
Arts and recreation services	14	0.4%	4	0.2%	18	0.3%
Other services	77	2.3%	14	0.6%	91	1.5%
<b>Intermediate total</b>	<b>3,311</b>	<b>100.0%</b>	<b>2,208</b>	<b>100.0%</b>	<b>5,519</b>	<b>92.3%</b>
Net taxes in final demand <sup>b</sup>	-	-	-	-	462	7.7%
<b>Total</b>	<b>3,311</b>	<b>100.0%</b>	<b>2,208</b>	<b>100.0%</b>	<b>5,981</b>	<b>100.0%</b>

<sup>a</sup> Household income and other value added are the two components of GRP. Using the income method to derive GRP enables its estimation on a sector-by-sector basis.

<sup>b</sup> Includes net taxes (i.e. taxes less subsidies on products and production) paid by households and other components of final demand.

Source: ABS (2012d) and EconSearch analysis

## 2.3 Contribution of Individual VNAP Market Segments to the Economy

The significance of horticulture to the VNAP region can be measured through consideration of horticultural production in relation to other productive units, including:

- the area of land given to overall horticultural holdings and to individual crop types
- the quantity of production
- farm gate GVP<sup>2</sup>

2 GVP is gross value of production measured at the farm gate. It should not be confused with gross regional product (GRP) which is the gross value of production less the cost of goods and services (including imports) used in producing the output (see definition in Appendix 1).

These are outlined in the following subsections:

### 2.3.1 Area of holdings

- The current agricultural profile for the VNAP region is described by ABS Agricultural Census Data (ABS 2012d).
- The total area of holding in the NAP region for 2011 is shown in Table 2-3 and it is noted that (by far) the largest area of holding is for growing crops.
- Of the 16,000 ha used for growing crops in the region approximately 10,000 ha (almost two-thirds) were planted to field crops in 2011.
- On this land around 30,000 tonnes of field crops were produced (Table 2-4).

Table 2-3 Area of holding, VNAP region, 2011

Area of holding	ha
Total area of holding	22,094
Land not used for agriculture - Set aside for conservation	936
Land not used for agriculture - Other areas not used for agricultural producti	955
Land mainly used for agriculture - Crops	16,060
Land mainly used for agriculture - Total grazing	4,108
Land mainly used for agriculture - Grazing on improved pastures	3,348
Land mainly used for agriculture - Grazing on other land	759
Land mainly used for agriculture - Forestry plantation	2
Land mainly used for agriculture - Other agricultural purposes	139

Source: ABS 2012d

Table 2-4 Area and production of Field Crops, VNAP region, 2011

Field Crops	ha	t
Pasture and other crops cut for hay	1,139	6,648
Wheat	3,923	12,462
Oats	160	435
Barley	1,587	4,653
Triticale	52	99
Other cereals	0	0
Canola	405	678
Field beans	937	1,456
Field peas for grain	1,672	1,823
Lentils	126	283
Chick peas	58	81
Coriander	1	2,000
All other broadacre crops n.e.c	294	0
<b>Total Field Crops</b>	<b>10,354</b>	<b>30,618</b>

Source: ABS 2012d

The data for horticulture in the agricultural census was compared to a similar data set prepared by PIRSA. Based on the two sets of data, consultations with selected growers in the region and the views of the consulting team, a composite set of horticulture data was developed for 2011/12 and is presented below (Table 2-5).

Table 2-5 below demonstrates that, whilst horticulture accounted for a relatively small proportion of the total land grown to crops, approximately 5,100 ha (just over one-quarter) produced more than five times the amount of field crops (166,000t). The gross value of production (GVP) of \$250m far exceeded that of both field crops (\$6.8m) and livestock, and livestock products (\$20.3m).

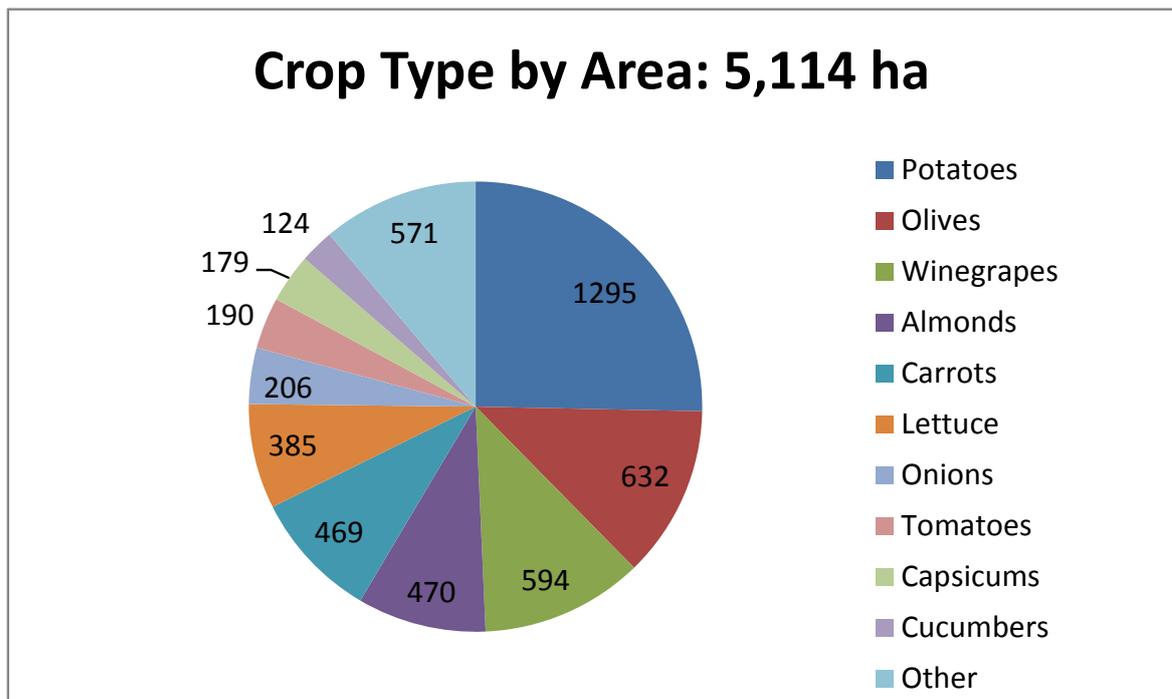
Table 2-5 Agricultural production, NAP region

	Area (ha)	Production (t)	GVP (\$m)
Horticulture	5,114	166,199	249.8
Field Crops	10,354	30,618	6.8
Livestock/grazing	4,108	-	20.3
<b>Total Agriculture</b>	<b>19,576</b>	<b>196,817</b>	<b>276.9</b>

Source: ABS 2012d, PIRSA pers. comm., EconSearch analysis

The breakdown of crop type by area is illustrated in the figure below. Six crops account for over three-quarters of the irrigated horticulture area, namely potatoes (25%), olives (12%), winegrapes (12%), almonds (9%), carrots (9%) and lettuce (8%).

Figure 2-6 Area of horticultural crops (ha), NAP region, 2011/12



Source: ABS 2012d, PIRSA pers. comm., EconSearch analysis

Table 2-7 Area and production of horticulture, NAP region, 2011

Horticulture	ha	t
Potatoes	1295	24,250
Winegrapes	632	4,458
Almonds	594	1,389
Olives	470	1,483
Carrots	469	34,738
Lettuce	385	9,720
Onions	206	13,574
Tomatoes	190	26,249
Capsicums (excluding chillies)	179	17,850
Cucumbers	124	12,750
Celery	108	5,350
Vegetables for seed	105	1,018
Cauliflowers	75	2,769
Cabbage	75	3,389
Leeks	57	2,219
Broccoli	40	820
Spring Onions	33	581
Spinach	12	64
Mushrooms	11	1,820
Beans (french and runner)	11	72
Melons	10	665
Beetroot	10	112
Parsnips	8	350
Zucchini, Marrows, Squash	6	148
Nurseries & cut flowers	4	-
Herbs	3	103
Pumpkins	2	22
Sweet corn	-	237
<b>Total Horticulture</b>	<b>5,114</b>	<b>166,198</b>

Source: PIRSA pers. comm., ABS 2012d, EconSearch analysis

### 2.3.2 Quantity of Production

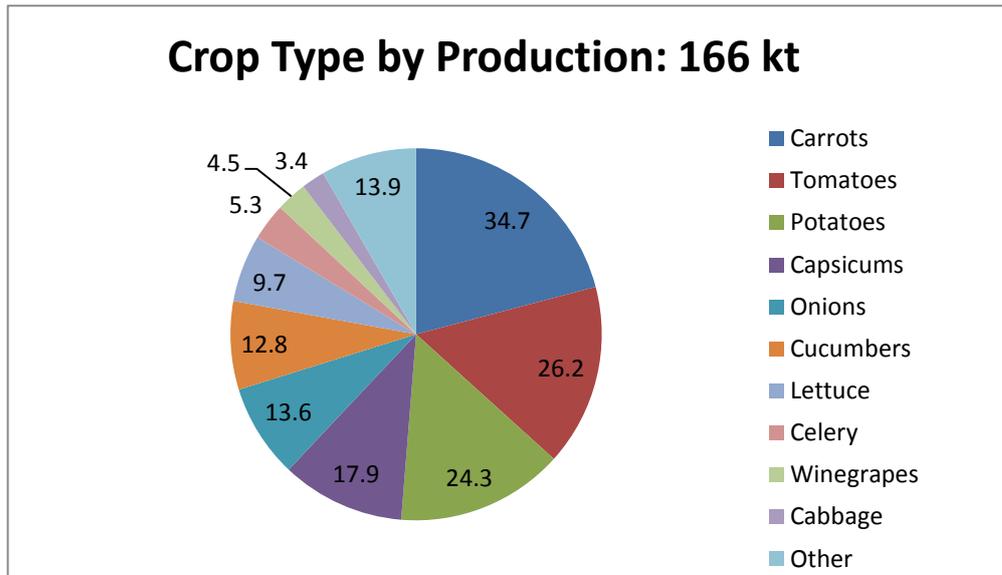
The picture is quite different when considering the quantity of production. As with area, six crops comprise over three-quarters of the quantity produced in the region, however, in this case, only two of the top six crops (by quantity), carrots and potatoes, are common to the top six crops by area.

The top six by quantity are carrots (21%), tomatoes (16%), potatoes (15%), capsicums (11%), onions (8%) and cucumbers (8%).

### 2.3.3 Farm Gate GVP

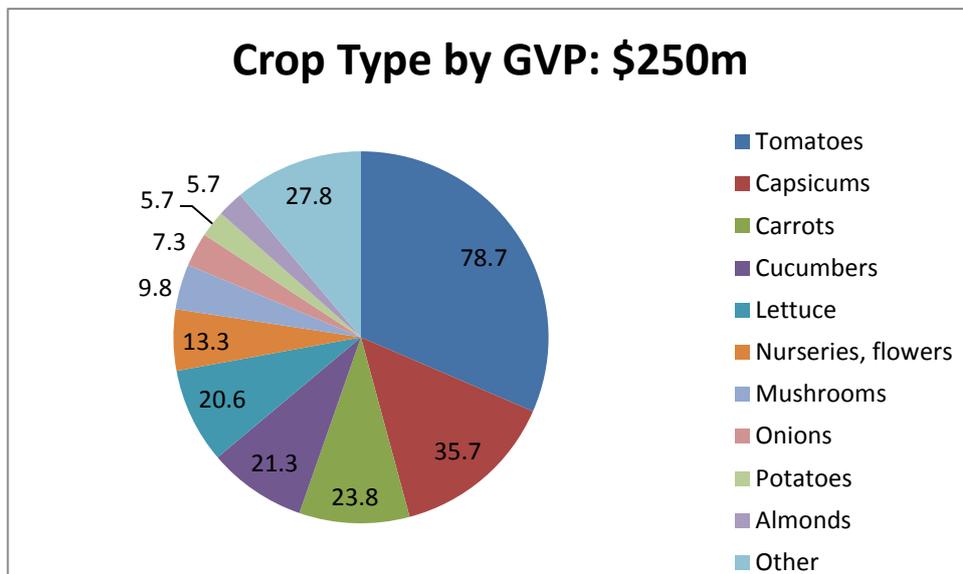
The ranking of crops is different again when based on farm gate GVP. As can be seen in the tables below, the top six crops by value account for almost 80 per cent of the horticultural GVP which sums to an estimated \$250m. The top six are comprised of tomatoes (32%), capsicums (14%), carrots (10%), cucumbers (9%), lettuce (8%), and nurseries and cut flowers (5%).

Figure 2-8 Horticultural production (kt), NAP region, 2011/12



Source: ABS 2012d, PIRSA pers. comm., EconSearch analysis

Figure 2-9 Value of horticultural crops (\$m), NAP region, 2011/12



Source: ABS 2012d, PIRSA pers. comm., EconSearch analysis

Table 2-10 Value of horticulture production, 2011, (\$m)

Horticulture	\$m
Tomatoes	78.7
Capsicums (excluding chillies)	35.7
Carrots	23.8
Cucumbers	21.3
Lettuce	20.6
Nurseries, flowers, turf	13.3
Mushrooms	9.8
Onions	7.3
Potatoes	5.7
Almonds	5.7
Celery	5.3
Leeks	3.9
Winegrapes	3.1
Cauliflowers	2.8
Spring Onions	2.6
Olives	2.6
Cabbage	2.3
Broccoli	1.7
Vegetables for seed	1.1
Parsnips	0.7
Herbs	0.6
Melons	0.3
Zucchini, Marrows, Squash	0.2
Sweet corn	0.2
Beans (french and runner)	0.2
Beetroot	0.1
Spinach	0.1
Pumpkins	0.0
<b>Total Horticulture</b>	<b>249.8</b>

Source: ABS 2012d, PIRSA pers. comm., EconSearch analysis

Although a relatively minor crop in the region, data for the winegrape industry is available in slightly more detail than that provided in the tables above. According to the Phylloxera and Grape Industry Board of South Australia there were 632 ha planted to winegrapes in 2011/12 with the majority planted to red varieties (almost 70 per cent) (Table 2-11). In total there were almost 4,500t of winegrapes crushed worth \$3.14m in 2011/12.

Table 2-11 Area planted to winegrapes, NAP, 2011/12

	Area (ha)	Crush (t)	Value (\$m)
Red winegrapes	424	2,733	1.97
White winegrapes	208	1,725	1.17
<b>Total</b>	<b>632</b>	<b>4,458</b>	<b>3.14</b>

Source: PGIBSA 2012

## 2.4 Human Resources and Skills

### 2.4.1 On Farm Employment

On-farm horticulture employment by place of work in the VNAP horticulture region is shown in Table 2-12. The vast majority (89%) of those employed are employed in the vegetable sector, with the balance in the fruit and tree nut (7%) and nursery/cut flower sectors. Consultation in the region suggests that for various reasons (e.g. language and informal economy) these census-based estimates are likely to understate the real level of employment in the industry, although no indication was given as to the extent that the estimates are understated.

Table 2-12 Employment in horticulture by sector and place of work, NAP, 2011

	Nursery & Floriculture Production	Mushroom & Vegetable Growing	Fruit & Tree Nut Growing	Total	Share
Gawler - North	0	35	5	40	4%
Lewiston - Two Wells	4	110	13	127	12%
Virginia - Waterloo Corner	28	713	34	775	74%
Munno Para West - Angle Vale	10	81	20	111	11%
<b>Total</b>	<b>42</b>	<b>939</b>	<b>72</b>	<b>1053</b>	<b>100%</b>
<b>Share</b>	<b>4%</b>	<b>89%</b>	<b>7%</b>	<b>100%</b>	

Source: ABS 2012

### 2.4.2 Off Farm Employment

In addition to on-farm employment there is significant employment in downstream activities.

According to 2011 census data, there were 147 people employed in fruit and vegetable processing and 483 in the storage and packing services. Together with on-farm employment this gives a total of 1,683 jobs in horticulture and related downstream activities (that is, within the production region) (see Figure 2.2). Of these jobs (excluding processing/packing) 40% are occupied by people who live in the VNAP horticultural region.

Table 2-13 shows that the age distribution of the on-farm workforce is relatively even across the 10-year categories. Although the 20-29 year category is somewhat under-represented (15%), the distribution is quite even across the three decades between 30 and 59 years.

Table 2-13 Employment in horticulture by age group, NAP, 2011

	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	Total
Gawler - North	0	6	13	5	12	3	3	42
Lewiston - Two Wells	0	23	38	40	15	5	7	128
Virginia - Waterloo Corner	12	113	168	215	189	71	5	773
Munno Para West - Angle Vale	0	11	21	29	33	13	3	110
Total	12	153	240	289	249	92	18	1053
Share	1%	15%	23%	27%	24%	9%	2%	100%

Source: ABS 2012

### 2.4.3 Employment by Sector

Region	Nursery & Floriculture Production	Mushroom & Vegetable Growing	Fruit & Tree Nut Growing	Total	Share
Gawler - North	0	35	5	40	4%
Lewiston - Two Wells	4	110	13	127	12%
Virginia - Waterloo Corner	28	713	34	775	74%
Munno Para West - Angle Vale	10	81	20	111	11%
Total	42	939	72	1053	100%
<b>Share</b>	<b>4%</b>	<b>89%</b>	<b>7%</b>		

### 2.4.4 Working Age Distribution

Region	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	Total
Gawler - North	0	6	13	5	12	3	3	42
Lewiston - Two Wells	0	23	38	40	15	5	7	128
Virginia - Waterloo Corner	12	113	168	215	189	71	5	773
Munno Para West - Angle Vale	0	11	21	29	33	13	3	110
Total	12	153	240	289	249	92	18	1053
<b>Share</b>	<b>1%</b>	<b>15%</b>	<b>23%</b>	<b>27%</b>	<b>24%</b>	<b>9%</b>	<b>2%</b>	

## 2.5 Social Baseline Data

### 2.5.1 Socio Economic Disadvantage

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Consideration of the Socio Economic Index of Disadvantage (SEIFA) mapping for the VNAP region provides some broad trends of note for the Study Area. SEIFA is a useful tool that provides an overall picture of the relative level of disadvantage in a region compared to the South Australian average.

*A higher score on the index means a lower level of disadvantage. A lower score on the index means a higher level of disadvantage.*

There are two key points.

**Firstly, in general, compared to the South Australian average, areas of the VNAP within the City of Playford exhibit:**

- lower median household income distribution across the VNAP region (with the exception of some of the higher-earning settlements in Mallala such as Lewiston)
- lower educational attainment
- higher unemployment
- jobs in relatively unskilled occupations.

**Secondly, within the VNAP region, there are significant diversity in levels of disadvantage.**

For example, in and around Virginia and at the north-western areas of the VNAP, there are high levels of disadvantage. Areas around Angle Vale and Penfield Gardens display fewer indicators of disadvantage. Within Two Wells and within the northern rural extremities of the study area there are higher levels of disadvantage than the average for the Mallala District Council area.

As an overall trend, within the District Council of Mallala the level of disadvantage is less than the areas south of the Gawler River within the City of Playford. For example, Lewiston shows less socio economic disadvantage than the Claire and Gilbert Valleys (DC).

## 2.5.2 Cultural and Language Diversity

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The VNAP region is characterised in part by high numbers of people working and living in the region who are from Non English Speaking Backgrounds (NESB). For example, the high numbers of people with Italian and Greek heritage contribute significantly to the cultural diversity of the region. These people:

- entered market typically closer to Adelaide (inner north east suburbs)
- still have a high rate of home ownership in these areas where they originally settled, and tend to commute or have second properties in VNAP area
- mostly are second generation Greek or Italians with more sophisticated business acumen

There are also a higher proportion of Vietnamese speaking households than English within the Study Area. In general, Vietnamese (and Cambodian) people:

- entered the market in and around VNAP (compared to Greeks and Italian people who typically entered the market in and around the north eastern suburb region)
- have a high rate of home ownership in and around VNAP
- are of first generation (60 – over 75+) and are still strongly involved
- display varying degrees of ‘western’ economic business acumen, and it is noted that many of the second generation Vietnamese have excellent business acumen and willingness to embrace modern marketing and food chain approaches
- are distributed across the region but generally not north of the Gawler River
- are less likely to pass on their farms to their children, with strong support amongst families for their children to gain skills and education unrelated to horticulture. There are however some examples of the second generation taking on the horticulture farm and seeking investors, implementing new business models and adopting new and improved farm practices

It is also noted that **English** as the primary speaking background **represents less than one third of the population** (on average) within the study area and this needs to be taken into consideration in any policy responses. Furthermore, the proportion of non-English households increases considerably between Gawler North (at 75%) and the rest of the regions – if the Gawler region is excluded the average proportion of English households only equates to 27.8%

The most common ‘language spoken at home’ is Vietnamese (34% of the total horticulture workforce) followed by English (29%), Khmer (8%) and Italian (7%).

Amongst workers, anecdotal evidence suggests that large numbers of workers on the larger properties are either backpackers or are from an Asian (particularly Filipino) background. This adds to the cultural diversity of the region.

Region	English	Greek	Italian	Punjabi	Khmer	Vietnamese	Other	English %
Gawler - North	30	0	7	0	0	0	3	75%
Lewiston - Two Wells	29	12	3	10	15	11	48	22%
Virginia - Waterloo Corner	213	38	39	23	68	307	89	27%
Munno Para West - Angle Vale	36	3	25	0	6	35	3	33%
Total	308	53	74	33	89	353	143	29%
<b>Share Across Region</b>	<b>29%</b>	<b>5%</b>	<b>7%</b>	<b>3%</b>	<b>8%</b>	<b>34%</b>	<b>14%</b>	

03



### 3 Natural Resource Baseline

#### 3.1 Groundwater

The main underground water resources available for irrigation in the VNAP are supplied from two aquifers, T1 and T2. These aquifers are regulated by the Department of Environment, Water and Natural Resources. Refer to the annual "Groundwater Level and Salinity Status Reports" for details of the condition of these aquifers.

The T1 aquifer is recharged from the Mt Lofty Ranges to the east with rain water entering through the fractured rock system and moving downwards in the sandstone, sand and limestone layers towards the coast to the west. T1 is the main source of water in the area south of Waterloo Corner and in 2010/11, metered water extraction was 3180ML, 28.6% of the groundwater extraction in the VNAP. The status of the T1 aquifer water resource was assessed by in 2011 as "Green, with no adverse trends, indicating a stable or improving situation".

The T2 aquifer lies below the T1 aquifer and is made up of well-cemented limestone. This aquifer is also recharged from the Mt Lofty Ranges to the east through the fractured rock system and moves towards the coast. T2 is the main source of underground water for the VNAP and in 2010/11 7573ML was extracted, providing 68% of the groundwater extraction in the VNAP. The status of the T2 aquifer was assessed in 2011 as "Green, with no adverse trends, indicating a stable or improving situation".

In the 1970s the underground water resources of the VNAP were not well understood or controlled by the water authorities and water levels in bores were dropping with salinity increases as salt water from the west moved into the aquifer. Restrictions were placed on water extraction and transfers of water licences between some parts of the VNAP to protect this water resource. These were unpopular with many irrigators, but since that time the condition of the underground water system has stabilised. The development of the distribution system for reclaimed Bolivar water in the 1990s has allowed irrigation to continue in a sustainable way for the VNAP horticultural industries.

#### 3.2 Salinity

The salinity of underground water varies greatly across the VNAP but in the main production areas the average salinity is about 1200mg/L.

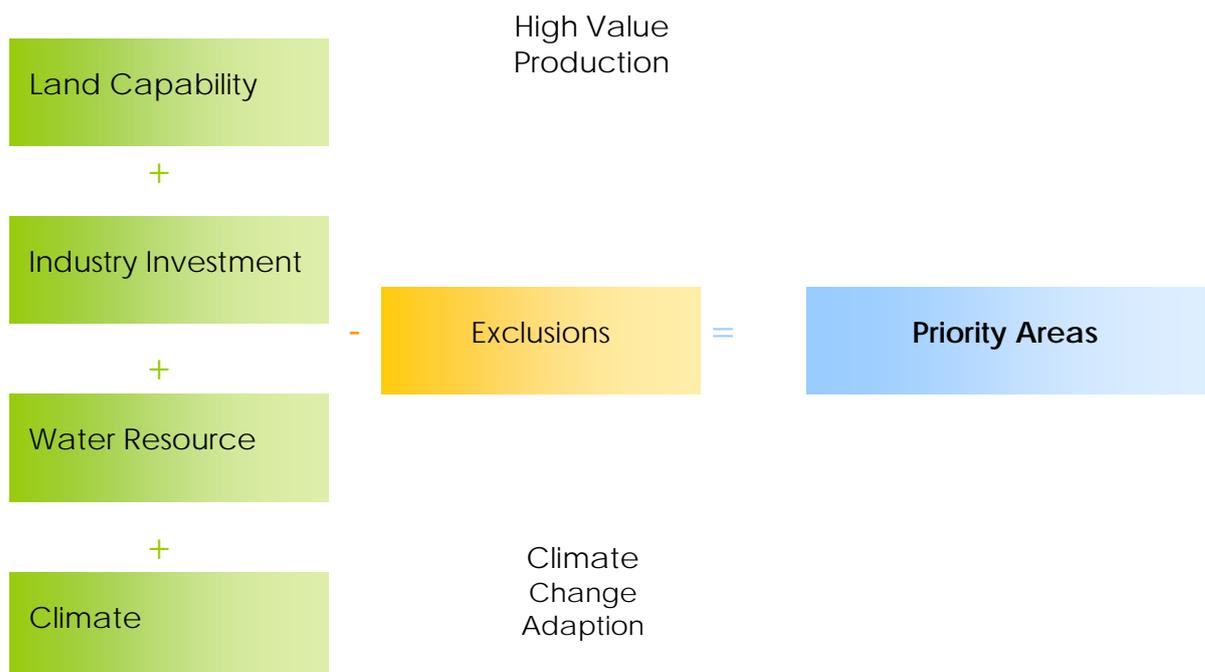
The status of "Green, with no adverse trends, indicating a stable or improving situation" for the T1 and T2 aquifers indicates that the current salinity of both aquifers is stable (T1) or declining (T2).

### 3.3 PIRSA Priority Area Mapping

In mid-2011, Primary Industries and Resources SA (PIRSA) produced draft priority area mapping for each local government area that detailed areas with primary production significance within the Greater Adelaide region.

The broad objective of the project was to identify these areas for local and state government to consider when developing land use policy for primary industry land.

The areas were identified using a multi-dimensional assessment in recognition of the complicated farming sector and food system in SA – acknowledging that soil conditions alone are rarely a sufficient explanation of strategic importance. The figure below shows what relevant factors were combined in order to identify priority areas:



Conceptual outline of PPPA identification method (PIRSA 2011)

The areas identified by PIRSA through this process were then provided to State and Local government as a guide for future land use decisions.

### 3.3.1 City of Playford

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Within the City of Playford, PIRSA identified three areas (refer to the map on next page). The largest of the three areas was the Virginia Horticultural region (Area 1). The remaining two are south or east of the Northern Expressway with PIRSA noting that these areas are likely to be used for primary production only in the short-to-medium term with residential growth planned for Area 3 and employment planned for Area 2.

### 3.3.2 District Council of Mallala

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Within the District Council of Mallala, PIRSA also identified three areas with the first two contained solely within the Study Area and a significant portion of the third (refer to the map on next page). Area 1 is adjacent to the Gawler River (within its flood plain).

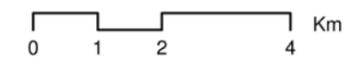
# Virginia and Northern Adelaide Plains Horticulture Study

## Detailed Landuse - Level 3 Specific Irrigated Agriculture PPPA Overlay

### Legend

- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Cadastre
- Area of Interest
- Local Government Areas
- Airport / Runways

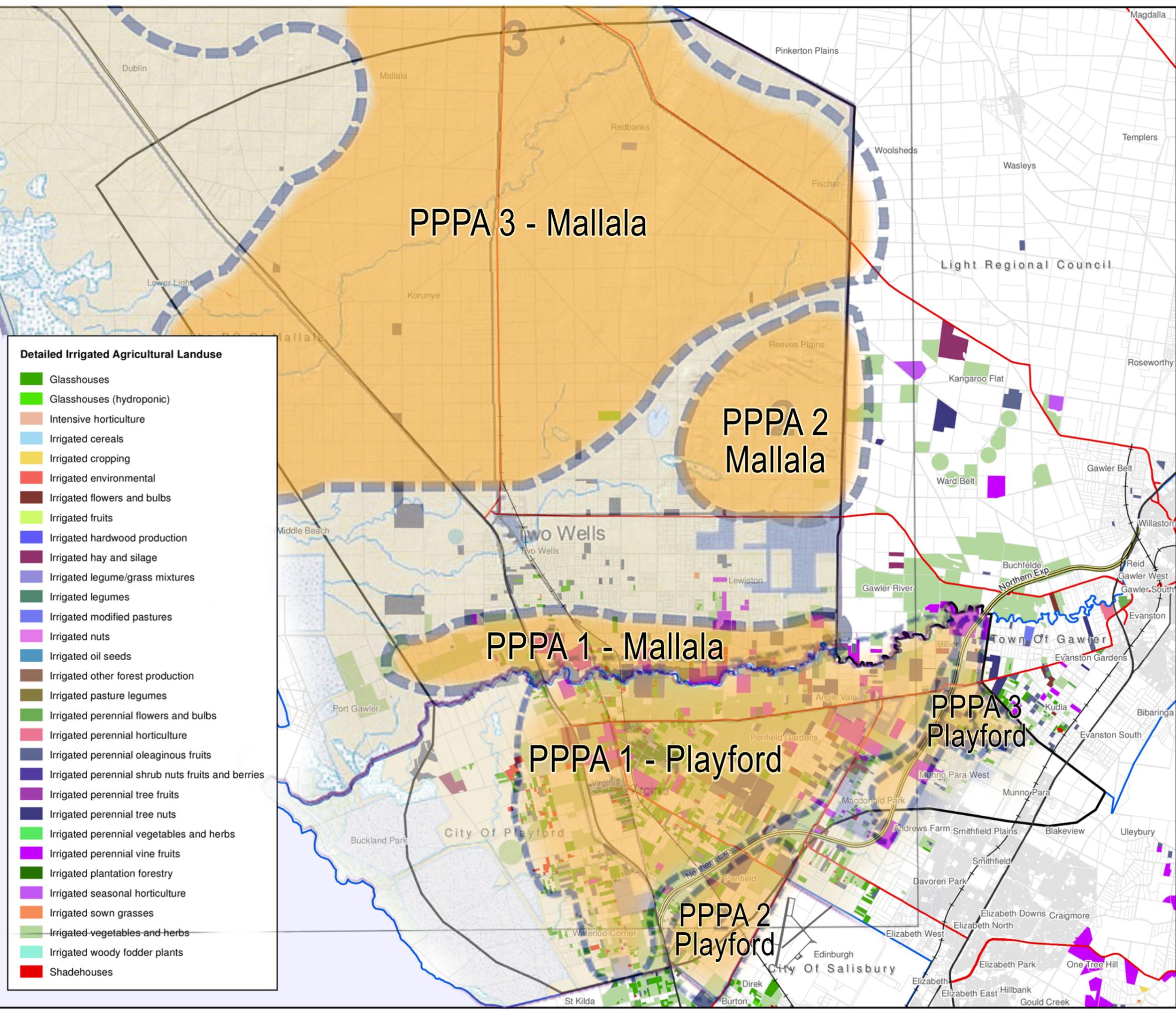
Scale at A3 1:110,000



GDA 94 - MGA Zone 54  
 Map generated December 2012 by  
 Avante Mapping Solutions  
 Data Source:  
 DPTI, DPLG, DEWNR, SA Water, BING Maps

The accuracy of the information shown on this plot is not guaranteed and no responsibility is accepted by Jensen Planning, Avante Mapping Solutions, or their officer, agents and servants for any loss or damage caused by reliance upon this information, as a result of any error, omission or misdescription here on whether caused by negligence or otherwise.

- ### Detailed Irrigated Agricultural Landuse
- Glasshouses
  - Glasshouses (hydroponic)
  - Intensive horticulture
  - Irrigated cereals
  - Irrigated cropping
  - Irrigated environmental
  - Irrigated flowers and bulbs
  - Irrigated fruits
  - Irrigated hardwood production
  - Irrigated hay and silage
  - Irrigated legume/grass mixtures
  - Irrigated legumes
  - Irrigated modified pastures
  - Irrigated nuts
  - Irrigated oil seeds
  - Irrigated other forest production
  - Irrigated pasture legumes
  - Irrigated perennial flowers and bulbs
  - Irrigated perennial horticulture
  - Irrigated perennial oleaginous fruits
  - Irrigated perennial shrub nuts fruits and berries
  - Irrigated perennial tree fruits
  - Irrigated perennial tree nuts
  - Irrigated perennial vegetables and herbs
  - Irrigated perennial vine fruits
  - Irrigated plantation forestry
  - Irrigated seasonal horticulture
  - Irrigated sown grasses
  - Irrigated vegetables and herbs
  - Irrigated woody fodder plants
  - Shadehouses



## 3.4 Biosecurity

### 3.4.1 Biosecurity Definition

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Biosecurity is the protection of livelihoods, lifestyles and the environment. Simply put, improved regional biosecurity should in a practical sense involve the whole of the community and provide greater protection against the introduction of exotic and unwanted pests and diseases into the VNAP community.

Australia's quarantine system aims to achieve and maintain a very low risk of plant pests entering and establishing in Australia. "Zero-risk" is not an achievable, nor reasonable target, and a range of post-border measures at the regional level are required to extend the detection and management of quarantine issues to individual farms and communities such as those within the Study Area.

Plant biosecurity is about managing our land and agricultural livelihood. Sharing biosecurity responsibility (with government) demands collaboration. In a regional sense that means collaboration within and across enterprises, governments and the community. Coordinated efforts to address biosecurity are more likely to be effective than individual efforts, but every effective step requires that responsible and aware individuals are involved.

### 3.4.2 Threats to Biosecurity

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The steps towards regional biosecurity encompass understanding of the region and the threats; the stakeholders and their capacity; impediments and solutions. The methodologies include investigation, consultation, communication, motivation, consolidation and evaluation.

The VNAP region is a complex horticultural region. Threats in this region relate to its crop (and animal) diversity, demographic diversity, peri-urban location and range of biotic and abiotic threats to the industries and the community as a whole.

Specific threats include:

- biological pests, diseases and weeds yet to arrive (exotic) and those already present
- contaminated inputs
- poor practices related to hygiene, waste removal, waste water management and stormwater management
- lack of human and financial resources, and
- surveillance, recording (surveillance activity is undertaken in the region by government, but it is limited on-farm. Property identification codes

and grower registers are a means of increasing both engagement and trace-backs)

### 3.4.3 Biosecurity Benefits

Some of the benefits of biosecurity to the various stakeholders are shown in the table below.

Commonwealth Government	State / Territory Governments	Horticultural Industries	Local Government and General Community
Reduced management costs	Improved state quarantine	New/improved (or perceived) market access	Greater awareness and collaboration
Improved value of non-commercial amenities	Harmonised domestic trade regulations	Increased interstate trade	Whole-of-community reflected in strategies and participation
Reduced environmental impact	Strengthened collaboration with industry	Increased international trade	Improved biosecurity
Improved regional economies	Consistent messages reinforced across regions	Harmonised regulations, easier compliance	Engaged ethnic groups
Food security	Integrated, targeted R&D	Improved on-farm yields and quality; biosecurity	Actively shared responsibility
Evidence- and science-based compliance and pest/disease knowledge	Evidence- and science-based compliance and pest/disease status	Improved value chain involvement, and profitability	Valued regional reputation and 'sense of community'
Shared responsibility	Shared responsibility and investment	Reduced threat of incursions; increased vigilance, hygiene	Informed volunteers with sense of purpose
Knowledge repositories populated from multiple sources	Knowledge repositories populated and used by multiple groups	Targeted R&D; knowledge and reporting repositories accessible	Feedback received; responsiveness and behavioural change
	Resource allocations linked to risk	Shared responsibility – with other industries, regions, governments	Beneficiaries and perpetrators engaged
	Sustainability increased	Sustainability; preparedness improved	

Source: Adapted from draft National Fruit Fly Strategy (PHA 2008)

### 3.5 Climate Change

The 2012 update by CSIRO and BOM (State of the Climate 2012) provides a summary of the current Australian climate and an analysis of the factors that are influencing climate change. The topics in the "State of the Climate 2012" document are temperature, rainfall, oceans, greenhouse gases, global warming and future changes. Across Australia, the following climatic changes have been observed:

#### Temperature

- Each decade since the 1950s has been warmer than the previous decade.
- The average annual maximum temperatures have increased by 0.75° C since 2010, and the average annual minimum temperatures have increased by more than 1.1° C since 2010.
- 2010 and 2011 were the coolest years recorded since 2001 due to two consecutive La Niña events.

#### Rainfall

- South-west WA has experienced a long-term reduction in rainfall during the winter half of the year (April to September).
- In recent decades there has been a trend towards more spring/summer monsoonal rain in northern Australia, higher rainfall in Central Australia and less autumn winter rainfall across southern Australia.

#### Oceans

- Sea levels are increasing as a result of higher sea temperatures.

#### Rainfall

- The concentration of CO<sub>2</sub> in the atmosphere in 2011 was 390 ppm, higher than at any time in the past.
- The main cause of the increase in CO<sub>2</sub> is the combustion of fossil fuels since the industrial revolution. Recent (2000 to 2010) emissions of CO<sub>2</sub> have increased by more than 3% per year.

In summary, observations suggest both natural and human influences have affected climate over the past 100 years. The warming around Australia is consistent with the global pattern and there is evidence of more extreme temperatures globally. Australian average temperatures are projected to rise by 1 to 5° C by 2070 and there will be an increase in droughts in southern Australia, as well as increases in intense rain events in many other areas.

### 3.5.1 Implications for the VNAP Region

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A changing climate could have the following implications within the Study Area:

- an increase in demand for water for crops
- reduced soil moisture due to reduced winter rainfall, resulting in increased water run-off and evaporation
- reduced recharge of T1 and T2 aquifers due to reduced rainfall and soil absorption
- shorter growth periods for individual crops (due to higher temperatures)
- faster ripening crops
- a change in presence, frequency and severity of pest and disease outbreaks
- an increase in flood events in the catchments of the Gawler River, River Light, Templers Creek and Salt Creek

The quality of produce may or may not be affected depending on management and timing of extreme weather events (for example, sunburn, reduced fruit size, wine grape quality, etc).

Crops that are irrigated from a secure source (from Bolivar, for example) will not necessarily suffer from a reduced winter rainfall – the greater threat is from increased summer heat and increased incidence of severe weather events, such as hail or heat waves.

Crops that are reliant on underground water may also be affected by the prospect of less rainfall, runoff and recharge of the aquifer from stream and river flows from the ranges to the sea. The expectation of more intense summer rainfall will not compensate for the lower winter rainfall as the summer rain may not be as important for aquifer recharge as are the more prolonged winter rain periods.

### 3.5.2 Temperatures

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- Some crops/cultivars will be unable to cope with increasing temperatures (i.e. thresholds are reached for crop development phases)
- Increased annual irrigation demand and peak daily water requirement
- Decrease in product quality (e.g. heat damage) or crop yields and or changes to pollination

- Increased need for cooling systems (and hence energy costs)
- Longer winter growing season (potential benefit)

### 3.5.3 Frosts and Cyclonic Events

- Long term decrease incidence decrease of frosts in Virginia, with increase incidence of frost within in areas along the south-eastern coastline
- Less cyclonic weather events, but when they do occur, they will be more intense, and produce more rainfall and stronger winds

### 3.5.4 Rainfall<sup>1</sup>

- Increased irrigation demand
- Decreased groundwater recharge (particularly important for tertiary aquifer)
- Increased demand for recycled wastewater
- Limitations within on-property irrigation infrastructure
- Small increase floods damage

**In order to build resilience and adaptation, growers need an improved understanding of the following:**

- Crop types and crop management
- Integrated water management
- Managing heat wave events
- Managing pests and disease
- Production cycle cost projections

Points to consider

Some implications may have less significance than others. For example, warmer temperatures may allow for earlier planting of some crops or for multiple crops in a season (for instance, lettuces, French bean, tomato, etc).

If these changes occur, producers of annual crops will be better placed than vine or tree crop growers to respond to these changes in climate. The most serious production impacts that growers will have to face are related to:

- drought and reduced availability of water
- higher water use by crops because of higher temperatures
- increased incidence of severe weather events, and
- more pest, disease and weed problems

<sup>1</sup>Billington K; Ferguson K; Unpublished report for the AMLRNRM, Baseline Data - Building Adaptive Capacity and Resilience in the Northern Adelaide Plain (2013)



## 4 Physical Infrastructure Baseline

### 4.1 Electricity, Gas and Telecommunications

The horticultural industry has significant need for electricity and gas. Irrigation, heating, pumping and lighting are all generators of power demand. The demand has seasonal variations. Heating requirements are greater in cooler months. Irrigation requirements are greater in warmer months.

The degree of technology used in the operations influences the extent of telecommunication requirements. However, general access to internet and mobile phone is essential.

#### 4.1.1 Demand and Supply

---

The electrical, gas and telecommunications services are provided on a demand basis (generally based on urban demands). Should a greater demand be required, a group must submit usage information to the service provider to determine the scope of upgrades required.

There are many examples where demand is not appropriately met. In some instances, growers have required additional gas or electricity requirements, however generally they have been unsuccessful in their individual representations to infrastructure providers in getting additional infrastructure to support their operations. In other instances, a group of growers/advocates who collectively have presented a coordinated and justified case to infrastructure providers have had success in getting additional infrastructure.

#### 4.1.2 Implications for the VNAP Region

---

Future demand for electricity, gas and telecommunications must be met if industry viability is to be guaranteed. A coordinated, collaborative and well justified case for further energy provision seems to be a prerequisite for a favourable outcome.

The following maps highlight the existing level of service (as provided by the main service providers). It is noted that these maps do not show many additional small, local extensions to the services; however this data was not able to be sourced from the energy providers for the purpose of inclusion in this document.

### 4.2 Waste – Sewer and Hard Rubbish

Currently, waste disposal is the area predominately consists of on-site septic tanks with soakage systems. SA Water sewerage within this region is limited. Any upgrades are commercially driven, through residential development in this region, or beyond.

Disposal of hard rubbish is a major issue for the region. The unsightliness of mounds of flapping plastic, discarded irrigation pipes, dead vines, twine, and plastic containers is detrimental to the image of a vibrant, sustainable, well managed horticultural region. Many farmers have noted how difficult it is to discard hard rubbish, some of the reasons include:

- Legislative constraints regarding burning - they are not allowed to burn off many items (for example, because vines are wrapped around twine, the old vines cannot be burn off because it is too difficult to separate them from the twine)
- Prohibitive cost of dumping materials
- Time and resources to travel to sites to dump materials
- A lack of confidence in the longevity of their farming operations (noting that it is unlikely that their children will take over) so there is no incentive to "clean up"
- Incidental, small scale piles of rubbish easily turn into larger, unsightly deposits
- Lack of knowledge or understanding about waste management

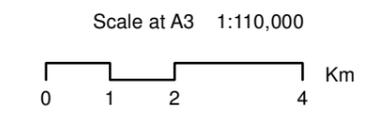
A common "call for help" by many of the smaller growers was for assistance with waste management. The preference is for this to be in the form of "carrots" - advice, rebates, resources, and meaningful communication, rather than fines (a stick approach). It is clear that the issue is unlikely to resolve itself without significant education, capacity building, well presented alternative waste management options and enforcement of compliance.

# Virginia and Northern Adelaide Plains Horticulture Study

## Infrastructure - Gas Distribution

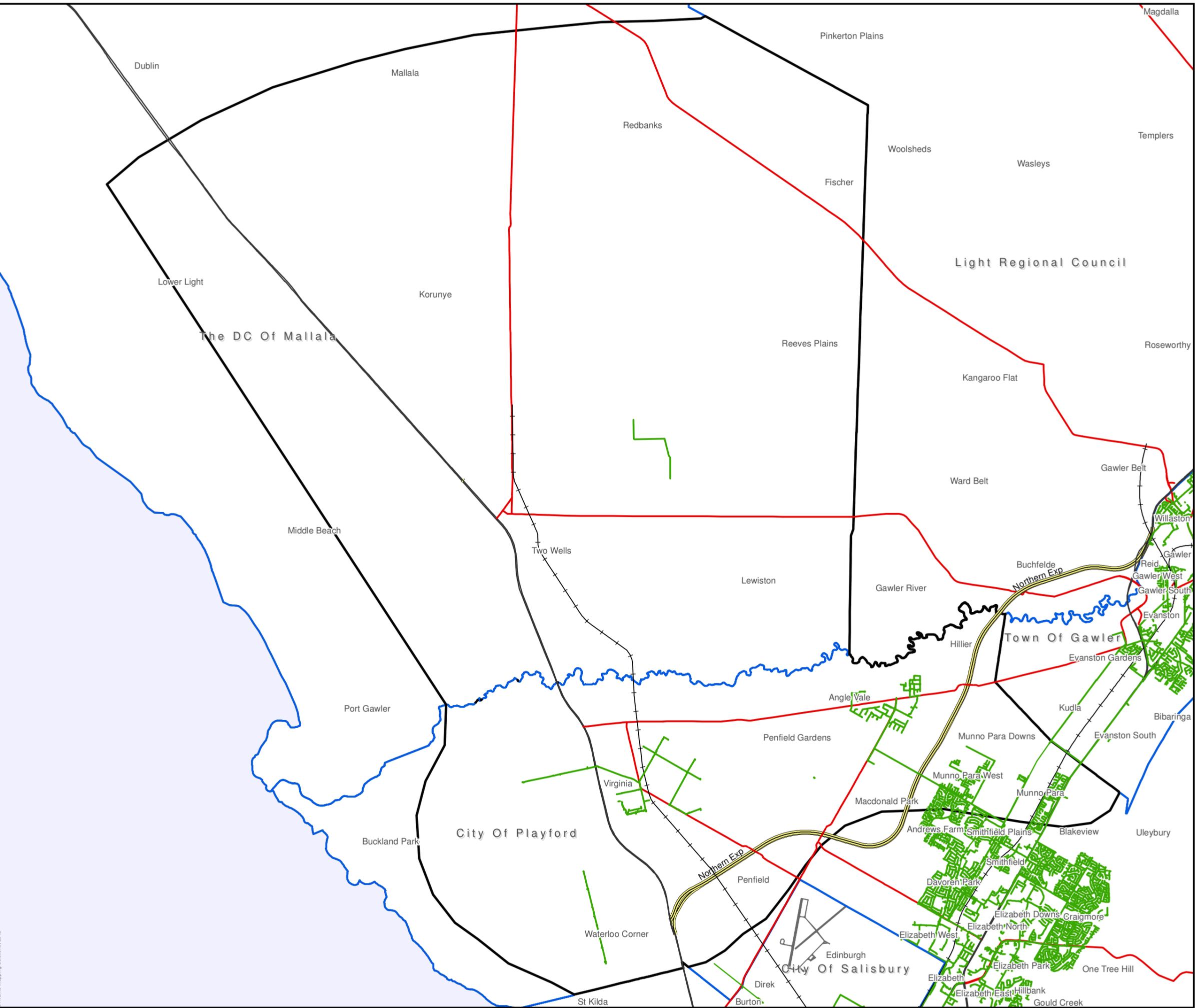
### Legend

- Gas Distribution Pipe
- Gas Transmission Main
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Area of Interest
- Local Government Areas
- Airport / Runways



GDA 94 - MGA Zone 54  
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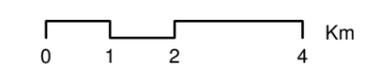
# Virginia and Northern Adelaide Plains Horticulture Study

## Infrastructure - Electricity Distribution

### Legend

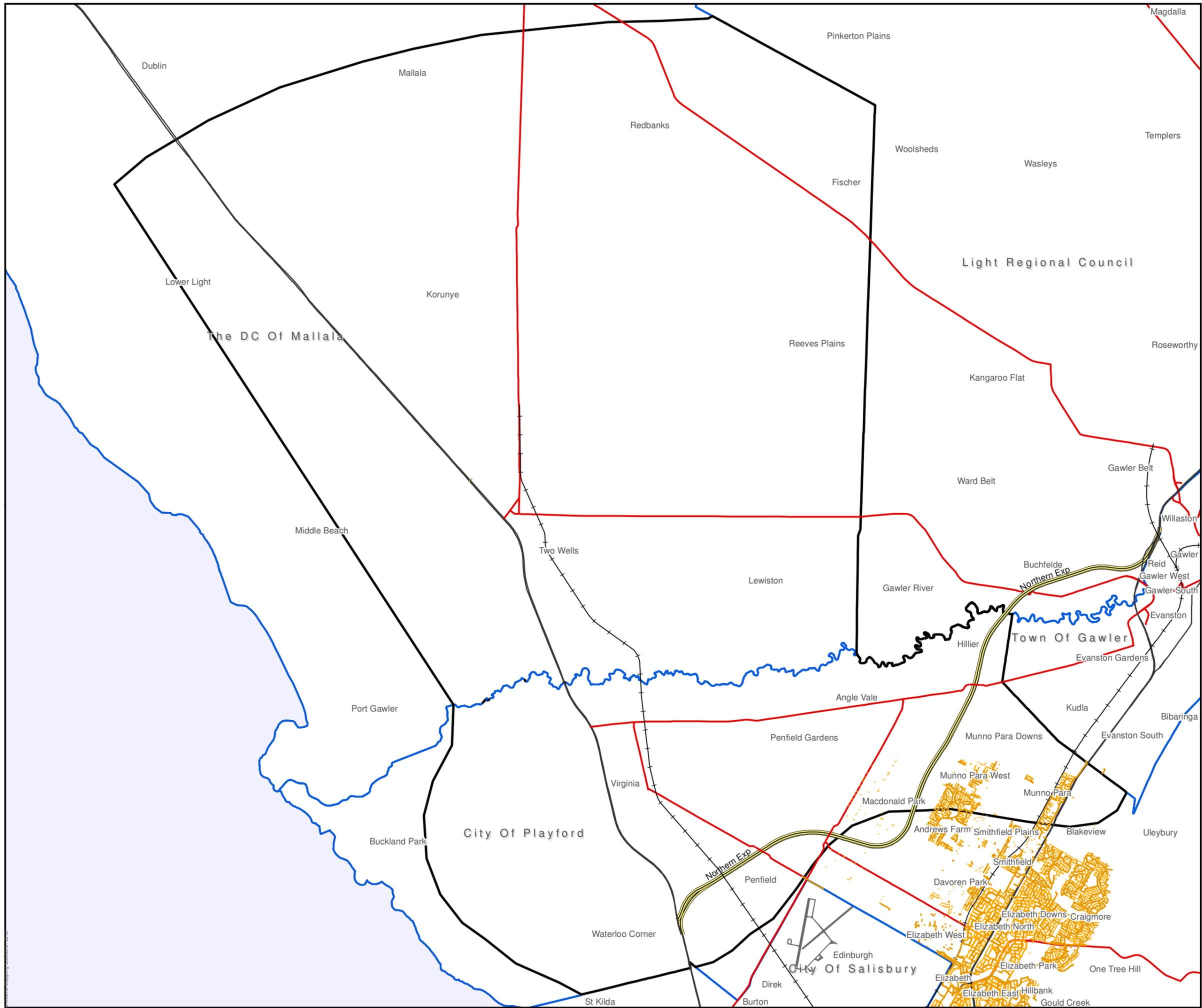
- Low Voltage Cable
- High Voltage Cable
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Area of Interest
- Local Government Areas
- Airport / Runways

Scale at A3 1:110,000



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### 4.3 Water Resources

Growers within the VNAP use water for irrigation from a number of sources, depending on their location and their access rights (ie whether they can access rights or licences for use). These water sources include:

- **Groundwater** from T1 and T2 aquifers
- **Treated wastewater** from Bolivar and delivered by WRSV
- **Mains supply** from SA Water potable water mains
- **Capture and Reuse** from stormwater on site
- **Capture and Reuse of stormwater** from Local Government Schemes, including:
  - City of Playford Wetland and ASR scheme
  - City of Salisbury Wetland and ASR scheme
  - Gawler Water Re-use Scheme

The table below summaries the key features of the various water resources being used within the VNAP Region:

Water Source	Volume Available	Comment
<b>Groundwater</b> from T1 and T2 aquifers	<ul style="list-style-type: none"> <li>▪ Volume controlled by licence allocations</li> <li>▪ In 2011, use was 10,753 mega litres (ML)(less than entitlement volume)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Salinity levels vary but average approximately 1200mg/L</li> <li>▪ 61% of the extracted water is used for irrigated vegetables and herbs, 20% is used for irrigated perennial horticulture, while an addition 16% is used for pasture</li> <li>▪ Water level 10 year trend indicates a stable condition (although there are considerable annual variations – due to changes annual rainfall and crop demands)</li> <li>▪ Salinity 10 year trend indicates an increasing condition</li> <li>▪ Extractions from the T2 aquifer have created a long-standing cone of depression centred on Virginia that has been relatively stable over the last 20 years and reaches its maximum seasonal drawdown in March</li> </ul>
<b>Treated wastewater from Bolivar and delivered by WRSV</b>	<ul style="list-style-type: none"> <li>▪ 40,000ML generated by Bolivar plant per annum</li> <li>▪ At peak season, distribution system at full capacity at 20,000ML (95% is being used throughout the Virginia Horticulture Area)</li> <li>▪ During off-peak winter season, distribution system is at half capacity (50%)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Salinity generally 900 to 1200mg/L and capped at 1500mg/L</li> <li>▪ Capacity within the plant to double water generated but would require new infrastructure for storage and distribution</li> <li>▪ Ownership and management of delivery system will transfer from WRSV to SA Water in January 2018</li> </ul>

Water Source	Volume Available	Comment
	<ul style="list-style-type: none"> <li>▪ With 10GL surplus water available in off peak winter months because it is not being used by horticultural operations, there is potential to store this allocation for use during the peak season when demand is greater. However the cost of storing is extremely cost prohibitive for individual growers to undertake</li> </ul>	
<p><b>Mains supply</b> from SA Water</p>	<ul style="list-style-type: none"> <li>▪ Limited only by cost and size of supply outlet</li> </ul>	<ul style="list-style-type: none"> <li>▪ Salinity 400 to 500mg/L</li> <li>▪ Mains water is much more expensive than other sources but infrastructure (in general) is already in place</li> <li>▪ Greenhouse growers are known to use mains water for irrigation in absence of other water but the volume of this use is unknown</li> <li>▪ This is not a good use of potable water (it is not needed for irrigation)</li> <li>▪ Some limited 'bulk water transport' by SA Water of River Murray Licences is available in some districts (off-peak) but only for wine grapes so not a useful option for the Study Area</li> </ul>
<p><b>Capture and Reuse of storm-water or rain-water on site</b></p>	<ul style="list-style-type: none"> <li>▪ Using the average rainfall for the Study Area of about 450mm per year, 1 hectare of greenhouse roof will capture about 4.5ML of water per year that could be used for irrigation</li> </ul>	<ul style="list-style-type: none"> <li>▪ There are good examples of the local urban collection and re-use of stormwater by City of Salisbury via wetlands and aquifer recharge</li> <li>▪ Some better growers in the Study Area are harvesting water from the roof of greenhouses and storing in dams to supplement their other water sources – but this requires significant investment and a business model that supports long term investment in water infrastructure. Many of the smaller growers are highly unlikely to undertake onsite storage individually because of these limitations</li> <li>▪ There is a cost (and engineering required) to collect and store the water in a dam. Although required for all allotments serviced by the VPS, anecdotal evidence suggests</li> </ul>

Water Source	Volume Available	Comment
<p><b>Local Government Wide Capture and Reuse of Stormwater (City of Salisbury &amp; City of Playford)</b></p>		<p>that on-site stormwater storage is not being fully utilised throughout the VNAP</p> <ul style="list-style-type: none"> <li>▪ There is significant opportunity for a regional approach to water storage. It requires careful consideration of dam (or aquifer) location such that it will service a range of growers, will be cost effective and managed. This requires a collaborative and partnership approach – unlikely to come about unless there is a representative body that seeks to support collaborative and integrated approaches</li> <li>▪ There are good examples of the local urban collection and re-use of stormwater by City of Salisbury and Playford via wetlands and aquifer recharge. The recycled network is currently adjacent, although it is not reticulated throughout VNAP</li> <li>▪ There is scope to increase extent of the network, or provide stormwater harvesting options</li> <li>▪ The key for supply is ensuring the demand throughout the region, otherwise infrastructure is less likely to be extended. However, demand is currently fragmented and the case for increased supply is not well justified in a coordinated manner that is representative of a wide and diverse interest group</li> <li>▪ The City of Salisbury has for some years successfully recharged aquifers as a means of storage of excess stormwater (one of the most difficult aspects of a storm-water capture and reuse scheme)</li> <li>▪ Using aquifers in this way can prove very effective as it provides a substantial holding area, reduces storm-water being let out to sea and provides more water to the region</li> <li>▪ ASR schemes have been looked at and talked about for a long time but are not yet used much for irrigation within the Study Area</li> <li>▪ This would be a good way of storing the winter surplus Bolivar water but is an option with mixed</li> </ul>

Water Source	Volume Available	Comment
		views within the community and environmental groups due to concerns of possible contamination

#### 4.3.1 Potential Integrated Water Management Approaches

The region is working towards an integrated approach to water management in which the mains and groundwater resources are supplemented by combining the use of all sources of recycled water together to provide a sustainable non-potable supply for urban and economic uses thus reducing the need for potable water. This is being facilitated by a collaborative process involving all four councils – Mallala, Light, Gawler and Barossa. The region’s clear goal is to develop water reuse infrastructure for the benefit of the Northern Adelaide Plains Horticulture industry (as identified in the *RDA Barossa Regional Roadmap*, 2012).

The regional integrated approach aims to provide a minimum 40 GL non-potable water supply scheme by 2040, sourced from:

- 33.6 GL - Waste Water – Bolivar, Buckland Park , Two Wells, Roseworthy & Concordia, Angle Vale & Virginia
- 18.7 GL - Storm/Surface Water – Greater Gawler, Buckland Park, Angle Vale , Virginia, Two Wells & Gawler River
- 4 GL - Possible incorporation of Greater Edinburgh Parks

The use of this water is likely to be for

- Urban non-potable uses in Greater Gawler, Two Wells, Angle Vale & Virginia and potentially within Buckland Park and Greater Edinburgh Parks
- Irrigation – 32GL for grapes, glass houses, intensive animal raising & broad acre specialty crops

##### 4.3.1.1 Key Challenges

The key challenges in moving forward with a regional, integrated approach to securing an affordable and consistent increased supply of water are:

- Securing a water resource
- Securing appropriate water storage (such as a dam or aquifer that is of an appropriate size and location to meet regional needs, is affordable to a range of growers, supports supply in peak summer periods)
- Securing a market for future water needs that will both generate demand and be prepared to pay for the service
- Securing funding and collaboration between stakeholders

#### 4.3.1.2 Benefits

The benefits of an integrated regional non-potable water supply include:

- a gross income of \$1.5 billion per year (excluding multipliers)
- over \$800m in rural production investment (excluding transport and services)
- the provision of sustainable recreation and open space
- assistance in funding flood mitigation on the Gawler River
- sustainable surface and subsurface water resources.

(Sourced from *Gawler Water – Progress Report*, 30 May 2013, Wakefield Group)

The regional integrated water use approach is being progressed primarily in two parts:

#### 4.3.1.3 Gawler Water Reuse Scheme (the urban water component)

This is a multi-water use scheme involving 1.2 GL in two wetlands (one on the Gawler River and the other at the Gawler racecourse) by 2017, and ultimately 12 GL over the next 30 years as the Gawler/Roseworthy expansion continues to grow.

The scheme is based on reusing stormwater in the growing northern suburbs (Greater Gawler and Roseworthy). The network is planned to extend south to Evanston Gardens and East to Woods Road, Ward Belt but the actual extent of the works to be constructed may change through the design development phase.

It intends to supply water to the four northern councils and recreation space users, and there will be some potential to extend the scheme to horticultural uses.

It is commencing with a \$10.7 million Commonwealth grant, which has been approved, and LR+M Consortium has been secured as the preferred partner.

Councils are also seeking the addition of the currently unallocated Gawler river flow, which could increase supply by 10GL per year for use in irrigation. The SA Minister for Water has advised that progress on the Draft Water Allocation Plan has ceased, so the Councils should continue to seek this access to this water.

There is potential to link the scheme to other schemes including the Waterproofing Playford system and potentially to supply non-potable water to Blakeview and Playford Alive.

#### 4.3.1.4 Northern Adelaide New Irrigation Area (NAIS)

This is focused on Mallala and is in formulation stage. Preliminary studies have been completed including a market survey, which indicated interest in purchasing 23 GL per year of irrigation water. It is noted that prices for this water will likely be higher than the Bolivar water but comparable to other water schemes (such as Willunga).

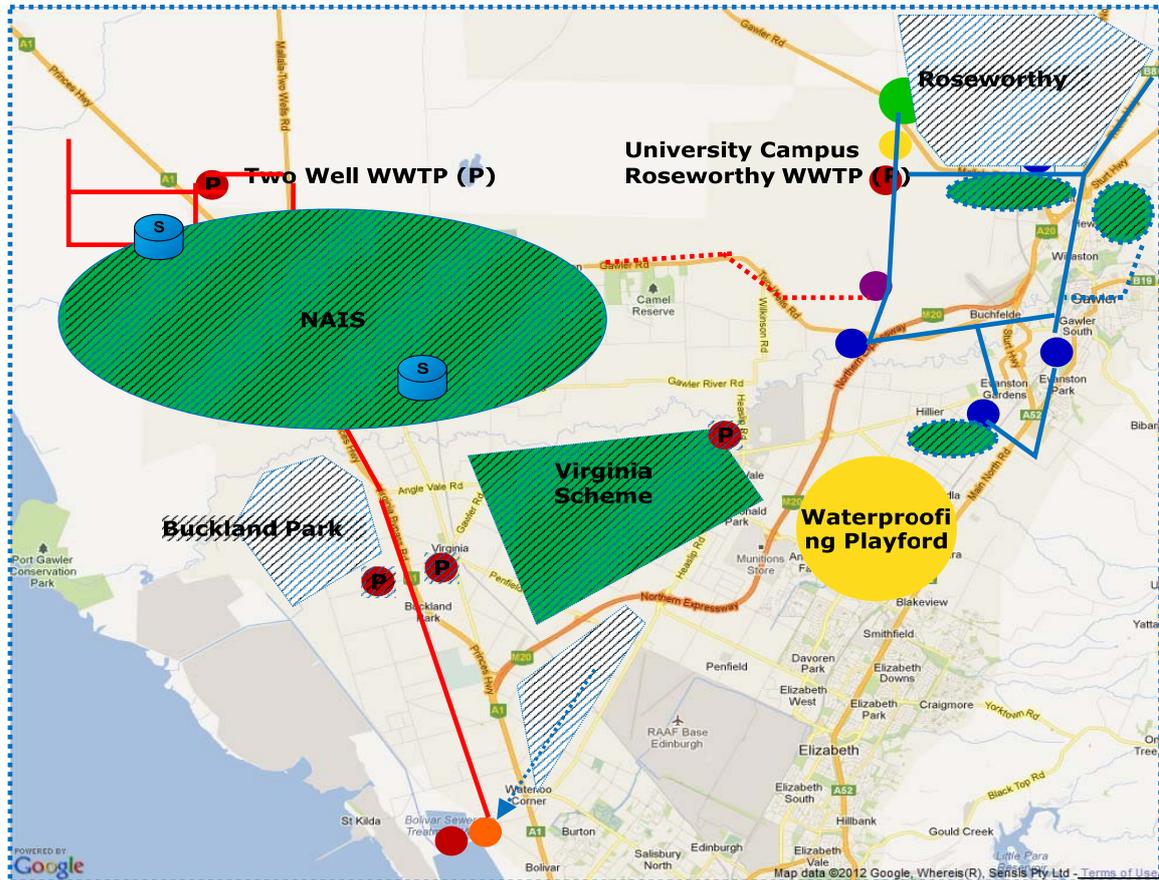
Initial Stages of this will see up to 6 GL per year supply drawn from Bolivar WWTP during winter (noting that this is all SA Water can commit to at the present time), increasing to 26 GL per year by 2040. There is also an agreement from a landowner adjacent to Two Wells who has a large land holding and who would be prepared to make storage (probably dam or aquifer) available. There could be a distribution system which could link in with the Gawler Water Reuse scheme.

Discussions are progressing to secure funding to develop a Business and Capital Raising Plan and position the Council to seek grant funding at the next opportunity.

Discussions are also underway with SA water to consider interaction with Virginia Pipeline Scheme.

### 4.3.1.5 Barossa infrastructure scheme

In addition, a separate study has recently gone out to tender to extend the scheme westwards along Gomersal Road. The scheme would involve purchasing more water from the River Murray and increasing the scope of the scheme by 2 – 3 GL.



**NAIS SCHEME LOCATION & REGIONAL LINKS Dec 12**

- |   |   |
|---|---|
| <span style="color: red;">●</span> <b>WWTP</b>                      | <span style="color: orange;">●</span> <b>Pump Station</b>   |
| <span style="color: green;">●</span> <b>Irrigation Area</b>         | <span style="color: red;">—</span> <b>NAIS Scheme</b>   |
| <span style="color: blue;">●</span> <b>Wetland</b>                  | <span style="color: blue;">—</span> <b>GWR Scheme</b>   |
| <span style="color: purple;">●</span> <b>ASR borefield</b>          | <span style="color: blue;">⋯</span> <b>Coventry Road link (possible)</b>  |
| <span style="color: yellow;">●</span> <b>Waterproofing Playford</b> | <span style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: inline-block;"></span> <b>Surface Storage</b> |

*A Proposed Integrated, Regional Water Supply Scheme*  
 (Sourced from *Gawler Water – Progress Report*, 30<sup>th</sup> May 2013, Wakefield Group)

# Virginia and Northern Adelaide Plains Horticulture Study

## Water Mains

### Legend

#### Water Main

##### Diameter (mm)

0 - 150

151 - 400

401 - 750

751 - 1200

1201 - 2475

Salisbury Distribution Pipeline

Main Roads

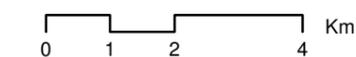
Area of Interest

Local Government Areas

Built-up Areas

Reservoirs

Scale at A3 1:110,000



GDA 94 - MGA Zone 54

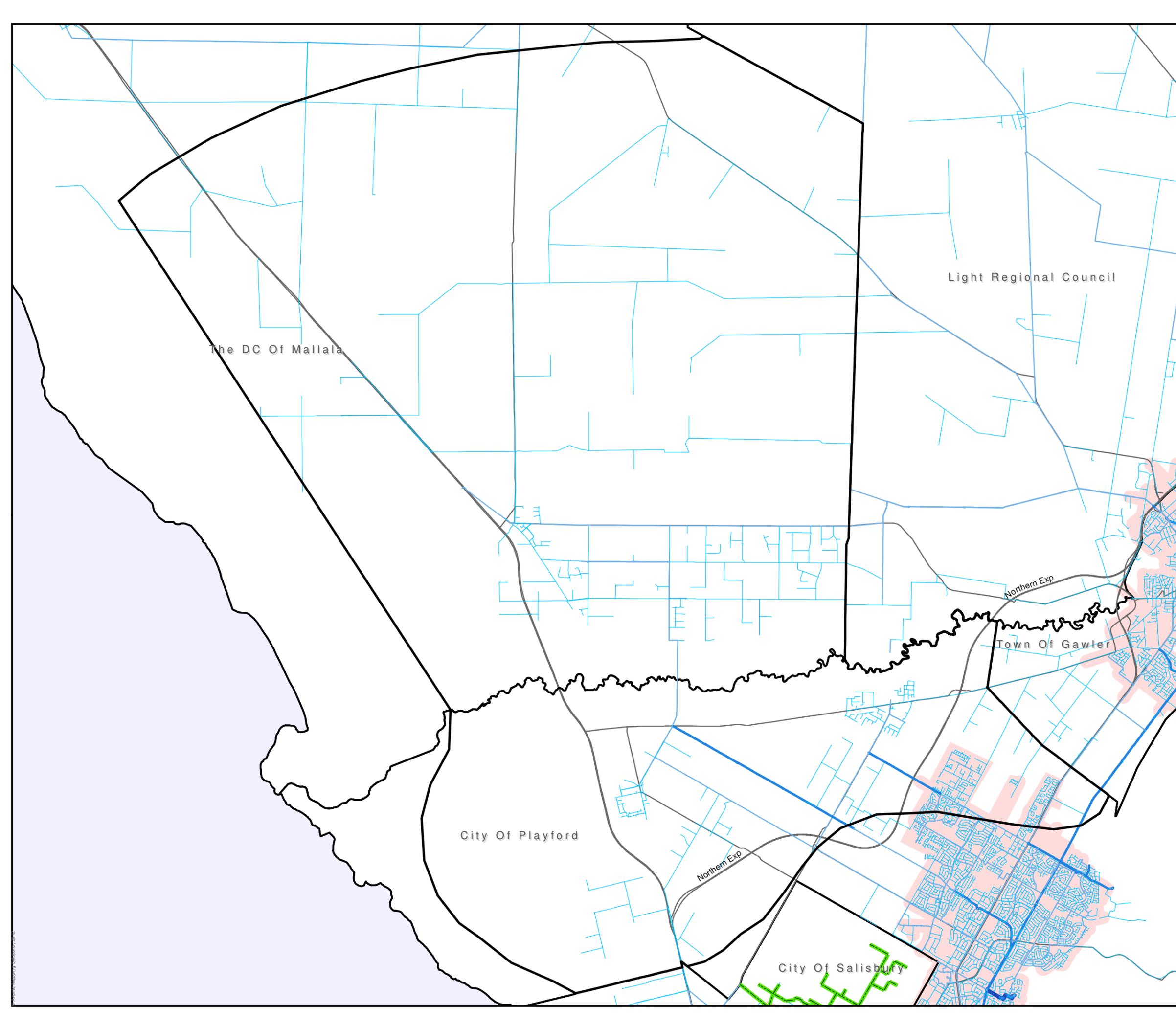
Map generated December 2012 by

Avante Mapping Solutions

Data Source:

DPTI, DPLG, DEWNR, SA Water, BING Maps

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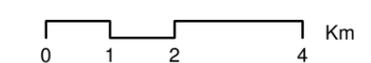
# Virginia and Northern Adelaide Plains Horticulture Study

## Infrastructure - Water Reticulation

### Legend

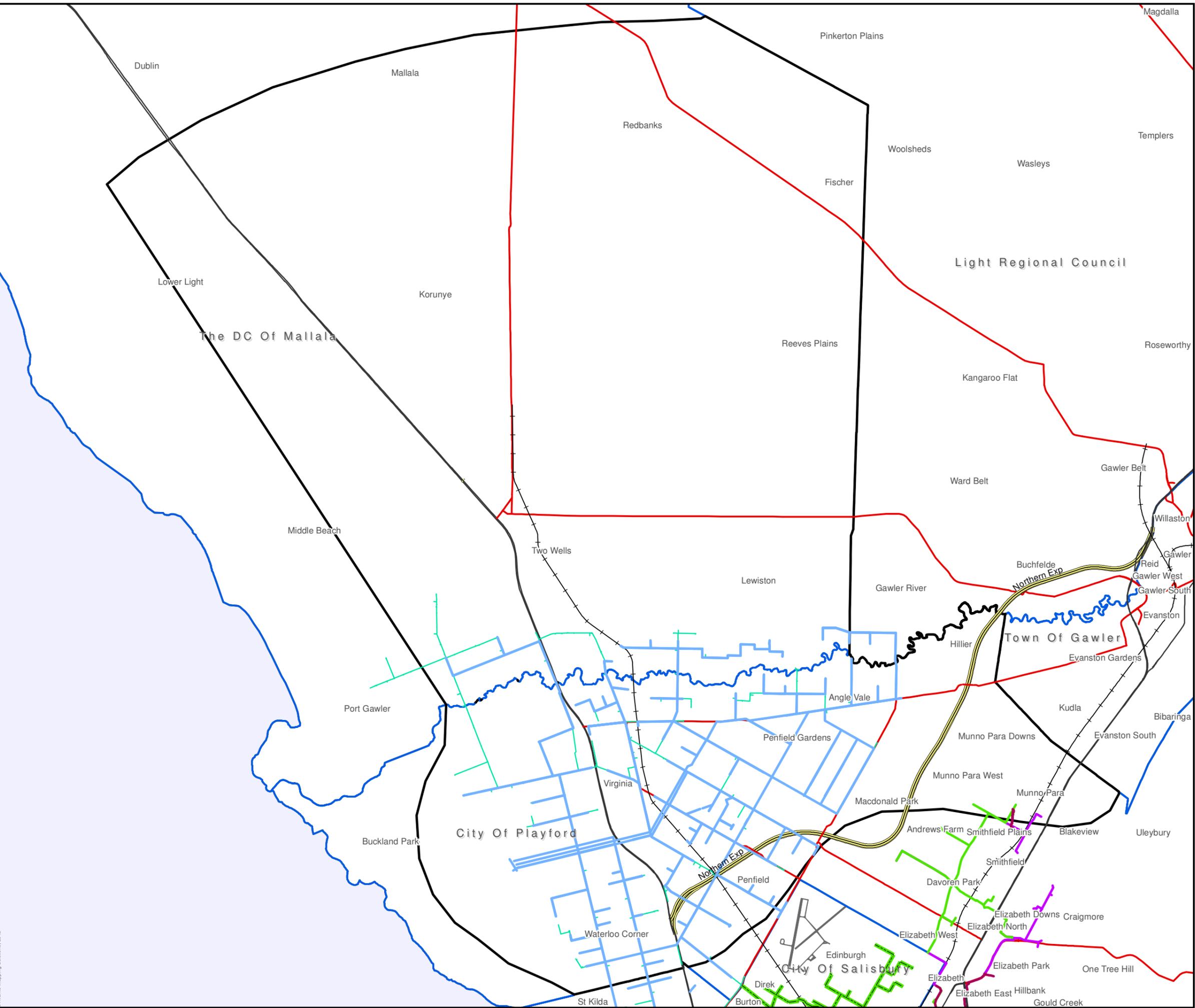
- Salisbury Distribution Pipeline
- Reticulation Pipeline
- Stage 1 Reticulation Pipeline
- Stage 2 Reticulation Pipeline
- Virginia Pipeline - 2010
- Virginia Pipelines
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Area of Interest
- Local Government Areas
- Airport / Runways

Scale at A3 1:110,000



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05

650 5712

A menu board on the left wall, featuring a dark background with white and red text. It lists various items and prices, with a prominent red circular logo on the left side.

Menu board above the counter

A large menu board mounted above the counter, displaying a variety of food items and prices in white text on a dark background. It includes images of some dishes.

## 5 Land Use Baseline

There are a variety of uses, allotment sizes and distribution patterns, with some distinct patterns of horticultural uses and allotment sizes either side of the Gawler River, and around the townships of Two Wells, Angle Vale and Virginia, and within the settlement of Lewiston.

Patterns of development are significantly changing as a result of the 30-Year Plan, changing levels of housing affordability, increasing take-up of improved greenhouse technology, efficient management of field crops (e.g. irrigation and harvesting), availability of water, and infrastructure expenditure (particularly NEXY).

The following land use maps highlight that:

- Greenhouses and closed system horticulture is predominantly located adjacent to the Gawler River (most commonly around the Virginia township and west of Pt Wakefield Road), and also in some locations immediately north of the River
- Field cropping occurs both north and south of the Gawler River, although there are generally higher operational costs to the south of the river
- The potential for water access and flood inundation are likely to be the key limiters to expansion of field cropping north of the river, although with a secure water supply and careful design and location of buildings and infrastructure, this may not be so significant
- The potential for flood inundation may limit greenhouse expansion immediately north and south of the river, and design and location of buildings and infrastructure related to greenhouses will need to be carefully considered and managed
- Interface issues (primarily spraying) with adjacent primary production north of the horticultural areas, as well as with residential uses (such as at Buckland Park) may be evident but can be minimised through careful design, location and management, particularly for spraying in closed systems (greenhouses)
- Greenhouses do not necessarily require large parcels of land – international trends are showing that greenhouse operations are increasing in size vertically but not necessarily requiring larger footprints. The business efficiency and output relates more to technology, business operational models and water and gas supply than the actual size of the allotment
- Many greenhouse operations currently exist on land allotments of 2.5 ha (see mapping in this report), and also on smaller parcels that have been leased.
- There remains significant amounts of undeveloped land on larger allotments

The land uses described below are those that relate specifically to horticultural development, rural living, field crops, vines, orchards and greenhouses/glasshouses.

## 5.1 Rural Living

### 5.1.1 Definition

---

In the context of the VNAP Region, the term *rural living* refers to allotments created for residential living with associated *rural* activities such as small-scale horticulture, horse keeping, etc.

They typically comprise allotments that range in size from 1,500m<sup>2</sup> (smaller 'rural living', as to be incorporated within Buckland Park and Two Wells development) to 8,000m<sup>2</sup> (approximately 2 acres, as located within Macdonald Park, Lewiston, Two Wells and Andrews Farm). However, they often can extend anywhere to up to 4 hectares (40,000m<sup>2</sup>).

### 5.1.2 Implications for the VNAP Region

---

Rural Living development can result in both opportunities and create challenges within the region:

#### Opportunities

- The increasing diversity of household type to a local population can have a positive effect on the vibrancy and economic activity within the supporting townships and communities
- The development of land provides income to existing land-owners that can support capital investment into their business and/or provide a 'boost' to the land owner's superannuation

#### Challenges

- There is a significant body of research that suggests smaller 'rural living' or 'hobby farms' are often poorly managed and that this can lead to increases in disease, pests and weeds (i.e. biosecurity risk)
- The creation of these smaller allotments also can result in conflict between land users with the needs (and perhaps expectations) of the country lifestyle seeker, which are often different from those who need the land for productive purposes
- Additional households within the region place strain on existing services and infrastructure
- Unapproved land uses, for example horse keeping and commercial truck parking, seems to be prevalent in these areas

The extent of the effect rural living will have on a region is linked to the size of the lots and the nature of their use – obviously the smaller the

allotment, the higher likelihood of conflict (e.g. less noise and spray buffers, more intensive residential use) and the less chance of productive use of the land due to its size, etc.

Some of these issues can be managed through:

- improved land management techniques
- improved levels of understanding about the issues and management responses
- planning policy that supports appropriate size, shape and distribution of rural living allotments
- planning policy that supports early consideration of interface issues through the development assessment process

Points to consider

Arguably, the biggest risk of providing for smaller land parcels to suit horticultural (particularly greenhouse) requirements is the potential conversion of that land in the future to rural living should the greenhouses become non viable.

Recognising that the smaller land parcels are likely to be taken up by smaller growers with less capital, lower levels of technology and traditional approaches to greenhouse operations, the risk of compromised greenhouse viability on these parcels into the future is certainly a possible scenario.

It is extremely difficult to control the conversion of already divided parcels of land to rural living through the planning system.

A proliferation of rural living in areas where it is not envisaged presents many challenges for council, and renders the land unsuitable for further productive uses.

The potential loss of productive land is arguably at odds with the purpose of this project which is to recommend ways to support the long term growth and sustainability of the industry in the VNAP region.

Notwithstanding this, many allotments are already divided into 2.5 ha – and formally supporting greenhouses on these allotments may be one way of supporting the smaller grower who have less financial resources to invest in larger allotments.

These challenges must be considered in balancing up the advantages and disadvantages of providing for division of smaller allotments.

## 5.2 Field Crops / Vines / Orchards

### 5.2.1 Location

---

As shown on Section 5 maps, in general terms the majority of field crops, vineyards and orchards are located north of Two Wells where land is larger, but they also form a significant part of land south of the river towards the centre of the Virginia region.

### 5.2.2 Allotment Sizes

---

Viable field crop operations generally require allotments that are large, (50 to 100 hectares), but it is noted that a number of operations are run on smaller parcels within the VNAP to capitalise on climate, soil conditions and labour.

The size of the farming site is only part of the equation and management, technology, production costs, supply, demand, skills and ability to value-add influence the allotment size requirements.

It is unlikely that horticulturalists will seek to amalgamate smaller allotments south of the river to pursue field crops. The value of the land to do this, as well as the likely interface challenges imposed by nearby residential areas is prohibitive.

One of the biggest limiting factors to the expansion of field crops north of the river is ensuring a consistent, affordable and appropriate water supply.

## 5.3 Green / Glass-houses

### 5.3.1 Location

---

Green and glass-houses are dotted through the VNAP most commonly adjacent to the Gawler River and of highest concentration around the township of Virginia. There are several types of operations as described in *Section 7, Industry Character*.

### 5.3.2 Allotment Sizes

---

In areas where potential greenhouse clusters may be formalised (for example around Virginia), attached mapping shows that there are currently few separately titled allotments smaller than 2.5 hectares being used for greenhouses. 2.5 hectares provides a good opportunity to locate a number of greenhouses, accommodate on-site truck parking, landscaping, on site water harvesting (these are all recommendations addressing improvements to function and amenity of operations), and also potentially a house.

In other words, land in potential greenhouse cluster areas has already been divided in many circumstances to 2.5 ha allotments, but generally not into smaller allotments.

This is not to say that greenhouse operations could not successfully be undertaken on smaller sized allotments, and indeed there are examples from around the world that shows this to be the case (See Section 7.6)

### 5.3.3 Leasing of land parcels

---

It is noted there are a number of portions of allotments that are leased as parcels of land smaller than 2.5 ha. There is certainly opportunity to run a viable greenhouse business on less than 2.5 ha (see Section 7.5.3). The ability to be able to lease land on smaller parcels provides some opportunities for greenhouse operators who wish to farm smaller operations, but do not have the finance to purchase larger parcels.

There are some limitations to this approach – there is a requirement to gain development approval for the land use if the parcel is leased for a certain number of years. This is a perceived disincentive for long term investment in greenhouses. There may be an opportunity to review this legislative limitation if necessary.

### 5.3.4 Management

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With hydroponic growing systems, it is not entirely necessary to have good natural soils where the greenhouses are located.

However, with soil based greenhouse-growing systems, the quality of soil is very important because if it is not suitable, or saline water tables develop, the sustainability of the business will be threatened. Some of the soils in the western part of the VNAP near Brooks and Tozer Roads are shallow, heavy and saline and unless good irrigation and drainage practices are used, long-term productivity can be jeopardised.

### 5.3.5 Greenhouse Development and Compliance Issues

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During the construction of the Northern Expressway, Council officers became aware of a high number of greenhouse structures. Anecdotally, it would seem that most of these structures were already built prior to the construction of the expressway and that they simply became more visible during and after construction. But the exact age of the development is unclear.

Either way, the vast majority of these structures do not have approvals from Council. As it stands, generally the City of Playford will only respond to complaints regarding these structures rather than pro-actively 'policing' the issue. The District Council of Mallala will enforce illegal construction when noted.

Common complaints regarding the illegal structures relate to loose plastics that are caught in the wind and carried into neighbouring fields (or on the road), unsightliness of the structures, and stormwater management with stormwater often directed onto the Council verge or unmanaged and often creating flooding on neighbouring properties.

Notwithstanding their lack of compliance, we understand many are built illegally because:

- it saves time
- it avoids Council attention
- the approval process is not understood, and/or
- growers do not have the resources to put together an application

### **Classification and Assessment**

When applications are lodged, they are subjected to differing engineering requirements due to varying applications of the Australian Building Code between building surveyors. For example, some private certifiers classifying these structures as Class 10a (private verandah / garage, etc.) whilst Councils tend to treat as Class 7b or 8 depending on the size, type and function of the structure. This inconsistency is a problem for the industry as the classes have significantly different requirements with respect to access and fire safety. The different assessment requirements also require different levels of information (and resultant cost and timing implications).

The level of information provided is often poor and lacking of basic site plans and stormwater management plans. Engineering is also rarely up to the relevant requirements (if details from an engineer are even provided) and fire safety is a point of contention depending upon classification (as per above).

### **Compliance and Risk**

What are the advantages and disadvantages of increased focus on compliance?

If Council chooses not to enforce the construction requirements of these structures then there is a risk that the issue will continue to compound (and there is a clear trend towards continued expansion of this type of farming), further undermining the areas image and opportunity for improved branding.

Enforcing these illegal works in a way that is not supported by an effective consultation and capacity building programme may impact on council relationship with the industry.

If a structure was to fail, the Council could be held to account for not enforcing the requirements of the Development Act as required in the legislation. Whilst failures recorded thus far are only of a minor nature (for example the loss of plastic from the sides and roof of the structures), the risk of structural failure is still high and the consequences serious – particularly as growers continue to build larger and more complex houses that can accommodate higher numbers of workers.

Notwithstanding these issues, there are many structures within the VNAP that have not been approved. To approach this issue fairly will mean tackling the entire issue in a collaborative manner involving both Playford and Mallala Councils, which will have significant resource implications.

# Virginia and Northern Adelaide Plains Horticulture Study

## Detailed Landuse - Level 1

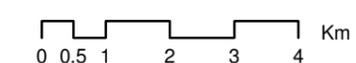
### Legend

- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Area of Interest
- Local Government Areas
- Airport / Runways

### Detailed Landuse - 2008

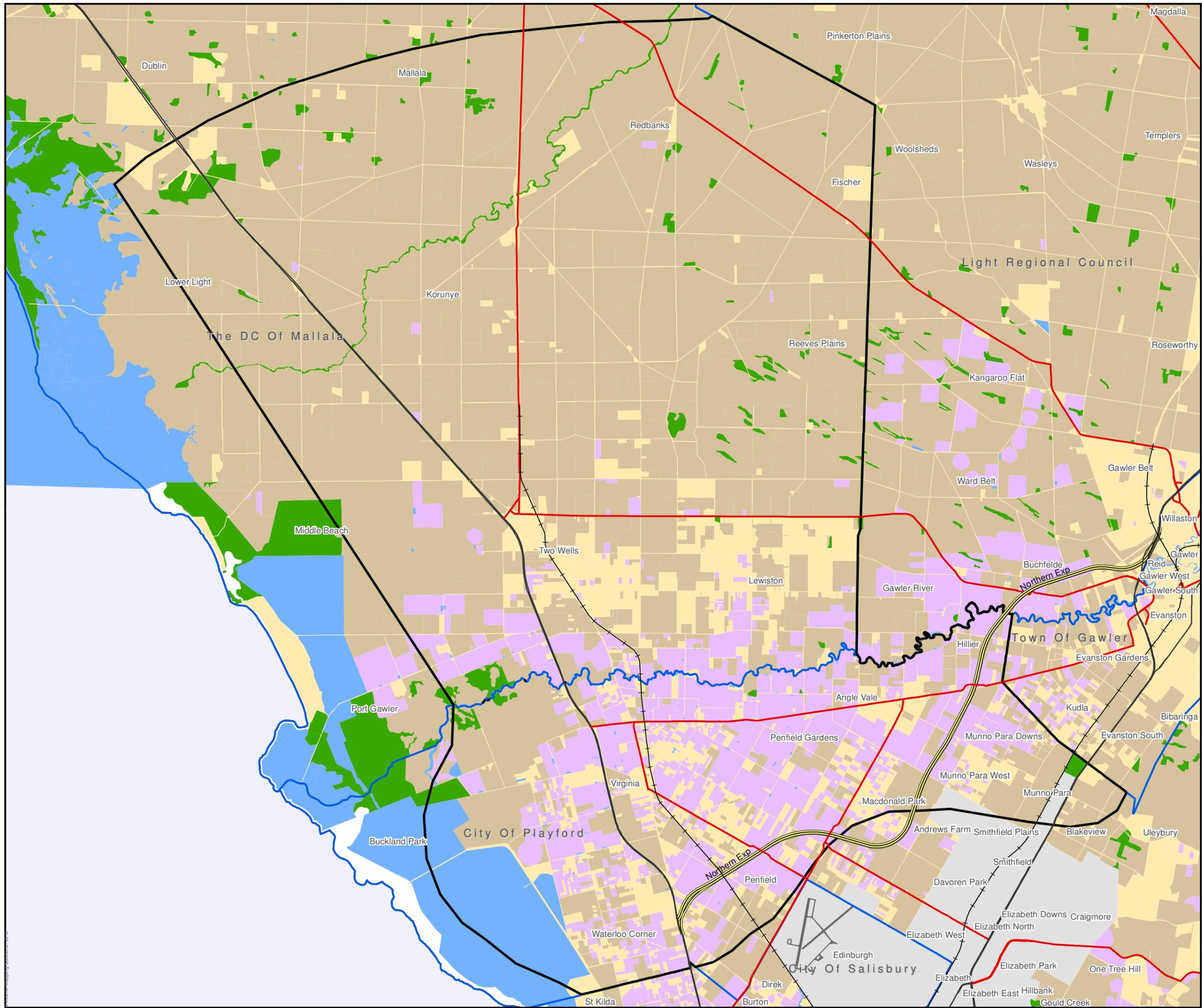
- Conservation and Natural Environments
- Intensive Uses
- Production from Dryland Agriculture and Plantations
- Production from Irrigated Agriculture and Plantations
- Production from Relatively Natural Environments
- Water
- Unmapped

Scale at A3 1:110,000



GDA 94 - MGA Zone 54  
 Map generated December 2012 by  
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 Data Source:  
 DPTI, DPLG, DEWNR, SA Water, BING Maps

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# Virginia and Northern Adelaide Plains Horticulture Study

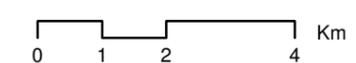
## Detailed Landuse - Level 3 Specific Irrigated Agriculture

- Detailed Irrigated Agricultural Landuse**
- Glasshouses
  - Glasshouses (hydroponic)
  - Intensive horticulture
  - Irrigated cereals
  - Irrigated cropping
  - Irrigated environmental
  - Irrigated flowers and bulbs
  - Irrigated fruits
  - Irrigated hardwood production
  - Irrigated hay and silage
  - Irrigated legume/grass mixtures
  - Irrigated legumes
  - Irrigated modified pastures
  - Irrigated nuts
  - Irrigated oil seeds
  - Irrigated other forest production
  - Irrigated pasture legumes
  - Irrigated perennial flowers and bulbs
  - Irrigated perennial horticulture
  - Irrigated perennial oleaginous fruits
  - Irrigated perennial shrub nuts fruits and berries
  - Irrigated perennial tree fruits
  - Irrigated perennial tree nuts
  - Irrigated perennial vegetables and herbs
  - Irrigated perennial vine fruits
  - Irrigated plantation forestry
  - Irrigated seasonal horticulture
  - Irrigated sown grasses
  - Irrigated vegetables and herbs
  - Irrigated woody fodder plants
  - Shadehouses

**Legend**

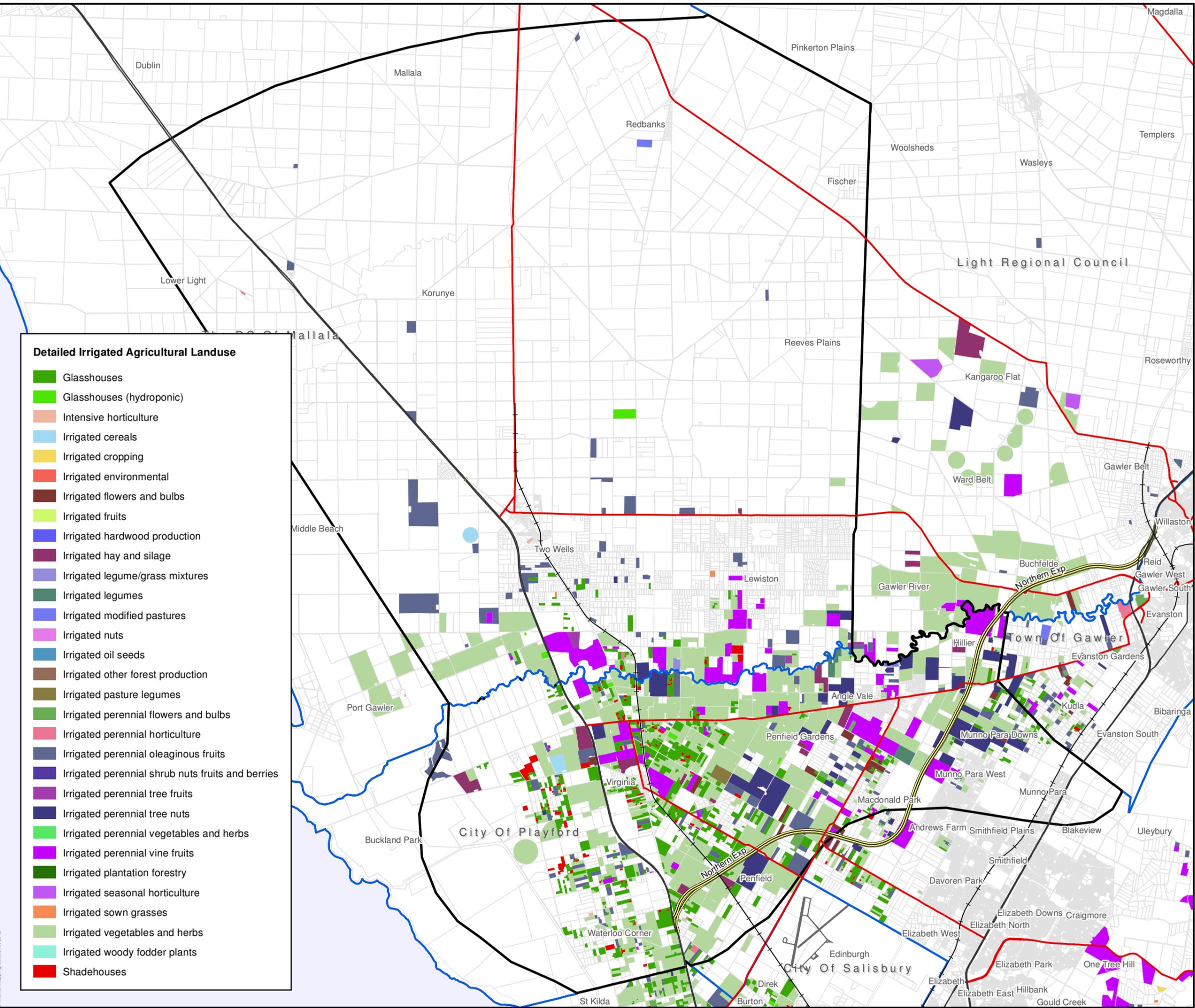
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Cadastre
- Area of Interest
- Local Government Areas
- Airport / Runways

Scale at A3 1:110,000



GDA 94 - MGA Zone 54  
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# Virginia and Northern Adelaide Plains Horticulture Study

## Detailed Landuse - Level 3 Specific Irrigated Agriculture

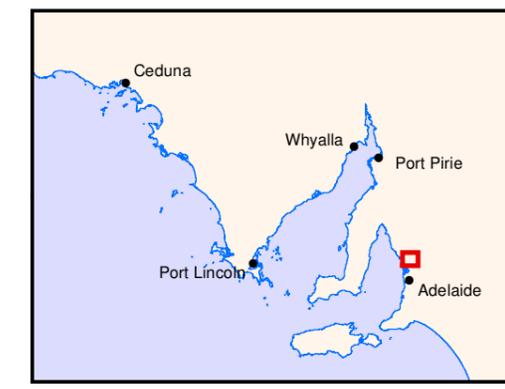
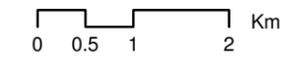
**Detailed Irrigated Agricultural Landuse**

Glasshouses	Irrigated legumes	Irrigated perennial tree nuts
Glasshouses (hydroponic)	Irrigated modified pastures	Irrigated perennial vegetables and herbs
Intensive horticulture	Irrigated nuts	Irrigated perennial vine fruits
Irrigated cereals	Irrigated oil seeds	Irrigated plantation forestry
Irrigated cropping	Irrigated other forest production	Irrigated seasonal horticulture
Irrigated environmental	Irrigated pasture legumes	Irrigated sown grasses
Irrigated flowers and bulbs	Irrigated perennial flowers and bulbs	Irrigated vegetables and herbs
Irrigated fruits	Irrigated perennial horticulture	Irrigated woody fodder plants
Irrigated hardwood production	Irrigated perennial oleaginous fruits	Shadehouses
Irrigated hay and silage	Irrigated perennial shrub nuts fruits and berries	
Irrigated legume/grass mixtures	Irrigated perennial tree fruits	

**Legend**

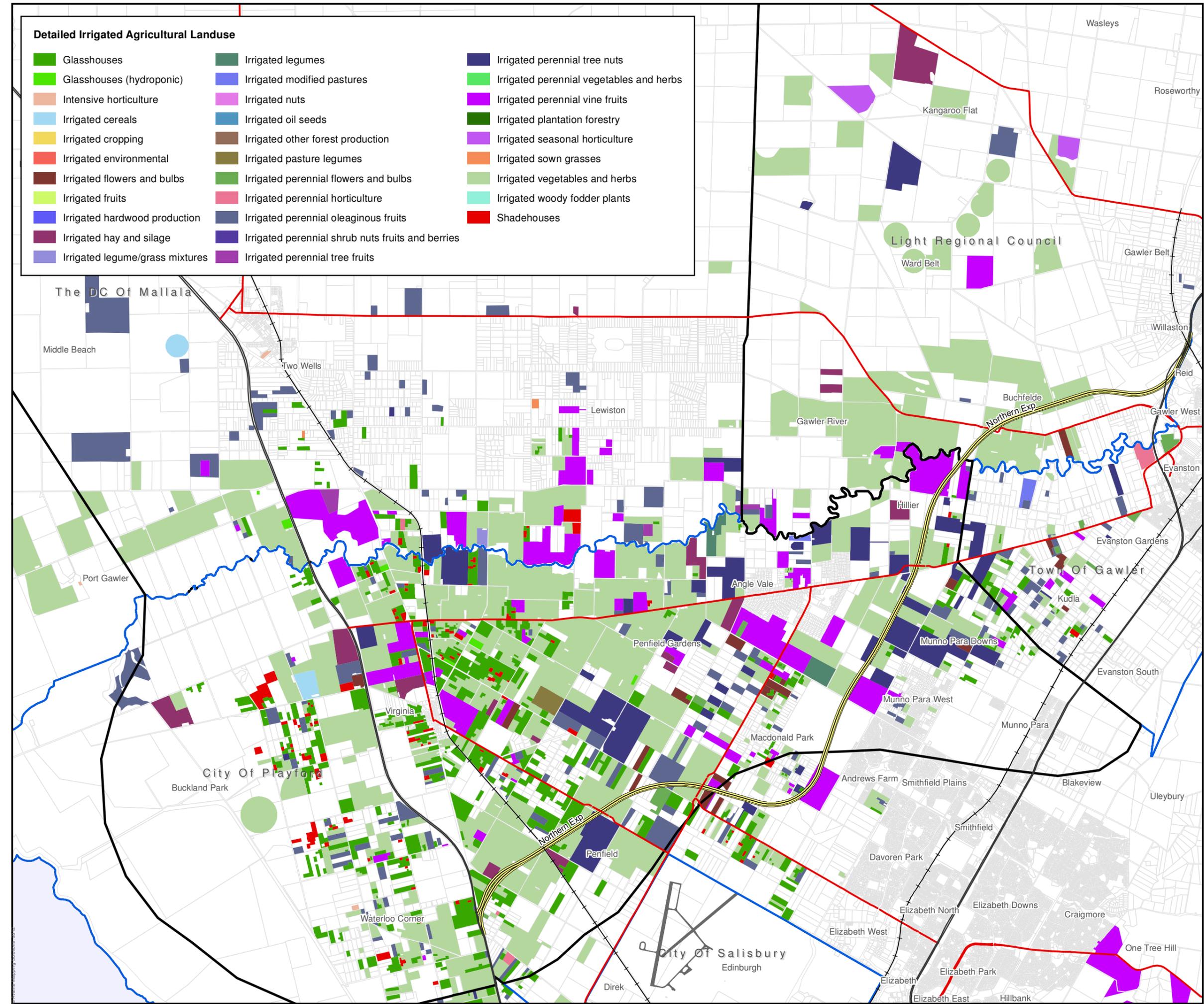
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Cadastre
- Area of Interest
- Local Government Areas
- Airport / Runways

Scale at A3 1:73,998



GDA 94 - MGA Zone 54  
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 Data Source:  
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# Virginia and Northern Adelaide Plains Horticulture Study

## Horticultural Property Size

### Legend

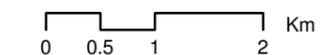
- Coast
- Freeway / Expressway
- Arterial Road
- Main Road
- Railway
- Local Government Areas

### Property Boundaries

#### Area (Hectares)

- 0.0 - 0.5
- 0.6 - 1.0
- 1.1 - 1.5
- 1.6 - 2.0
- 2.1 - 2.5
- 2.6 +

Scale at A3 1:65,000



GDA 94 - MGA Zone 54

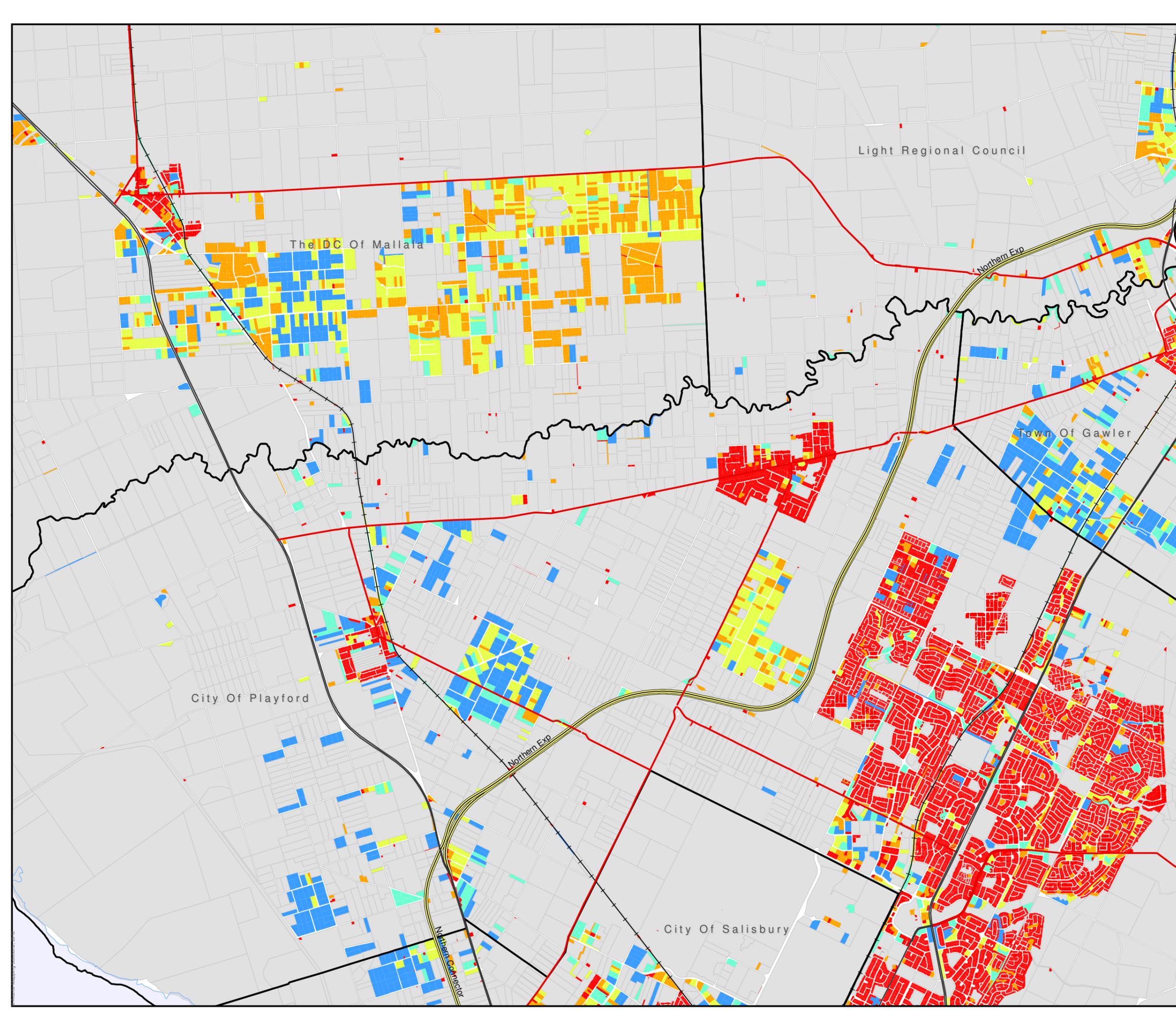
Map generated October 2013 by

Avante Mapping Solutions

Data Source:

DPTI, DPLG, DEWNR, BING Maps

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06



## 6 Policy Context

### 6.1 Strategic Policy

#### 6.1.1 South Australia's Strategic Plan 2011

The South Australian Strategic Plan (2011) sets out the State Government's priorities, vision statements, goals and targets that form the framework for policy and decision making across all State Government departments. A number of targets within the plan have relevance to the horticultural industry as described below.

Priority: **Our Prosperity**

Vision	Goal	Target
A strong, sustainable economy that builds on our strengths.	South Australia has a resilient, innovative economy.	<b>35: Economic growth</b> Exceed the national economic growth rate over the period to 2020 (baseline: 2002-03)
		<b>37: Total exports</b> Increase the value of South Australia's export income to \$25 billion by 2020 (baseline: 2002-03)
	We develop and maintain a sustainable mix of industries across the state.	<b>38: Business investment</b> Exceed Australia's ratio of business investment as a percentage of the economy by 2014 and maintain thereafter (baseline: 2002-03)
		<b>39: Competitive business climate</b> Maintain Adelaide's rating as the least costly place to set up and do business in Australia and continue to improve our position internationally (baseline: 2004)
		<b>40: Food industry</b> Grow the contribution made by the South Australian food industry to

\$20 billion by 2020  
(baseline: 2001-02)

We have a skilled and sustainable workforce.	South Australia has a sustainable population.	<b>46: Regional population levels</b>  Increase regional populations, outside of Greater Adelaide, by 20,000 to 320,000 or more by 2020 (baseline: 2010)
--	---	--

Priority: **Our Environment**

Vision	Goal	Target
South Australians think globally, act locally and are international leaders in addressing climate change.	We adapt to the long term physical changes that climate change presents.	<b>62: Climate change adaptation</b>  Develop regional climate change adaptation plans in all State Government regions by 2016 (baseline: 2011)
We look after our natural environment.	We look after our land, rivers and wetlands.	<b>70: Sustainable land management</b>  By 2020, achieve a 25% increase in the protection of agricultural cropping land from soil erosion and a 25% improvement in the condition of pastoral land (baseline: 2002-03 and 2005-06 respectively)
We value and protect our water resources.	Industry and agriculture are highly efficient and innovative in their use of water.	<b>75: Sustainable water use</b>  South Australia's water resources are managed within sustainable limits by 2018 (baseline: 2003)

Priority: **Our Community**

Vision	Goal	Target
We are connected to our communities and give everyone a fair go.	Governments demonstrate strong leadership working with and for the community	<b>33: Government planning decisions</b>  South Australia leads the nation in timely decisions of development applications through to 2020 (baseline: 2009-10)

The South Australian Strategic Plan sets ambitious targets for food security and acknowledges the need to adapt to climate change, provide for additional housing and make efficient use of water.

### 6.1.2 30-Year Plan for Greater Adelaide

The 30-Year Plan for Greater Adelaide is the Volume of the SA Planning Strategy relevant to the study area. It outlines the State Government's direction for land use change within the Greater Adelaide region and is complemented by regional plans that provide direction for the remainder of the State. The planning directions outlined in the Planning Strategy are translated into local policy by Councils when they are incorporated into local Development Plans. The role of the Development Plan is to assist in implementing the Planning Strategy. Development Plans are a tool for use in assessing Development Applications, which guide the form of development.

The 30-Year Plan for Greater Adelaide outlines the State Government's vision for growth and development forms through to 2036. The Plan assumes and prepares for steady population growth of 560,000 people, resulting in the construction of 258,000 additional dwellings, creation of 282,000 new jobs and economic growth of \$128 billion. A significant focus of the 30-Year Plan is urban consolidation in an effort to limit urban growth into the surrounding primary production and food producing regions and in recognition of the unsustainable energy and infrastructure costs associated with urban sprawl.

With respect to primary production, the 30-Year Plan requires that: "...areas of primary production significance will be identified on the basis of land capability, industry investment and land use, climatic considerations (including anticipated climate change), access to water, and any other local conditions that give rural land special significance for primary production. The process of identifying these areas will be restricted to land zoned rural, general farming, primary production or similar, where agriculture or primary production is already nominated as the intended future use of the land." (GSA 2010, pg 106)

The 30-Year Plan calls for the protection of strategic areas for horticulture, viticulture, dairying and grain production (which includes the entire study area).

It also earmarks expansion of horticultural production north of the Gawler River and recommends the introduction of a standard set of planning controls to protect primary production uses. The controls listed in the plan include those that would avoid further fragmentation of primary production land by restricting land sub-division to maintain viable and productive land-use activity. These planning controls will

differ across the area depending on the dominant activity of a particular area and the appropriate minimum lot size of that type of agricultural activity.

To support Development Control measures, the 30-Year Plan also calls for the removal of unnecessary regulatory barriers and for Development Plans to be flexible enough to allow property holders to change agricultural practices or commodity type, particularly where the change would enable increased productivity or better environmental outcomes. This could also include the enabling of small-scale value adding activities that complement local primary production but the Plan suggests large-scale value adding activity should be located outside areas of primary production significance.

Lastly, the Plan suggests co-location of intensive primary industries and compatible processing activities so to reduce land use conflict and achieve efficiencies in production, processing, distribution, energy efficiency and waste recycling, taking into account environmental, bio-security, infrastructure and rural amenity issues.

Points to consider

There is an arguable conflict between the 30-Year Plan's support for horticulture within the VNAP and accommodations for housing growth within its townships and settlements, and most notably at Buckland Park. These interface issues will require careful management, although closed greenhouse systems minimise some of the interface risks.

It is clear that the 30 Year Plan seeks to ensure that productive land with relevant infrastructure (including access to water) is secured for horticulture and not lost to housing. Consideration of land division and dwelling opportunities for horticultural land needs to be carefully considered in light of this state policy direction.

The 30 Year Plan offers support for the potential clustering of intensive primary industries such as greenhouses. Whilst specific locations for clusters will not be considered as part of this strategic project, the merit of clustering and possible guiding principles for location will be further explored.

### 6.1.3 City of Playford Strategic Framework

#### *Playford Community Vision 2043*

The Playford Community Vision 2043 seeks to set high level strategic direction for the Council that feeds into its Strategic Directions Report and will influence the Council's future Advocacy Plans. The Vision articulates the communities' collective values and includes information about the various State, National and Global issues that will need to be taken into account when planning for the future of Playford. Of relevance to this study are the intentions within the Vision for the City to be *environmentally sensitive and sustainable* and to protect the

horticultural industry in Virginia. Commentary surrounding this aspiration states that:

*Playford will be recognised as the food bowl of South Australia, supplying clean, green food and quality wines not only for the local community but also with a thriving export market. Good planning, the protection of primary production land, and access to water, energy and transport links will enable us to utilise our high quality, fertile soils to guarantee food security and create sustainable employment. Associated industries such as vegetable packing and farm gate sales will add to the prosperity of the horticultural areas.*

*Council Plan – 2011/2012 – 2014/15*

Sitting beneath the Council's forward planning vision is the *Council Plan*, which articulates Council's finer grained priorities over the next four years. It *paves the way forward* for the Council – providing its strategic framework for dealing with its four goals of community wellbeing, economic prosperity, environmental care and organisational excellence. The following Goal, Objectives and Strategies are relevant to this study:

Goal	Objective	Strategy
<b>Economic Prosperity</b>  Goal: To improve the economic prosperity of the region.	2.2 Local jobs for local people	<a href="#">Strategy 2.2.1</a>  Use the long term urban and economic development planned for the City to create training to employment pathways for local people.
	2.3 A better place to do business	<a href="#">Strategy 2.3.4</a>  Ensure collaboration and research with industry and educational institutions to encourage innovation and creativity.
	2.4 Recognised as a great place	<a href="#">Strategy 2.4.4</a>  Develop urban design and planning initiatives to improve City: amenity, access, sustainability and presentation.
	2.4 Planning for urban renewal and growth	<a href="#">Strategy 2.5.2</a>  Implement the 30 Year Plan for Greater Adelaide through coordination of social, economic,

Goal	Objective	Strategy
		environmental and infrastructure development.
		<a href="#">Strategy 2.5.4</a>
		Foster commercial and industrial opportunities for employment growth.

#### 6.1.4 District Council of Mallala Strategic Plans (2013 - 2016)

This District Council of Mallala Strategic Plan has been developed to ensure that a clear direction is mapped out which will lead to improved services and outcomes for its community. It will also ensure that the Council as an organisation will continue to provide leadership in a challenging and changing environment. The following Goals, Outcomes and Strategies of the Plan are relevant to the study:

Goal	Outcome	Strategy
<b><i>Economic Development</i></b>  A developing economic base and increased employment supported by a growing population and appropriate infrastructure.	<b>2.1</b> Business and employment growth	<a href="#">Strategy 2.1.1</a>  Work in partnership with the business community in the development and promotion of business growth and employment opportunities.  <a href="#">Strategy 2.1.2</a>  Investigate and pursue appropriate business support initiatives and incentives.
	<b>2.2</b> Infrastructure that supports sustainable economic development	<a href="#">Strategy 2.2.1</a>  Identify and advocate for improved funding and development of infrastructure needs which supports the needs of local and regional businesses and industry.
	<b>2.3</b> A strong and diverse economic base	<a href="#">Strategy 2.3.1</a>  Market and promote agriculture, aqua cultural and horticultural diversity of the regional and its potential to the business

Goal	Outcome	Strategy
		and investment industries.
		<p><a href="#">Strategy 2.3.2</a></p> <p>Facilitate targeted economic development opportunities.</p> <p><a href="#">Strategy 2.3.3</a></p> <p>Develop and maintain intergovernmental economic development relationships.</p>
	2.4 A growing tourism industry	<p><a href="#">Strategy 2.4.1</a></p> <p>Promote and support local and regional tourism initiatives.</p>
		<p><a href="#">Strategy 2.4.2</a></p> <p>Work with regional and State tourism bodies to identify and develop tourism opportunities.</p>
<p><b><i>Built Environment</i></b></p> <p>A natural environment that is protected, valued and enhanced and a built environment that meets current and future community needs</p>	3.1 Integrated waste management	<p><a href="#">Strategy 3.1.2</a></p> <p>Promote recycling, reuse and minimisation of waste materials to the community and industry</p>
	3.5 Preservation of local heritage and character of towns and rural living areas	<p><a href="#">Strategy 3.5.1</a></p> <p>Encourage development that is consistent with the individual character of towns and rural living areas</p>
<p><b><i>Natural Environment</i></b></p> <p>A natural environment that is protected, valued and enhanced and a built environment that meet current and future community needs</p>	4.2 Sustainable use and integrated management of water resources	<p><a href="#">Strategy 4.2.1</a></p> <p>Investigate, Promote and assess initiatives for water conservation and re-use</p> <p><a href="#">Strategy 4.2.2</a></p> <p>Develop, manage and maintain stormwater</p>

Goal	Outcome	Strategy
		infrastructure
	4.4 Responsiveness to Climate Change	<p><b>Strategy 4.4.1</b></p> <p>Investigate and plan for climate change impacts at the local level in partnership with the community, government and the private sector.</p>

### 6.1.5 South Australian Food Strategy 2010 - 2015

The South Australian Food Strategy sets three targets for food production in the State – recognising the importance of the industry for employment (one in five South Australians are employed within the industry, according to the study) and working towards a vision that this State’s food goes “beyond the expectations of consumers around the globe”. The three targets are to:

- Generate \$16 billion in gross food revenue by 2015 (up from \$12.4 billion in 2008/09)
- Increase the food industry’s contribution to South Australia’s wellbeing
- Reduce the South Australian food industry’s impact on the environment.

Points to consider

If the VNAP is to reflect the goals of the Food Strategy then it needs to be appropriately supported and resourced.

### 6.1.6 Regional Development Australia Barossa – Regional Roadmap 2012

This roadmap identifies key issues and strategies for economic growth and job creation for the Barossa RDA region, which includes the VNAP Horticultural Region. Key strategies of direct relevance to this study include:

Priorities	Strategies
<b>Strategic Dimension 1</b>	<ul style="list-style-type: none"> <li>▪ Development of regional water stewardship</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>▪ Attract infrastructure for water reuse for multiple uses</li> </ul>

Priorities	Strategies
<b>Strategic Dimension 2</b> Community and Workforce Development	<ul style="list-style-type: none"> <li>▪ Coordinate partnerships for facilities and education for a locavore community, connected with local food and agriculture</li> <li>▪ A strong agricultural workforce with identified career paths</li> <li>▪ High school at Two Wells with farm trade skills facility</li> </ul>
<b>Strategic Dimension 3</b> Entrepreneurship Development	<ul style="list-style-type: none"> <li>▪ Clusters of targeted industries for densities of thought and innovation</li> <li>▪ New ideas and creative industries as innovation drivers</li> <li>▪ Business mentoring</li> <li>▪ Capital attraction for enterprise growth and symbiotic new enterprises</li> <li>▪ Invest in relevant PhD research based in the region</li> <li>▪ Innovation in thinking, process and product</li> <li>▪ Increase and growth in universities represented in the region</li> <li>▪ Regional culinary training facilities</li> </ul>
<b>Strategic Dimension 4</b> Industry Development	<ul style="list-style-type: none"> <li>▪ Structural adjustment and business model innovation</li> <li>▪ Information to support new investment decisions</li> <li>▪ Regional and produce brand development for strength and leverage</li> <li>▪ Input replacement and value adding within region</li> <li>▪ Strong industry networks – inter and intra industry</li> <li>▪ Diversified tourism and visitor experiences driven by excellence</li> <li>▪ A culinary institute</li> </ul>

The *Barossa Regional Development Australia Roadmap* highlights many of the issues raised in this State of Play report.

**In particular it highlights the need for supporting improved water infrastructure, supporting business innovation and strong industry networks, and investing in education and capacity building programmes.**

It highlights that a regional, integrated approach is critical, which suggest Playford and Mallala Councils should consider future partnerships on some of the actions highlighted in the Virginia and Northern Adelaide Plains Horticulture Framework.

### 6.1.7 Parliamentary Enquiry

The SA House of Assembly established a Select Committee on Sustainable Farming Practices and the Committee met at Virginia in October 2012 to receive submissions from interested people in the VNAP. A number of local organisations and individuals spoke to their submissions.

A summary of issues raised in these submissions is presented below.

#### Importance of horticulture

- Mr. Mike Redmond of Grow SA gave an overview of Australian, State and VNAP horticulture
- The Australian gross value of production (GVP) from horticulture is about \$6.92billion (excluding wine grapes)
- The figures from the relevant PIRSA Scorecard at the time of the Select Committee estimated SA's GVP at around \$709 million per annum
- Mr. Redmond estimated that the current GVP may be about \$800 million

#### Infrastructure

- Require certainty related to recycled water
- Differences in licensed amount versus actual requirements
- Bolivar use changes over the seasons
- There is a new water allocation plan being produced

#### Financial

- Impact of the Carbon Tax
- Require security of payment
- How to encourage the private sector to pay money for infrastructure
- Need a clearer picture of the cost of production and contribution to the economy
- Opportunity for a specific rural bank that provides rural financial counselling support

- Cost of quality assurance is significant with benefits not readily understood by many growers

### Land Use Planning

- Ensure that the area is not a “land bank”
- Rural living is impacting on interface issues
- What is the differential land value system?
- Seems to be a limited use of buffers
- Productive land = future superannuation
- How can the planning system support value adding opportunities
- Require viable storage solutions

### Marketing

- Compare Virginia to McLaren Vale / Barossa
- Significant potential to improve marketing but need support
- PIRSA extension support is limited

### Representation

- Are past statistics accurate?
- Need an actionable overall strategy
- Need for representative and strong industry representation
- Representation needs to consider future for small growers as well as larger, innovative, well resourced operators

### Training and Education

- Requirements for improved training and education that is accessible to all growers

#### Points to consider

The submission to the *SA House of Assembly Select Committee on Sustainable Farming Practices* highlights the importance of the VNAP and the need for government support. The findings of the committee reflect much of the findings of this report, following similar themes and observations.

It highlights that future support for the industry involves multiple tools and approaches – ranging from education, representation, infrastructure and financial support through to land use planning policy. No single tool alone will be able to achieve industry sustainability objectives.

## 6.2 Development Planning Policy

The broader VNAP region (i.e. including areas both within and adjoining the defined Study Area) includes land within the jurisdictions of the following SA Councils:

- The DC of Mallala
- Light Regional Council
- Town of Gawler
- City of Salisbury
- City of Playford

Consideration has been given to the Council approaches for land within the broader VNAP region to understand the planning policy 'context' of the Study Area. As expected, there are a variety of approaches to development control within the study region, ranging from the choice of zone to level of prescription, and including variations to General (i.e. Council Wide) provisions as well Zone provisions. The key areas of consistency and variations in policies are described below.

### 6.2.1 Land Division

---

In general, there is consistency regarding the division of land – it is not encouraged and in many cases, it is listed as a non-complying form of development. Where land division is allowed, in general the various Development Plans stipulate that it should not result in additional allotment(s) nor impair efficient use of land. So generally, land division is reserved for land consolidation, boundary realignment and flood management purposes only.

The existing discouragement of land division within the study area sends a clear message to the horticultural and development industry that the primary purpose of the area is for primary production. The questions posed for this study are:

- Whether the method of discouragement of land division is fair and reasonable? Who are the winners and losers – and how does the industry as a whole (rather than the individual) benefit?
- Could greater flexibility be introduced through reviewing land division arrangements relating to non-complying or merit?
- Whether discouragement of land division supports or hinders the industry in the short-term or long-term (or both)?
- Whether the discouragement of land division sufficiently addresses the often heard perception that the area is “really just deferred urban”, and that developments such as NEXY, and Buckland Park shows that the government “isn’t really serious about protecting the future of the land for primary production”?
- Whether there should be greater consistency in approach between the various Councils?

### 6.2.2 Allotment Sizes

If land division is to occur, the City of Playford does not specify a minimum allotment size, whereas Mallala DC does. Within the surrounding region, only three of the five Councils specify minimum allotment sizes to provide assessment guidance as detailed below:

The minimum allotment sizes for Horticulture and Primary Production zones (where specified) range from:

- 4 hectares (Rural Zone - Gawler)
- 8 hectares (Horticulture Policy Area - Mallala)
- 33 hectares (Primary Industry – Light Regional)
- 40 hectares (Primary Production - Mallala)

This baseline analysis of allotment patterns and land use distribution raises a number of questions to consider in the forthcoming Framework:

Points to consider

- Is it sensible to determine a minimum land division size given the difficulty in determining *minimum development units* for varying horticultural products? It may be appropriate to determine a minimum for greenhouses (i.e. closed system farming) because there are many examples of viable greenhouses on certain sized units. However, field crop land sizes are highly influenced by unpredictable climate, economic and market forces and therefore a minimum allotment size is more difficult to determine.
- Does a Council's 'no division' policy support the longevity of the industry or stifle innovative growth?
- Will further fragmentation of the land jeopardise its long-term future? It may be appropriate to allow further fragmentation of land in an area already significantly fragmented and with minimal opportunity to return to viable field cropping uses. However, it is likely to be less appropriate in areas still suitable for broad-acre field cropping.
- Similarly, what impact will fragmentation have on the value of land? An increase in land value may not necessarily be detrimental to the market for smaller land parcels for horticultural uses (e.g. greenhouses) as the division allows opportunity for purchase of smaller parcels of land. However, for horticultural land uses that require extensive land (e.g. field cropping) an increase in land value will impact on the future economic viability of these uses (with land already understood to be expensive south of the Gawler River due to a number of factors).
- Should planning policies support legitimate value adding activities and what are these?

### 6.2.3 Residential Development

Residential development within horticultural areas is currently generally restricted to no more than one dwelling per allotment, and this is on the proviso that the dwelling has a demonstrated association with the farming/rural use of the land.

Points to consider

Preliminary feedback from growers suggests that many farmers would prefer greater flexibility to enable them to create additional smaller allotments within their farms to provide for an additional detached dwelling for their retirement, or cash injection and/or support for family members, etc.

The individual benefits of relaxing this policy approach must be balanced against the broader public benefits and industry sustainability. Allowing housing in combination with farming provides convenient access between home and farm activities. However, once the land is removed from productive to residential purposes, it is highly unlikely that it will be returned to productive uses in the future.

#### 6.2.4 Interface

All Council areas focus on the minimisation of impacts from rural land uses on urban land uses. Playford's Primary Production Zone, Light Regional Council and Gawler's Rural Zone stipulate that development within 300m of residential/urban development must be compatible with residential development (i.e. the onus is on the productive land uses to incorporate this buffer). Likewise, Council Wide Policy for Mallala requires a similar consideration.

The model of British Columbia, Canada complements its rigid urban growth boundary with a *shared responsibility* philosophy that has successfully been marketed and (apparently) widely accepted. The responsibility for interface management is for both the grower and the adjoining residential development. However, *farming* has greater priority and buffers are the responsibility of residential development, with improved farming techniques the responsibility of the farmers.

This differs from Council Development Plan requirements for development adjacent to a residential zone, Township Zone and Rural Living Zone to incorporate a landscape buffer on the boundary of at least 5 metres in width, as per City of Playford (for example).

The advantage of a shared responsibility philosophy is that it raises awareness within the residential community and can also provide opportunities for alternative (often larger) residential lots on the city's edge that provide housing choice but ensure occupants are aware of their limited rights to obstruct farming activity. Conversely, farmers on the other side of the edge are committed to continual improvement to technique and high-quality management practices – but, the growers have a guaranteed *right to farm*.

#### Points to consider

The question for the VNAP is whether future policies should seek to share the responsibility to plan the edges on both sides or simply rely upon the horticultural industry or residential developers to provide buffers?

#### 6.2.5 Certainty through development classification

Many of the Zones do not specify complying development and refer to Schedule 4 of the Development Regulations 2008 for complying development. Farming is complying in the Primary Industry (Light Regional) and Primary Production Zones (Playford).

#### 6.2.6 Notification Categories

Horticulture (excluding olive orchards and glasshouses / shade houses) is Category 1 development in the following zones:

- Primary Production (Mallala)
- Horticulture (Mallala + Salisbury)
- Rural (Salisbury)
- Rural Living (Salisbury)
- Primary Industry (Light – Policy Areas 2 + 3)
- Primary Production (Playford – excluding Policy Area 5)
- Horticulture (Light)
- Rural (Light)

Horticulture comprising structures (or not assigned to Category 1) is Category 2 in the following zones / policy areas:

- Primary Production (Playford - excluding Rural Policy Area 5)
- Horticulture Policy Area (Mallala)
- Primary Industry (Light)

Points to consider

Where possible, supported development should be either complying or assigned a merit classification but with no requirement for notifying adjoining property owners (i.e. Category 1). Notifying adjoining property owners for supported development can raise unreasonable expectations from the notified owner regarding their rights to influence Council decision making process. The process also takes longer and costs more for both the developer and for Council, and presents a barrier to the industry to follow due process and seek relevant approval. The approval process should be as streamlined as possible with a high level of certainty and clarity to encourage the industry to seek approval and for supported development to not be stifled by the Development Approval process.

### 6.2.7 General Provisions

- Mallala - very 'amenity' and appearance focused
- Light Regional - focus on maintaining the viability of the industry within the state, as well as minimising impacts to other uses
- Gawler - focus on the minimisation of impacts to other uses, salinity levels of the Gawler River, and the preservation of local vegetation, etc
- Salisbury - focus on impact minimisation
- Playford - BDP provisions from the SA Planning Policy Library

In the general provisions, there is limited consistency between the Councils' Development Plans. However, all Councils focus on the minimisation of impacts from rural land uses on urban land uses and, as mentioned, restrict dwellings to no more than one per allotment and generally associated with the farming/rural use of the land. The diversity between the Development Plans extends to issues of amenity, environmental preservation and to minimising the impacts of development.

## Points to consider

All Councils are expected by the State Government to adopt the State's standardised planning policy known as the South Australian Planning Policy Library. The process is known as a *Better Development Plan Conversion* DPA (Development Plan Amendment). As such, the questions to consider with respect to the general provisions of the relevant Council Development Plans are:

- Assuming future compliance with the South Australian Planning Policy Library, to what extent should Development Plan policy between Councils provide for significant local variations?
- How will a future South Australian Planning Policy Library address these issues and differences of approach between the Councils?
- What work can be done to influence suited amendments to the South Australian Planning Policy Library to ensure it caters and supports the horticulture industry within the VNAP

#### 6.2.8 The South Australian Planning Policy Library + BDP Project

It is understood that a review of planning policy pertaining to primary industry and rural land uses will be undertaken as part of Department for Planning, Transport and Infrastructure's ongoing additions to the South Australian Planning Policy Library. Previous research undertaken by URPS, in addition to this project undertaken by Jensen Planning + Design, could inform the policy development of the South Australian Planning Policy Library.

The Department for Planning, Transport and Infrastructure has not provided a definitive timeline and commitment to this process.



## 7 Industry Character and Trends

### 7.1 Unity and Diversity

The diversity of the Study Area is well illustrated as shown thus far in this report. Economic diversity has already been described. The dominant crops in terms of farm gate value are tomato, capsicum/chilli, carrot, cucumber and lettuce, and they collectively total \$180million or 72% of the total value. However, there is a very long “tail” of other crops that are still an important part of the local economy.

In addition, the washing, packing and marketing of crops like potatoes, onions and carrots is a very significant component of the economy, even though much of the volume of these crops is grown elsewhere in South Australia.

However, diversity relates not only to the horticultural activities undertaken – but also to the types of growers and market systems that they are a part of. Diversity amongst growers relates to:

- ethnicity and language
- understanding and use of technology and innovations
- preference for crop types and growing techniques
- marketing
- willingness/ability to collaborate given knowledge, confidence, level of English, place of residence and so on
- business skill levels
- business size
- resourcing and access to finance
- access to markets, and
- overall understanding of the value chain process in a “Western / Global” economy

While there is some unity between some ethnic groups (Vietnamese growers, Cambodian growers, etc.) and market groups (i.e. *Virginia Best*), as always in the vegetable industry, growers are competing with each other in one way or another.

For the purposes of this report, we have profiled typical “growers” in order to highlight the diversity (and the need for a future VNAP Framework to nurture the positive aspects of this diversity) and to identify ways to improve the challenges that this diversity brings. This “profiling” will be further informed by ongoing consultation with the industry.

As outlined in the tables to follow, the following categories of growers have been determined:

1. High tech, high investment hydroponic
2. Low-medium tech, low capital hydro
3. Medium tech soil greenhouse growers
4. Low tech, traditional enterprises glasshouse and field crops
5. Field crop Enterprises

Grower Type Profile # 1

**High tech, high investment, large hydroponic enterprises**

Larger businesses like D’Vineripe or P/petual. They do not necessarily need to be based in peri-urban area such as the VNAP region as they tend to supply to the interstate market that has the required quantity of consumers prepared to pay for quality produce.

However, they do need access to appropriate climate (which can be managed through heating, cooling and water), capital (many high tech operations have secured investment from interstate or overseas), technology expertise, land (but not horticultural lands as not using a soil based system), power, water, local labour, and proximity to transport.

Require a very high level of technical horticultural skills for success.

Procure specialists regarding nutrition, disease control, IPM systems, post-harvest handling and storage (some of these specialists come from Europe).

High productivity and well established good market arrangements.

Use infrastructure (gas, water, electricity) to manage internal climate and therefore produce high quality produce all year round.

Constraints to Growth

- Capital, water, market (currently narrow crop focus), disposal or treatment of hydroponic waste solution, visual impact , securing labour, and community opposition relating primarily to interface issues

Development Issues

- Should there be a Hydroponic precinct where all of infrastructure is supplied and specific zoning with strong interface conditions to avoid conflict if placed in peri-urban area?
- Could be developed on cheaper non-agricultural land as long as not too far from labour pool and access to water.
- However, significant capital has already been spent on other projects scattered around the VNAP and they cannot be “shifted” .
- Could merit special project status from SA Government.
- Waste management issues are an ongoing challenge.



Grower Type Profile # 2

### Low-Med Tech, Low Capital Hydro

Less capital intensive smaller hydroponic glasshouse enterprises developed by local growers. Smaller businesses utilising technology and part of local "hydroponic group".

Not yet marketing together as a group.

Includes some second generation Vietnamese growers who have knowledge about best practice techniques in other parts of the world and have secured investment to improve the business model and secure new technology for their family's farm.

#### Constraints to Growth:

- These smaller growers are in a difficult market position as they are not large enough to deal directly with supermarkets but will need to work with those who are.
- Building regulations for construction of hydroponic structures more stringent than for simple greenhouses.

#### Development Issues:

- Size of holding does not necessarily have to be large to achieve productivity.
- Waste management needed on regional scale.
- Should avoid the crops grown by major players and try and find some niche crops and/or different varieties of existing crops.



Grower Type Profile # 3

**Medium tech soil greenhouse growers**

Larger family businesses that have grown from smaller family businesses.

Often group to market collectively or supply to market aggregators (e.g. Virginia Best growers).

Knowledge of sustainable soil management, willingness to work collaboratively and try to access better market conditions.

Some have a good reputation for quality and send to specific interstate markets.

Many of the growers we have talked with have expressed the view that there is a need for much training that is “hands on” rather than classroom based.

Constraints to Growth:

- Still not in position to deal directly with supermarkets but have strong relationship with aggregators for supermarkets or merchants in market.
- Need for capital (as always) when looking for expansion.
- Ability/willingness to collaborate and trust partners in marketing.
- Still busy working in their business rather than having time to develop new business skills.
- Less likely to have resources to invest in infrastructure (gas, electricity) to heat and cool greenhouses, so difficult to compete with quality of produce from high tech, heavily invested hydro operations

Development Issues:

- Much of development may still not be under control of Councils.
- Land parcels can be as small as 1.5 hectares and still provide profitable business opportunities.
- Large parcels of land can be poorly managed outside of greenhouses.
- Waste management needed on regional scale.



Grower Type Profile # 4

**Low tech, traditional enterprises glasshouse and field crops**

Developed by local growers – highly traditional, perhaps less business “savvy”.

Many smaller Vietnamese and Cambodian growers are in this group but others have moved to the next level up.

Because of size, quality of produce and lack of marketing skill, these growers often market through a middle man who takes part of profit.

There is a heavy reliance on family labour that either lives onsite or close by. Tend to be growers of small operations. May be new to vegetable growing and may lease land or greenhouses and get their technical advice on growing crops from neighbours, family groups and supply houses for fertiliser and chemicals.

Often the growers sell their produce out of the greenhouse to a middleman packer or trader who will combine this produce with that from other growers. These growers often have no market power and are price takers.

**Constraints to Growth:**

- Need horticultural training to improve skills to increase productivity.
- Lack of capital to own property. If on leased land may not take responsibility for land or water management.
- Soil management practices often not good.
- Poor knowledge and capacity to keep pace with new market conditions and opportunities.
- Cash economy seems to be part of the culture.
- Language and culture a barrier to understanding or valuing western food market chains
- View the farm as a “lifestyle” rather than as a business” and therefore tend to work long hours, 7 days a week

**Development Issues:**

- Much of development not under control of Councils.
- Businesses are not adequately profitable to afford water or waste management systems.
- Should there be a precinct for small growers?
- Some outside help needed to establish facilities for grower training.
- Sometimes land owned by one group, and leased as smaller parcels to a number of other growers.



Grower Type Profile # 5

### Field Crop Enterprises

Generally growing potato, onion carrot, brassica or celery through mechanised production systems requiring high capital of resultant need for economies of scale.

Recognise specific market niche of VNAP area. Mixes with season for other districts for year round supply.

Most of larger players have processing/packing facilities in VNAP.

The desire for larger allotments has led to a desire to develop land north of the river for field crop horticulture (but constrained due to water access).

Suggest that growers need 50-100 hectare of land to maintain a competitive operation. Despite this, growers seem to be willing to keep growing crops south of the river because the soil and climatic conditions provides them with the ability to supply produce over all seasons, which other regions do not.

#### Constraints to Growth:

- Availability of land in suitable sized blocks.
- Water availability and other infrastructure (particularly north of the Gawler River).
- Land price very high south of the Gawler River compared with other regions.
- Peri-urban issues with noise dust, spraying etc. – too many hassles!
- Difficult to manage field crops on small parcels of land due to tractor movements, seeding, spraying, large irrigation pivot points, etc.

#### Development Issues:

- Need larger land holdings in order to manage crops in efficient and cost effective manner.
- Whilst land is more expensive south of the river, growers require the advantageous soil and climatic conditions to “balance” their outputs from other regional areas and supply the market through all seasons.
- There is a willingness (or need) to pay a higher price and manage the frustrations of smaller allotment sizes as a trade off for being able to achieve a consistent ongoing supply of products.



## 7.2 Representation

There is no “single voice” that can claim to represent all of the growers and segments of the industry in the VNAP as detailed within the grower profiles.

There does appear to be effective representation of (and collaboration with) the ‘low tech – traditional’ growers, and conversely, some of the larger ‘high-tech – hydro’ groups are able to have a stronger voice in the market due to their business knowledge and resource capacity.

The growers are fiercely independent and generally do not like to be regimented by organisations.

In addition, growers have a different set of needs that they want an organisation to provide and if they are not met, they are unhappy.

Effective and accessible representation for all grower types is likely to be a resource intensive and complex process requiring long-term commitment to relationship building. The absence of Government managed and funded representation means that representation falls in part to the private sector, which can only be sustainable for the particular group if it is generating income.

Therefore, some grower groups that require significant assistance are less likely to be represented by a private sector group.

Conversely, the private sector is better placed to have local knowledge and relationships within the sector and has a strong interest in the success of the industry. Therefore, the private sector may argue that it is better placed to provide effective representation.

Some of the existing representative / supportive bodies include:

Representation	Description
AUSVEG	AUSVEG is represented locally by GrowSA (formerly the Virginia Horticulture Centre) who represents the national vegetable industry body, which is funded with levy funds collected from vegetable sales.
GrowSA	GrowSA, formally the Virginia Horticulture Centre, took over the role of industry support and representation from the PIRSA in 1996.
Hortex	Hortex is a private representative body that represents a number of growers within the VNAP including hydroponic growers and <i>Virginia Best</i> greenhouse growers.
VGA /CGA	The Vietnamese and Cambodian Growers’ Associations are

	representative bodies that support growers from the respective countries.
Mt Lofty Ranges NRM Board	The MLR NRM Board's role is generally confined to broad policy setting of soil and water management issues.
PIRSA	Primary Industries and Resources have traditionally played a large role in the economic and operational activities of the region but its role is generally reserved to broad policy setting.
City of Playford	The City of Playford supports the industry through the subsidisation of the Virginia Horticulture Centre building, and through the various studies (including the OPAL study and those relating to access to fresh food).
Potatoes SA	Potatoes South Australia will represent and promote the interests of potato industry stakeholders, undertake research and development, commission marketing and consumer education programs and provide policy advice to Australian Government regarding potato industry issues.
Other Bodies	<ul style="list-style-type: none"> <li>▪ Horticulture Coalition SA (a member of Primary Producers SA)</li> <li>▪ Virginia Irrigation Association (purposed with advancing the intelligent use of water in the irrigation industry)</li> <li>▪ Onions Australian (an umbrella organisation for the onion industry)</li> </ul>

## Points to consider

- It is important that the VNAP growers have a collective 'voice' and are suitably represented to ensure their infrastructure needs are attended to by government at all tiers
- Representation of this diverse group of cultures, growing styles, size and influence will be a challenging role but nonetheless an important one
- The lack of representation of particular segments of the industry is of concern

### 7.3 Levies

The National Vegetable and the National Potato Levies are gathered from growers across Australia, which fund research and development (R&D) projects with the objective to improve efficiency, product quality, sustainability and the ability to supply and respond to market needs. The levy is payable on selected vegetables and potatoes produced in Australia for either the domestic or export markets, and sold either by the producer, or used by the producer in the production of other goods. The current rate for the levies is 0.5 per cent of the vegetables' value at the point of sale.

The National Vegetable and National Potato Levy applies to many vegetables and potatoes, but there are some exclusions including tomatoes, asparagus, garlic, hard onions, herbs (other than fresh culinary shallots and parsley), melons, mushrooms and seed sprouts.

The levy is collected from the grower at the first point of sale by the Levies Revenue Service (LRS). This is usually at a wholesale market or processing company. If it is a direct sale then it is collected by the retailer. A producer who sells produce directly to consumers must submit the levy returns directly to the Levies Revenue Service (LRS). Horticulture Australia Limited (HAL) is responsible for managing industry funds and the Australian Government matches the levy dollar-for-dollar.

A common misconception is that levy funds are distributed to industry representative organisations such as AUSVEG, but this is not the case. It is the industry's responsibility to recommend via the Vegetable and Potato Industry Advisory Committees (IACs) how funds should be invested.

There are three separate IACs – two for vegetables and one each for fresh and processed potatoes. The IACs are subcommittees of the HAL board and they make recommendations to HAL about which R&D projects should be funded by the levies, in accordance with industry priorities.

AUSVEG plays an important role in the process by representing the interests of growers. However, AUSVEG's role in the levy investment process is limited to recommending to HAL about the composition of the Vegetable and Potato Industry Advisory Committees (IAC).

It is understood that the Industry Advisory Committees have in the past invested in research and development projects managed by Grow SA. However, there are no grower levies that are paid directly to a representative body. This is in contrast to the Barossa Grape and Wine Association, which is funded by a voluntary levy on Barossa grapes crushed since its incorporation in 2010. It now operates as a peak body for the grape growing and wine producing industries and has been a step forward for the regional wine industry.

## 7.4 Profile and Marketing

### 7.4.1 Profiling Challenges

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- The profile of the VNAP in the wider community is not high and many consumers would not know where their fruit and vegetables are grown.
- The area is flat and un-vegetated, hot, dry and windy, and not well known. It arguably lacks the “sophisticated” or “sexy” marketing image of more attractive well known regions such as McLaren Vale, the Adelaide Hills and the Barossa Valley – though it is acknowledged that the nature of the areas differ significantly (with the VNAP not a tourist destination).
- Nonetheless, brand is still important and there is no single body representing the diversity and full extent of the industry that can tackle improved profiling and marketing.
- The growers are also generally uncoordinated in these marketing approaches.

### 7.4.2 Profiling Opportunities

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- GrowSA has established an “SA Grown” brand to encourage local consumers to purchase locally produced fruit and vegetables whenever possible. This is not just confined to produce from the VNAP but is a state-wide campaign. Such a marketing program requires a large budget and we are not aware of the impact this program has had since it commenced in 2006.
- It is certain that the produce from the VNAP is sought after by the Australian market, particularly at certain times of the year. With the relatively small Australian population and the difficulties with exporting vegetables to distant markets, vegetable growers are always facing the economic ups and downs caused by over-supply of perishable produce on the Australian market.
- There is significant opportunity for a compelling story that is attractive to the increasing numbers of food consumers who want to know more about where the products come from, the journey that the products have taken from the farm gate to the table, and that the growers themselves will directly benefit from the sale. Successful marketing and profiling has been built around other cultures and landscapes, such as:
  - Italians (association with wine, pasta, tomatoes)
  - Germans (Beerenberg Jam, wine)
  - Kangaroo Island (green, organic produce)
- The region is extremely accessible to metropolitan Adelaide and therefore is a natural contributor to the *locavore* movement – one

often cited but not universal definition of "local" food is food grown within 100 miles of its point of purchase or consumption. This certainly fits well with VNAP the Adelaide market.

## 7.5 Where are the Markets for the Produce?

Currently, there is little formal data collected regarding the distribution of produce grown within the VNAP as this data is not collected through the Australian Bureau of Statistics. However, anecdotal information suggests the following current markets where the produce from the various growers is directed to.

### 7.5.1 Larger growers – primarily hydro, enclosed greenhouses, vegetables

High amounts (probably close to 100%) of the high quality, high quantity produce tends to be sold and processed interstate – particularly Victoria, New South Wales and Queensland, and largely through contracts with key buyers. This is in part due to the larger demand and greater number of consumers in the Eastern States prepared to pay for high quality produce. Undertaking numerous transactions with a range of buyers in the SA market in order to sell the large quantities is time consuming and often not cost effective. With a number of the smaller growers willing to compete against each other and sell lesser quality produce at lower prices, it is uneconomic for the larger growers to compete against them. Also, there is currently limited ability to value-add or undertake local processing in the VNAP region. The main winners of this scenario are the freight companies. However, it means that it is wasteful of energy in transporting a low value resource across Australia, it is a loss of local produce that is not being distributed "localvore", and is a loss of potential employment opportunities.

There are limited examples of produce being distributed overseas, largely because of the regulations relating to pest and disease, and also the costs. Products such as tomatoes and cucumbers have limited shelf life and this restricts their ability to travel long distances. However, there is a growing understanding of the potential of the Chinese market in particular.

### 7.5.2 Smaller growers – primarily soil grown greenhouses

Much of the smaller amounts of produce tend to be sold locally within South Australia through local agents. Companies such as Coles or Woolworths are unlikely to deal direct with a grower. Smaller growers who have not invested in technology (such as gas to warm greenhouses in winter or reuse of water) are unable to produce the same quality products all year round. Their products will command lower prices in South Australia, and they tend to compete with each other, resulting in lower farm gate prices.

## 7.6 Trends in Greenhouse Operations

### 7.6.1 Size of operations

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Hydroponics is a growth area for Australian agriculture, with some reports that about 5% of the northern region growers changing over from field crops to hydroponics (Hien Minh Ly on ABC News, 2012).

Around the world, the average size of the greenhouse operations have grown, favouring the accumulation of capital – in part due to technological improvements in the greenhouses, which have allowed farmers to manage ever-greater surface areas.

For example, in Armenia, Spain the average surface area of greenhouses has increased from 1 hectare in the mid-1980's to 2.5 hectares at present (Aznar-Sánchez, J and Galdeano-Gómez, E; 2011). In the Netherlands, the economic size of the total greenhouse vegetable sector increased in the period 2000-2011 by 21 percent (HortiBiz, 2012) and the average farm size increased by 86% to 4.6 ha between 2000 and 2011 (HortiBiz, 2012). In line with this trend, the VNAP region is seeing increasing investment in larger operations such as D'Vineripe or P/petual (as described in Section 7.1).

Despite this trend, there are examples where greenhouse clusters are still small-scale and predominantly family-run affairs, and they are efficient and economically viable operations. Examples of intensive urban farming (for example, Will Allen's Growing Power in Milwaukee, WI, USA) show viable units with six greenhouses on 2 acre lot (0.8 hectare), generating 40 tonnes of food per year through intensive and integrated food system (Heart Foundation 2011).

These examples are of particular significance for the VNAP region where a large part of the "face" of the industry is smaller, Cambodian and Vietnamese family run operations. There is clearly a place for smaller operations to coexist with larger, heavily invested operations – providing smaller operations can adapt to changing technological, climatic, business management and market requirements.

To some extent, the size of the allotment as an influence on business viability is less significant than the operations efficiency per square metre. This efficiency is highly influenced by the presence of gas and water (and the nature of the water licence), the business operational styles, technological improvements, marketing and supply chains and so on.

### 7.6.2 Technology

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Technology is a major influence upon the economic returns. In Europe for example, there has been constant introduction of improvements to respond to the needs and particular features of the area (drip irrigation, thermal plastic,

soilless crops, pollination by bees, industrial greenhouses, climate control, integrated pest and disease control, etc. The introduction of technology to address climate change impacts is particularly important.

The implications of these trends are that the VNAP region (and particularly the smaller growers) must improve its uptake of technology if it is to improve business viability.

### 7.6.3 Labour

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Internationally, trends are that labour requirements are staying steady, however output per labour is increasing – again largely due to improvements in technology and business management. There is also an increasing availability of qualified, specialised labour (agricultural engineers, marketing experts, advisers, industrial technicians, etc.)

However, in some instances, greenhouse work is still a family concern (such as Armenia in Spain, and the smaller greenhouse operations in the VNAP region).

### 7.6.4 Clustering

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From the late 1980's onwards, there has been an emergence of agroindustrial clusters. In addition to the greenhouses, the clusters also varyingly provide handling and marketing, transport, IT services, agronomic counselling, financial assistance, plastics, irrigation, packing, and technological inputs (agrochemicals, seeds, biological production and machinery). The benefits of clustering are widely known in the western economy, particularly in the European Union and the United States of America. The benefits of clustering are detailed extensively, and are high on economic development agendas. Benefits relate very clearly to collaborations, marketing, branding, economic infrastructure provision, improved chains of production, research and training – identified within the Framework as key components of a sustainable VNAP horticultural region.

The European Commission Innovation Policy states that:

*“Clusters are powerful engines of economic development and drivers of innovation in the European Union. They provide a fertile business environment for companies, especially SMEs, to collaborate with research institutions, suppliers, customers and competitors located in the same geographical area”.*

The US EDA Mission states that clustering should:

*“lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy”.*

Cluster strategies have the potential to significantly accelerate regional economic growth, but only if they are properly understood. The US EDA Investment Priority #1 states that the prerequisites to successful clustering include:

- real and accessible engagement of stakeholders – growers, suppliers of inputs and infrastructure, policy makers, representative bodies, investors, buyers
- collaboration, particularly long term intergovernmental and public/private collaboration
- support for existing and emerging horticultural industries and technologies
- open and effective “social infrastructures” are required which foster social interaction, trust and a shared vision in order to be effective.

The proponent of a regional cluster is likely to be Council or RDA with support from the State Government.

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## 8 Land Use Planning Approaches

There are a number of land use planning approaches around the Western world that aim to assist to protect and strengthen the industry. These approaches can be both legislative (for example zoning) and non-legislative (for example incentives, training and education).

It is important to understand that land use planning approaches (zoning, policies etc.) are generally blunt instruments and are only one way of supporting an industry. Other non planning instruments such as training, educating, marketing and technology may at times be more useful as tools to improve business viability.

Recognising the sensitivities of changing zoning, boundaries, complying status of dwellings and so on (see below 8.1), the pros and cons of introducing of land use planning changes must be carefully balanced against the relative merits of other tools.

A summary of some of the key land use planning approaches that aim to protect viable agricultural land is detailed below.

### 8.1 Right to Farm

A key issue relating to the implications of planning approaches for the VNAP region relates to our entrenched thinking in Australia concerning our individual rights to land – whether it is for farming or living. Any perceived infringements (through land use planning, taxation or legislation) on these entrenched rights are difficult to introduce and implement for the political leaders of the day. Therefore, they become politically unpalatable. Furthermore, experience is that any recommendation to change policy relating to land division or ability to build dwellings in rural areas in Australia is generally an extremely sensitive issue.

This entrenched psyche is not as prevalent in North America and European countries, which leaves the door open in these continents to explore a larger range of land use planning approaches.

*Right to Farm* policies can be introduced through policy that favours farming. For example:

- Interface policy
- Complying status of ancillary developments (trucks, retail sales, sheds etc)
- Complying status of farm dwellings on property
- Hours of operation (conditions of development)
- Non-complying status of non farming/ancillary uses

## 8.2 Legislative Approaches

### 8.2.1 Growth Boundaries

Growth boundaries, green belts and zoning that restricts encroachment of urbanisation onto farming land are relatively successful techniques used around the globe (Zazada 2011). It is a very rigid growth boundary that is integral to industry protection techniques in use within British Columbia, Canada as it provides certainty for both farmers and developers either side of the boundary as to their rights (British Columbia 2009). Likewise, in Barcelona within the Baix Llobregat Agrarian Park (BLAP) region, a fixed urban growth boundary and supportive zoning underpin the protection of farming rights (complemented by a 'bottom-up' campaign led by a consortium of farmers for further legislative protection). Certainty is vital as it gives confidence for investment and deters land speculation at the city fringe.

#### Points to consider

- The SA experience suggests that there is a strong perception that the likelihood of a fixed containment of urban growth is unlikely. It is this perception that is important in the market as it is perception that drives land values.
- Growth within the VNAP is earmarked within 30-Year Plan for Greater Adelaide and contained to urban settlements such as Buckland Park, Angle Vale, Virginia, Two Wells, and the Playford North extension (adjacent to the southern side of the Northern Expressway).
- There is additional pressure from land owners to develop within the region– even just for an additional dwelling and small lot per farm.
- Introduction of a firm containment boundary (supported by strong economic and planning policy and resources) will send a clear message to the region regarding its future for productive farming.
- However, it could be argued that the introduction of a long standing, firm containment boundary is not compatible with our system of governance with short parliamentary terms (4 years) and a history of green-field suburban development at the city's fringes.

### 8.2.2 Land Use / Zoning

Zoning to control the type and form of land use is probably the most commonly used planning control within the developed world. It is certainly the most common form of land use control in South Australia. The challenge is for the VNAP region to be protected by zoning that provides a balanced level of prescription for uses that support and protect the industry whilst not making it too difficult for industry to adapt to market and climate. The other challenge is to provide consistency between Council areas within the region for cohesion and to support the growers.

## Points to consider

- Some regions within North America have tailored *horticultural enterprise zones* that offer flexibility with respect to land use particularly for onsite services and products including auxiliary commercial buildings (Maryland Department of Planning 2012).
- Within the South Australian Planning Policy Library there is a Horticulture Policy Area that sits beneath the Primary Production Zone. Adoption of this Policy Area between Council will help to provide consistency but this would need to be complemented with tailored local variation.
- There may be an opportunity to consider alternatives to a “generic” horticulture policy area (which does not recognise major differences between different crop types and management systems such as field crops versus greenhouses), such as a “greenhouse policy area”.

### 8.2.3 Allotment Size / Land Division

Restricting rights to subdivide land is also a common and arguably effective way to limit development that may jeopardise the longevity of the industry within the VNAP.

For example, the creation of allotments that are of an inappropriate size may be too small to efficiently cater for their intended horticulture use (and associated requirements for truck parking, storage, waste management, on site water storage etc.) or too large resulting in surplus land management issues (proliferation of weeds, pests etc).

Conversely, some industry stakeholders have also strongly argued that there needs to be an increased number of smaller allotments available to support the smaller operators that do not have the financial resources to invest in larger operations, and who do not need a large site to run a viable operation.

In the short term, as well as providing increased opportunities for greenhouse operators, dividing land into smaller allotments will also provide immediate returns for land owners who divide their land.

In the long term, the risk is that if the smaller operations in the VNAP region do not improve business viability through improved technology, improved water licensing conditions and business operating styles, many smaller greenhouse operations will become unviable, rendering the land unproductive and will ultimately be used for residential development.

In order to minimise the risk of productive land being used for residential purposes, restricting rights to subdivide productive land and build dwellings on it has been used by the Playford Council in particular for a number of years in response to the already highly fragmented and small holdings south of the Gawler River.

In considering the pros and cons of providing industry with opportunities to divide land for the purpose of horticultural uses, it is important to note that choosing an appropriate allotment size in a policy is an extremely blunt tool and necessitates "drawing a line in the sand" that may not suit all farm conditions.

The challenge inherent to specifying a minimum allotment size (a Minimum Development Unit or MDU) is getting the size right. Too small and there is a risk that the industry will be diluted through alternative uses such as hobby farms and lifestyle seekers. Too large and buying into farming becomes too cost prohibitive, and might not reflect industry requirements for parcel sizes – which will always be changing and varies over crop types. Field crops using pivot irrigation need much larger allotments than intensive horticulture crops using climate and soil conditioning technology.

Land use planning decisions must be influenced both by short term and long term overall industry needs (rather than needs of specific land owners). In the case of the VNAP horticulture region, industry needs are highly varied.

## Points to consider

- Within the study area the Councils have varying approaches but at this point in time generally do not support further land division.
- The 30-Year Plan encourages retention and support of productive land and encourages provision of infrastructure and services within existing urban settlements rather than the uneconomic proliferation of uncoordinated infrastructure provision to new dwellings outside of existing townships.
- The issue of setting appropriate land sizing and the location for any future subdivision for horticultural purposes is complex and will require more detailed investigation. It is not the intention of this project to determine exact locations of the policy detail – this will be determined in a future Development Plan Amendment process.
- The trend is that smaller land holdings can be extremely productive with greenhouse operations operating on only 1.5 hectares, but this is heavily reliant upon strong business acumen, use of appropriate technology, good water supply, and available resources.
- South of the Gawler River, greenhouses, glasshouses and shadehouses currently occupy roughly 10% of land area used for horticulture.
- South of the Gawler River around Virginia, the majority of allotment titles being used for greenhouse production are 2.5 ha. In areas such as this, it is unlikely that land will be used for other productive uses such as field cropping into the future because the land parcels are too small. There are a number of greenhouses on smaller land parcels but this is through a leasing arrangement.
- The question is whether this is the form of horticulture to be further enabled (particularly south of the river) or whether field cropping still has its place in this part of the VNAP.

#### 8.2.4 Interface Management

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The interface between the VNAP and the surrounding urban areas is important to the long-term sustainability of the industry. In British Columbia (as discussed), rather than simply abutting primary production zones against residential, a model is used whereby both uses share responsibility for the interface. The farmers have a right to farm right up to their boundary but are expected to maintain high quality management techniques to limit impacts of noise, spray drift and storm-water, while residential development transitions to lower densities at the edge with integrated buffers *within* the residential developments. This method is then complemented with widespread marketing and information that highlights both parties' commitment to sharing the responsibility for managing the interface.

## Points to consider

- Traditionally in SA, responsibility for interface management is that of the farmer and/or is dependant upon who occupied the space first.
- In the model developed by British Columbia, Canada farming is always a right (regardless of what use occupied the space first) and the rights extend over the entire site.
- In British Columbia, there are high expectations regarding farming practices at the interface with other sensitive land uses, rather than just physical buffers.
- This is complemented by the concept of shared responsibility with the adjacent urban/peri-urban residential areas designed (where possible) in a manner that limits conflict (i.e. through larger 'rural living' allotments at the interface with the farming activity) as well as media campaigns that reinforce the primary role of the area is for primary production.

### 8.2.5 Value Adding Activities

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As discussed briefly, a number of North American approaches to supporting primary production include flexible zoning that supports a greater number / range of *value adding* activities such as warehouses and processing plants. In Maryland, USA these allowed activities were extended to allow breweries, stills, wineries and on-farm processing of produce (Maryland 2012). In the Yarra Valley Gateway Estate, zoning allows for farm gate shops, which provide direct retailing opportunities to surrounding farmers. The works to elevate the brand and awareness of the local produce provides a direct source and supports local business (National Heart Foundation 2011).

## Points to consider

- Development controls can limit additional activities that may add value to the broader industry and/or make individual commercial investment more sustainable through easier access to market, ongoing income streams less reliant on climate and market trends, etc.
- The reasons for these controls are usually to avoid issues of lost amenity and primary productive activity.
- Management is crucial in all instances, which presents significant challenges within the SA system of Development Control that is a 'point in time' system and all management requires resourcing for follow up and suitable enforcement authority.
- The 30-Year Plan for Greater Adelaide encourages small-scale value adding activity that complement local primary production but calls for large-scale value adding activity to be located outside of primary production areas (PIRSA 2012).
- There may need to be addition 'value adding activities' accommodated within the policy for the relevant area to facilitate uses such as produce storage, packing, assembly, transport storage and on site sales (which have been raised during consultation for this study).
- It is acknowledged that currently within City of Playford Development Plan all of these activities are envisaged, other than storage of trucks.

### 8.3 Non-legislative / non-development control approaches

#### 8.3.1 Partnership Building

In addition to legislative approaches to supporting the industry, there are a myriad of other opportunities that are supportive and non-legislative in nature. Educational and training partnership between government, non-government and private growers is one of these opportunities. In Milwaukee, USA, not-for-profit Growing Power Inc establishes such partnerships and provides opportunities for struggling youths to gain training and employment within peri-urban agricultural regions – learning new life skills and providing accessible labour.

## Points to consider

- A number of education and training partnerships exist within the VNAP region but could be strengthened with opportunities to partner with TAFE, Adelaide University (Roseworthy Campus) and Department of Education and Children's Services through training pathways that work collaboratively with local industry.

#### 8.3.2 Marketing / Branding

As discussed in Section 7.3, there is a growing demand for 'traceability' as new consumers want to know where their food produce has come

from. This presents a real opportunity for VNAP due to its proximity to metropolitan Adelaide and access to local markets.

### 8.3.3 Food Central to the Urban Landscape

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Likewise, there are opportunities to further market and emphasise the importance of food and food security. Examples of this approach include residential developments with food production central to the site, such as in Santiago, Chile model and Southlands in British Columbia. Both of these developments market the 'food story' for new residential sales, making use of waste for fertiliser, water capture for watering, etc. They also provide opportunities for education and generally elevate food as a vital part of the urban and peri-urban landscape.

### 8.3.4 Supportive Toolkit

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Other approaches include the USA example of grower 'toolkits' that provide information regarding gaining approvals and abiding to regulations. They are often supported by an economic development office that can help to act as a liaison between those in the industry and the regulatory bodies (Maryland Department of Planning 2012)

### 8.3.5 Demonstration Farms

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Demonstration farms can fulfil a number of roles including development and promotion of new technologies, elevate the importance of food security and provide opportunities for training. In Somerton Parks, Philadelphia, a demonstration farm utilises the Small Plot Intensive (SPIN) approach developed in Saskatchewan. Situated on only around 2000m<sup>2</sup> of unwanted land, it now generates amazing product and revenue from this 'half-acre plot' with the goal of cultivating the rebirth of commercial agriculture in Philadelphia. This approach has been used in the past in the VNAP but may need to be revisited.

### 8.3.6 Landscape Management

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Another common issue raised regarding the VNAP is the management of sites and their landscapes. Often there are issues of unsightliness, illegal dumping and stormwater damage. In Europe, farmers are encouraged to adopt landscape management practices and environmentally friendly farming procedures that comply with Good Agricultural and Environmental Condition standards – in short, farmers are given financial incentives to keep their land in good aesthetic and environmental condition. Rather than legislate and enforce (which has considerable resourcing implications for Council), an economic incentive (for example, a rate reduction) is one way to address the issue of poor land management.

### 8.3.7 Economic Incentives

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Other economic incentives have been used within the United States to promote productive uses and discourage land-division. Rather than minimum allotment sizes, economic incentives are widely used as a way of preserving agricultural land as well as achieving biodiversity conservation and landscape preservation. For example, the government will purchase the development rights to a farm (therefore farmers receive an income from the sale of development rights), and in return, a covenant is taken out over the land to ensure it is only used for agricultural or conservation purposes. This type of policy works in the United States as it is based on the assumption that the owner has an inherent right to continue to develop rural land. This economic incentive approach has limited application in Australia where there is no such right to develop land, only the right to lodge a development application, which is then assessed against the relevant policies.

10



## 9 Industry Requirements

The following points are a summary of key industry requirements raised during consultation and research for a sustainable horticultural industry.

### 9.1 Land

- Not all soils within the VNAP are suitable for horticulture and assessment regarding the suitability of the soil against the requirement of the crop should be undertaken
- Land should be of a size appropriate for the growing of crops in an efficient and profitable way, and situated away from urban areas (where possible) unless there are suitable management mechanisms for interface issues
- Preferably not in the lowest part of the landscape with a higher risk of flooding or water-logging
- Land has not been used for the growing of incompatible crops with possible carryover of soil diseases, or has had incompatible weedicide applied to the previous crop
- Hydroponic particularly is not dependant on good soil

### 9.2 Infrastructure

The infrastructure available on or near the property should include most of the following things:

- Water supply, including mains supply, bore water, or WRSV water connection, or the possibility of a new connection being available.
- Power (3 phase) installed, or in close proximity.
- Gas, particularly for greenhouse heating, processing or packing of produce.
- Road access to allow truck and machinery access.
- Adequate shedding, office or housing on property, or no impediment to them being constructed
- Suitable access to transport
- Access to storage

### 9.3 Economic certainty

- Land right certainty
- Operational certainty as well as certainty about the future value of land for sale/superannuation

### 9.4 Financial Management

- A purchase price for the land / business that can be supported by the returns from the crop to be grown

- It is important to carry out a rigorous reality check on the economics of growing the proposed crop on the land
- The costs and returns for growing the proposed crop are realistic and verifiable. Include some discount factor taking into account a 1-year-in-10 chance of getting a complete crop failure
- Think about how the predicted climate changes in the next 20 years may impact on the crop
- Use realistic interest rates into the future as current rates are the lowest they have been for a long time
- Beware of mortgaging your assets too highly to provide security to the body providing you with finance (leave some capacity for an unforeseen requirement for further funds)

### 9.5 Operational Management

- A manager with experience in growing the crop in the VNAP
- Good people management skills
- Knowledge of management to a rigid cash flow budget
- Requires flexible and cooperative approach to match changes in market demand and supply conditions, changes in technology, changes in availability of labour and so on

### 9.6 Industry coherence and leadership

- There is a need for stronger and more focussed industry leadership in the VNAP
- This report acknowledges the difficulty of working with diverse cultural groups with many not having a strong grasp of English
- There are also big differences between growers in their technical and marketing skills
- The vegetable industry is not a single industry like grapes, olives, almonds, etc. and it is made up of many very different crops that require different growing and marketing techniques
- The ornamental horticulture and nursery industry has similar problems and there may be some lessons to be learnt there

### 9.7 Access and Knowledge of Markets

Markets can change very quickly as crops go in and out of favour.

- Understanding of competitors in the market
- Membership of a marketing group with other like-minded growers
- Understanding of what is happening with the proposed crop elsewhere in the VNAP, interstate and overseas
- Knowledge of what agents and other potential buyers are thinking about your produce
- Flexibility in use or machinery and infrastructure, the property infrastructure and machinery should be suitable if another crop needs to be grown

## 9.8 Training

- Relevant to cropping systems
- Specific to cultural and language needs of the growers
- Tailored to existing level of knowledge/competency
- Training should be seen as a way of not only building knowledge but creating/maintaining relationships / collaborative opportunities
- Localised
- Scenario and interactive

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# APPENDICES

## Appendix 1: Economic Analysis Methodology

### Introduction

The economic impact of the VNAP horticultural industry, both on the local economy as well as the state economy, is discussed in Section 2 of this report. The baseline data presented is premised on a number of assumptions and methodological approach. This method is described below.

### Economic Impact Estimates

The estimates of economic impact are based on the use of the input-output (I-O) method. I-O analysis provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, the method can be used two ways.

First, the I-O transactions table provides a numerical picture of the size and shape of the economy and its essential features. It can be used to describe some of the important features of an economy, the interrelationships between sectors and the relative importance of the individual sectors.

Second, I-O analysis provides a standard approach for the estimation of the economic impact of a particular activity. The I-O model is used to calculate industry multipliers that can then be used to estimate economic impacts arising from some change in the local economy or the economic contribution of an existing industry.

### I-O Model Construction

#### Region defined

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For the purpose of data collection and economic modelling, it was appropriate to define two regions of relevance for this study. The first is the region that includes the Virginia and Northern Adelaide Plains (VNAP) horticultural production area. It is noted that **the region defined for the purposes of economic analysis differs from the area defined as the Study Area**. This has been done in response to the data available and Statistical Areas defined by the Australian Bureau of Statistics. The area defined for this section of the report is considered relevant to the Study Area, albeit larger in size and comprising areas outside of City of Playford and District Council of Mallala.

The VNAP economic region is comprised of four Statistical Area 2s (SA2s)<sup>2</sup>, which are defined below:

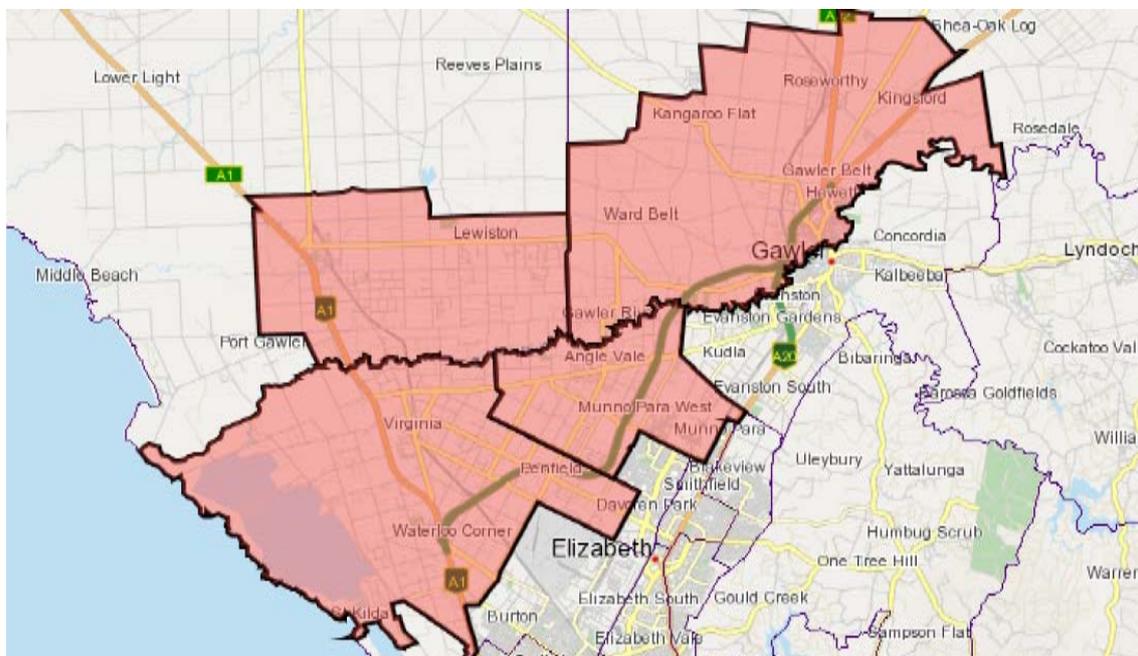
Figure A.1 - The Northern Adelaide Plains horticulture region by SA2 and LGA

Local Government Area	Statistical Area 2
Gawler (T)/Light (RegC)	Gawler - North
Playford (C)	Munno Para West - Angle Vale
Playford (C)/Salisbury (C)	Virginia - Waterloo Corner
Mallala (DC)	Lewiston - Two Wells

'C' refers to city, 'RegC' refers to Regional Council and 'T' refers to Town

Source: EconSearch analysis

Figure A.2 The Northern Adelaide Plains Horticulture Growing Region (for the purposes of economic baseline analysis)



Source: ABS TableBuilder 2012

The second region of relevance is the region of economic influence. The Virginia and Northern Adelaide Plains (VNAP) economic region is comprised of 11 Statistical Area 2s (SA2s), which are listed in Figure A.3 and shown in Figure A.4.

<sup>2</sup> Geographical classification sourced from ABS Cat No. 1270.0, Australian Statistical Geography Standard (ASGS), July 2011.

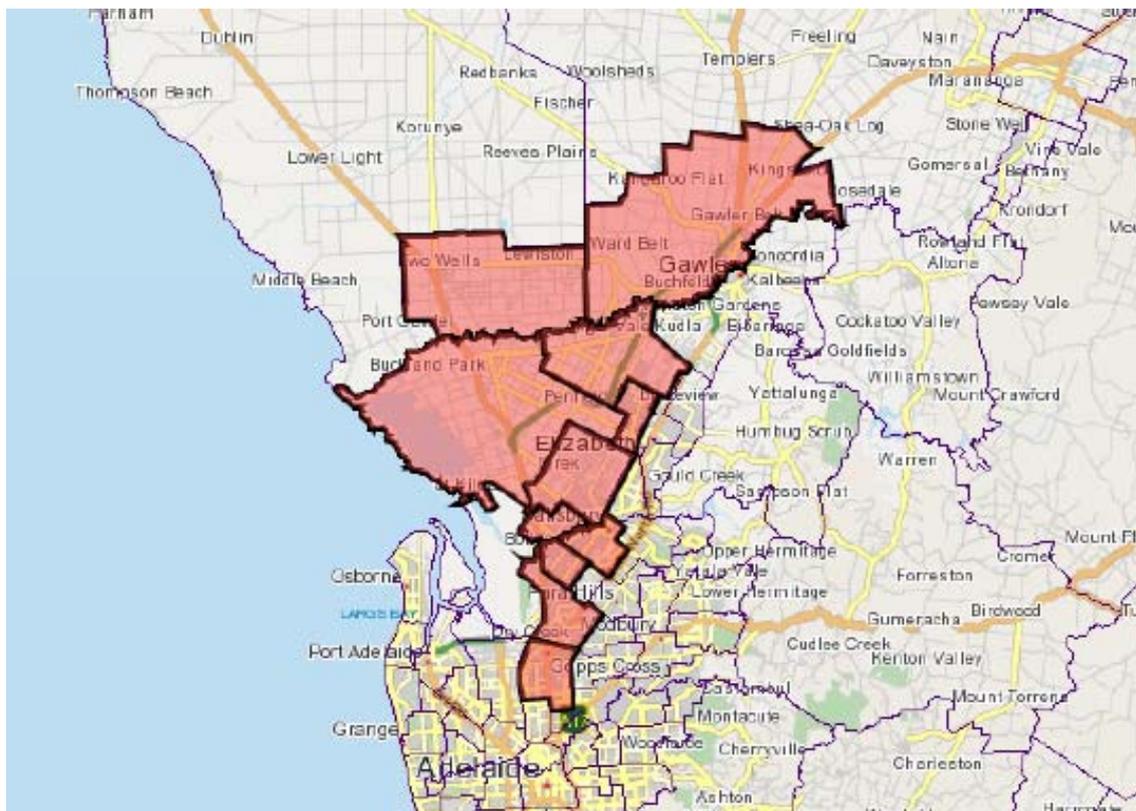
Figure A.3 The Northern Adelaide Plains Economic Region by SA2 and LGA

Local Government Area	Statistical Area 2
Gawler (T)/Light (RegC)	Gawler - North
Playford (C)	Davoren Park
Playford (C)	Munno Para West - Angle Vale
Playford (C)/Salisbury (C)	Virginia - Waterloo Corner
Mallala (DC)	Lewiston - Two Wells
Salisbury (C)	Salisbury
Salisbury (C)	Salisbury - North
Salisbury (C)	Parafield Gardens
Salisbury (C)	Paralowie
Salisbury (C)	Pooraka
Port Adelaide Enfield (C)	Enfield - Blair Athol

a 'C' refers to city, 'RegC' refers to Regional Council and 'T' refers to Town

Source: EconSearch analysis

Figure A.4 The Northern Adelaide Plains – Area of Economic Influence (for the purpose of economic baseline analysis)



Source: ABS TableBuilder 2012

Gawler – North, Munno Para West – Angle Vale, Lewiston – Two Wells and Virginia – Waterloo Corner SA2s were chosen as the area that covers the horticultural growing region (Figure A.2).

The remaining SA2s were chosen based on where the people live who work in nursery & floriculture production, mushroom and vegetable growing and fruit and tree nut growing industries. The boundary of the economic region (Figure A.4 - Area of Economic Influence) was determined by those SA2's where more than 25 residents who work in the horticultural industries of the VNAP horticulture region.

For estimating the local economic contribution of horticulture on the VNAP region (and the impact of future growth scenarios), economic impact models for the VNAP economic region and the State of South Australia were constructed by the consultants for 2011/12. The data sources and method used to construct these models are detailed below.

### Economic model construction method

A standard input-output model for the VNAP economic region for 2011/12 was developed using the GRIT (Generation of Regional Input-Output Tables) method, a 'hybrid' method, which utilises local/regional data and computer methods to generate I-O tables. Whilst the majority of data compilation and manipulation was undertaken in Microsoft Excel® spreadsheets, the first stage of the GRIT procedure (based on the use of output-based location quotients) was undertaken using IO9 software (West 2009).

The 'parent' table for the VNAP regional I-O model was an I-O table for South Australia for 2011/12.

An important characteristic of GRIT-produced I-O tables relates to their accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some will not be important because they are very small values and, therefore, have no possibility of generating inaccurate estimates of multipliers and economic impacts. Others will not be important because of the lack of linkages that relate to the particular sectors under study.

The GRIT method involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. Research resources are targeted to data gathering in these areas. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen 1980). That means the table provides a generally accurate representation of the economy, but does not guarantee the accuracy of any particular cell.

Sources of data for the regional I-O model included:

- the Australian Bureau of Statistics (ABS)
  - 2011 Census of Population and Housing (ABS 2012a);
  - Australian National Accounts, 2011/12 State Accounts (ABS 2012b);
  - Australian National Accounts, Input-Output Tables - Electronic Publication 2008/09 (ABS 2012c)
  - 2011 Agricultural Census (ABS 2012d) and AgStats data for 2010/11 (ABS 2012e);
  - 2009/10 Household Expenditure Survey (ABS 2011c);
  - Regional Population Growth, Australia and New Zealand (ABS 2012f);
- Department of Employment and Workplace Relations (DEWR 2012); and
- Australian Taxation Office (ATO 2012).

Based on work undertaken by Mangan and Phibbs (1989), the I-O model developed for this project was extended as a demographic-economic (DECON) model. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

- The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
- The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

A range of data for construction of the DECON model was obtained from the Australian Bureau of Statistics' 2011 Census of Population and Housing (using the ABS TableBuilder database).

Another aspect of the I-O models developed for this project was the inclusion of an additional column in the final demand quadrant of the model, namely a profile of sales of goods and services to visitors to the region (i.e. expenditure by tourists). Data were sourced from Tourism Research Australia (2012) and ABS (2011b).

The data described above were incorporated into a Microsoft Excel® spreadsheet based economic impact model for the region (i.e. RISE v3.0). This type of model allows for description of the structure of the economy. It can also be used for the estimation of economic impacts over time in response to the introduction of a new industry, the impact of an existing industry or a change in the final demand for the output of one or many sectors. Model assumptions can be modified to account for:

- price changes between the model construction year (2011/12) and the base year for the analysis
- labour productivity change over time (as above and for the subsequent years)
- the level of regional migration (e.g. for a positive employment impact, the proportion of new jobs filled by previously unemployed locals).

The economic impact model developed for the VNAP region for this project (and for SA) was specified in terms of 66 intermediate sectors. Sector specification in terms of the national input-output sectors is detailed in Appendix 1. An overview of economic impact analysis methodology, including a description of extending the standard I-O model as a DECON model and incorporating a tourism demand profile, is provided in Appendix 2. A glossary of I-O terminology is provided in Appendix 3.

### Indicators of Economic Impact

The following indicators of economic impact were generated using the economic modelling framework described above:

- gross regional product (GRP)/ gross state product (GSP)
- household income
- employment

**Gross regional product (GRP)/ gross state product (GSP)** is a measure of the net contribution of an activity to the regional economy. GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, 'gross operating surplus and gross mixed income net of payments to owner managers' and 'taxes less subsidies on products and production'. It represents payments to the primary inputs of production (labour, capital and land). Using GRP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

**Household income** is a component of GRP and is a measure of wages and salaries paid in cash and in-kind, drawings by owner operators and other payments to labour including overtime payments, employer's superannuation contributions and income tax, but excluding payroll tax.

**Employment** is a measure of the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalent (FTE) jobs. Employment is measured by place of remuneration rather than place of residence.

Estimates of economic impact are presented in terms of:

- direct (or initial) impacts

- indirect (or flow-on) impacts
- total impacts.

**Direct (or initial) impacts** are an estimate of the change in final demand or level of economic activity that is the stimulus for the total impacts.

**Indirect (or flow-on) impacts** are the sum of production-induced impacts, consumption-induced impacts and offsetting consumption effects.

- Production-induced impacts are the sum of first-round impacts (i.e. estimates of the requirement for or purchases of goods and services from other sectors in the economy generated by the initial economic activity) and industrial support impacts (i.e. output and employment resulting from second, third and subsequent rounds of spending by firms). Production-induced impacts are sometimes referred to as 'indirect effects'.
- Consumption-induced impacts are additional output and employment resulting from re-spending by households that receive income from employment in direct and indirect activities. Consumption-induced effects are sometimes referred to as 'induced effects'.
- Offsetting consumption effects are 'lost' consumption expenditure by the local unemployed before taking a job or 'new' consumption expenditure of those losing a job as they shift to welfare payments.

**Total impacts** are the sum of direct and indirect (flow-on) impacts.

## Appendix 2: Grower Consultation Summary

In preparing this report the consultancy team interviewed a number of growers and industry leaders within the VNAP region to help inform the findings presented.

A list of those consulted with is provided below:

### GOVERNMENT AGENCIES, INFRASTRUCTURE AND INDUSTRY BODIES

- Mike Redmond, Grow SA
- Domenic Cavallaro, Hortex
- Tony Fox, Adelaide and Mt Lofty Ranges NRM Board
- David Viola, Cluster Development Consultant, DMITRE
- Chris Kaufmann, Infrastructure and Funding Advice, Mallala, Light, Playford and Gawler Councils
- Nick Pezzaniti, North Adelaide Plains Water Allocation Plan Advisory Committee
- Peter Houston & Jack Landberg, PIRSA
- Jo Lavarro & Andrew D’Cruz, SA Water
- Anne Moroney, Craig Groecke, Barossa Regional Development Australia Tony White, Water Reticulation Services Virginia
- Food SA

### GROWERS

- Gary O’Neill, Mitolo Group
- Paul White, Zerella Fresh
- Steve Marafioti, Virginia Farm Produce
- Emmanuel and Bill Cafcakis, Cafcakis
- Tom Lioulios, Lioulios Family
- Hieu Ly, Ly Hydroponics
- Dino Musolino, Musolino’s Hi Tech Hydroponics
- Alicia Panin, Panin
- Phuong Van Vo
- Andrew Matthew, Red Earth Vegies
- Tracey Tran & Son Le, EE Muir
- Paul Pezzaniti & Richard Knowles, Complete Ag and Seed Supplies
- Gino, Gino Nursery
- Jim Genchev, Virginia Nursery
- Tony & George Metaxas, Woodstock Nursery
- Tony Burfield
- Trevor Linke, B Wize Consulting
- Jim Kelly, Arris
- James Altmann
- Clinton Zerella
- Sen Tach
- Andrew Potter, Perpetual Farms
- Hieu Ly