Values of the Metropolitan Rural Area of the Greater Sydney Region

Report, 14 February 2017

ABN 41 107 715 364
Michael Clarke
P: (02) 9817 5888
M: 043 8844024
E: clarke@AgEconPlus.com.au
W: www.AgEconPlus.com.au

In partnership with: Gillespie Economics;
CAB Consulting; and Eco Logical Australia

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Executive Summary

Scope of Study

This report provides an evidence base for the analysis and spatial recognition of the economic, environmental and social values of the Metropolitan Rural Area (MRA) in each of the five districts of Greater Sydney that contain parts of the MRA, to support district planning. The study primarily relied on existing Geographic Information System (GIS) data and hence information that was not available in this form was unable to be represented. This study was undertaken at a strategic level and ground truthing was beyond the scope of the study.

Part of the scope of this study was also consideration of criteria set out in *A Plan for Growing Sydney* (2014) to assist decision makers to:

- minimise the adverse economic impacts on existing primary industry and productive agriculture;
- consider critical natural resource constraints;
- provide adequate public open space and recreational activities and avoid creating unsustainable pressure on existing Crown Land areas and State forests;
- consider natural hazards, such as the need to evacuate people from flood/bushfire prone areas; how flood-prone areas will be avoided and not increasing flood risks in new housing areas (through early planning for stormwater management); and
- consider and plan to protect significant natural resources including water quality, riparian and aquatic habitats and marine estates.

Overview of Land Uses in the MRA and Values

The MRA is that part of Greater Sydney which is outside the established and planned urban area. Broadly, the MRA can be thought of as comprising:

- public land protected for conservation and other public values e.g. defence etc.;
- peri-urban land used for a range of rural and rural lifestyle purposes; and
- rural towns and villages.

These lands provide different sets of values to the community and are facing different pressures.

Seventy three percent of the MRA is public land, the value of which has been recognised through public policy, and regulation has been enacted to protect these values. These values include biodiversity conservation, open space for recreation, drinking water catchments and defence.

Privately owned MRA lands, which make up 27% of the MRA, have both private values that are determined by the interaction of supply and demand in the market, but may also provide public values to the community e.g. biodiversity values or scenic landscapes.
The majority of private land in the MRA is peri-urban land located outside of rural villages. While this land has rural characteristics, agricultural activity is minimal with the primary land use being “other minimal landuse” followed by “grazing”.

For the purpose of this study rural villages were defined as those areas having the following zonings - RU5, R1-5, B1-7, IN1-4, RE1-2, SP, E4.

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1 For the purpose of this study rural villages were defined as those areas having the following zonings -RU5, R1-5, B1-7, IN1-4, RE1-2, SP, E4.
The primary determinant of the market value of peri-urban lands is likely to be urban influences rather than the agricultural characteristics of this land. In particular, distance and travel time from Sydney City is likely to be a dominant determinant of value, with properties closer to Sydney City having higher values. Speculation about future subdivision potential may also be capitalised into land values as Sydney’s urban footprint has grown over the past decade.

In examining the broad environmental, social and economic values of the MRA, this report has focussed its analysis on several specific values, being:

a) agricultural values  
b) biodiversity values  
c) water quality values  
d) air quality values  
e) mining and extractive industries  
f) scenic landscape values  
g) tourism and recreation values  
h) waste management values  
i) rural lifestyle values  
j) rural towns and village values  
k) European and Aboriginal Heritage values  
l) Other values

Agricultural Values

The value of land for agricultural production is indicated by its Land and Soil Capability (LSC), whether it is identified as an agricultural cluster and whether it is mapped as Biophysical Strategic Agricultural Lands (BSAL). However, BSAL mapping which takes account of LSC classification, soil fertility and access to a reliable water supply is likely to give the best indicator of high value agricultural lands. BSAL represents 1% of the MRA and 5% of private rural lands (outside of rural villages) in the MRA.
While BSAL is a good indicator of the ability of land to accommodate different rural land uses, ultimately market forces primarily dictate the suitability of land for different agricultural activities and the viability of agricultural activities and clusters.

Globalisation and trade in agriculture has put downward pressure on agricultural commodity prices and led to a trend of fewer and larger farms and more intensive production. Small farms in peri-urban locations struggle to compete and hence there has been a relocation of commercial fruit and vegetable production to rural areas where land is cheaper and there is more access to production inputs such as water.

In NSW fruit and nut production (excluding grapes) is now primarily from the Riverina (40%), Richmond-Tweed (24%) and Murray (8%) Australian Bureau of Statistics (ABS) Statistical Area level 4 (SA4) areas. Vegetables for human consumption (other than mushrooms) is now primarily from the Central West (29%), Riverina (24%), and Murray (16%) SA4s.

Across the private rural zoned land of the MRA the major land use is “other minimal landuse” followed by “grazing”. There are only small areas of intensive agricultural uses.

The highest value food products are poultry for meat and eggs, and mushrooms (all produced in sheds) and unrelated to LSC, soil fertility and access to water. Nurseries, cut flowers or cultivated turf is the second most valuable agricultural activity in the MRA. Vegetables for human consumption (other than mushrooms) are the fifth main product followed by fruit and nuts (excluding grapes).

Figure ES4 - Value ($) of Agricultural Commodities Produced in the MRA, 2014-15

Source: ABS (2016)

Agricultural values in the MRA are expected to continue to decline in significance with a continuing shift in the share of fruit and vegetable production to other regions of NSW, where land is cheaper and inputs such as water are more readily available. Current minimum subdivision sizes are unlikely to result in increased agricultural production, since current fragmentation and land values (influenced by proximity to Sydney City) are already prohibitive for farm amalgamation or ‘buy-in’ for agriculture investors.
As well as continuing pressure from global market forces, the predominant use of private MRA lands for rural lifestyle properties and rural residential can also give rise to landuse conflicts between these properties and commercial/semi-commercial agricultural activities that can generate odours, noise, pollutants and pathogens as well as truck movements.

**Biodiversity Values**

Significant areas of biodiversity in the MRA are conserved in public protected areas such as national parks, reserves and water catchments. However, a considerable amount of biodiversity also occurs outside protected areas on privately owned rural land.

The report identifies land:

- mapped by OEH as being of High Environmental Value (HEV) i.e.:
  - NPWS estate gazetted & acquired;
  - Declared wilderness;
  - Council reserves;
  - Biobanking agreement sites;
  - Overcleared vegetation types;
  - vegetation in overcleared landscapes;
  - Threatened Ecological vegetation Communities;
  - Rainforest;
  - Old growth forest;
  - Key habitats for threatened species;
  - Riparian vegetation; and
  - Karst landscapes.

- zoned high conservation value in council LEPs; and
- identified on a Biodiversity Investment Opportunities (BIO) Map which is considered a priority investment area for government and the private sector.

Biodiversity values on private land will increasingly come under pressure from land use change and intensification.

**Water Quality Considerations**

The MRA contains Sydney’s Drinking Water Catchment, including Protected and Special Areas with restricted access, and a range of waterways that are mapped using the Strahler Stream Order. The relevant water sharing plan for the Greater Sydney is the Greater Metropolitan Unregulated - Kangaroo River Water Sharing Plan. Waterways throughout the MRA can provide a range of ecosystem, water supply and recreation and tourism values. These values can be compromised by nutrient, chemical, pathogen and sediment runoff from adjoining landuses.

Water quality of waterways and catchments in the MRA will continue to be impacted by agricultural runoff, rural residential uses of MRA land where MRA properties are unsewered and hence rely on various onsite sewage disposal systems, and mining/extractive industry activities.
Air Quality Considerations

Clean air is fundamental to everyone's wellbeing. Poor air quality can be particularly critical to the health of children, older people, pregnant women and those with pre-existing health conditions, while also affecting the natural environment and liveability of the communities in which we work and reside.

Air quality in Sydney has improved significantly since the 1980's with initiatives to reduce urban air pollution implemented across industry, business, homes and motor vehicles. However there are still significant challenges in reducing the impact of photochemical smog (ground-level ozone) and particle pollution in the Sydney Basin.

The west and south west of Sydney are the regions most often exposed to ground level ozone as a result of summertime atmospheric circulation in the Sydney Basin. Particle pollution generally meets standards in Sydney except when bushfires or dust storms occur.

Approaches to reducing air quality issues will need to be broad ranging and across sectors. Constraining landuse in a particular location is likely to have minimal impacts on overall air quality in the Sydney Basin.

Mining and Extractive Industry Values

The entire Sydney Basin is underlain by in situ black coal resource with mining titles primarily held in the South West of the MRA with existing underground coal mining operations. The coal resource includes both thermal and metallurgical coal, with the former used for power and heat generation and the latter used in the process of creating coke necessary for iron and steel-making.

Coal seam gas resources are associated with the presence of coal and hence exist across almost all of the MRA. Coal seam gas is a natural gas, made up primarily of methane that can be used to generate electricity. Existing large scale exploitation of this resource is mainly associated with the Camden Gas Project located southwest of Campbelltown.

The MRA also has a number of regionally significant extractive industry resources e.g. sand and crushed sandstone. Extractive industry resources are principally used as construction material including for road base, concrete, bricks, pavers, blocks, building stone, land formation and landfill material, and landscaping.

Key pressures for mining, coal seam gas and extractive industries include:

- direct land use conflict
- encroachment of adjoining incompatible land uses
- air quality issues
- noise and vibration
- transport
- water quality issues
- subsidence (for underground mining).

Scenic Landscape Values

Scenic landscapes in the MRA are associated with both MRA destinations and more general open space and vistas. MRA destination sites include the World Heritage Area listed Blue Mountains and a number of national parks, wilderness areas and other protected areas. The MRA also contains historic and scenic
villages, open recreation spaces and rural vistas to both residents and visitors. Areas of scenic protection in local environmental plans include the Scenic Hills and East Edge Scenic Protect Lands in the *Campbelltown Local Environmental Plan 2015*.

The MRA has significant landscape values for residents and tourists alike that can be impacted by changes or intensification of land uses. With a forecast growing population in urban areas of Greater Sydney, visitation to the MRA is likely to expand, requiring planning and management to ensure that the landscape attributes that are valued by the community are not also degraded by the community.

**Tourism and Recreation Values**

There are four main landscape features of significance for tourism and recreation in the MRA, the World Heritage listed Blue Mountains, the Hawkesbury Nepean River System, Western Sydney Parklands and the rural landscape and rural towns and villages.

As the population of Sydney increases, these significant tourism and recreation features of the MRA will experience increased demand with associated pressures on carrying capacity and the features that attract visitors in the first place.

**Waste Management**

There are 14 waste facilities located in the North, South, South West and West Districts, servicing all of Sydney. Sydney will require additional waste management and recycling infrastructure, including landfill and liquid waste processing capacity.

The Government will respond to this shortage by identifying and protecting appropriate locations for waste management infrastructure in Sydney. The location of recovery and recycling facilities is reasonably flexible and can generally be located within industrial zoned land. Landfills are generally developed in existing excavated areas that are geo-technically suitable.

Existing and proposed landfills provide a constraint on surrounding land uses as they may produce leachate, stormwater runoff, landfill gas, offensive odour, dust, noise and litter. Landfill activities have the potential to adversely affect local amenity, and they may also affect threatened species of flora and fauna, native vegetation and items of Aboriginal heritage. Landfills also provide a constraint on future land uses once they are completed with open space generally the preferred use.

**Rural Lifestyle Values**

The majority of private land in the MRA is peri-urban land located outside of rural villages. While this land has rural characteristics, agricultural activity is minimal and the primary determinant of the market value of this land is its proximity to Greater Sydney rather than the agricultural characteristics of this land.

Given the significant increase in value that comes simply from subdivision (where smaller properties have higher per hectare values than larger properties), the majority of the rural lands of the MRA will increasingly be primarily in demand as rural lifestyle properties.
This can result in increased demand for the provision of infrastructure such as sewerage, water, telecommunications, waste facilities and roads, as well as increased demand for the goods and services provided by the rural villages of the MRA.

The use of the MRA lands for rural lifestyle properties and rural residential can also give rise to landuse conflicts between these properties and commercial/semi-commercial agricultural activities that can generate odours, noise, pollutants and pathogens as well as truck movements.

Any increase in the fragmentation of lots for rural lifestyle properties and rural residential may also provide a constraint on any long-term future urban development potential of the MRA as smaller lots attract higher land values than larger agricultural holdings and they provide a barrier to consolidation for future urban development given that they have multiple owners and land titles. Nevertheless, allowing some subdivision can generate wealth that could be used to achieve the long-term protection and enhancement of other MRA values such as biodiversity and landscape values.

**Rural Towns and Villages**

Rural towns and villages are scattered within the MRA. Rural towns and villages are distinct from urban areas in the Metropolitan Urban Area in that they provide mainly for local growth needs, as distinct from the needs of the Greater Sydney. They service the surrounding areas of the MRA and visitors to the area. Increases in population of the MRA, tourism and the Metropolitan Urban Area can lead to demand for expansion of rural towns and villages together with an associated increased demand for the provision of infrastructure such as sewerage, water, telecommunications, waste facilities and roads.

**European and Aboriginal Heritage Values**

The MRA contains significant Aboriginal and European Heritage values.

Aboriginal cultural heritage consists of places and items that are of significance to Aboriginal people because of their traditions, observances, lore, customs, beliefs and history. It provides evidence of the lives and existence of Aboriginal people before European settlement through to the present. Aboriginal cultural heritage is dynamic and may comprise physical (tangible) or non-physical (intangible) elements. It includes things made and used in traditional societies, such as stone tools, art sites and ceremonial or burial grounds. It also includes more contemporary and/or historical elements such as old mission buildings, massacre sites and cemeteries. Tangible heritage is situated in a broader cultural landscape and needs to be considered in that context and in a holistic manner.

Cultural heritage is not confined to sites. It also relates to the connection and sense of belonging that people have with the landscape and each other as well as peoples’ memories, storylines, ceremonies, language and ‘ways of doing things’ that continue to enrich local knowledge about the cultural landscape.

Historic heritage includes places and landscapes of historic, cultural, social, spiritual sacrifice, archaeological, architectural or aesthetic significance. Identifying and listing items of heritage significance are the first steps in protecting and managing those places and objects. This includes the World Heritage List, National Heritage List, the State Heritage Register and in Council’s Local Environmental Plans. Statutory registers provide legal protection for heritage items. In NSW legal protection generally comes from the **Heritage Act, 1977** and the **Environmental Planning and Assessment Act 1979**. Places on the
National Heritage List are protected under the *Environment Protection and Biodiversity Conservation Act 1999*.

Aboriginal and Historic heritage, particularly where it is located on private land, may not be compatible with some intensive rural and urban land uses.

**Other Values**

The report provides maps of flood prone land, bushfire prone land, acid sulfate soils, ANEF contours and special land uses such as military lands. Whether private MRA land is used for rural lifestyle properties, rural residential or commercial/semi-commercial agriculture, planning and management of these lands must have regard to the consequence of flooding, bushfire hazard, acid sulfate soils and ANEF noise contours from airports.

The uses of private lands of the MRA also need to be managed to have regard to the impact of different private land uses on public values such as biodiversity, water quality, heritage and landscape. These public good values are expected to increase in value as demand increases with population growth and increased community wealth and public good attributes become scarcer.

**Values and Decision-Making Criteria**

All land uses in the MRA are associated with a range of economic, environmental and social values to society. Some of these values are mutually exclusive while others can be complementary. Conceptually, one objective of land use planning is to maximise the net benefits of present and future generations from a combination of land uses which benefit the wider community, now or in the future. This objective for land use allocation may be achieved via allocation of land to multiple land uses simultaneously, sequential land uses or a single land use. Land use planning may also involve trade-offs between values that are mutually exclusive. Where one land use displaces another, values from the displaced land use will be lost temporarily or permanently.

However, no criteria can replace the complexities and trade-offs involved with delivering strategic planning objectives. Where different strategic planning options are available, evaluation frameworks such as Multi Criteria Analysis and Cost Benefit Analysis can provide inputs to decision-making, the former identifying the performance of options against predetermined criteria and the latter weighing up the community costs and benefits of alternatives. However, these are only inputs to decision making not substitutes for it and do not adequately take into account the local, district and metropolitan context as well as limitations of available information. Consequently, the analysis and spatial representation of values provided in this report provides information on which strategic planning for the MRA can be advanced, including the scale and location of productive agriculture, natural resource constraints, natural hazards, public and private land and significant natural resources.

**Further Considerations**

There were a number of limitations in the information provided in this report that may benefit from further study. In particular, spatial information on significant rural and other landscapes within the MRA was limited. There may be benefit in further spatially defining significant landscapes within the MRA.
1 Introduction

1.1 Metropolitan Rural Areas

The Metropolitan Rural Area (MRA) of Sydney is shown in Figure 1.1 by a solid black line. The MRA is that part of Greater Sydney which is generally outside the established and planned urban area. The MRA includes rural towns and villages, farmland, floodplains, defence land, national parks and areas of wilderness. Rural towns and villages are distinct from urban areas in the Metropolitan Urban Area in that they provide goods and services for the local community and visitors to the area, as distinct from the needs of the broader area of Greater Sydney. The MRA excludes planned urban growth areas in *A Plan for Growing Sydney* (APFGS), however this report includes potential urban areas that were identified for investigation in AMFGS in December 2014 as part of the MRA.

Broadly the MRA can be thought of as comprising:

- Public land protected for conservation and other public values e.g. defence etc.;
- Peri-urban land used for a range of rural and rural lifestyle purposes; and
- Rural towns and villages.

There is significant capacity in the existing release areas and investigation areas to meet housing demand in the short to medium term particularly in the:

- North West Priority Growth Area
- South West Priority Growth Area
- Western Sydney Priority Growth Area
- Greater Macarthur Priority Growth Area, and
- Wilton New Town.

Nevertheless, the proximity of parts of the MRA to urban areas of Sydney means there is always pressure from landowners to seek uplift urban development or rural residential subdivision.

APFGS recognises the significant environmental, social and economic values of the MRA. The Plan proposes a strategic framework for the MRA, with criteria to assist decision making, to enhance and protect its values. To inform a strategic approach to the MRA, this study examines the values of the MRA including:

- Agricultural values
- Rural lifestyle values
- Biodiversity values
- Water quality values
- Air quality values
- Mining and extractive industry values
- Scenic landscape values
- Heritage values
- Tourism and recreation values
- Waste management values.
1.2 Policies Relating to Agriculture in the MRA

There are a range of government policies in relation to rural land in the MRA.

Section 117(2) Direction 1.2 Rural Zones aims to protect the agricultural production value of rural land in Local Government Areas of Greater Sydney² by:

- not rezoning land from a rural zone to a residential, business, industrial, village or tourist zone; and

² Penrith LGA is excluded from the second provision.
• not increasing the permissible density of land within a rural zone (other than land within an existing town or village).

A planning proposal may be inconsistent with this Direction if justified by a strategy that, amongst other things, gives consideration to the objectives of the Direction.

The NSW Healthy Eating and Active Living Strategy (NSW Health 2013) under “Environments to support healthy eating and active living - Strategic Direction 1” identifies an action for the NSW DP&E to use land use/zoning to retain, and where possible increase, opportunities for agricultural and horticultural uses to keep fresh foods available locally.

The NSW Agricultural Industry Action Plan (NSW Government 2014) made the following recommendations that are relevant to the MRA:

Recommendation 25: Industry to actively engage in the implementation of the NSW planning reforms through regional and local plan development processes including articulation of its investment strategies and proposing ways to effectively manage conflict.

Recommendation 26: Government to ensure equity and transparency in the resource planning process through the state planning reform to ensure the improved security of farm tenure and access to valuable natural resources for agriculture.

1.3 A Plan for Growing Sydney

Action 4.1.2 of APFGS is to "prepare a strategic framework for the Metropolitan Rural Area to enhance and protect its broad range of environmental, economic and social assets".

APFGS identifies that a strategic framework will balance the Metropolitan Rural Area’s significant conservation, economic and social values and will assist decision making by establishing criteria to:

• minimise the adverse economic impacts on existing primary industry and productive agriculture;
• consider critical natural resource constraints;
• provide adequate public open space and recreational activities and avoid creating unsustainable pressure on existing Crown Land areas and State forests;
• consider natural hazards, such as the need to evacuate people from flood/bushfire prone areas; how flood-prone areas will be avoided and not increasing flood risks in new housing areas (through early planning for stormwater management); and
• consider and plan to protect significant natural resources including water quality, riparian and aquatic habitats and marine estates.

In the longer term, the development of demand and supply data sets for agriculture and resource extraction industries will be explored.

APFGS states that the Government will work with councils to develop a detailed planning framework for the area that:

• protects the Greater Blue Mountains World Heritage Area and other natural areas across the Metropolitan Rural Area, while fostering opportunities for international tourism, including a review of management and monitoring of impacts and cumulative effects of surrounding land uses on the World Heritage environmental values;
• identifies and protects the productive mineral, energy and construction material needs and provides appropriate buffers;
protects productive agricultural land to keep fresh food available locally by planning for the infrastructure and land use needs of agricultural activity and providing appropriate buffers between different land uses to minimise conflicts;
• protects the Sydney drinking water catchment by requiring new development in the catchment to have a neutral or beneficial effect on water quality (consistent with Government policy);
• manages the risk from natural hazards, particularly flooding in the Hawkesbury-Nepean Valley and bushfires, by mapping where geophysical factors impose constraints on economic activity and urban development; and
• considers how all these activities can be best accommodated, including the sequencing of various activities, such as mining and urban development.

1.4 Greater Sydney Commission and District Plans

The Greater Sydney Commission was established to, amongst other things; lead metropolitan planning for the Greater Sydney Region. This includes the preparation of District Plans for each of Sydney’s six districts.

The six Sydney districts are:

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NB: Table reflects Council amalgamations as at January 2017. It is noted that amalgamations are ongoing

Local Government Areas (LGAs) in five Districts encompass MRAs:

• South District - Sutherland LGAs;
• South West District - Camden, Campbelltown, Fairfield, Liverpool and Wollondilly LGAs;
• West District - Penrith, Blue Mountains and Hawkesbury LGAs;
• West Central District - Blacktown and the Hills
• North District - Hornsby, Ku-ring-gai, Northern Beaches.

1.5 This Report

This report provides an evidence base for the understanding and consideration of the economic, environmental and social values of the MRAs in each of the five districts. It provides an overview of the

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3 The Central District does not contain any MRA.
landscape setting of the MRA, an introduction to the consideration of values, a narrative on the different
economic, social and environmental values of the MRA and criteria for mapping them. GIS maps showing
the location of different values across the MRAs of the five districts are then provided. This component of
the study primarily relied on existing GIS data and hence information that was not available in this form was
unable to be represented. Ground truthing of data was beyond the scope of the study.

Discussion is then provided in relation to criteria to assist decision-makers:

• minimise the adverse economic impacts on existing primary industry and productive agriculture;
• consider critical natural resource constraints;
• provide adequate public open space and recreational activities and avoid creating unsustainable
  pressure on existing Crown Land areas and State forests;
• consider natural hazards, such as the need to evacuate people from flood/bushfire prone areas;
  how flood-prone areas will be avoided and not increasing flood risks in new housing areas
  (through early planning for stormwater management); and
• consider and plan to protect significant natural resources including water quality, riparian and
  aquatic habitats and marine estates.
2 Introduction to Economic, Social and Environmental Values of the MRA

At a broad level the MRA comprises both public and private lands, with private lands comprising rural towns and villages and peri-urban lands. In this context, 73% of the MRA is public land, with private land being mostly highly fragmented lots of less than 20 ha.

Figure 2.1 - MRA that is Public Land, Rural Villages⁴ and Other Private Land

Public and private lands provide different sets of values to the community and are facing different pressures. Consequently, for the purpose of planning in the MRA it is helpful to distinguish between the two.

Public lands support a range of values and activities that would not otherwise be provided or would be underprovided by the market. In the context of the MRA this includes conservation, water management, defence etc.

For public lands an economic, social or environmental value has been recognised through public policy, and regulation has been enacted to protect these values. While the economic, social and environmental values of public lands need to be protected from actions taken by adjoining private landholders e.g. agricultural runoff, weed infestations etc., threat to the values of these lands from a change in their own landuse and regulatory protection is unlikely.

Public lands across the MRA and the responsible agencies include:

- Reserved lands under the *NSW National Parks Act* (National Parks, Nature Reserves and State Recreation Areas) managed by NSW Office of Environment and Heritage (OEH);
- Declared Wilderness Areas managed by the NSW OEH;
- Crown Reserves managed by the NSW Department of Primary Industries;
- Sydney Drinking Water Catchment managed by the Water NSW;
- Defence Lands (e.g. Holsworthy with potentially unexploded ordinance) managed by the Commonwealth Department of Defence;

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⁴ For the purpose of this study rural villages were defined as those areas having the following zonings – RUS, R1-5, B1-7, IN1-4, RE1-2, SP, E4.
• Land zoned for Open Space and Environmental Conservation under Council Local Environmental Plans managed by Local Councils;
• State Forests managed by the Forestry Corporation of NSW;
• Cemeteries managed by Cemeteries and Crematoria NSW; and
• Waterways managed by Roads and Maritime Services NSW with the beds of tidal waterways managed by the NSW Department of Primary Industries.

Private lands have economic values that are determined by market forces within the limits of planning regulations. These economic values encompass the market value of the land which in turn reflects the characteristics and capability of the land, including its agricultural capability.

The attributes of private land e.g. biodiversity, cultural landscapes, scenic values and heritage, may also have social and environmental values to society that is not fully reflected in market values for individual properties. These social and environmental values can be impacted by actions taken by private landholders such as clearing, mining and extractive industries.

The economic, environmental and social values of public and private land in the MRA including the presence of hazards and constraints such as flood prone land, bushfire prone land, contaminated land etc., are discussed in the subsequent sections of this report. Specific characteristics and values of MRA lands in each planning District are then briefly discussed in Sections 14 to 18 and represented spatially on a series of maps for each District.
3 Determinants of Economic, Environmental and Social Value of the MRA

3.1 Determinants of the Economic Value of Peri-Urban Lands

3.1.1 Analysis

The economic value of MRA lands\(^5\) is determined by the interaction of demand and supply in the market, with the market price for land reflecting the willingness to pay of a potential purchaser. Willingness to pay reflects the discounted future potential returns from the land (whether from agriculture, rural residential uses, mining and extractive industries, recreation uses, potential (real or otherwise) to convert to urban uses. These potential future returns reflect the structural, access and environmental attributes of the land.

Structural attributes include lot size and shape, house attributes, other property improvements, land capability, resource endowments, current zoning, future subdivision potential, road frontage, water, sewerage, electricity, communication services etc.

Access includes proximity to Greater Sydney and the employment and community and social services this offers.

Environmental attributes may include:

- air quality, water quality and scenic amenity - all of which positively impact land values;
- the presence of native vegetation and biodiversity - which can have a positive impact on private land values in terms of amenity and a negative impact on private land values in terms of restrictions on current and potential use of the land; and
- the presence of hazards such as flood prone land and bushfire hazard - which reduce private land values by limiting land use opportunities or increase land values by supporting particular farming activity e.g. floodplains.

The value of private MRA lands\(^6\) on the urban fringe are potentially determined by both agricultural characteristics of the land (i.e. future potential agricultural returns) and urban influences including access to the urban area (and associated physical and social infrastructure including employment, schools, hospitals etc.) and potential for urban conversion. Values will also be impacted by characteristics of the land parcel such as size, rights to build dwellings etc. The degree to which potential for urban conversion is reflected in land values will depend on how far in the future this potential is likely and on the land use planning policy context. This is because people have a preference for immediate returns and those that occur far in the future would be heavily discounted and have little impact on private land prices. However, even if a firm limit to urban growth is delineated, if markets perceive some government flexibility or probability that the limit to urban growth will vary, then some values associated with future potential development will be capitalised into private land values. This would include expectations about rural residential subdivisions, as well as urban subdivision.

Where no potential for urban conversion exists in the next say 20 to 30 years, potential agricultural production and/or access to urban areas (employment and physical and social infrastructure) are likely to be major potential determinants of MRA land values. Given enough distance from an urban area, land parcels are valued for agricultural uses only (Guilting et al 2009) and land values increase linearly with size. While there are some arguments why agricultural land closer the urban areas may be more valuable for agricultural production (i.e. more fertile lands, higher value crop production and decreased transport costs

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\(^5\) Private land value.

\(^6\) Excluding land with resource endowments. For this land, its value is reflected by the potential profits that can be obtained from resource extraction.
(Delbecq et al. 2014)) other factors such as cost of land and lack of scale can reduce agricultural land rents (see Section 4.5). Rural land under the influence of a nearby urban area may be in an agricultural use, but the value of this land is often driven by factors other than soil fertility. In particular, values associated with access to the urban areas and associated employment opportunities and community and social infrastructure, for use as lifestyle properties are likely to dominate agricultural values in determining the market value of land. These urban forces can extend for over 70km (Guiling et al. 2009) with the distance increasing over time with increasing population and real incomes of the urban areas, as well as reductions in travel times with improvements in infrastructure. Refer to Figure 4.1 for a characterisation of urban and agricultural influences on land values with distance from the CBD.

While distance to the CBD has a significant influence on land values, Abelson et al. (2013) in a study of urban house prices across Sydney found that even if there was a significant employment centre, say 20 km from the CBD, this is unlikely to increase house prices in the vicinity of the centre. This is because of a wage gradient with distance from the CBD that complements the house price gradient. Even if a significant employment centre (such as Western Sydney Airport) did have an effect on land prices in the MRA, this would increase the effect of urban influences on MRA land values relative to the effect of the agricultural characteristics of the land.

**Figure 4.1 - Private Land Values and Distance to the CBD**

As well as access to the CBD, other potentially significant determinants of the value of private MRA land are likely to include:

- Lot size - with land values in the MRA increasing at a decreasing rate as size increases
- Quality and size of dwelling
- Presence of other property improvements such as good condition fences and sheds, dams etc.
- Permissibility of the development of a house even if no house is currently constructed
• zoning with higher land values associated with rural residential zones relative to rural zonings and higher values for rural zones relative to environment protection zones, on an average price per hectare basis.
• access to utilities such as sewerage, water, electricity and telephone
• expectations about future growth (subdivision potential)
• amenity attributes – properties with amenity attributes such as views, creeks, lakes, etc. are likely to be more expensive than properties without such attributes
• water entitlements.

Lot size as a determinant of land value is of particular interest and has important policy implications. Empirical studies have found that land values in peri-urban areas increase with increase in size, but the rate of increase will be diminishing with increase in size (referred to as the plattage effect). The consequence of this is that there are immediate benefits to land holders of subdivision.

An example of the plattage effect and the benefits of subdivision can be found in four rural properties located in the Hawkesbury LGA within the MRA and zoned RU4 - Rural Small Holdings. The size, total property value and property value per ha for the four properties are shown in Table 4.1. By subdividing Property 1 into lots of equivalent size to Property 2, 3 and 4, its value is uplifted by between $2.8M and $18.7M.

<table>
<thead>
<tr>
<th>Property</th>
<th>Property 1</th>
<th>Property 2</th>
<th>Property 3</th>
<th>Property 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ha</td>
<td>85.012</td>
<td>14.99</td>
<td>3.803</td>
<td>1.334</td>
</tr>
<tr>
<td>Value</td>
<td>$4,420,000</td>
<td>$1,270,000</td>
<td>$559,000</td>
<td>$363,000</td>
</tr>
<tr>
<td>$/ha</td>
<td>51,993</td>
<td>84,723</td>
<td>146,989</td>
<td>272,114</td>
</tr>
<tr>
<td>No. of lots in Property 1</td>
<td>1.0</td>
<td>5.7</td>
<td>22.4</td>
<td>63.7</td>
</tr>
<tr>
<td>Value of Property 1 in different subdivisions</td>
<td>4,420,000</td>
<td>7,202,484</td>
<td>12,495,847</td>
<td>23,132,951</td>
</tr>
<tr>
<td>Uplift from subdivision</td>
<td>-</td>
<td>2,782,484</td>
<td>8,075,847</td>
<td>18,712,951</td>
</tr>
</tbody>
</table>

Table 4.1 - Case Study of the Plattage Effect in the MRA

Source: Based on data from NSW Globe.

The presence of attributes with public good values such as native vegetation, Aboriginal and Cultural heritage is likely to reduce the private value of a property since it reduces area of land available for production, property improvements and future potential development. Although in some circumstances where native vegetation improves amenity, without constraining other uses, it can increase property values. Similarly, in some situations cultural heritage can increase future potential private returns from the land e.g. where profitable cultural heritage tourism is possible. Natural hazard constraints such as flooding and bushfire hazard can also reduce private land values.

4.1.2 Consequence for the MRA

Urban influences are likely to be more significant determinant of private MRA land values than agricultural characteristics of the land. In particular, distance and travel time from Sydney City is likely to be a dominant determinant of value, with properties closer to Sydney City having higher values. This can be due to a range of reasons including lifestyle housing proximate to the metropolitan area. Expectations about future subdivision potential may also be capitalised into land values, if there are expectations that subdivision outside urban growth areas will be permitted.

Development associated with Western Sydney Airport is unlikely to impact MRA land prices but if it does this would increase the effect of urban influences on MRA land values, relative to the effect of the agricultural characteristics of the land.

Other major determinants of private MRA land values are likely to relate to characteristics of the land e.g. lot size, and housing attributes.
Because of the plattage effect where the value of MRA private land increases at a declining rate with increase in size, there are immediate financial benefits to landholders from subdivision within the ‘rural’ framework of MRA land. Consequently, there is likely to be pressure to allow further subdivision, even from properties undertaking commercial agriculture.

Refer to Section 4.5 for a discussion of the market forces faced by commercial agriculture and reasons why agricultural activities in the MRA are likely to decline over time.

3.2 Determinants of the Environmental Value of MRA Lands

Environmental attributes of MRA lands include air quality, water quality and scenic amenity as well as the presence of native vegetation and biodiversity. These environmental attributes occur on both private and public lands. Their value to society is also determined by supply and demand attributes, with scarcer resources (i.e. those with limited supply) tending to be considered of higher value and demand (i.e. willingness to pay) for environmental resources also being higher for goods and services with fewer substitutes. However, most environmental goods and services are public goods for which no market exists and hence without government intervention these attributes will be under provided by the market.

Government approaches to protection of environmental values include direct protection on public lands e.g. declaration of national parks, regulation of activities on public and private lands e.g. approval processes for native vegetation clearing or activities that may impact species, communities or populations that are listed as threatened, and establishment of markets for environment goods e.g. offsets.

Consequently, high environmental values in the MRA are indicated by lands that:

- are reserved for conservation or other purposes such as national parks, wilderness, council reserves, water catchments etc.
- contain listed threatened species, communities and populations; and
- are identified as important for biodiversity connectivity.

3.3 Determinants of the Social Value of MRA Lands

Social values relate to values held by individuals, social groups or communities. They overlap with economic and environmental values and include values related to scenic amenity, tourism and recreation values, waste disposal, cultural heritage and villages. They are also taken here to include consideration of constraints on landuses such as flooding, bushfire hazard, acid sulfate soils etc.

For the most part social values are also determined by supply and demand considerations e.g. value of areas for tourism, although some social values such as those related to cultural heritage, exhibit public good characteristics and require government intervention in the market via regulations and listings to ensure adequate provision.

For this study, social values are represented by maps indicating their distributions.

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7 Intrinsic environmental values also exist. These relate to the ethical notion that non-human species have moral interests and values in themselves - not related to anthropocentric values.
4 Agriculture Values of the MRA

4.1 Historical Context of Agriculture in the Sydney Basin

The history of agriculture in the Sydney Basin has been one of land use succession as farm enterprises have found more profitable locations to produce.

When Europeans arrived in 1788 they found an open landscape shaped by Aboriginal fire and available for grazing or crop production with little initial need for clearing. Agriculture was managed by the colonial government and grants were made to freed convicts. The first land grant was made to James Ruse in 1789 and a successful wheat crop grown at Rosehill.

Grants were subsequently made to former convicts in areas with better soils such as Prospect where the soil is derived from volcanic sources and on the Hawkesbury and along South Creek in the parishes of Cabramatta and Bringelly where the alluvial soil provided better chances of farming success. The most successful early farming areas were on the silt derived soils of the Hawkesbury River flats. The Hawkesbury, which was serviced by small boat, was at the outer limit of perishable food production in Sydney’s first twenty years.

At the same time as small land grants were being made to former convicts larger area grants were made to officers, officials and merchants. Much of this land was not used for arable cropping but for more profitable pastoral purposes. In 1789 John Macarthur established Elizabeth Farm at Parramatta with three Spanish merino rams and five ewes.

By 1800 a pattern of settlement had emerged whereby small holdings focussed on cropping were located on the riverbanks and pockets of better soils while grazing took place on large holdings on the balance of the mostly uncleared land.

By the 1860s larger grazing holding were being cleared by tenant farmers to grow wheat in areas such as Menangle and Greendale. While initially successful, crops were subsequently struck with the fungal disease rust and wheat growing was wiped out of the Country of Cumberland and Camden in favour of areas west of the Blue Mountains. Drier areas west of the Blue Mountains were more climatically suitable for wheat growing and the expanded industry was now serviced by a rail system that could haul grain economically.

Cattle had originally been raised in western Sydney followed later by sheep. By 1880 most of the colony’s cattle had been sent inland to large holdings on more fertile soil better able to produce beef. While sheep took over from cattle in the short term and the foundation of the wool industry shifted from Parramatta to Camden, the dominance of the Sydney Basin for wool production was short lived. By the middle of the 1800s wool production had shifted to the inland – Goulburn, Yass, Bathurst, Orange, Tamworth and pastoralists found sheep performed better in dryer inland areas where green grass scourds and diseases such as liver fluke were not as prevalent.

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For those who stayed in the County of Cumberland, either as landowners or tenants, the choice of crop and livestock enterprise was becoming more limited. Fodder crops were grown, cattle were taken in from the inland on agistment and a range of specialist crops were tried.

In 1856 the country’s first irrigation scheme was established in Liverpool. Market gardens for vegetables spread out where there was ready access to market, either near train lines or close to towns such as Parramatta and Liverpool. Chinese Australians leased small areas of land for this purpose and were prominent and skilful users of water to raise their crops. Vegetable production in small scale market gardens remained in the Sydney Basin while ever transport proved a constraint. With widespread access to motor vehicles in the twentieth century and the opening up of new irrigation districts associated with the Snowy Scheme, most vegetables are now produced on broadacre operations with high security water and low cost land.

Specialist producers such as vineyards emerged in the latter part of the nineteenth century to fill the void left by livestock and grain. Camden Park was an early focus for vine production as was Fairfield and the Minchinbury property further west. However, grape production suffered from disease and by the late nineteenth century phylloxera had infected many of the vines. Once again more profitable locations such as the Hunter Valley, Griffith and Orange were found for this major Australian industry.

Closer to towns such as Parramatta were orchards and some specialist producers such as poultry farms. Orchards spread through the Hills District and reached the Hawkesbury by the twentieth century. In 2016 orchard tree crops remain in the Hawkesbury servicing mainly farmer markets and harvest trails. Most tree crops are now sourced from specialist growing regions with favourable climates, guaranteed water and low cost land e.g. Goulburn Valley, Victoria.

In the late nineteenth century dairy helped to fill the gap in Sydney Basin agricultural opportunity. Cheese and butter production became an option. The salting of butter and the drying out of cheese in processing made them transportable in a hot climate. The development of refrigeration and cooling technology in the late nineteenth century opened up a vast new market for producers to supply Sydney.

The resulting dairy boom brought a wave of subdivision and in the early twentieth century and other smaller farms were deliberately created by specialist subdivision. These farms were aimed at purchasers who would occupy them for dairy, market gardening or poultry farming.

Despite the growth of dairy production up and down the NSW coast as highly fertile and well-watered land was serviced by an expanding rail network, dairy remained in place in the Sydney fringe until final deregulation of the industry in 2000. Dairy is now produced inland mainly in the Murray and Murrumbidgee Valleys.

Poultry production became a profitable use for small Sydney Basin farms throughout the twentieth century. Initially it was based on small family farms producing eggs and some birds for the table and housing their stock in ramshackle homemade pens. By the mid twentieth century, the poultry farmer was the most typical farmer in Western Sydney. Later, egg and broiler production became separate enterprises and highly intensive utilising cages in sheds for eggs and birds in barns for broilers. These industries are now in the process of relocating to areas such as Tamworth which are close to reliable grain supplies, have lower cost land and cause fewer problems for neighbours with smell and noise. Difficulties in securing
environmental approval for greenfield poultry production has slowed industry transition and has meant that existing sites with environmental approval have additional value to the poultry industry.

4.2 Land and Soil Capability Assessment Scheme for the Identification of Significant Agricultural Land

Agriculture refers to the production of food, fibre and ornamental products. The value of land for agricultural production is partly determined by its land capability, which is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. In NSW, the Office of Environment and Heritage (OEH) has developed a Land and Soil Capability Assessment Scheme (OEH 2012) that classifies land into eight classes based on the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics.

Class 1: Extremely high capability land: land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.

Class 2: Very high capability land: land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.

Class 3: High capability land: land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.

Class 4: Moderate capability land: land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.

Class 5: Moderate–low capability land: land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.

Class 6: Low capability land: land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.

Class 7: Very low capability land: land has severe limitations that restrict most land uses and generally cannot be overcome. Onsite and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.

Class 8: Extremely low capability land: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.
Class 1 and Class 2 land is highly arable land with the greatest potential for food production such as fruit and vegetables. Class 3 land, while capable of crop production, is undulating with slopes of up to ten percent, is more restricted in its use for broadacre crops and horticulture, and is relatively abundant throughout the NSW Wheat-Sheep Zone where it is held in large and contiguous commercial holdings.

**Figure 4.1 - Area (ha) of Land and Soil Capability Class of Private Land Outside of Rural Villages**

![Area (ha) of Land and Soil Capability Class of Private Land Outside of Rural Villages](image)

Figure 4.1 identifies the areas of each LSC class across private land (outside of rural villages) in the MRA. There is no Class 1 or Class 2 land in the MRA. 4.9% of private land (outside of rural villages) in the MRA is Class 3 land with 95% of this land being flood prone. Class 3 land only occurs in the West and South West Districts. 35.4% of the private land (outside of rural villages) in the MRA is Class 4 land with 3.6% of this flood prone land.

**4.3 Clusters as an Indicator of Significant Agricultural Zones**

Agricultural clusters are one way of considering the agricultural value of land in the MRA that encompasses linkages, including processing and employment linkages. APFGS identified thirteen preliminary agricultural cluster groups in Greater Sydney (APFGS, 2014, page 99). Refer to Table 4.1.

An industry cluster is a group of proximate firms ‘interlinked by input/output, knowledge and other flows that may give rise to agglomerative advantages’ (Lubinski, 2003, p. 454). This concept relates to the idea of economies of scale and network effects. Simply put, as more firms in related industries cluster together, costs of production may decline significantly (firms have competing multiple suppliers, greater specialisation and division of labour result). Even when multiple firms in the same sector (competitors) cluster, there may be advantages because that cluster attracts more suppliers and customers than a single firm on its own.
### Table 4.1 - Agricultural Clusters Identified in A Plan For Growing Sydney

<table>
<thead>
<tr>
<th>District</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>1. Fruit trees – Bilpin</td>
</tr>
<tr>
<td>West</td>
<td>2. Hawkesbury River multi-use cluster – between Windsor and Richmond</td>
</tr>
<tr>
<td>South West</td>
<td>3. Irrigated horticulture (vegetables and herbs), Warragamba – Silverdale, Wollondilly LGA</td>
</tr>
<tr>
<td>West Central</td>
<td>4. Irrigated seasonal horticulture (vegetables and herbs) – west of Rouse Hill</td>
</tr>
<tr>
<td>West Central</td>
<td>5. Multi use horticulture cluster (vegetables and tree fruits) – Maroota</td>
</tr>
<tr>
<td>West Central and North District</td>
<td>6. Multi use horticulture cluster (vegetables, tree fruits) – Middle Dural, Galston, Arcadia (cluster spans both the West Central and North District)</td>
</tr>
<tr>
<td>Outside of Greater Sydney</td>
<td>7. Multi use horticulture cluster with sparse poultry sheds – Central Coast</td>
</tr>
<tr>
<td>South West</td>
<td>8. Multi use irrigated horticulture cluster, large lot sizes – Cobbity and Camden</td>
</tr>
<tr>
<td>South West</td>
<td>9. Multi use seasonal horticulture, poultry sheds, small lots – Horsley Park to Leppington</td>
</tr>
<tr>
<td>South West</td>
<td>10. Poultry sheds – Appin, Wollondilly and Campbelltown LGAs</td>
</tr>
<tr>
<td>Outside of Greater Sydney</td>
<td>11. Production forestry – Central Coast</td>
</tr>
<tr>
<td>West/West Central</td>
<td>12. Seasonal horticulture with poultry sheds – Riverstone and Marsden Park</td>
</tr>
<tr>
<td>West</td>
<td>13. Seasonal horticulture – Shane Park, Llandilo and Berkshire Park (Penrith LGA).</td>
</tr>
</tbody>
</table>

NB: APFGS also identified a production forestry cluster which is primarily outside Greater Sydney and as a consequence it has not been discussed further in this report.

Johnstone (2003) distinguishes two broad categories of cluster, trade-driven and knowledge-driven. The former which is more relevant to agriculture is based on enhancing business opportunities within clusters, either through direct trade, or by pooling resources to compete for export markets. Within trade-driven clusters two types can be distinguished: horizontal clusters, in which the members, operating in the same end-product market, cooperate in pre-competitive activities such as research and development, collective marketing and purchasing; halo clusters, in which a powerful and demanding purchaser, such as a large multinational, attracts a variety of suppliers (Johnston 2003). Put simply a cluster is a group of businesses or organisations that can benefit by doing things together (Johnstone 2003). A key characteristic of clusters is collaboration among participants (Johnstone 2003).

However, co-location does not necessarily produce collaboration and the economic advantages of clusters (Johnstone 2003). Consequently, co-located industries may not necessary be clusters in the true economic sense. While the 13 agricultural clusters identified in APFGS certainly represent areas of concentrated co-located agricultural production. The extent to which they represent industry clusters achieving economic benefits to members via collaboration and interconnections within the cluster is questionable. No evidence of the operation of areas as industry clusters with agglomeration and network advantages has been documented. However, at a minimum they represent areas where commercial agricultural activities are concentrated, and coincide with 66% of the Class 3 and 17% of Class 4 private land (outside of rural villages). However, the large areas of low capability land included in the clusters would suggest that mapping of clusters boundaries in APFGS was of a general nature only.
**Table 4.2 - Land and Soil Capability Classes in Private Land (Outside of Rural Villages) zoned within Agricultural Clusters**

<table>
<thead>
<tr>
<th>LSC Classes</th>
<th>North District (ha)</th>
<th>South West District (ha)</th>
<th>West Central District (ha)</th>
<th>West District (ha)</th>
<th>Grand Total (ha)</th>
<th>Grand Total % of this Land Class in the MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2,099</td>
<td>-</td>
<td>-</td>
<td>4,279</td>
<td>6,378</td>
<td>66%</td>
</tr>
<tr>
<td>4</td>
<td>3,627</td>
<td>2,737</td>
<td>2,942</td>
<td>2,313</td>
<td>11,620</td>
<td>17%</td>
</tr>
<tr>
<td>5</td>
<td>103</td>
<td>939</td>
<td>20</td>
<td>2,020</td>
<td>3,082</td>
<td>15%</td>
</tr>
<tr>
<td>6</td>
<td>376</td>
<td>2,022</td>
<td>393</td>
<td>1,331</td>
<td>4,123</td>
<td>13%</td>
</tr>
<tr>
<td>7</td>
<td>1,587</td>
<td>898</td>
<td>1,363</td>
<td>1,480</td>
<td>5,329</td>
<td>10%</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>101</td>
<td>6</td>
<td>143</td>
<td>250</td>
<td>3%</td>
</tr>
<tr>
<td>Rock / disturbed</td>
<td>17</td>
<td>3</td>
<td>39</td>
<td>14</td>
<td>73</td>
<td>6%</td>
</tr>
<tr>
<td>Water</td>
<td>-</td>
<td>23</td>
<td>-</td>
<td>3</td>
<td>26</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>5,711</strong></td>
<td><strong>8,823</strong></td>
<td><strong>4,763</strong></td>
<td><strong>11,583</strong></td>
<td><strong>30,881</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

To the extent that the identified agricultural clusters represent industry clusters achieving agglomeration economies and cost advantages, the increase profitability of these enterprises will be reflected in private land values. However, even then the dominant influence on the economic value of these lands is likely to be their proximity to urban areas and Sydney City.

It is also important to understand that industry clusters are not static; they grow, evolve, mature and die, primarily in relation to market forces (Johnston 2003). For example a cluster may die when there is a fundamental change in market dynamics and or government policy. New clusters may form in other locations, if the attributes of the new location provide cost advantages to producers. See the discussion of the expansion of vegetable production in the NSW Central West in Section 4.5.

Clusters can be associated with employment ‘hot spots’. As well as direct employment in agriculture they may also be associated with employment in agricultural processing. Agricultural processing can take place on farm (e.g. trimming and packing vegetables for market) or in nearby towns/employment areas (e.g. abattoirs for processing broiler chicken).

### 4.4 Biophysical Strategic Agricultural Lands

Biophysical Strategic Agricultural Land (BSAL) is land with high quality soil and water resources capable of sustaining high levels of productivity. The NSW Government has undertaken mapping of BSAL across NSW to help manage competing land uses proposed for high quality agricultural land.

The mapping of BSAL is based on a number of criteria including LSC capability class, soil fertility and access to a reliable water supply. Refer to Box 4.1. Generally, BSAL is land of LSC class 1, 2 or 3 with reliable water supply and high or moderately high soil fertility, or where soil fertility is only moderate LSC class is 1 or 2.

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Box 4.1 - BSAL Criteria

The regional maps of BSAL meet the following criteria:

- properties with access to a reliable water supply, defined by:
  - rainfall of 350mm or more per annum (9 out of 10 years), OR
  - a regulated river (maps show those within 150m), OR
  - a 5th order or higher unregulated river (maps show those within 150m), OR
  - an unregulated river which flows at least 95 per cent of the time (maps show those within 150m), OR
  - highly productive groundwater sources, as declared by the NSW Office of Water. These are characterised by bores having yield rates greater than 5L/s and total dissolved solids of less than 1,500mg/L and exclude miscellaneous alluvial aquifers, also known as small storage aquifers.

AND

- land that falls under soil fertility classes ‘high’ or ‘moderately high’ under the Draft Inherent General Fertility of NSW (OEH), where it is also present with land capability classes 1, 2 or 3 under the Land and Soil Capability Mapping of NSW (OEH).

OR

- land that falls under soil fertility classes ‘moderate’ under the Draft Inherent General Fertility of NSW (OEH), where it is also present with land capability classes 1 or 2 under the Land and Soil Capability Mapping of NSW (OEH).

BSAL mapping is likely to give the best indicator of high value agricultural lands. A comparison of BSAL and clusters is provided in Map 4.1. Only 30% of agricultural clusters are identified as BSAL.
Map 4.1 - Biophysical Strategic Agricultural Lands and Agricultural Clusters in the MRA
BSAL represents 1% of the MRA and 5% of private rural lands (outside of rural villages).

**Figure 4.2 - BSAL in the MRA**

4.5 Market Considerations

While land capability, BSAL and clusters are important indicators of the ability of land to accommodate different rural land uses and what is currently being produced, ultimately market forces primarily dictate the current and future suitability of land for different agricultural activities. Suitability combines consideration of land capability with market forces of demand and supply, implications of globalisation and trade and the cost and profitability of production. For instance, while land may be capable of irrigated vegetable production, the land size may be insufficient for production to compete with alternative sources, it may lack access to cheap water for irrigation or may have higher value to the land owner in an alternative use.

The implications of globalisation and trade and the economics of farming in the MRA are discussed below.

**4.5.1 Globalisation and Trade**

Agriculture production has experienced increasingly globalization essentially expanding and deepening markets for all commodities as a result of a reduction in the transaction costs of trading internationally. The most striking feature of modern globalization is the increase in trade across the world. A key feature of trade is that by concentrating on the production of goods and services that a country has a comparative advantage in producing (i.e. can produce at a lower cost) and exchanging or trading any excess of those things with other countries that have a comparative advantage in, both countries can be better off.

Globalisation and trade has resulted in cheaper agricultural products. While it has increased food miles associated with agricultural products, food miles are a poor indicator of the environmental impacts of agriculture and food supply (Lusk 2013). Of all the global warming impacts that are said to come from food consumption, only 10% is due to transportation, whereas 80% is a result of activities on the farm (Lusk 2013). The implication for global warming is that to reduce emissions it is desirable to grow food on farms where production in most efficient and then ship it to the consumer (Lusk 2013).
4.5.2 Australia Agricultural Production and the Impact of Globalisation

More than two thirds of all Australian agricultural production is exported, although for wool, cotton, sugar, beef and grains, exports account for more than 90% of production. Other strong export sectors include dairy, sheepmeats and wine, for all of which exports account for more than 50% of production. The successful export sectors generally involve extensive, rather than intensive production systems. Nevertheless, more intensive production such as fresh fruit and vegetable production are net exporters.

Associated with globalisation and trade over the last two decades (and the associated downward pressure on prices) there has been a trend towards:

- fewer and larger farms;
- increased concentration of farm output on larger farms;
- the adoption of more intensive farming techniques; and
- the closer integration of production and related activities in the agri-food chain (Productivity Commission 2005).

“The trend towards increased concentration of output has accentuated the dualistic nature of Australia’s agriculture sector — where a small number of large-scale commercial farms produce the majority of agricultural output while small-scale or niche farms (which make up the majority of farms) account for only a small proportion of output. Many of the smaller farms tend to be operated by ‘lifestyle farmers’, who farm part-time and supplement their income from off-farm sources. These farms are particularly prevalent on the fringes of major metropolitan and regional centres” (Productivity Commission, 2005, p. 39).

4.5.3 Overview of Agricultural Production in the MRA

Globalisation and trade in agriculture has put downward pressure on prices and led to a trend of fewer and larger farms and more intensive production. Small farms in peri-urban locations are therefore likely to struggle to compete and therefore increasingly be operated by ‘lifestyle farmers’. This section explores the extent to which this is reflected in agricultural production of the MRA.

Figure 4.3 identifies the agricultural land uses across the private land (outside of rural villages), using the Australian Land Use and Management Classification (refer to Appendix 1 for a Summary of definitions). The major private land use by area in the MRA is “Other minimal land use” (referring to land that is defence land - natural, stock route, residual native cover or rehabilitation) followed by “Grazing of modified pastures and grazing of native vegetation”. There are small areas used for “Intensive animal production” (which includes poultry farming) and “Intensive uses undefined” as well as “Horticulture” (which includes production in glasshouses as well as irrigated and non-irrigated perennial and seasonal flowers, fruit, nut and vegetable production). This pattern of land use reflects the LSC of the MRA land.
The dominance of minimal land uses, grazing and pastures is common across all Districts containing MRA lands. Intensive uses (undefined and animal production) and horticulture (including intensive horticulture such as mushroom production) are most prevalent in the South West District and West District. Refer to Figure 4.4.

Figure 4.4 - Land Uses on Private Land (Outside of Rural Villages) by MRA District

- Cropping combines cropping and irrigated cropping. Horticulture combines seasonal horticulture, perennial horticulture, irrigated seasonal horticulture, irrigated perennial horticulture and intensive horticulture. Forestry combines plantation forestry and production forestry. Conservation combines nature conservation and managed resource protection.
The highest value of products comes from the intensive production. From Figure 4.5 it can be seen that the highest value food products are poultry for meat and eggs, and mushrooms. Nurseries, cut flowers or cultivated turf is the second most valuable agricultural activity in the MRA. Vegetables for human consumption (other than mushrooms) are the fifth main product followed by fruit and nuts excluding grapes.

**Figure 4.5 - Value (\$) of Agricultural Commodities Produced in the MRA, 2014-15**

From Figure 4.6 it can be seen that for all ABS Statistical Area 4 regions that contain the MRA\(^\text{11}\) apart from Baulkham Hills and Hawkesbury, Livestock Products and Livestock Slaughtered are the primary production. Figure 4.7 provides further breakdown of Livestock Products and Livestock Slaughtered by region, indicating that this is mainly poultry for meat and eggs, with the greatest production being in the South West and Outer South West.

Figure 4.8 provides further breakdown of Cropping by region, indicating that Baulkham Hills and Hawkesbury is the most significant region for cropping with the majority of this being nurseries, cut flowers and turf and mushrooms. Vegetables for human consumptions (other than mushrooms which is grown in sheds) mainly occurs in South West and Outer South West and Baulkham Hills and Hawkesbury. Fruit and nuts (excluding grapes) mainly occurs in Outer West and Blue Mountains.

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\(^\text{11}\) SA4 regions do not coincide with Planning Districts. A concordance is provided in Attachment 1.
Figure 4.6 - Value ($) of Agricultural Commodities Produced in the MRA, 2014-15 by SA4 Region and Category

Source: ABS (2016)

Figure 4.7 shows production by location. Poultry slaughterings are prominent in the South West and Outer South West as well as Blacktown.

Figure 4.7 - Value ($) of Livestock Products in the MRA, 2014-15 by SA4 Region and Detailed Category

Source: ABS (2016)
4.5.4 Economics of Farming in the MRA

Productivity growth is central to the performance and international competitiveness of Australia’s agriculture sector. Most Australian farmers are highly dependent on world markets where they are largely ‘price takers’. The past 25 years have seen world prices for many agricultural commodities decline significantly in real terms (Productivity Commission 2005), while input costs have risen.

To increase the scale of production so as to improve productivity a farmer either needs more land or to intensify the production system by applying more capital.

As identified in Section 3, in peri-urban locations, the price of land often reflects its potential for non-agricultural uses e.g. location in relation to Sydney City, and hence acquisition of additional land by a farmer is expensive and ongoing holding costs such as rates are high.

Production decisions of farmers are therefore generally around how to maximise profits given their fixed supply of land. This can lead to intensification of farming where other inputs to production e.g. capital, are increased in order to increase profits. Additional inputs to production are increased provided the value of the additional output exceeds the marginal cost of increased inputs.

However, farmers can reach a point where the marginal costs of production exceed their marginal revenue, but they will keep producing in the short term provided their short term marginal variable costs are lower than their marginal revenue. While farmers can operate profitable in this way in the short term, in the long term it is not sustainable, so farms in this situation enter a “run-off” phase where they do not invest more capital to expand the business and allow the existing sunk capital invested in the business, to run down. Once the capital equipment and infrastructure breakdown or wear out, rather than sink more capital into repairing or replacing it, they are likely to cease production. Notwithstanding, difficulties in securing

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12 This section is based on Agribiz (2007)
approvals in alternative locations because of perceived or actual noise, odour and other impacts can lead to extension of this “run-off” phase.

Intensification is only available for agricultural production where capital infrastructure can be substituted for land e.g. poultry for eggs and meat, and mushrooms. Agricultural activities in peri-urban areas that cannot substitute capital for land may consider the acquisition of additional land. However, where land values are high and reflect non-agricultural use, as is the case in most peri-urban areas, the marginal factor cost of land will exceed its marginal value product in agriculture. It will therefore be uneconomic for a farmer to acquire more land in the locality and hence farming production will cease or relocate to another region where land costs are lower.

There is not a relative shortage of alternative farmland in NSW of comparable or better quality to the land in the MRA, and this alternative land is available at considerably lower costs. Refer to recent trends in the location of fruit and vegetable production in Section 4.5.5 below.

The above underlying drivers of agricultural profitability in peri-urban areas together with competition against production with greater economies of scale has resulted in many agricultural activities in the MRA no longer being economically sustainable. This explains why there are only a small number of landholdings being used for commercial farming and the relatively small amount of the total rural land available that is being used for agricultural activities.

Most of the commercially viable agricultural operations in the MRA are intensive operations e.g. mushrooms, and poultry. These types of agricultural production systems often more closely resemble manufacturing production system (in sheds) and have been referred to as “factory” farming. They require substantial investment in environment modifying capital structures on the land and thus by definition substantially compromise the rural ambiance of the landscape. They may also have a range of externalities associated with noise, odour etc. These commercial operations are not linked to land capability. Agribiz considered that many of the remaining operations farms in the Liverpool LGA (although by inference the MRA) are now at or near the maximum intensification potential and have little or no scope to increase production economically by adding more variable inputs. Expansion of scale of these operations is limited by the high land costs and externalities associated with operation.

The main agricultural activity by area in the MRA is low-level semi-commercial beef cattle grazing. This can provide owners with a small income to offset landholding costs such as rates, but is unlikely to provide a market rate of return on the labour, capital and land invested, so it is a semi-commercial land holding activity. That is, the land is essentially in a “holding pattern” providing lifestyle rural accommodation pending any opportunity for further reduction in lot size - smaller rural lots, rural residential or urban - that can capitalise on the proximity of the land to urban areas and Sydney City.

For some landholders, especially with small land holdings, the returns from these activities are so low they are not worth pursuing, so the land is then left vacant and often becomes overgrown with weeds and redundant agricultural structures such as fences and sheds become neglected and fall into disrepair. This can also be the case with land that is owned as an investment and is unoccupied.

The observed land use that occurs in the MRA, of a few highly intensive “factory” farms, a small number of struggling intensive vegetable crop operations and a lot of low intensity, semi-commercial livestock production, with some land left vacant with no commercial agricultural activity occurring, is consistent with the rationale of the above economic framework.

A consequence of this economic framework is that continued zoning for rural purposes does not guarantee continued agricultural production on rural lands. Only economic viability of production will. Economic viability of commercial farming operations will come under increasing pressure from domestic competition (with greater scale economies) and imports.
4.5.5 Fruit (ex grapes) and Vegetables (ex Mushrooms)

Fruit (excluding grapes) and vegetables (excluding mushrooms) are the main food production in the MRA that are linked to the capability of the land. While agricultural production of fruit (excluding grapes) and vegetables (excluding mushrooms) have traditionally been grown on the fringes of major population centres, they operate in a highly competitive domestic and international market, requiring improvements in productivity and cost. This has led to some relocation of farming to areas with a good climate, access to markets (via good road infrastructure), irrigation and cheaper land.

In NSW, fruit and nut production (excluding grapes) is now primarily from the Riverina (40%), Richmond-Tweed (24%), Coffs Harbour and Grafton (9%), Central West (9%) and Murray (8%) (Figure 4.9) while vegetables for human consumptions (other than Mushrooms) is primarily from the Central West (24%), Riverina (21%), and Murray (13%) and New England and North West (5%) (Figure 4.10).

**Figure 4.9 - Percentage of Total NSW Fruit and Nut (excluding grapes) Production Value by SA4 Region 2014-15**

![Percentage of Total NSW Fruit and Nut (excluding grapes) Production Value by SA4 Region 2014-15](source: ABS (2016))
Between 2010-11 and 2014-15 there has been a dramatic shift in the location of fruit and nut (excluding grapes) production and vegetables for human consumptions (other than Mushrooms).

Between 2010-11 and 2014-15 the value of fruit and nut (excluding grapes) production grew from $401.6M to $454.5M with an increasing share of total production concentrated in the Riverina and Richmond Tweed, the two major fruit and nut (excluding grapes) production areas in NSW. While the share of production in all other areas declined or remained relatively constant, the exception was Sydney - Outer West and Blue Mountains where the share of total NSW production increased by nearly 2%, from a zero base. Overall the share of NSW fruit and nut (excluding grape) production in Sydney MRA increased from 2.4% to 2.8%, but this represents a very small percentage of total NSW production.
Between 2010-11 and 2014-15, the NSW value of vegetables for human consumptions (other than Mushrooms) contracted from $376.9M to $357.3M, with an increasing share of total production concentrated in the Central West and Murray region, two of the major production areas in NSW for vegetables for human consumptions (other than Mushrooms). The share of total NSW production from the MRA declined from 36% to 25%, reflecting the issues identified earlier.
The structure of the Australian vegetable industry still leans towards relatively small farms, with 65% of all vegetable farms on less than 50 hectares. Although, there have also been signs of consolidation among larger vegetable producers, with the number of establishments holding more than 1,000 hectares increasing. Overall there has been a decline in the number of vegetable growing businesses over time, reflecting consolidation and exits from the industry.

Production costs (especially labour) continue to be an issue for vegetable growers, especially smaller growers who do not benefit from economies of scale. Horticulture Innovation Australia (2015a) found that on average, vegetable growing has not proven to be profitable in New South Wales possibly because farms are smaller in scale than the national average, limiting the cost advantages derived from economies of scale in larger operations. While the data suggests that on average NSW vegetable growers are unprofitable, this does not apply to all enterprises, and there are undoubtedly vegetable growing farms located in parts of NSW which perform better than the NSW average. In particular, Horticulture Innovation Australia (2015b) has found that the larger a vegetable farm, the more profitable that farm is likely to be.

The majority of Australian vegetable production is sold in domestic markets. Australian grown vegetables account for 85 per cent of vegetable products sold in Australia, with the remaining 15 per cent imported. Vegetable produce is primarily distributed to local fresh produce wholesalers, retail chains and vegetable processors. These distribution channels account for around 92 per cent of production, while exports make up around 7 per cent of production and 1 per cent is sold direct to consumers.

However, the focus on the domestic market has contributed to an oversupply of vegetable produce, with an estimated 25 per cent of vegetable production going to waste each year. This in turn reduces vegetable prices to levels that may not be commercially sustainable and leads to an increase in unsold product through wastage. Growers operating in the domestic market also face pressure due to the market dominance of the major retailers. The major retailers’ share of Australian food consumption has increased in recent years, allowing them to demand lower prices and higher quality standards. The retailers are increasingly looking to foreign suppliers for vegetables in an effort to raise operating margins and supply fresh produce all year round. This puts pressure on farm returns as Australian growers struggle to compete with cheaper imports.

Research shows that export markets offer the greatest opportunity to Australia’s vegetable industry. Modelling undertaken by the Centre for International Economics suggests that the gains from increases in exports offer the greatest potential returns on research and development investment. The growing demand from international markets and freeing of trade barriers will present growers with opportunities that did not exist before (Horticulture Australia Limited 2013).

Some vegetable growers are recognising these opportunities. The Australian Bureau of Agricultural and Resource Economics and Sciences (2014) found that the more profitable vegetable growers are more likely to export. These growers recognise that expansion to overseas markets mitigates the risks of the domestic market and increases the scope for future growth.

Traditionally, the vegetable industry has relied upon the domestic market for its sales. However, in the last decade, the domestic market has been eroded by competition from cheap foreign vegetable imports. In particular, processed and frozen vegetable imports have surged, leading to a widening of the vegetable trade deficit (Horticulture Australia Limited 2013).

4.5.6 Agricultural Processing in the MRA

ABS census data is available on employment by industry sector involved in agricultural product processing. However, manufacturing industry sectors include those involved in initial processing e.g. milk and cream processing, as well as those involved in further processing e.g. cake and pastry manufacturing. The further
removed from the primary product input the more likely that inputs sources are many and varied. For the purpose of this analysis of MRA agricultural processing, only industry sectors involved in what could be considered to be first step processing of agricultural inputs are included. Even then the source of inputs to processing and the extent to which inputs are sourced from the MRA are unknown.

However, it is evident that the main processing of primary production relates to poultry and this mainly occurs in the South West and West Central Districts.

Figure 4.13 - Primary Agricultural Product Processing in the MRA 2011 - Employment (no.s) by District

Source: ABS (2011)

Summary

Land capability provides an indicator of the inherent physical capacity of the land to sustain agricultural land uses. NSW Office of Environment and Heritage (OEH) has developed a Land and Soil Capability (LSC) Assessment Scheme (OEH 2012) that classifies land into eight classes, with class 1 and class 2 land having the highest capability for food production.

In addition, the NSW Government has also developed criteria for the identification of Biophysical Strategic Agricultural Land.

There is no class 1 or 2 private land (outside rural villages) in the MRA. 5% of rural zoned private land in the MRA is identified as Class 3 land with 97% of this also being BSAL.

Agricultural clusters identified in the MRA represent areas of concentrated co-located agricultural production. However, the extent to which they represent industry clusters achieving economic benefits to members via collaboration and interconnections within the cluster is questionable. No evidence of the operation of these areas as industry clusters with agglomeration and network advantages has been documented. However, at a minimum they represent areas where commercial agricultural activities are concentrated and generally coincide with Class 3 land from the LSC Assessment.

While land capability, BSAL and clusters are important indicators of the ability of land to accommodate different rural land uses and what is currently being produced, ultimately market forces primarily dictate the suitability of land for different agricultural activities and the viability agricultural activities and clusters.
Globalisation and trade in agriculture has put downward pressure on prices and led to a trend of fewer and larger farms and more intensive production. Small farms in peri-urban locations struggle to compete and hence there has been a relocation of fruit and vegetable production to rural areas where land is cheaper and there is more access to inputs to production such as water.

In NSW fruit and nut production (excluding grapes) is now primarily from the Riverina (40%), Richmond-Tweed (24%) and Murray (8%).

Vegetables for human consumptions (other than Mushrooms) is now primarily from the Central West (29%), Riverina (24%), and Murray (16%).

Land use patterns in the MRA reflect the increasing importance of economies of scale in food production, with most land used for low level grazing to offset land holding costs and only a small area used for commercial agriculture - most of this being in factory farming operations or occurring on floodplains.

The main agricultural processing occurring in the MRA relates to poultry processing.

4.6 Additional Agricultural Values

In addition to food production value, specific agricultural sites in the MRA have value for research and education, tourism, points of direct sale to consumers, heritage and landscape. Refer to Table 4.3.

Table 4.3 - Additional Agricultural Values

<table>
<thead>
<tr>
<th>Values</th>
<th>Some Sydney Peri-urban examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and educational facilities that adds value to NSW and Australian agriculture.</td>
<td>• University of Sydney Camden Farms network - essential to supporting core teaching and research activities of the Faculties of Veterinary Science and Faculty of Agriculture and Environment and vital to securing new initiatives arising from government and industry priorities in education, bioscience and food chain research occasioned by climate change, peak oil, urbanization, food and water security.</td>
</tr>
<tr>
<td></td>
<td>• Elizabeth Macarthur Agricultural Institute at Menangle employs 200 Department of Primary Industries (DPI) staff involved in biosecurity, research and education and administration. Opened in 1990 the Institute’s facilities underwent a $57 million refurbishment in 2012. The nationally accredited laboratories monitor the disease status of the State’s primary industries and provide certification for freedom from specific disease. This is vital for the protection of Australia’s economy, community and environment from animal and plant pests and disease.</td>
</tr>
<tr>
<td></td>
<td>• Launched in 2006, the NSW Centre for Animal and Plant Biosecurity comprises the department’s EMAI site, University of Sydney’s Plant Breeding Institute and the Faculty of Veterinary Science, all located in the Camden area. The Centre links a highly responsive, world-class set of interrelated and complementary facilities and staff for response, research and teaching in animal and plant health and production.</td>
</tr>
<tr>
<td></td>
<td>• Belegenny Schools Education programs including Department of Education programs for primary and secondary schools</td>
</tr>
<tr>
<td></td>
<td>• Greater Sydney Local Land Services Demonstration farm at Richmond. Current research projects are funded through the NSW Environment Protection Authority under its Waste Less Recycle More Organics Market Development Grant Program. The Next Generation Compost project aims to unlock the potential for recycled organics in horticulture.</td>
</tr>
<tr>
<td>Direct sale of local seasonal produce to</td>
<td>• Cobbity Village Markets, Macarthur Sunday Market</td>
</tr>
<tr>
<td></td>
<td>• The Epicure Store</td>
</tr>
</tbody>
</table>
### Values

<table>
<thead>
<tr>
<th><strong>Values</strong></th>
<th><strong>Some Sydney Peri-urban examples</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>chefs and to urban families via markets, local outlets food trails &amp; food boxes</td>
<td>• Hawkesbury Harvest</td>
</tr>
</tbody>
</table>
| Agricultural tourism (Events, Food trails and farm experiences) | • the ‘Macarthur Farm experience attractions’ includes Camden Saleyards, Camden town farm, various Markets, Wineries and Breweries  
• Regional Shows and events (e.g. polo / stockhorse events and sales)  
• Hawkesbury Harvest  
• also various farms stays e.g. Mowbray Park, Picton |
| Heritage values | • Heritage listed Belgenny Farm and Camden Park Estate were instrumental and influential in the development of Australia’s agricultural, pastoral, horticultural and viticultural industries. Collectively they form the oldest, intact, rural landscape and group of farm buildings in Australia, with close associations with the Macarthur family.  
• Gledswood Homestead (1810, 113 ha property) |
| Landscape Values | • areas of significant biodiversity value  
• scenic amenity outdoor recreation  
• environmental services  
• open space |

Source: Based on NSW DPI (2016)

### 4.7 Pressures on Rural Lands in the MRA

Areas identified for urban development in APFGS contain sufficient land to accommodate expected urban growth for the medium to longer term.

Consequently, it is expected that proximity to the Sydney City will continue to be a major determinant of land values in the MRA, making expansion of commercial agricultural production prohibitively costly. Combined with costs pressures and competition from globalisation it is expected that the viability of commercial agricultural production will come under increasing pressure and there will be a continuing shift in the share of fruit and vegetable production to other regions of NSW, where land is cheaper and inputs such as water are more readily available. The maintenance of minimum subdivision sizes to promote agricultural production is unlikely to be successful, since current fragmentation and land values are already likely to be prohibitive for farm amalgamation or ‘buy-in’ for agriculture investors.

As a result, the majority of the rural lands of the MRA will increasingly be primarily in demand as rural lifestyle properties, with some semi-commercial or non-commercial agricultural activities.

Given the plattage effect, there will also likely to be increasing demand for subdivision of land into smaller rural lifestyle properties and for rural residential use. This can result in increased demand for the provision of infrastructure such as sewerage, water, telecommunications, waste facilities and roads, as well as increased demand for the goods and services provided by the rural villages of the MRA.

The use of the MRA lands for rural lifestyle properties and rural residential (whether additional subdivision is allowed or not) can also give rise to landuse conflicts between these properties and commercial/semi-commercial agricultural activities that can generate odours, noise, pollutants and pathogens as well as truck movements.

Any increase in the fragmentation of lots for rural life style properties and rural residential may also provide a constraint on long term future urban development potential of these areas as they smaller lots attract higher land values than larger agricultural holdings and they provide a barrier to consolidation for urban development given that they have multiple owners and land titles.
Whether MRA land is used for rural lifestyle properties, rural residential or commercial/semi-commercial agriculture these uses are potentially constrained by flood, fire and conservation properties of the land. These uses may also impact public values associated with biodiversity, water quality, heritage and landscape.

The public good values and biophysical constraints of the lands of the MRA are discussed in the following Sections.
5 Biodiversity Values of the MRA

5.1 Biodiversity Overview

*Biodiversity*, or *biological diversity*, is the variety of all life forms at the genes, species and ecosystem level (Natural Resource Management Ministerial Council 2010). Conserving biodiversity provides a range of ecosystem functions and services that are linked to our physical, social and economic well-being (Natural Resource Management Ministerial Council 2010).

Significant areas of biodiversity are conserved in public protected areas such as National Parks, reserves and water catchments. However, a considerable about of biodiversity also occurs outside protected areas on privately owned rural land, with greater pressures from land use change or intensification.

A substantial array of legislation, policies and guidelines apply to the assessment, planning and management of biodiversity values on land outside protected areas. This includes the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)* and the *NSW Threatened Species Conservation Act 1995 (TSC Act)*.

The *EPBC Act* establishes a process for assessing the environmental impact of activities and developments where ‘matters of national environmental significance’ (MNES) may be affected. The *EPBC Act* lists endangered ecological communities, threatened and migratory species that have the potential to occur, or are known to occur on a site.

The *TSC Act* aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The schedules of the Act list species, populations and communities as endangered or vulnerable. All developments, land use changes or activities need to be assessed to determine if they will have the potential to significantly impact on species, populations or communities listed under the Act.

Biodiversity values are partially incompatible with rural and other land uses. For instance, intensification or extension of a rural land use can directly or indirectly diminish biodiversity values. While some rural activities e.g. beekeeping, firewood collection, may have minimal impacts. Processes under the *EPBC Act* and *TSC Act* generally require case by case assessment of impacts and their significance.

In NSW, the Independent Biodiversity Legislation Review Panel has recently completed a review of the way we manage, protect and enhance our biodiversity. The Panel made recommendations to improve the legislative and policy framework for biodiversity conservation and native vegetation management in New South Wales. In March 2015, the NSW Government committed to implementing all 43 recommendations in the report. On 3 May 2016 the NSW Government released a draft *Biodiversity Conservation Bill, draft Local Land Services (Amendment) Bill* and supporting products for public exhibition. In November 2016 the *Biodiversity Conservation Bill 2016* was passed by NSW Parliament.

5.2 High Environmental Value Land

Against this context, the OEH has identified land it considers to be of High Environmental Value (HEV). This land includes:

- NPWS estate gazetted & acquired;
- Declared wilderness;
- Council reserves;
• Biobanking agreement sites;
• Overcleared vegetation types;
• vegetation in overcleared landscapes;
• Threatened Ecological vegetation Communities;
• Rainforest;
• Old growth forest;
• Key habitats for threatened species;
• Riparian vegetation; and
• Karst landscapes.

These lands are valued by the community for the environmental conservation services they provide.

5.3 Council LEP Terrestrial Biodiversity

A number of Councils have prepared LEPs that identify land of high conservation value and zoned it accordingly. This includes:

**North District**
- Hornsby Local Environmental Plan 2013
- Ku-ring-gai Local Environmental Plan 2015
- Pittwater Local Environmental Plan 2014

**South District**
- Sutherland Shire Local Environmental Plan 2015

**South West District**
- Fairfield Local Environmental Plan 2013
- Wollondilly Local Environmental Plan 2011

**West Central District**
- The Hills Local Environmental Plan 2012
- Hawkesbury Local Environmental Plan 2012
- Hornsby Local Environmental Plan 2013

**West District**
- Blue Mountains Local Environmental Plan 2015
- Hawkesbury Local Environmental Plan 2012
- Penrith Local Environmental Plan 2010

This provides another representation of land with high environmental values.

5.4 Biodiversity Investment Opportunities

Areas identified as having high environmental and biodiversity value are generally incompatible with rural or other land uses. However, areas of biodiversity value on private lands may not be actively managed for this purpose and hence biodiversity values can decline over time. Government policy recognises this and that it is not always possible for impacts of developments to be avoided and so when all feasible measures have been taken to avoid and minimise impacts, offsets can be used to compensate for remaining impacts (NSW Government 2014).

Offsets can also be considered at a strategic level. For instance, biodiversity certification was introduced under the *TSC Act* (s.126G) to confer certification of an area if the Minister is satisfied that outcomes in a Biodiversity Certification Strategy will lead to the overall improvement or maintenance of biodiversity.
values – typically at a landscape scale. In the North West and South West Growth Centres (now known as Priority Growth Areas) the NSW Government established the $397.5M Growth Centres Biodiversity Offset Program to permanently protect some of the best remaining bushland in western Sydney and the surrounding areas to offset the impacts on biodiversity that will be caused by the development of the North West and South West Growth Centres. This, together with future large projects such as the Western Sydney Airport, Outer Sydney Orbital and the Bells Line of Road – Castlereagh Connection, will drive the demand for offsets in the MRA.

The OEH has developed the following principles for the use of biodiversity offsets in NSW:

1. Impacts must be avoided first by using prevention and mitigation measures.
2. All regulatory requirements must be met.
4. Offsets will complement other government programs.
5. Offsets must be underpinned by sound ecological principles.
6. Offsets should aim to result in a net improvement in biodiversity over time.
7. Offsets must be enduring – they must offset the impact of the development for the period that the impact occurs.
8. Offsets should be agreed prior to the impact occurring.
9. Offsets must be quantifiable – the impacts and benefits must be reliably estimated.
10. Offsets must be targeted.
11. Offsets must be located appropriately.
12. Offsets must be supplementary.
13. Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or contracts.

For developments in the urban growth areas and MRA, offsetting is permissible with the Sydney Basin Bioregion. The Sydney Basin Bioregion extends from just north of Batemans Bay to Nelson Bay on the central coast, and almost as far west as Mudgee. As well as Greater Sydney itself, the Sydney Basin Bioregion encompasses the towns of Wollongong, Nowra, Newcastle, Cessnock and Muswellbrook.

While this could possibly lead to a propensity for offsetting outside Greater Sydney, where land values and hence costs of offsetting may be cheaper, OEH principles for the use of biodiversity offsets in NSW are likely to mitigate this. Areas secured as offsets are published on the OEH website, however there is no database available in relation to offsets to track the source of impacts and location of offsets.

A Biodiversity Investment Opportunities (BIO) Map has been prepared for parts of the Sydney Basin to identify land that is considered a priority investment area and to help direct biodiversity investment funding from government and the private sector to the strategic locations of greatest benefit.

A landholder’s right to carry out agricultural and developmental activities on their land are not altered by their property being identified as a priority investment area on the BIO Map. The BIO Map identifies areas where landowners have more opportunities to receive funding to protect their bushland. Any involvement by a landowner in such programs is entirely voluntary. As such, these areas are lands where there is an opportunity for landowners to obtain a private value from the protection of their bushland.

The BIO Map identifies core areas and biodiversity corridors of state and regional significance. These core areas tend to be a subset of HEV lands while corridors can also include lands not identified as HEV.
The 4-3-2-1 depth rule can be used as simple rule of thumb for estimating the capital value part of a property. This rule states that the first 25% of a property provides 40% of the total land value, while the second 25% accounts for some 30%, the third 25% accounts for 20%, and the 25% farthest from the frontage accounts for 10% (Colwell 1999).

Therefore if an acquisition/covenant is to apply to the back 25% of a property the capital value will be approximately 10% of the total property value. If the acquisition/covenant is to apply to the back 50% of a property the capital value will be approximately 30% of the total property value. If the acquisition/covenant is to apply to the back 75% of a property the capital value will be approximately 60% of the total property value. If the acquisition/covenant is to apply to the entire property the capital value will be approximately 100% of the total property value.

As well as pursuing part properties rather than whole properties, cost effective conservation offset outcomes can be achieved by targeting lower order zonings, large properties rather than small properties, properties more distant from Sydney City and urban release areas and those on poorer capability lands.
6 Water Quality Issues in the MRA

6.1 Sydney Drinking Water Catchment

Water quality is important for drinking, farming, ecosystem and recreational uses. Sydney’s water catchment areas are protected to maintain drinking water quality. Water NSW (previously the Sydney Catchment Authority) maintains a multi-barrier approach which starts with the set aside of land to minimise disturbance and in so doing protect the quality of water supply. These MRA Protected and Special Areas (http://www.sca.nsw.gov.au/catchment/manage/special-areas) have the following restrictions placed on them:

- **Special areas – no entry:** These areas include the water storages and surrounding land with the exception of Fitzroy Falls Reservoir and part of Lake Yarrunga, which are classed as restricted entry.
- **Controlled areas – no entry:** These areas include the land at Warragamba protecting the water supply infrastructure and the land along the Warragamba Pipelines and Upper Canal.
- **Special areas – restricted entry:** These areas include the water storages and surrounding land of Fitzroy Falls Reservoir and part of Lake Yarrunga, and the second protection zone around Lake Burragorang. Vehicles (including motorcycles and bicycles), horses, pets, powered watercraft and firearms are not allowed.
- **Restrictions do not apply to privately owned land and public roads within the Special Areas.**

Map 6.1 MRA Water Catchment Areas

![Map of MRA Water Catchment Areas](http://www.sca.nsw.gov.au/catchment/manage/special-areas)

6.2 Impact of Land Uses on Sydney Drinking Water Catchment

Development in the declared drinking water catchment is regulated by State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 (the SEPP). Under the SEPP, proposed developments in the drinking water catchment that need consent under a council’s local environmental plan must have a
neutral or beneficial effect (NorBE) on water quality, and should incorporate current recommended practices or performance standards endorsed or published by the Water NSW related to water quality.

A neutral or beneficial effect on water quality means development that:

- has no identifiable impact on water quality, or
- will contain any water quality impact on the development site and stop it from reaching any watercourse, waterbody or drainage depression on the site, or
- will transfer any water quality impact outside the site where it is treated and disposed of to standards approved by the consent authority.

The ‘Neutral or Beneficial Effect on Water Quality Assessment Guideline 2015’ (Water NSW, 2015) gives clear instructions about the meaning of the neutral or beneficial effect, how to show it, and how to assess an application against the NorBE test.

6.3 Waterways

Waterways throughout the MRA can provide a range of ecosystem, water supply and recreation and tourism values. These values can be compromised by nutrient, chemical, pathogen and sediment runoff from adjoining landuses.

Controlled activities (riparian corridor offsetting for non-riparian corridor uses, cycleways and paths, detention basin, storm water outlet structures and essential services, stream realignment, road crossings) carried out, in, on or under waterfront land are regulated by the Water Management Act 2000 (WM Act). Waterfront land includes riparian corridors (RC) which comprises:

- the channel which comprises the bed and banks of the watercourse (to the highest mark); and
- the vegetated riparian zone (VRZ) adjoining the channel.

Riparian corridors perform a range of important environmental functions such as:

- providing bed and bank stability and reducing bank and channel erosion;
- protecting water quality by trapping sediment, nutrients and other contaminants
- providing diversity of habitat for terrestrial, riparian and aquatic plants (flora) and animals (fauna);
- providing connectivity between wildlife habitats; and
- conveying flood flows and controlling the direction of flood flows;
- providing an interface or buffer between developments and waterways; and
- providing passive recreation uses.

The NSW Office of Water (2012) recommends a VRZ width based on watercourse order as classified under the Strahler System of ordering watercourses, with the VRZ measured from the top of the highest bank on both sides of the watercourse. Table 6.1 outlines the recommended VRZ width and RC width for different orders of streams.
Table 6.1 - Recommended Riparian Corridor Widths

<table>
<thead>
<tr>
<th>Watercourse type</th>
<th>VRZ Width (each side of watercourse)</th>
<th>Total RC Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Order</td>
<td>10 metres</td>
<td>20 metres + channel width</td>
</tr>
<tr>
<td>2nd Order</td>
<td>20 metres</td>
<td>40 metres + channel width</td>
</tr>
<tr>
<td>3rd Order</td>
<td>30 metres</td>
<td>50 metres + channel width</td>
</tr>
<tr>
<td>4th Order of Greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)</td>
<td>40 metres</td>
<td>80 metres + channel width</td>
</tr>
</tbody>
</table>


The Office of Water allows a range of works and activities on waterfront land and in riparian corridors subject to obtaining approval.

6.4 Impact of Landuses in the MRA on Water Quality

Runoff from agricultural land can carry large amounts of nitrogen, phosphorus, and sediment. Excess nitrogen and phosphorus can cause algal blooms in waterways that can be toxic to humans, livestock, and fish. Sediment can clog fish gills, smother plants and can reduce light penetration in the water. Without light, aquatic plants on the river bed cannot survive. Aquatic plants are important for commercial and recreational fishing as they provide a habitat and food source for fish.

Reducing agricultural runoff has a positive effect on river health, increasing water clarity and the abundance of fish and aquatic plants. Agricultural runoff can be managed by:

- fencing cattle away from streams
- maintaining healthy vegetation around streams
- capturing and re-using runoff in retention ponds
- recycling greenhouse wastewater
- covering or enclosing fertiliser and manure storages
- reducing fertiliser use through better targeting
- upgrading to more efficient irrigation systems
• mechanically aerating compacted soils to increase infiltration.

The nutrient and pathogen impacts of agricultural runoff may be exacerbated by residential uses of MRA land where MRA properties are unsewered and hence rely on various onsite sewage disposal systems. On-site disposal systems need to be operated efficiently and be properly maintained for effective effluent disposal. Otherwise there can be deterioration of effluent quality and leakages. The release of pollutants into the environment from the on-site septic systems result in:

• eutrophication of waterways (lowering oxygen, reducing biodiversity and increasing algae growth);
• altering the terrestrial environment by favouring weed species;
• contaminating groundwater;
• adding human pathogens to the environment; and
• reducing public amenity due to odours, water logging and insects.

No GIS information was available at the time of the preparation of this report on the extent of unsewered properties in the MRA.

Mining activities in the MRA may also potentially generate water quality impacts on surface water from any discharges of water captured on the surface infrastructure site or groundwater seepage in the underground workings as well as from water that flows into cracks in creek beds from subsidence and re-emerges with different chemical properties. While water discharges from mines are regulated by the NSW Environment Protection Agency, including permitted volumes and pollutant concentrations, to manage the impact from mining on the environment, they require careful monitoring.

6.5 Dams in the Peri-urban Area and Water Licensing

Rural landholders in NSW can build dams on minor streams that capture up to 10% of the average regional runoff under a basic landholder right. Rights are more extensive in the Western Division of NSW.

The maximum harvestable right dam capacity (MHRDC) is the total dam capacity allowed under the harvestable right for a property and takes into account rainfall and variations in rainfall pattern.

Dams constructed outside of the MHRDC need to secure both an approval and a licence for the water volume that exceeds the MHRDC. Water licensing and approval is managed by the relevant NSW Government agency – Water NSW (http://www.water.nsw.gov.au/water-licensing/basic-water-rights/harvesting-runoff).

Furthermore licenses are not required for dams built before 1 January 1999 provided these dams are only used for stock and domestic watering purposes and are located on a minor stream (http://www.water.nsw.gov.au/__data/assets/pdf_file/0005/599117/Dams-in-nsw-do-you-need-a-licence.pdf).

If a rural property in the MRA fronts a river or overlies a groundwater aquifer, the owner is entitled to pump water to meet reasonable domestic and stock requirements without a licence as part of their basic landholder right. For groundwater, however, the landowner will still need works approved for the bore.

Where established under Commonwealth law, native title rights to water are also protected by the relevant metropolitan area water sharing plan. The water sharing plans protect these rights by allowing the landowner to continue to take water even when licensed users must cease to pump.

However, in very dry times, restrictions may be imposed on the amount of water that can be taken, recognising the impacts of extraction on the environment and other users. These restrictions are described in the Water Management Act 2000 and are not generally defined in the water sharing plans.
If an MRA landowner takes water from a farm dam according to their harvestable right, their access is not affected by the rules in a water sharing plan.

Access to a reasonable supply of water for licensed domestic and stock use has a higher priority than any other licence type. Water sharing plans recognise this priority by ensuring that a full share of water is allocated for domestic and stock use, except where exceptional drought conditions prevent this. In an unregulated river system, access may still be limited by the daily variations in river flow. When a river has very low flows, pumping by licensed domestic and stock users may be reduced or not permitted. These rules are specified separately in each metropolitan water sharing plan (http://www.water.nsw.gov.au/water-management/water-sharing/how-water-sharing-plans-work).

Clean air is fundamental to everyone’s wellbeing. Poor air quality can be particularly critical to the health of children, older people, pregnant women and those with pre-existing health conditions, while also affecting the natural environment and liveability of the communities in which we work and reside.

Since the early 1990s a substantial body of research has been published about the adverse health effects of air pollution. The research suggests that air pollution – even at the relatively low levels common in many urban environments of industrialised countries – is a risk factor for health. An increasing range of adverse health effects has been linked to air pollution, especially fine particles.

Short-term exposure to elevated air pollutants exacerbates existing respiratory and cardiovascular problems and increases the risk of acute symptoms, hospitalisation and death. Long-term repeated exposure increases the risk of chronic respiratory and cardiovascular disease and mortality, has an impact on birth weight, and can permanently affect lung development in children.

The health costs of air pollution at 2005 levels in the Greater Metropolitan Region (GMR), which includes Newcastle, the Central Coast and Wollongong, were estimated to be $4.7 billion or $893 per head of population. Looking at motor vehicle pollution alone, the Australian Bureau of Transport and Regional Economics estimated health costs of $3.3 billion per year in the country’s capital cities with Sydney’s share $1.5 billion.

Certain key air pollutants that are regulated or subject to standards based on criteria related to health and/or environmental effects are known as ‘criteria’ air pollutants. To help protect the health of the Australian population, the National Environment Protection Council in 1998 set ambient air quality standards and goals for six criteria pollutants in the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM). The six pollutants in the AAQ NEPM are ground-level ozone, particles (as PM$_{10}$), carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. In addition, an Advisory Reporting Standard for PM$_{2.5}$ was introduced in 2003.

Air quality in Sydney has improved significantly since the 1980s with initiatives to reduce urban air pollution implemented across industry, business, homes and motor vehicles. The concentrations of four out of the six air pollutants measured under the AAQ NEPM have reduced - carbon monoxide, nitrogen dioxide, sulfur dioxide and lead.

However, there are significant challenges in reducing the impact of the remaining two air pollutants in the Sydney Basin – photochemical smog (ground-level ozone) and particle pollution.

Ground-level ozone (a key component of photochemical smog which appears as white haze in summer) remains an issue for Sydney and concentrations have generally continued to exceed national air quality standards between 2009 and 2011 on up to 16 days a year. While all parts of Sydney can experience ozone concentrations above the AAQ NEPM standards at some time, the west and south-west of the city are the regions most often exposed. Western and south-western Sydney’s exposure is the result of summertime atmospheric circulation in the Sydney Basin. Hence these areas of the MRA are more adversely affected by ground-level ozone pollution than other areas.

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13 This section is based on the NSW EPA (2012).
14 Ozone is formed in the lower atmosphere when a number of ‘precursor’ compounds – mainly oxides of nitrogen (NO$_x$) and volatile organic compounds (VOCs) – react in warm, sunny conditions. (Carbon monoxide is a lesser source of ozone as well.) Major anthropogenic sources of NO$_x$ and VOCs include emissions from industrial facilities, electric power stations and motor vehicle exhausts, and fumes from engines used in garden equipment and recreational boats as well as paints, aerosols and solvents used in homes and businesses. It is also important to note that natural sources, such as eucalyptus trees, contribute approximately 55% the total emissions of volatile organic compounds in the GMR.
The number of days when ozone standards are exceeded in any given year is strongly dependent on meteorological conditions, which vary year to year. A statistical analysis to filter out most of the meteorological variability shows ozone concentrations in Sydney are not decreasing.

Particle pollution (appearing as brown haze) generally meets standards in Sydney except when bushfires or dust storms occur. The national standard for particle pollution has been exceeded in Greater Sydney by up to 11 days per year in the last decade and the fine particles standard has been exceeded by up to 14 days per year.

Air quality issues can reduce the values of landuses in the MRA and impose a health cost on society, particularly those that are more exposed.

Approaches to reducing air quality issues are broad ranging and across sectors. Constraining landuse in a particular location is likely to have minimal impacts on overall air quality in the Sydney Basin – growth will be shifted but not reduced.
8 Mining and Extractive Industry Values in the MRA

8.1 Introduction

The MRA has values for mining, coal seam gas and extractive industry.

8.2 Coal Resource

The entire Sydney Basin is underlain by in situ black coal resource (Geoscience Australia 2012) – Figure 8.1. However, mining titles are primarily held in the South West of the MRA and relate to a number of existing underground coal mining operations. These include Appin Mine and West Cliff Colliery which are owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), itself a wholly owned subsidiary of South32 Pty Ltd, and Tahmoor Mine which is owned by Glencore. All three mines are mature longwall mining operations, having commenced longwall operations in 1969, 1976, and 1987 respectively with plans to continue mining for the next 20-30 years. However, current depressed coal prices have led to Glencore announcing the closure of Tahmoor Mine by 2019.

Figure 8.1 Map of NSW Coalfields – Showing Southern and Central Coalfields

Source: NSW Department of Industry Resources and Energy
While some groups have suggested that such closures signal an end to coal mining per se, it more reflects the current supply and demand imbalance and commodity price cycle. As identified by the International Energy Agency (2015) coal is predicted to continue to be a significant contributor to global energy over the forecast period to 2040, with its share of world primary energy demand remaining constant under the Current Policy Scenario and reducing modestly under the New Policy Scenario. Even under this latter policy demand for coal is forecast to increase over time to 2040, although this is primarily for thermal coal with demand for coking coal declining by 10% over the period to 2040 under the Current Policy Scenario. Notwithstanding, Macquarie Bank as recently upgraded its price forecast for coking coal (Business Insider Australia 2016). Consequently, planning for the MRA would be wise to continue to have regard to land use issues surrounding coal mining and other land uses.

The underground coal mining operations in the South West of the MRA occur at greater than 400m depth using longwall mining methods to extract high value coking coal. Longwall mining is the most efficient system of underground mining and currently the only economically viable option for recovering coal resources in the MRA due to the depth and nature of the coal deposit.

Coal mining operations have potential to cause surface impacts in a variety of ways including surface subsidence, exploration and gas drainage activities, ventilation and power supply infrastructure, subsidence mitigation and remediation activities, as well as noise, dust, transport, water discharge, and other activities largely confined to the pit top area and adjacent transport routes. In a semi-rural setting with only small, isolated townships, these impacts can generally be managed without undue inconvenience to the community at a cost that allows mining to remain profitable and therefore viable.

In the Southern Coalfield, longwall operations typically cause vertical subsidence of up to 1-2 m over the centre of each longwall panel with lower subsidence nearer to the edges of each panel. Permanent tilting of the land surface occurs around the edges of each panel but at generally low enough levels to be largely imperceptible and tolerable. Horizontal ground movements also occur in response to the vertical movements and these tend to generate zones of stretching where tension cracks may become evident or zones of compression where the ground is squashed and shortens. In some circumstances, these horizontal movements may become focused at one location and cause localised damage to structures above background levels.

At any given point on the surface, subsidence impacts associated with longwall mining at depth occur within the period of active mining of the panel directly below and the period of active mining of adjacent panels. The period of most change typically occurs within 1-2 months during active mining with some additional change a year or so later and possibly again a year or so later when the adjacent panels are mined. Once mining in an area is complete, subsidence is also complete and there is generally no potential for further subsidence impacts.

From a purely subsidence impact perspective, the concept of co-existence of mining operations and urban development is possible for residential properties, most types of urban infrastructure, and some types of commercial and industrial developments. Design and construction methodologies to accommodate subsidence impacts are well developed but some more significant structures may not be able to tolerate large subsidence movements and the only option is to avoid mining near them.

In New South Wales, the legal framework to manage subsidence impacts from coal mining is well established. There is a mechanism to manage the costs of the rectification of damage to properties caused by mining subsidence through the Mine Subsidence Board. This mechanism does not cover consequential losses to businesses, repair of damage to structures that are constructed after the declaration of Mine Subsidence Districts but do not meet the design requirements, the costs of maintaining public safety, or the costs associated with managing impacts to the natural environment or anything that is not a built feature. The costs of managing these consequential impacts are a direct cost to the coal mining operation.
8.3 Coal Seam Gas

Coal seam gas resources are associated with the presence of coal and exist across almost all of the MRA. Existing large scale exploitation of this resource is mainly associated with the Camden Gas Project located southwest of Campbelltown. This project supplies about 5% of New South Wales’s gas needs (AGL 2015). The Project includes 144 gas wells (96 currently producing gas), over 100km of low-pressure underground gas gathering lines, and the Rosalind Park Gas Plant (AGL 2014). At the Rosalind Park Gas Plant, natural gas collected via low pressure underground gathering lines from each of the wells is compressed, dried, and made ready for distribution through the local natural gas network. The Camden Gas Project is scheduled to cease production in 2023.

There are also several small scale operations integrated with coal mining operations within the MRA. Significant gas reserves remain in unmined coal seams.

In October 2013, the NSW Government prohibited coal seam gas activity in existing residential zones in all LGAs in NSW and future residential growth areas in the North West and South West Growth Centres of Sydney via an amendment to the State Environment Planning Policy (Mining Petroleum Production and Extractive Industries) 2007 (the Mining SEPP). Coal seam gas exploration and extraction were also banned in 2 km buffers around these zones (NSW Government 2014, Strategic Regional Land Use Policy January 2014).

Figure 8.2 - Coal Seam Gas Wells and Gathering Pipe Network (from AGL 2014)

No GIS layer of gas well locations was available at the time this report was prepared.
8.4 Extractive Industry

Existing and potential reserves of construction materials (e.g. sand and crushed sandstone) are located within the MRA. These resources are important for construction purposes. Regionally significant resources of clay/shale, sand and gravel, hard rock, crushed sandstone and dimensional sandstone are identified in Regional Environmental Plan No. 9 – Extractive Industry No. 2 – 1995-574 (NSW Government 2015). Active extractive industry operations are identified in the Maps produced for each District.
9 Scenic Landscape Values of the MRA

Scenic landscape values are associated with both MRA destinations and more general open space and vistas. MRA destination sites include the World Heritage Area Listed Blue Mountains. Values recognised by UNESCO in World Heritage Listing include both cultural and natural values. World Heritage values relevant to Blue Mountains listing were drawn from:

- Superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
- Major stages of earth’s history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- Significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
- The most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Outside of the World Heritage Area, the MRA is ringed by national parks, wilderness and other protected areas. Visitation to these areas provides direct access to scenic landscape. Lookout points provide vistas for those landscapes without access.

In addition to the internationally and nationally recognised and protected natural and scenic landscape values, the MRA contains historic and scenic villages, outlooks, micro-vistas, rural roads and open recreational spaces. These landscapes provide a sense of open space valued by both residents and urban visitors. Open space scenic landscape values include:

- Villages and towns that retain their ‘standalone’ rural character including but not limited to the Macquarie towns of Castlereagh, Pitt Town, Richmond, Wilberforce and Windsor
- Small scale rural land uses with ancillary residences that are distinct in scale, form and building materials from nearby suburban development
- Roads lined by mature eucalypts and other native species that create a strong visual, physical and ecological transition between urban living and rural landscape
- Stands of mature trees with understory which enhance the non-urban character of the landscape
- Transitional landscapes that frame the changing topography moving between mountains, rolling hills and the flatter floodplain below
- Local peaks accessed by road that provide district views with a semi-aerial quality
- Internal views within landscape units that include combinations of native vegetation, farm land grazing and rural dwellings
- Colonial era roads, rail cuttings and water supply systems that are integral to the established scenic landscape e.g. Sydney Water Supply Upper Canal or Menangle Road which follows the route of an early colonial road which serviced cow pastures in the south west of the MRA
- Combinations of creek and river lines, native vegetation and recreational space including golf courses such as the Riverside Oaks Golf Resort adjoining Cattai National Park
- Homesteads associated with historic MRA pastoral properties e.g. Rouse Hill House dating from 1810 and Sugarloaf Farm with its intact vernacular nineteenth century farming landscape
- Single exotic trees and remnant gardens with heritage significance such as the Bunya Pine located at the intersection of the old Minto Road (now Glenlee Road) that marks the entrance to the Glenlee estate.

These assets and views provide a high degree of visual and historic integrity. Retention and enhancement of their values may include:

- Retention/replanting of corridors including creek and road lines
- Buffer lands and links kept free of major structures and hard surfaces
• Retention of tall trees as a prominent visual element
• Careful consideration of development densities to ensure retention of rural character
• Ensuring that new development is visually subservient to the landscape – modest in scale, sympathetically located and finished in materials that minimise visual impact
• Fencing that is visually transparent so that it does not limit view lines.

Areas of outstanding scenic landscape value are protected and these include the Scenic Hills and the Eastern Edge Scenic Protection Lands in the South West District (see Figure 9.1). Protection is provided via the Campbelltown Local Environmental Plan 2015.

Figure 9.1 - Scenic Hills and the Eastern Edge Scenic Protection Lands in the South West District
10 Tourism and Recreation Values of the MRA

10.1 Introduction

Tourism is associated with visitation by people from outside the study area. Recreation focuses on land and water based activities enjoyed by study area residents. Open space includes public protected areas as well private recreation. Scenic areas provide visitors and residents with pleasing rural vistas and can include public protected areas as well as private agriculture and bushland blocks. Often scenic areas include views from lookouts, scenic drives and the general amenity of a rural area.

10.2 Tourism and Recreation in Western Sydney

Destination NSW (2015), the NSW Government’s agency for tourism and major events, provides a visitor profile for Western Sydney that includes the LGAs of Blacktown, Camden, Campbelltown, Cumberland, Fairfield, Hawkesbury, Liverpool, Parramatta, Penrith, The Hills, Wollondilly and part of Canterbury-Bankstown. According to this profile Western Sydney attracted 281,000 international visitors, 2 million domestic overnight visitors and 6.6 million domestic day-trip visitors in 2015.

International visitors were drawn from New Zealand (20.8%), South Korea (9.1%), India (8%), China (6.9%), and United States (6.7%). International visitors spent approximately $980 million in the region. International visitors were most likely to be unaccompanied travellers in their mid-20s. The main purpose of visit to Western Sydney was visiting friends and relatives (58%), followed by holiday (23.5%) and business (10.8%).

Most domestic overnight visitors to Western Sydney came from regional NSW, stayed an average of three nights and spent an estimated $1.4 billion in 2015. The most popular activities for domestic overnight visitors were visiting friends and relatives (60.3%), eating out in restaurants and cafes (54.1%) and shopping for pleasure (20.9%). Most domestic overnight visitors were in the 15 to 29 years age bracket.

In 2015, Western Sydney received 6.6 million domestic day trippers, spending $690 million in the region. The main activities undertaken were visit friends and relatives (46.6%), eating out in restaurants and cafes (37.1%) and going shopping or pleasure (17%).

Table 10.1 summarises MRA tourism and recreational values.

<table>
<thead>
<tr>
<th>Table 10.1 Western Sydney Tourism and Recreation Values</th>
</tr>
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<tbody>
<tr>
<td><strong>Western Sydney LGAs</strong></td>
</tr>
<tr>
<td><strong>Visitor Numbers</strong></td>
</tr>
<tr>
<td>International visitors (No.)</td>
</tr>
<tr>
<td>Domestic overnight visitors (No.)</td>
</tr>
<tr>
<td>Domestic day trip visitors (No.)</td>
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<td><strong>Total Visitors (No.)</strong></td>
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<td><strong>Visitor Expenditure</strong></td>
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<tr>
<td>Domestic day trip visitors ($)</td>
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<tr>
<td><strong>Total expenditure ($)</strong></td>
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<tr>
<td><strong>Employment</strong></td>
</tr>
<tr>
<td>Accommodation (jobs)</td>
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<tr>
<td>Cafes, restaurants, pubs and clubs (jobs)</td>
</tr>
<tr>
<td>Nature reserves, conservation parks, zoological and botanical gardens operation</td>
</tr>
<tr>
<td>Sport and recreation</td>
</tr>
<tr>
<td><strong>Total employment (jobs)</strong></td>
</tr>
</tbody>
</table>

| **Blue Mountains**                                    |
| **Visitor Numbers**                                   |
| International visitors (No.)                           | 101,600 |
| Domestic overnight visitors (No.)                      | 909,000 |
| Domestic day trip visitors (No.)                       | 2,700,000 |
| **Total Visitors (No.)**                              | 3,710,600 |
| **Visitor Expenditure**                               |
| International visitors ($)                             | Not available |
| Domestic overnight visitors ($)                        | $336 million |
| Domestic day trip visitors ($)                        | $214 million |
| **Total expenditure ($)**                             | Not available |

Source: Destination NSW and ABS Industry by Employment LGA data

1 Compiled for LGAs of the MRA only. It includes data for the Bankstown part of the Canterbury-Bankstown LGA. Employment is not solely attributable to tourism and recreation.
While the main activities of tourists to the Western Sydney LGAs are visiting friends and relatives, eating out in restaurants and cafes and going shopping or pleasure, tourism and recreation is associated with both the built and natural environments.

In the MRA there are four main landscape features of significance for tourism and recreation:

- the World Heritage-listed Blue Mountains, which from the data in Table 10.1 attracts 42% of the visitors to Western Sydney LGAs, and include scenic attractions, walks, canyoning, etc.;
- the Hawkesbury Nepean River system catchment which provides a range of recreation opportunities including fishing, boating, water skiing and passive recreation;
- Western Sydney Parklands which comprises 5,280 hectares that stretches 27 kilometres from Blacktown in the north to Leppington in the south and includes Sydney’s largest dog off-leash area, the Warrigal Run at Bungarribee (Doonside Road); Plough and Harrow Park (Elizabeth Drive, Abbotsbury); Lizard Log Park (Corner Cowpasture Road and The Horsley Drive, Abbotsbury); and Wylde MTB Trail (Range Road off Elizabeth Drive, Cecil Park). Annual visitation is around 1.3 million people (Western Sydney Parklands Annual Report 2013-14); and
- the rural landscape and rural towns and villages (e.g. Picton, Camden and Dural) which provide an array of visual and other experiences for visitors.

Associated with these major landscape features are numerous businesses, services providers and attractions including bed and breakfast accommodations, hotels and motels, caravan parks, cafes and restaurants, conference facilities and retreats, nurseries, farmers markets, golf courses, farm stays, farm attractions (e.g. Macarthur Farm), Hawkesbury Harvest, heritage attractions (e.g. Belgenny Farm and Camden Park Estate) etc.

The MRA also contains a number of recreation facilities that are possible due to the rural character of the area such as rifle ranges and parachuting facilities.

Significant tourism and recreation features such as the Blue Mountains are reserved in perpetuity in the public estate. As identified in *The Intergenerational Report* (NSW Treasury 2015, p. xii) “protecting the environment can also contribute to economic growth, particularly in sectors such as tourism.”
11 Waste Management Issues in the MRA

No matter where it occurs, population and economic growth results in the generation of waste. Once generated, waste is either recovered and recycled or joins the residual waste stream for disposal at landfill.

Action 4.3.2 of APFGS is to “identify and protect land for new waste management facilities”. APFGS states that Sydney will require additional waste management and recycling infrastructure, including landfill and liquid waste processing capacity, with the city needing:

- additional recycling infrastructure capacity of 165,000 tonnes per year for municipal (local council) waste;
- additional recycling infrastructure capacity of 380,000 tonnes per year for commercial and industrial waste; and
- an additional 25 community recycling centres for recycling of household hazardous waste.

The Government will respond to this shortage by identifying and protecting appropriate locations for waste management infrastructure in Sydney.

The location of recovery and recycling facilities is reasonably flexible and can generally be located within industrial zoned land. Demand for new facilities can be allowed for within concept planning for new growth centres or be accommodated within existing appropriately zoned land.

Unlike other waste facilities, landfills are generally developed in existing excavated areas that are geotechnically suitable. Landfills are usually formed by quarrying and mining operations rather than identifying a site with unexcavated land. It is economically more efficient to fill existing excavations than it is to create new ones. The availability of landfill is therefore linked to the availability of suitable fill locations. Sites need to be accessible to waste transport trucks. However, beyond the distance that is viably serviced by collection vehicles, distance is not a strong constraint. This is because of the low cost per tonne kilometre of transferring compacted waste in large trucks (Hyder 2009).

Almost all mixed residual putrescible waste (after recovery and recycling) generated in the municipal sector invariably goes to putrescible waste landfill in Sydney (Belrose, Lucas Heights, Eastern Creek and Jacks Gully) or to Woodlawn for disposal. In addition, nearly 40% of waste generated in the Construction and Industrial sector is collected as putrescible waste loads and is sent to putrescible waste landfills for disposal. A review of landfill capacity in 2009 (Wright Corporate Strategy Pty Ltd 2009) concluded that there is ample landfill capacity available for Sydney putrescible waste disposal extending for more than 20 years. Hyder (2009) found no evidence of any critical shortage of landfill capacity at any of the Australian population centres.

The Productivity Commission (2006) in response to concerns that Australia is running out of suitable space to use as landfills identified that typically, landfills have used old quarry or mine sites in or near urban areas, taking advantage of the underground voids already created and that generally speaking, Australia is creating new excavation sites faster than we are filling old excavation sites with waste. While the location of these sites, their geological suitability for landfill and concerns of many people about having a landfill in their ‘backyard’, can limit availability, the Commission considers that these issues are not insurmountable and can for the most part be addressed through the market and appropriate planning frameworks. To the extent that landfill space near an urban area becomes scarce, rising gate fees will make it financially worthwhile to transport the waste further afield, thus opening up the possibilities for new landfills.

Existing and proposed landfills provide a constraint on surrounding land uses as they may produce the following pollution streams: leachate, stormwater runoff, landfill gas, offensive odour, dust, noise and litter. These pollutants can degrade the quality of surrounding surface water bodies, groundwater, soil and air.
Landfilling activities have the potential to adversely affect local amenity, and they may also affect threatened species of flora and fauna, native vegetation and items of Aboriginal heritage.

Consequently, inappropriate areas for landfilling includes sites located as follows:

- within 250 metres (or other protection zone) of an area of significant environmental or conservation value identified under relevant legislation or environmental planning instruments, including national parks, historic and heritage areas, conservation areas, wilderness areas, wetlands, littoral rainforests, critical habitats, scenic areas, scientific areas and cultural areas;
- within specially reserved drinking water catchments, such as special areas identified by Water NSW, Sydney Water and local water supply authorities;
- within 250 metres of a residential zone or dwelling, school or hospital not associated with the facility;
- in or within 40 metres of a permanent or intermittent water body or in an area overlying an aquifer that contains drinking water quality groundwater that is vulnerable to pollution;
- within a karst region or with substrata that are prone to land slip or subsidence;
- within a floodway that may be subject to washout during a major flood event (a 1-in-100-year event) (NSW EPA 2016).

Inappropriate areas also include land identified in an environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance (NSW EPA 2016).

In the case of large putrescible waste landfills (more than 50,000 tonnes of putrescible waste per year), buffers of at least 1,000 metres should be provided where practicable to residential zones, schools and hospitals to protect the amenity of these land uses from odour, noise and other impacts (NSW EPA 2016).

Landfills also provide a constraint on future land uses once they are completed with open space generally the preferred use.

Existing waste facilities in the MRA are summarised in the following table.

### Table 11.1 - Waste Facilities in the MRA

<table>
<thead>
<tr>
<th>Waste Facility Type</th>
<th>Name</th>
<th>MRA District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubbish Depot</td>
<td>Kimbriki Resource Recovery Centre</td>
<td>North District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Lucas Heights Waste Management Centre</td>
<td>South District</td>
</tr>
<tr>
<td>Landfill</td>
<td>Harringtons Quarry</td>
<td>South District</td>
</tr>
<tr>
<td>Landfill</td>
<td>IWC landfill</td>
<td>South District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Unnamed</td>
<td>South West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Unnamed</td>
<td>South West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Macarthur Resource Recovery Park*</td>
<td>South West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Glenfield Waste Disposal</td>
<td>South West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Badgerys Creek Landfill Depot</td>
<td>West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Eastern Creek Resource Recovery Park</td>
<td>West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Penrith Landfill Depot</td>
<td>West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Blaxland Waste Management Facility</td>
<td>West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Katoomba Waste Management Facility</td>
<td>West District</td>
</tr>
<tr>
<td>Rubbish Depot</td>
<td>Hawkesbury Waste Management Facility</td>
<td>West District</td>
</tr>
</tbody>
</table>

*Previously known as Jacks Gully.
12 Rural Lifestyle Values

The majority of private land in the MRA is peri-urban land located outside of rural villages. While this land has rural characteristics, agricultural activity is minimal with the primary land use being "other minimal landuse" followed by "grazing" (refer to Figures 4.3 and 4.4).

As identified in Section 3, the primary determinant of the market value of peri-urban lands is likely to be urban influences rather than the agricultural characteristics of this land. In particular, distance and travel to from Sydney City is likely to be a dominant determinant of value, with properties closer to Sydney City having higher values.

Given the plattage effect (where smaller properties have higher per hectare values than larger properties), the majority of the rural lands of the MRA will increasingly be primarily in demand as rural lifestyle properties, with some semi-commercial or non-commercial agricultural activities.

This can result in increased demand for the provision of infrastructure such as sewerage, water, telecommunications, waste facilities and roads, as well as increased demand for the goods and services provided by the rural villages of the MRA.

The use of the MRA lands for rural lifestyle properties and rural residential (whether additional subdivision is allowed or not) can also give rise to landuse conflicts between these properties and commercial/semi-commercial agricultural activities that can generate odours, noise, pollutants and pathogens as well as truck movements. Where commercial and semi-commercial agriculture occurs there is a need to ensure that it can continue, subject to market forces, without encroachment of incompatible landuses that will be adversely affected by agricultural activities.
13 Rural Towns / Villages

Rural towns and villages are scattered within the MRA. Rural towns and villages are distinct from urban areas in the Metropolitan Urban Area in that they provide mainly for local growth needs, as distinct from the needs of the Greater Sydney. They service the surrounding areas of the MRA and visitors to the area. Increases in population of the MRA, tourism and the Metropolitan Urban Area can lead to demand for expansion of rural towns and villages. Some the rural towns and villages in the MRA are identified in Table 13.1. However, the GIS data layer from which these are sourced was incomplete.

<table>
<thead>
<tr>
<th>District</th>
<th>Rural Towns and Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>North District</td>
<td>Brooklyn Galston Dangar Island</td>
</tr>
<tr>
<td>South District</td>
<td>Maianbar Waterfall</td>
</tr>
<tr>
<td>South West District</td>
<td>Bargo Menangle Douglas Park Mount Hunter Picton Nattai The Oaks Warragamba Appin Werombi Cawdor Wilton Couridjah Yanderra Maldon Yerranderie</td>
</tr>
<tr>
<td>West Central District</td>
<td>Glenorie Maroota Kenthurst Wisemans Ferry</td>
</tr>
<tr>
<td>West District</td>
<td>Bell McGraths Hill Bilpin Medlow Bath Blackheath Mount Riverview Blaxland Mount Victoria Bullaburra Mount Wilson Colo Heights North Richmond Ebenezer Richmond Faulconbridge Springwood Glenbrook St Albans Hazelbrook Valley Heights Katoomba Warrimoo Kurrajong Wentworth Falls Lapstone Windsor Lawson Winmalee Linden Woodford Leura</td>
</tr>
</tbody>
</table>
14 European and Aboriginal Heritage

Aboriginal cultural heritage consists of places and items that are of significance to Aboriginal people because of their traditions, observances, lore, customs, beliefs and history. It provides evidence of the lives and existence of Aboriginal people before European settlement through to the present. Aboriginal cultural heritage is dynamic and may comprise physical (tangible) or non-physical (intangible) elements. It includes things made and used in traditional societies, such as stone tools, art sites and ceremonial or burial grounds. It also includes more contemporary and/or historical elements such as old mission buildings, massacre sites and cemeteries. Tangible heritage is situated in a broader cultural landscape and needs to be considered in that context and in a holistic manner.

Cultural heritage is not confined to sites. It also relates to the connection and sense of belonging that people have with the landscape and each other as well as peoples’ memories, storylines, ceremonies, language and ‘ways of doing things' that continue to enrich local knowledge about the cultural landscape.

Aboriginal cultural heritage values are assessed from two perspectives, the values held by Aboriginal people i.e. Aboriginal heritage values, and scientific (archaeological) value i.e. the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects (NPWS undated).

The National Parks and Wildlife Act 1974 (NPW Act) is the primary legislation for the protection of some aspects of Aboriginal cultural heritage in New South Wales. It provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm unless harm is carried out under an Aboriginal Heritage Impact Permit (AHIP). Aboriginal Land Councils within each District are identified in Table 14.1.

<table>
<thead>
<tr>
<th>District</th>
<th>Aboriginal Land Councils</th>
</tr>
</thead>
<tbody>
<tr>
<td>North District</td>
<td>Darkinjung</td>
</tr>
<tr>
<td></td>
<td>Deerubbin</td>
</tr>
<tr>
<td></td>
<td>Metropolitan</td>
</tr>
<tr>
<td>South District</td>
<td>Gandangara</td>
</tr>
<tr>
<td></td>
<td>La perouse</td>
</tr>
<tr>
<td></td>
<td>Tharawal</td>
</tr>
<tr>
<td></td>
<td>Metropolitan</td>
</tr>
<tr>
<td>South West District</td>
<td>Deerubbin</td>
</tr>
<tr>
<td></td>
<td>Gandangara</td>
</tr>
<tr>
<td></td>
<td>Pejar</td>
</tr>
<tr>
<td></td>
<td>Tharawal</td>
</tr>
<tr>
<td>West Central District</td>
<td>Deerubbin</td>
</tr>
<tr>
<td></td>
<td>Metropolitan</td>
</tr>
<tr>
<td></td>
<td>Gandangara</td>
</tr>
<tr>
<td>West District</td>
<td>Deerubbin</td>
</tr>
<tr>
<td></td>
<td>Gandangara</td>
</tr>
<tr>
<td></td>
<td>Metropolitan</td>
</tr>
<tr>
<td></td>
<td>Tharawal</td>
</tr>
<tr>
<td></td>
<td>Wanaruah</td>
</tr>
</tbody>
</table>

Historic heritage includes places and landscapes of historic, cultural, social, spiritual sacrifice, archaeological, architectural or aesthetic significance. Identifying and listing items of heritage significance...
are the first steps in protecting and managing those places and objects. This includes the World Heritage List, National Heritage List, the State Heritage Register and in Council’s Local Environmental Plans. Statutory registers provide legal protection for heritage items. In NSW legal protection generally comes from the *Heritage Act, 1977* and the *Environmental Planning and Assessment Act 1979*. Places on the National Heritage List are protected under the *Environment Protection and Biodiversity Conservation Act 1999*.

Aboriginal and Historic heritage may not be compatible with some intensive rural and urban land uses.
15 Other Values of the MRA

15.1 Flood Prone Land

The NSW Flood Prone Land Policy recognises that flood prone land is a valuable resource but aims to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property and reduce public and private losses resulting from floods (NSW Government 2005). While the policy recommends a merit based approach to all development decisions in the flood plain taking into account economic, social and ecological factors, as well as flooding considerations, flood planning levels are generally based around 1% annual exceedance probability (AEP) flood events plus an appropriate free board (typically 0.5M) (NSW Government 2005).

Notwithstanding, the Policy recognises the need to consider the full range of flood sizes, up to and including the probable maximum flood (PMF), which is the largest flood that could conceivably occur at a particular location (NSW Government 2005).

Flood prone land e.g. a floodplain, can have high value for rural uses such turf farming, horticulture and grazing, but be a constraint on other uses and development of infrastructure. It also has implications for evacuations during times of flood. The Hawkesbury-Nepean River is one of the major river systems of NSW, draining a catchment area of 22,000 square kilometres. Exceptionally heavy rainfall in this area can lead to severe flooding. This is worsened below Richmond by the fact that water flows into the valley much faster than it can flow out.

1% AEP and PMF liable land are mapped for each district, as are evacuation routes where this information was available.

15.2 Bushfire Hazard

Bushfire prone land (BFPL) is land that has been identified as being able to support a bushfire or is subject to bushfire attack. It comprises three different vegetation categories (Vegetation Category 1, Vegetation Category 2, Vegetation Category 3) and different external buffers to each of these categories of vegetation (NSW Rural Fire Service 2015).

Planning for Bush Fire Protection requires certain protective measures be met in order to make a building less likely to suffer damage or destruction from bush fires. It is not the intention of the measures to prevent the development of land in bushfire prone areas however, in order to provide adequate protection from bush fires, it may be necessary to modify the style, construction material or sighting of a building.

15.3 Acid Sulfate Soils

Acid sulfate soils is the common name given to naturally occurring soil and sediment containing iron sulfides. When these natural occurring sulfides are disturbed and exposed to air, oxidation occurs and sulfuric acid is ultimately produced. The sulfuric acid can drain into waterways and cause severe short and long term socio-economic and environmental impacts (NSW Acid Sulfate Soils Management Advisory Committee 1998).

The most common activities that disturb acid sulfate soils are:
• agricultural activities that involve land drainage, works to prevent flood and tidal inundation (levees, drains and floodgates) and use of ground water - industry sectors especially implicated are sugar cane, tea tree, dairying, grazing, cropping and aquaculture
• infrastructure works especially flood management (levees, floodgates), drainage works, maintenance dredging, laying of utilities (water, sewerage, communications), roads and railways;
• urban and tourism development (housing, resorts, marinas)
• extractive industries - sand and gravel extraction from rivers or the floodplain (NSW Acid Sulfate Soils Management Advisory Committee 1998).

Actual and potential acid sulfate soils in NSW are collectively represented on Acid Sulfate Soil Risk Maps (Department of Land and Water Conservation 1998).

Acid sulfate soils have been classified based on the likelihood of the acid sulfate soils being present in particular areas and at certain depths. There are five classifications:

• Class 1 - Acid sulfate soils in a class 1 area are likely to be found on and below the natural ground surface. Any works\(^2\) will trigger the requirement for assessment and may require management.
• Class 2 - Acid sulfate soils in a class 2 area are likely to be found below the natural ground surface. Any works\(^2\) beneath the natural ground surface, or works\(^2\) which are likely to lower the water table, will trigger the requirement for assessment and may require management.
• Class 3 - Acid sulfate soils in a class 3 area are likely to be found beyond 1 metre below the natural ground surface. Any works\(^2\) that extend beyond 1 metre below the natural ground surface, or works\(^2\) which are likely to lower water table beyond 1 metre below the natural ground surface, will trigger the requirement for assessment and may require management.
• Class 4 - Acid sulfate soils in a class 4 area are likely to be found beyond 2 metres below the natural ground surface. Any works\(^2\) that extend beyond 2 metres below the natural ground surface, or works\(^2\) which are likely to lower the water table beyond 2 metres below the natural ground surface, will trigger the requirement for assessment and may require management.
• Class 5 - Acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1, 2, 3 or 4 land. Works\(^2\) in a class 5 area that are likely to lower the water table below 1 metre AHD\(^1\) on adjacent class 1, 2, 3 or 4 land will trigger the requirement for assessment and may require management.

Note: \(^1\) Australian Height Datum, and \(^2\) ‘work’ is defined as any works that disturb more than one (1) tonne of soil, or lower the water table.

15.4 ANEF Contours

ANEF charts are contour maps that show a forecast of aircraft noise levels that are expected to exist in the future. ANEF contours have implications for the types of buildings and activities that are compatible.
Table 15.4.1 - Building Compatibility with ANEF Contours

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Acceptable</th>
<th>Conditional</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>House, home unit, flat, caravan park</td>
<td>Less than 20 ANEF1</td>
<td>20 to 25 ANEF2</td>
<td>Greater than 25 ANEF</td>
</tr>
<tr>
<td>Hotel, motel, hostel</td>
<td>Less than 25 ANEF</td>
<td>25 to 30 ANEF</td>
<td>Greater than 30 ANEF</td>
</tr>
<tr>
<td>School, university</td>
<td>Less than 20 ANEF1</td>
<td>20 to 25 ANEF2</td>
<td>Greater than 25 ANEF</td>
</tr>
<tr>
<td>Hospital, nursing home</td>
<td>Less than 20 ANEF1</td>
<td>20 to 25 ANEF2</td>
<td>Greater than 25 ANEF</td>
</tr>
<tr>
<td>Public building</td>
<td>Less than 20 ANEF1</td>
<td>20 to 30 ANEF</td>
<td>Greater than 30 ANEF</td>
</tr>
<tr>
<td>Commercial building</td>
<td>Less than 25 ANEF</td>
<td>25 to 35 ANEF</td>
<td>Greater than 35 ANEF</td>
</tr>
<tr>
<td>Light industrial</td>
<td>Less than 30 ANEF</td>
<td>30 to 40 ANEF</td>
<td>Greater than 40 ANEF</td>
</tr>
<tr>
<td>Other industrial</td>
<td>Acceptable in all ANEF zones</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: The actual location of the ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

Note 2: Within 20 to 25 ANEF some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A of AS2021-2000).

Note 3: There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (eg an office in an industrial building). In these cases, Table 2.1 (above) should be used to determine site acceptability but internal design noise levels within the specific spaces should be determined by using Table 3.3 of AS2021-2000.

Section 117(2) Ministerial Direction 3.5 - Development Near Licensed Aerodromes - provides a higher standard with respect to some types of developments.

The Direction requires that a planning proposal must not rezone land:

(a) for residential purposes, nor increase residential densities in areas where the ANEF, as from time to time advised by that Department of the Commonwealth, exceeds 25, or
(b) for schools, hospitals, churches and theatres where the ANEF exceeds 20, or
(c) for hotels, motels, offices or public buildings where the ANEF exceeds 30.

It also states that a planning proposal that rezones land:

(a) for residential purposes or to increase residential densities in areas where the ANEF is between 20 and 25, or
(b) for hotels, motels, offices or public buildings where the ANEF is between 25 and 30, or
(c) for commercial or industrial purposes where the ANEF is above 30,

must include a provision to ensure that development meets AS 2021 regarding interior noise levels.

Airports or airport ANEF impacting the MRA include the following:
### Table 15.4.2 – MRA Airports

<table>
<thead>
<tr>
<th>MRA District</th>
<th>Location</th>
<th>Airport Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>Bankstown</td>
<td>Bankstown Airport (General Aviation)</td>
<td>Public</td>
</tr>
<tr>
<td>South West</td>
<td>Camden</td>
<td>Camden Airport (General Aviation)</td>
<td>Public</td>
</tr>
<tr>
<td>West</td>
<td>Richmond</td>
<td>RAAF Base Richmond</td>
<td>Military</td>
</tr>
<tr>
<td>South West</td>
<td>Badgerys Creek</td>
<td>Western Sydney Airport</td>
<td>Planned</td>
</tr>
<tr>
<td>South West</td>
<td>The Oaks</td>
<td>The Oaks Airfield (Recreational &amp; Ultra-light)</td>
<td>Private</td>
</tr>
<tr>
<td>South West</td>
<td>Wedderburn</td>
<td>Wedderburn Airport</td>
<td>Private</td>
</tr>
</tbody>
</table>

ANEF contour information was available for Bankstown Airport, Camden Airport and the planned Western Sydney Airport.

### 15.5 Other Special Uses (e.g. Military Lands)

Australian Land Use and Management (ALUM) classification identifies a range of other special land uses. This includes Military Lands which are classified under the category of “Services”. Military Lands have limitations for alternative uses due to risks associated with unexploded ordnance.
16 MRA Values of the South District

16.1 South District and MRA Lands

Sutherland LGA is the only LGA in the South District that contains MRA lands. Its main values relate to biodiversity, water catchment and tourism.

16.2 Public and Private Lands of the South District MRA

The South District MRA comprises predominantly public land - Royal National Park, Heathcote National Park and the bed of Port Hacking River. Private land occurs in the western area of the South District MRA. A large part of the private land is owned by Gandangara Local Aboriginal Land Council's and is subject to a proposal to:

- Conserve parts of the project area for public access;
- Create green corridors linking the Georges River National Park with the Woronora River;
- Remediate degraded and contaminated areas;
- Protect Aboriginal cultural sites and build an Aboriginal cultural centre;
- Provide for employment-generating industries and supporting retail;
- Create local employment – up to 4,700 jobs;
- Develop initiatives for energy efficiency, solar power and water efficiency mechanisms; and
- Release land for 2,400 residential dwellings.

Figure 16.1 - South District MRA that is Public Land, Rural Villages and Other Private Land
16.3 Agricultural Values of South District MRA

Land and Soil Capability

There is only a small amount of private rural land (outside of rural villages) in the MRA. Consequently, LSC information is presented for all private land (rather than just rural zoned land).

Figure 16.2 - Land and Soil Capability Class of Private Land (Outside of Rural Villages)

There is no Class 1, 2 or 3 private land within the South District MRA.

Agricultural Activities/Land Uses

The use of private land in the South District is predominantly 'Other minimal uses', 'Conservation' and 'Mining'. Productive agricultural use is minimal.
The total annual local value of agricultural production in the Sutherland LGA in 2014-15 was $71,466, from nurseries (ABS 2016). 99% of production value was outdoors and 1% indoors (ABS 2016).

**BSAL**

There is no BSAL in the South District.

**Land Fragmentation**

The private land in the MRA comprises mainly two lots of greater than 100ha.

**Clusters**

There are no agricultural clusters in the South District MRA.

**16.4 Biodiversity Values of the South District MRA**

Almost all of the South District MRA is of HEV or identified as having biodiversity values or constrained land in the LEP.

**16.5 Water Quality of the South District MRA**

**Water Catchment**

An area in the south west of the South District is identified as Water NSW land.
**Waterways**

There is an extensive network of waterways throughout the District including waterways with a Stream Order of 4 or greater.

**16.6 Mining and Extractive Industry in the South District MRA**

There is no current or prospective mining in the District, however there is some extractive industry towards the northern edge of the MRA.

**16.7 Landscapes**

The South District is dominated by the Hawkesbury Sandstone geological formation and the dissected Woronora Plateau with isolated pockets of remnant Wianamatta Group sediments. The landscape character is either National Park or Suburban development with nodes of Industrial Urban

**16.8 Tourism in the South District MRA**

The average, total number of visitors to Sutherland LGA for the three years ending September 2014 was almost 1.2 million (Destination NSW 2014).

International visitors who stayed overnight averaged 23,700. 64% of these visitors to Sutherland came to visit friends and relatives while 25% came for holiday purposes. For those who came to Sutherland for holiday purposes, the most popular activities were eating out at restaurants and cafes (89%), sightseeing (87%), going to the beach (78%), shopping (77%) and visiting national parks 68% (Destination NSW 2014).

The average number of domestic overnight visitors to Sutherland over the last three years was 265,000 with 63% travelling for the purpose of visiting friends and relatives, 18% for a holiday and 12% for business purposes. The most popular activities for domestic overnight visitors to Sutherland who came for holiday purposes were eating out at restaurants (64%), going to the beach (38%) and bushwalking (29%) (Destination NSW 2014).

The majority (944,100) of visitors to Sutherland were day trip visitors. Almost half (46%) came to visit friends and relatives, while 41% came to the area for leisure activities. The most popular activities for day trippers who visited Sutherland for leisure purposes were eating out at restaurants (38%), visiting national parks (34%) and going to the beach (30%) (Destination NSW 2014).

The public lands, in particular the National Parks, of the South District MRA have significant tourism values.

**16.9 Other Values of the South District MRA**

Refer to the Attached Maps of the South District MRA for maps of:

- Boundary of the South District MRA Land and LGAs;
- Public and Private Land in the MRA;
- Land and Soil Capability Class of Private Land in the MRA;
- Land Use of Private Land in the MRA;
- Land Use Zoning of Private Land in the MRA;
• Land Fragmentation of Private Land in the MRA;
• Biodiversity Values of Public and Private Land in the MRA;
• Water NSW (previously Sydney Catchment Authority) Catchments;
• Waterway Hierarchy in the MRA;
• Flood Prone Land in the MRA;
• Possible Maximum Flood extent in the MRA
• Bushfire Hazard in the MRA;
• Heritage Values in the MRA;
• Rural Towns and Villages in the MRA;
• Mining and extractive industries in the MRA;
• Waste Facilities in the MRA;
• Acid Sulfate Soil Risks in the MRA;
• Aboriginal Land Councils in the MRA.

16.10 Summary

The South District MRA is 96% public lands. The small area of private land is in large land parcels, predominantly owned by the Gandangara Local Aboriginal Land Council and subject to an existing development proposal.

Soil in the South District is LSC Class 4 or higher, with the main use of private land being 'Other minimal uses', 'Conservation' and 'Mining'. The South District MRA contains the Australian Nuclear Science and Technology Organisation and Lucas Heights Resource Recovery Park. Productive agriculture is minimal with the highest value activity being outdoor nurseries with a local value of production of $71,466 in 2014-15.

Almost all of the South District MRA is of HEV and bushfire prone. The public lands of the South District MRA, in particular the National Parks, have significant tourism values.
17 MRA Values of the South West District

17.1 South West District and MRA Lands

The LGAs of the South West District that contain MRA lands are:

- Camden;
- Campbelltown;
- Fairfield;
- Liverpool; and
- Wollondilly.

17.2 Public and Private Lands of the South West District MRA

The South West District MRA comprises both public and private lands. Public land makes up around 71% of the South West District MRA and includes parts of the Blue Mountains National Park, Nattai National Park, Dharawal National Park, Nattai Conservation Area, Burragorang Conservation Park and Yerrandene Conservation Park.

17.3 Agricultural Values of the South West District MRA

**Land and Soil Capability**

There is no Class 1 or Class 2 private land (outside of rural villages) within the South West District MRA. 88% of the Class 3 land is flood prone.
Agricultural Activities/Land Uses

The major agricultural land use of private land (outside of rural villages) in the South West District is ‘Grazing’ and ‘Other minimal land use’.

BSAL

There is 3,377ha of BSAL in the South West District MRA, 96% of which is flood prone. This land coincides with part of the Irrigated horticulture and Multi use irrigated horticulture clusters.
Land Fragmentation

The private land in the South West District of the MRA comprises a mix of lot sizes with 45% of the land being of greater than 40 ha lot size.

Clusters

There are three agricultural clusters in the South West District:

- Irrigated horticulture (vegetables and herbs), Warragamba – Silverdale, Wollondilly LGA
- Multi use irrigated horticulture cluster, large lot sizes – Cobbitty and Camden
- Poultry sheds – Appin, Wollondilly and Campbelltown LGAs

Irrigated horticulture (vegetables and herbs), Warragamba – Silverdale, Wollondilly LGA

This cluster has a diverse range of agricultural enterprises located within it. Following grazing (781 hectares), seasonal horticulture is the second largest enterprise by land use covering an area of 265 hectares with lettuce, sweet corn, potatoes and tomatoes the main production (ABS 2012). Large areas of seasonal horticultural production are located on the alluvial floodplains adjacent to the Nepean River. Perennial horticulture covers 12 hectares and comprises of an 11 hectare olive grove in the south of the cluster (comprising of 4,500 trees) and 1 hectare of vine fruits along Bents Road in the centre of the cluster. Intensive animal production comprises of two poultry enterprises and a horse complex and training facility located on Taylors Road. The main land uses are presented in the table below.

Table 17.1- Land Uses in the Warragamba – Silverdale Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture incl shadehouses</td>
<td>265</td>
</tr>
<tr>
<td>Perennial horticulture</td>
<td>12</td>
</tr>
<tr>
<td>Cropping - hay and silage</td>
<td>25</td>
</tr>
<tr>
<td>Intensive animal production (poultry and equine)</td>
<td>42</td>
</tr>
<tr>
<td>Grazing modified pastures</td>
<td>781</td>
</tr>
<tr>
<td>Remnant native cover (incl National Parks) and plantation forestry</td>
<td>782</td>
</tr>
<tr>
<td>Residential</td>
<td>250</td>
</tr>
<tr>
<td>Reservoir, dams, rivers</td>
<td>116</td>
</tr>
<tr>
<td>Other</td>
<td>218</td>
</tr>
<tr>
<td>Total</td>
<td>2,492</td>
</tr>
</tbody>
</table>

The gross value of agricultural commodities produced in the Warragamba - Silverdale Statistical Area is $9.9m. Vegetables account for $5.4m with potatoes, lettuce, sweet corn and tomatoes being the main products. Nurseries accounted for $0.7m, while olives accounted for $0.1m. These products would be sent directly to their own supply networks, or sold directly through Sydney Markets or directly to suppliers. Poultry enterprises in this region account for $3.6m of gross value of agricultural production and include almost 200,000 meat chickens which would sold directly to broiler plants across the Sydney region.

APFGS identified the following planning issues to be considered in relation to this cluster:

- Land use conflict and mitigation measures (noise, dust, odour etc.).
- Waste
Multi use irrigated horticulture cluster, large lot sizes – Cobbitty and Camden

Historically this region was one of the early agricultural regions of the Sydney Basin with Lord Camden sanctioning a grant of 5,000 acres to John and Elizabeth Macarthur in 1805 for the purpose of breeding merino sheep. The Macarthurs later established Australia’s first dairy in Camden in the late 1820s and their descendants introduced viticulture, fruit trees and wheat to the region. This cluster is based around the Nepean River and includes the University of Sydney Camden Campus and the Elizabeth Macarthur Agricultural Institute (EMAI) the NSW Department of Primary Industries (DPI) Centre of Excellence for Animal and Plant Health. EMAI is currently located on part of the original land granted to the Macarthur’s in 1805. Sydney University currently use this site for education and research programs associated with their veterinary science and agriculture programs.

Agricultural production in this multi-use cluster is diverse and includes 1,664 hectares of grazing modified pastures which are primarily used for dairy (65%) and beef (35%) enterprises. The area also includes turf, nurseries and vegetable enterprises in the areas adjacent to the Nepean River. Seasonal horticulture (vegetables and flowers) cover 300 hectares with lettuce, broccoli, potatoes, tomatoes, herbs, pumpkins and capsicums the main varieties. There is also a major wholesale nursery operation located on Stanhope Road. Perennial horticulture also includes viticulture and fruits trees and olives.

Irrigated cropping account for 197 hectares and involves pasture cut for hay or silage. Intensive animal production enterprises cover 427 hectares with the largest use within this category relating to equine facilities which are scattered throughout the cluster. Poultry enterprises account for 7 hectares of this cluster. The main land uses are presented in the table below.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture</td>
<td>304</td>
</tr>
<tr>
<td>Perennial horticulture (including fruit trees, olives and vine fruits)</td>
<td>72</td>
</tr>
<tr>
<td>Grazing pastures (non-irrigated)</td>
<td>1,664</td>
</tr>
<tr>
<td>Irrigated pastures and cropping</td>
<td>715</td>
</tr>
<tr>
<td>Intensive animal production</td>
<td>427</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>939</td>
</tr>
<tr>
<td>Residential</td>
<td>330</td>
</tr>
<tr>
<td>Reservoir, dam or River</td>
<td>198</td>
</tr>
<tr>
<td>Other</td>
<td>534</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,183</strong></td>
</tr>
</tbody>
</table>

The gross value of agricultural commodities produced in the Camden-Ellis Lane, The Oaks-Oakdale and Badgerys Creek-Greendale Statistical Area is $99.2m. Vegetables account for $25.6m, nurseries ($4.0m), followed by cut flowers ($1.7m) and turf ($1.3m). Pasture and other cereal crops cut for hay had a gross value of $0.8m. Poultry (broiler production) had a gross value of $45.4m while eggs accounted for $3.7m. Whole milk was valued at $10.7m from over 7,300 head of dairy cattle in these statistical areas (ABS 2012). These products are generally sent directly to their own supply networks (including milk processors), wholesalers or sold directly through Sydney Markets or directly to suppliers. Poultry for meat production is generally sold to broiler plants across the Sydney Basin.

APFGS identified the following planning issues to consider in relation to this cluster:

- Daily truck movements associated with dairy and poultry enterprises needs to be catered for
- Land use conflict and mitigation measures (noise, dust, odour etc.).
• Land value escalation impacting on returns on investment
• Waste

**Poultry sheds – Appin, Wollondilly and Campbelltown LGAs**

This cluster is contained within the recently announced Greater Macarthur Priority Growth Area.

The predominant landuse within the cluster is grazing modified pasture which is typically used for dairy production and horse agistment. Intensive poultry production occupies approximately 5% of the total land area of the cluster and does not include the land directly adjacent to the poultry sheds which is used as a buffer for biosecurity. The cluster is 1,074 hectares with the main land uses are presented in the table as follows below.

**Table 17.3 - Land Uses in the Appin Agricultural Cluster**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive animal production (poultry)</td>
<td>51</td>
</tr>
<tr>
<td>Intensive animal production (dairy)</td>
<td>20</td>
</tr>
<tr>
<td>Seasonal horticulture</td>
<td>1</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>332</td>
</tr>
<tr>
<td>Grazing pastures</td>
<td>537</td>
</tr>
<tr>
<td>Residential</td>
<td>2</td>
</tr>
<tr>
<td>Reservoir, dam and river</td>
<td>37</td>
</tr>
<tr>
<td>Other</td>
<td>94</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,074</strong></td>
</tr>
</tbody>
</table>

The major value commodities within the cluster include whole milk production and poultry products valued at $1.8m and $1.3m respectively. As the poultry sheds are owned by Inghams all poultry products are absorbed within the existing company supply chains. Morrisons Dairy is the largest dairy farm within the Appin area with other farms within the cluster and surrounding area typically of a much smaller size. APFGS identified the following planning issues to be considered in relation to this cluster:

• Daily truck movements associated with poultry enterprises
• Land use conflict and mitigation measures (noise, biosecurity, odour etc.).
• Waste

**17.4 Biodiversity Values of the South West District MRA**

Extensive areas of the South West District are of HEV. The majority is located on public lands, although large areas of private land are also of HEV and have been identified on the Biodiversity Investment Opportunities (BIO) Map as land that is considered a priority investment area.

**17.5 Water Quality of the South West District MRA**

**Water Catchment**

Large areas of land to the west and south of the South West District MRA is identified as Water NSW land.

**Waterways**

There is an extensive network of waterways throughout the District including waterways with a Stream Order of 4 or greater.
17.6 Mining and Extractive Industry in the South West District MRA

There are substantial mining titles in the south of the District and in the Nattai area relating to coal. Mining in this area primarily relates to underground metallurgical coal. There are also a number of extractive industry operations.

17.7 Landscapes

The area is characterised by the contrast between the vegetated dissected plateaux with hilly and partly cleared rural lands on the southern part of the Cumberland Plain. The plateaux containing Lake Burragorang and a major portion of the Water NSW catchment area is located to the west and the Cataract Dam and part Woronora Dam Water Catchment Area to the east.

A corridor of suburban development with pockets of commercial and industrial development and open space stretches along the eastern side of the area from Campbelltown to Fairfield. An area south of Liverpool is occupied by the Holsworthy Military Reserve.

The rural landscape character is formed by the remnant Wianamatta group of sediments overlying the Hawkesbury sandstone together with alluvium associated with the freshwater drainage system to create a series of long ridges and hills with contained valley spaces where clearing of indigenous vegetation has been carried out on almost all areas other than the Hawkesbury sandstone geological formation. The pattern of hills, ridges and valleys is distinctive as is the remnant plantings which mark former rural estates and generally dating to the nineteenth century.

17.8 Tourism in the South West District MRA

There is no specific tourism information from Destination NSW in relation to the South West District. Refer to Section 10 for discussion of tourism in Western Sydney generally.

17.9 Other Values of the South West District MRA

Refer to the Attached Maps of the South West District MRA for maps of:

- Boundary of the South West District MRA Land and LGAs;
- Public and Private Land in the MRA;
- Land and Soil Capability Class of Private Land in the MRA;
- Land Use of Private Rural Zoned Land in the MRA including Agricultural Clusters;
- Land Use Zoning of Private Land in the MRA;
- Land Fragmentation of Private Land in the MRA;
- Biodiversity Values of Public and Private Land in the MRA;
- Water NSW (previously Sydney Catchment Authority) Catchments;
- Waterway Hierarchy in the MRA;
- Flood Prone Land in the MRA;
- Bushfire Hazard in the MRA;
- Mining and extractive industry in the MRA;
- Scenic Protection Land in the MRA;
- Heritage Values in the MRA;
- Rural Towns and Villages in the MRA;
- Mining and extractive industries in the MRA;
- Waste Facilities in the MRA;
- ANEF Contours from Western Sydney Airport;
• Air quality monitoring stations;
• Contaminated lands; and
• Aboriginal Land Councils in the MRA.

17.10 Summary

The South West District MRA is 71% public lands. It contains numerous rural villages and the private land outside of rural villages comprises a mix of lot sizes with 45% of the land being in lots of greater than 40 ha.

Soil in the South West District is LSC Class 3 or higher, with 88% of the Class 3 land being flood prone. This land coincides with 3,377 ha of BSAL and part of the Irrigated horticulture and Multi use irrigated horticulture clusters. A poultry shed agricultural cluster also exists around Appin, in the Wollondilly and Campbelltown LGAs.

The major agricultural land use of private land (outside of rural villages) in the South West District is ‘Grazing’ and ‘other minimal land use’.

Flood prone land and evacuation routes are a consideration in future planning for the District.

Extensive areas of the South West District are of HEV including large areas of private land.

There are coal mining titles in the south of the District and in the Nattai area and a number of extractive industry operations.

The Scenic Hills in Campbelltown are identified as an area of high landscape value.

The planned Western Sydney Airport and Camden Airport occur in this District.
18 MRA Values of the West District

18.1 West District and MRA Lands

The West District LGAs containing MRA lands are:

- Blue Mountains;
- Hawkesbury; and
- Penrith.

18.2 Public and Private Lands of the West District MRA

The West District MRA comprises both public and private lands. Public land makes up the majority of the West District MRA and includes the Blue Mountains National Park.

**Figure 18.1 - West District MRA that is Public Land, Rural Villages and Other Private Land**

18.3 Agricultural Values of West District MRA

**Land and Soil Capability**

There is no Class 1 or Class 2 rural zoned land within the West District MRA. 99% of the Class 3 land is flood prone.
Agricultural Activities/Land Uses

The major land use of rural zoned land in the West District is ‘Other minimal land use’ and ‘grazing.’

BSAL

There is 5,973 ha of BSAL in the West District MRA, 100% of which is flood prone. This land coincides mainly with the Hawkesbury River multi-use cluster – between Windsor and Richmond.
Land Fragmentation

The private land in the MRA is highly fragmented with the majority (66%) being less than 20ha.

Clusters

There are three agricultural clusters in the West District:

- Fruit trees – Bilpin
- Hawkesbury River multi-use cluster – between Windsor and Richmond
- Seasonal horticulture – Shane Park\textsuperscript{15}, Llandilo and Berkshire Park (Penrith LGA).

Fruit Trees - Bilpin

This cluster is comprised mainly of apple orchards interspersed with seasonal horticulture (vegetables and flowers) and some grazing in the cleared areas. The area of the cluster is 7,269 hectares, with the main land uses presented in the table below.

Table 18.1 - Land Uses in the Bilpin Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial horticulture (fruit trees, cut-flowers)</td>
<td>191</td>
</tr>
<tr>
<td>Grazing modified pastures</td>
<td>452</td>
</tr>
<tr>
<td>Irrigated modified pastures</td>
<td>14</td>
</tr>
<tr>
<td>Seasonal horticulture (incl. shade houses)</td>
<td>14</td>
</tr>
<tr>
<td>Plantation forestry</td>
<td>24</td>
</tr>
<tr>
<td>Nature conservation</td>
<td>5,785</td>
</tr>
<tr>
<td>Residential</td>
<td>504</td>
</tr>
<tr>
<td>Dams, rivers and other land uses</td>
<td>285</td>
</tr>
<tr>
<td>Total</td>
<td>7,269</td>
</tr>
</tbody>
</table>

The gross value of apple production in this cluster is estimated at $1.2m per year with over 40,500 apple trees located in this vicinity (ABS 2013). Produce from this region is either sold directly through Sydney Markets or through farm gate trails or farmers’ markets run through Hawkesbury Harvest. A wholesale fruit shop is located in Bilpin and a brewing company has been established which sells local branded cider to stockists across Sydney.

APFGS identified the following planning issues to be considered in relation to this cluster:

- Farm gate trail advertising, sales and visitor facilities
- Land use conflict and mitigation measures (noise, odour etc.).
- Land value escalation impacting on returns on investment
- Waste

Hawkesbury River Multi Use Cluster

This cluster is located on the floodplains of the Hawkesbury River and is comprised primarily of turf farms, seasonal horticulture (vegetables and flowers) and perennial horticulture (citrus). The area also has a

\textsuperscript{15} While Shane Park has been included in this analysis it is noted that it is part of the North West Priority Growth Area and not part of the MRA. The data available to AgEconPlus from APFGS did not permit excision of Shane Park from this analysis.
number of equine enterprises and polo fields scattered among the other agricultural enterprises. The area of the cluster is 5,823 hectares, with the main land uses presented in the table below.

### Table 18.2 - Land Uses in the Hawkesbury River Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigated modified pasture and Turf</td>
<td>1,898</td>
</tr>
<tr>
<td>Seasonal horticulture (vegetables and flowers)</td>
<td>705</td>
</tr>
<tr>
<td>Perennial horticulture (citrus)</td>
<td>84</td>
</tr>
<tr>
<td>Intensive animal production</td>
<td>604</td>
</tr>
<tr>
<td>Grazing pastures and cropping</td>
<td>1,313</td>
</tr>
<tr>
<td>Residential</td>
<td>114</td>
</tr>
<tr>
<td>Reservoir, dam or river</td>
<td>612</td>
</tr>
<tr>
<td>Plantation forestry</td>
<td>14</td>
</tr>
<tr>
<td>River</td>
<td>498</td>
</tr>
<tr>
<td>Other</td>
<td>347</td>
</tr>
<tr>
<td>Nature conservation and vegetated areas</td>
<td>134</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,823</strong></td>
</tr>
</tbody>
</table>

The gross value of production from turf farms in this region is estimated at $35.2m, followed by vegetables ($23.5m) comprising mainly of potatoes, herbs, lettuces, broccoli, cauliflowers, capsicum and melons. Nurseries and cut flowers had a gross value of $3.6m and $2.4m respectively. Located within this cluster are irrigated citrus plantations with over 4,600 trees, extensive beef grazing enterprises and a number of horse studs located within the cluster. Much of the turf sold within the Sydney Basin is grown in this cluster, while fruit and vegetables produced in this cluster are either sold directly through Sydney Markets or through farm gate trails or farmers’ markets. Other agricultural industries in the region include mushroom farms and poultry enterprises although these industries are located outside of the identified cluster boundary.

APFGS identified the following planning issues to consider in relation to this cluster:

- Area prone to flooding which could impact on investment decisions.
- Land use conflict and mitigation measures (noise, odour etc.).
- Waste

### Seasonal Horticulture – Seasonal horticulture (vegetables and herbs) – Shane Park – Llandilo – Berkshire Park

This cluster is located partly within the West District and partly within the x District. This cluster covers an area of 3,306 hectares and comprises mainly of seasonal horticulture – vegetables and herbs (including shadehouses) interspersed with intensive animal (poultry) enterprises. There are tracts of land within this cluster that may have previously been used for seasonal horticulture enterprises that have now been removed and are either used for grazing activities (1,173 ha) or presently not utilised for agricultural production. Residential accounts for 302 hectares (9%) of the land area within this cluster. The main land uses for this cluster are presented in the table below.
Table 18.3 - Land Uses in the Hawkesbury River Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture</td>
<td>168</td>
</tr>
<tr>
<td>Perennial horticulture</td>
<td>1</td>
</tr>
<tr>
<td>Intensive animal production</td>
<td>67</td>
</tr>
<tr>
<td>Grazing pastures</td>
<td>1,173</td>
</tr>
<tr>
<td>Residential</td>
<td>302</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>748</td>
</tr>
<tr>
<td>Reservoir or dam</td>
<td>59</td>
</tr>
<tr>
<td>Other</td>
<td>789</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,306</strong></td>
</tr>
</tbody>
</table>

Seasonal horticulture (herbs, vegetables, cut-flowers) account for approximately 168 hectares of this cluster ($8.4m) and are grown either outdoors or under shadehouses. Herbs, lettuce, broccoli and capsicums are the main seasonal horticultural production after cut-flowers and nurseries. A number of poultry enterprises are also interspersed among the cluster with Pirovic and Sons, one of the largest enterprises. In the broader region, poultry (broiler production) has a gross value of product of $28.9m with eggs having a gross value of production of $24.8m within the Riverstone-Marsden Park and Castlereagh-Cranebrook area.

APFGS identified the following planning issues to be considered in relation to this cluster:

- Land use conflict and mitigation measures (noise, lights, odour etc.).
- Land value escalation impacting on returns on investment
- Waste

18.4 Biodiversity Values of the West District MRA

Extensive areas of the West District are of HEV. The majority is located on public lands, although large areas of private land are also of HEV and have been identified on the Biodiversity Investment Opportunities (BIO) Map has as land that is considered a priority investment area.

18.5 Water Quality of the West District MRA

Water Catchment

An area in the south west of the West District is identified as Water NSW land.

Waterways

There is an extensive network of waterways throughout the District including waterways with a Stream Order of 4 or greater.

18.6 Mining and Extractive Industry in the West District MRA

There are a number of coal mining leases in the Blue Mountains. There is also extractive industry along the Hawkesbury Nepean River, in particular the Penrith Lakes Scheme.
18.7 Landscapes

The area has contrasting landscapes with the larger northern and western sections of vegetated dissected plateaux derived from the weathered Hawkesbury Sandstone geology and the Narrabeen Group formation with pockets of Wianamatta Group sediments on isolated ridgetops and the northern portion of the Cumberland Plain. These pockets have been cleared for agriculture or horticulture. At the junction of South Creek and Eastern Creek with the Hawkesbury River large deposits of alluvium and sand sit in the riverine floodplain and cleared for agriculture from the early days of British colonial settlement. Smaller pockets of alluvium in the narrow river valleys have also been cleared for productive land uses with a mosaic of patches of Woodland vegetation structure, suburban development, rural development and urban industrial. Urban landscapes are confined to the most dense urban parts of the various towns.

Scattered throughout are volcanic intrusion as basalt flows or diatreme formations expressed as mounts, flows or excavated plugs.

The two major roads and a railway line over the Blue Mountains Plateau complex connected villages located at sources of water and the villages have evolved into towns associated with heath and recreation tourism and merged with the ever expanding roadway to change the identity of the individual towns. Suburban development has occurred on the ridges and plateaux to overlook the valleys in the tradition of the Picturesque Movement. The Bells Line of Road and the Putty Road are of a smaller scale but have the potential for expansion for more truck use and hence an increase in scale.

18.8 Tourism in the West District MRA

The major tourism activity in the West District occurs in the Blue Mountains LGA. Total visitors to the Blue Mountains in 2014 was 1, 783,000, comprising 48,000 international visitors, 418,000 domestic overnight visitors and 1,317,000 domestic day visitors.

Total expenditure of visitors was estimated at $295M, with $180M of this being from overnight visitors.

The main purpose of visits to the Blue Mountains for all groups was 'holiday'. Domestic overnight and domestic day visitors identified 'general sightseeing', 'bushwalking or rainforest walks' and 'visit national parks or State parks' in the top five activities undertaken.

No Destination NSW tourism data is available for other LGAs in the District.

18.9 Other Values of the West District MRA

Refer to the Attached Maps of the West District MRA for maps of:

- Boundary of the West District MRA Land and LGAs;
- Public and Private Land in the MRA;
- Land and Soil Capability Class of Private Land in the MRA;
- Land Use of Private Land in the MRA including Agricultural Clusters;
- Land Use Zoning of Private Land in the MRA;
- Land Fragmentation of Private Land in the MRA;
- Biodiversity Values of Public and Private Land in the MRA;
- Water NSW (previously Sydney Catchment Authority) Catchments;
- Waterway Hierarchy in the MRA;
- Flood Prone Land in the MRA;
• Bushfire Hazard in the MRA;
• Mining in the MRA;
• Scenic Protection Land in the MRA;
• Heritage Values in the MRA;
• Rural Towns and Villages in the MRA;
• Mining and extractive industries in the MRA;
• Waste Facilities in the MRA;
• Acid Sulfate Soil Risks in the MRA;
• Contaminated lands in the MRA;
• Air quality monitoring stations; and
• Aboriginal Land Councils in the MRA.

18.10 Summary

The West District MRA is 76% public lands. It contains numerous rural villages and the private land outside of rural villages comprises a mix of lot sizes with 69% of the area having lots sizes of 20 ha or less.

The West District includes 5,983 ha of land that is LSC Class 3, 100% of which is flood prone. This land coincides with land identified as BSAL and is part of the Hawkesbury River multi-use agricultural cluster – between Windsor and Richmond. Two other agricultural clusters occur in the district, Fruit trees – Bilpin; and Seasonal horticulture – Shane Park, Llandilo and Berkshire Park (Penrith LGA).

The major agricultural land use of private land (outside of rural villages) in the West District is ‘Other minimal land use’ and ‘grazing.

Flood prone land and evacuation routes are a consideration in future planning for the District.

Extensive areas of the West District are of HEV including large areas of private land.

The Penrith Lakes Scheme sand and gravel quarry occurs in the West District and there are two underground coal mining titles in the lower Blue Mountains part of the District.

Large areas south and north of Penrith are identified for Scenic Protection.
19 MRA Values of the West Central District

19.1 West Central District and MRA Lands

The LGAs of the West Central District that include MRA lands are:

- Blacktown; and
- The Hills.

19.2 Public and Private Lands of the West Central District MRA

The West Central District MRA is predominantly (84%) private lands.

Figure 19.1 - West Central District MRA that is Public Land, Rural Villages and Other Private Land

19.3 Agricultural Values of West Central District MRA

Land and Soil Capability

There is no Class 1 or Class 2 private land (outside of rural villages) within the West Central District MRA. The highest LSC class is Class 4 land.
**Agricultural Activities/Land Uses**

The major agricultural land use of rural zoned land in the West Central District is ‘Other minimal land use’ and ‘grazing.’

**Figure 19.3 - Land Uses on Private Land (Outside of Rural Villages) in the West Central District by Area**

Note: excludes residential and industrial use, services (which includes defence land), utilities, rivers, dams, wetlands and channels.

**BSAL**

There is no BSAL in the West Central District MRA.
**Land Fragmentation**

The private land in the MRA is highly fragmented with the majority (69%) of lots being less than 20ha.

**Clusters**

There are two agricultural clusters in the West Central District:

- Multi Use Cluster Horticulture (Vegetable and Tree Fruits) - Maroota; and
- part of the Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia (also shared with the Northern District)

**Multi Use Cluster Horticulture (Vegetable and Tree Fruits) - Maroota**

Agricultural activities within this cluster cover an area of 673ha with the main agricultural enterprises being seasonal horticulture (vegetables, herbs and cut-flowers) and perennial horticulture (fruit trees). This cluster covers an area of 2,683 hectares with the main land uses presented in the table below.

**Table 19.1 - Land Uses in the Maroota Agricultural Cluster**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture</td>
<td>185</td>
</tr>
<tr>
<td>Perennial horticulture (including nurseries and cut-flowers)</td>
<td>100</td>
</tr>
<tr>
<td>Intensive animal production</td>
<td>30</td>
</tr>
<tr>
<td>Grazing pastures</td>
<td>358</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>1446</td>
</tr>
<tr>
<td>Residential</td>
<td>268</td>
</tr>
<tr>
<td>Mining (quarries)</td>
<td>150</td>
</tr>
<tr>
<td>Reservoir or dam</td>
<td>34</td>
</tr>
<tr>
<td>Other</td>
<td>112</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,683</strong></td>
</tr>
</tbody>
</table>

The gross value of agricultural commodities produced in the Dural - Kenthurst - Wisemans Ferry Statistical Area is $43.0m. Nurseries (outdoor and undercover) account for $22.9m with a number of the large nursery suppliers within the Sydney region being located in this area, while cut-flowers represent $8.1m. Stone fruit accounts for $4.3m and cover an area of 100 hectares with nectarines ($2.4m) and peaches ($1.8m). Vegetable production includes tomatoes, herbs, sweet corn, lettuce and pumpkins. A poultry enterprise is located in the southern portion of this cluster. Nursery products are generally sent direct to their own supply networks, while the herbs, vegetables, cut-flowers and stone fruit would be sold directly through Sydney Markets or directly to suppliers.

APGS identified the following planning issues to consider in relation to this cluster:

- Land use conflict and mitigation measures (noise, odour, visual etc.).
- Waste

**Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia**

Nurseries are the largest agricultural activity in the area, accounting for approximately half of the gross value of agricultural commodities produced in this statistical area. Seasonal horticulture is also interspersed throughout the cluster and includes: beans, broccoli, herbs, capsicums, pumpkins and tomatoes. Perennial horticulture (fruit trees and nurseries) in this area is mainly situated to the north of the cluster along the Old Northern Road and includes peaches, nectarines, plums, prunes and citrus. Equine
facilities are also common across this area with horse numbers estimated at over 400. The main land uses are presented in the table below.

### Table 19.2 - Land Uses in the Middle Dural, Galston and Arcadia Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture</td>
<td>353</td>
</tr>
<tr>
<td>Perennial horticulture</td>
<td>283</td>
</tr>
<tr>
<td>Intensive animal production</td>
<td>10</td>
</tr>
<tr>
<td>Grazing modified pastures</td>
<td>970</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>6,851</td>
</tr>
<tr>
<td>Residential</td>
<td>1,609</td>
</tr>
<tr>
<td>Reservoir or dam</td>
<td>63</td>
</tr>
<tr>
<td>Other</td>
<td>755</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,894</strong></td>
</tr>
</tbody>
</table>

The gross value of agricultural commodities produced in the Dural - Kenthurst - Wisemans Ferry and Galston-Laughtondale Statistical Area is $57m. Nurseries (outdoor and undercover) account for $28.7m with a number of the large nursery suppliers within the Sydney region being located in this area, while cut-flowers represent $9.4m. Stone fruit accounts for $4.8m and cover an area of 283 hectares with nectarines, peaches, plums and prunes being the main activities. Vegetable production comprises of pumpkins, tomatoes, herbs, capsicums, beans and broccoli. Nursery products are generally sent direct to their own supply networks, while the herbs, vegetables, cut-flowers and stone fruit would be sold directly through Sydney Markets or directly to suppliers.

A PFGS identified the following planning issues to be considered in relation to this cluster:

- Land use conflict and mitigation measures (noise, odour, visual etc.).
- Land value escalation impacting on returns on investment
- Waste

### 19.4 Biodiversity Values of the West Central District MRA

The majority of the West Central District is HEV, identified in an LEP as having biodiversity value or being constrained land, or being subject to a Conservation Agreement.

### 19.5 Water Quality of the West Central District MRA

**Water Catchment**

None of the West Central District MRA land is identified as Sydney Catchment Area land.

**Waterways**

There is an extensive network of waterways throughout the District including waterways with a Stream Order of 4 or greater.
19.6 Mining and Extractive Industry in the West Central District MRA

There is no current or prospective mining activity in the District. Current activity relates to extractive industry, in the Maroota area and within the Maroota Agricultural Cluster.

19.7 Landscapes

This includes the Local Government areas of Blacktown and The Hills. This area has almost equal extent of dissected sandstone plateaux to the north, undulating hills and plains associated with Wianamatta Group geology with edges defined by ridges, Hawkesbury River frontage. Localised hill formations are associated with volcanic plugs or diatremes such as the former Prospect Hill and the western boundary is aligned with Eastern Creek.

Open Forest vegetation is associated with the dissected plateaux to the north and within the Hills area mostly along drainage lines within narrow valleys.

The dominant landscape type in this area is a suburban one with pockets of Industrial urban development and cleared rural lands throughout containing many dams of varying size.

This area is represented by the spatially open landscape of the northern portion of the Cumberland Plain with the more enclosed dissected plateau country gullies and the open gentle slopes of the plateau.

19.8 Tourism in the West Central District MRA

No specific Destination NSW tourism data is available for the West Central District. Refer to Section 10 for discussion of tourism in Western Sydney generally.

19.9 Other Values of the West Central District MRA

Refer to the Attached Maps of the West Central District MRA for maps of:

- Boundary of the West Central District MRA Land and LGAs;
- Public and Private Land in the MRA;
- Land and Soil Capability Class of Private Land in the MRA;
- Land Use of Private Land in the MRA including Agricultural Clusters;
- Land Use Zoning of Private Land in the MRA;
- Land Fragmentation of Private Land in the MRA;
- Biodiversity Values of Public and Private Land in the MRA;
- Waterway Hierarchy in the MRA;
- Flood Prone Land in the MRA;
- Bushfire Hazard in the MRA;
- Heritage Values in the MRA;
- Rural Towns and Villages in the MRA;
- Mining and extractive industries in the MRA;
- Acid Sulfate Soil Risks in the MRA;
- Contaminated lands in the MRA; and
- Aboriginal Land Councils in the MRA.
19.10 Summary

The West Central District MRA is 84% public lands. Private land outside of rural villages is highly fragmented with the majority (69%) of the area having lot sizes of less than 20ha.

Soils of the West Central District are LSC Class 4 or higher. The District contains no BSAL but has two agricultural clusters - Multi Use Cluster Horticulture (Vegetable and Tree Fruits) - Maroota; and part of the Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia (also shared with the Northern District).

The major agricultural land use of private land (outside of rural villages) in the West Central District is ‘Other minimal land use’ and ‘grazing.’

Extensive areas of the West Central District are of HEV including large areas of private land.

Extractive industries occur in the north east of the District at Maroota.

Soils along the Nepean River are in the high risk category for acid sulfate soils.
20 MRA Values of the North District

20.1 North District and MRA Lands

The LGAs of the North District that include MRA lands are:

- Hornsby;
- Ku-ring-gai; and
- Northern Beaches.

20.2 Public and Private Lands of the North District MRA

The North District MRA comprises both public and private lands. Public land makes up the majority of the North District MRA and includes Marramarra National Park, Muogamarra Nature Reserve, Garigal National Park and Ku-ring-gai Chase National Park.

Figure 20.1 - North District MRA that is Public Land, Rural Villages and Other Private Land

20.3 Agricultural Values of North District MRA

**Land and Soil Capability**

There is no Class 1, Class 2 or Class 3 private land within the North District MRA.
**Agricultural Activities/Land Uses**

The major land use of private land in the North District is 'Other minimal land use' and 'grazing.'

**Figure 20.3 - Land Uses on Private Land (Outside of Rural Villages) in the North District by Area (ha)**

Note: excludes residential and industrial use, services (which includes defence land), utilities, rivers, dams, wetlands and channels.
BSAL

There is no BSAL in the North District MRA.

Land Fragmentation

The private land in the MRA is highly fragmented with the majority (95%) of lots being less than 20ha and 60% being less than 5ha.

Clusters

There is part of one agricultural clusters in the North District - the Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia (shared with the West Central District).

Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia

Nurseries are the largest agricultural activity in the area, accounting for approximately half of the gross value of agricultural commodities produced in this statistical area. Seasonal horticulture is also interspersed throughout the cluster and includes: beans, broccoli, herbs, capsicums, pumpkins and tomatoes. Perennial horticulture (fruit trees and nurseries) in this area is mainly situated to the north of the cluster along the Old Northern Road and includes peaches, nectarines, plums, prunes and citrus. There is also a large stone fruit area in the Canoelands region in the northern section of this cluster located along Canoelands Road. Equine facilities are also common across this area with horse numbers estimated at over 400. The main land uses are presented in the table below.

Table 20.1 - Land Uses in the Middle Dural, Galston and Arcadia Agricultural Cluster

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal horticulture</td>
<td>353</td>
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<td>Other</td>
<td>755</td>
</tr>
<tr>
<td>Total</td>
<td>10,894</td>
</tr>
</tbody>
</table>

The gross value of agricultural commodities produced in the Dural - Kenthurst - Wisemans Ferry and Galston-Laughtondale Statistical Area is $57m. Nurseries (outdoor and undercover) account for $28.7m with a number of the large nursery suppliers within Greater Sydney being located in this area, while cut-flowers represent $9.4m. Stone fruit accounts for $4.8m and cover an area of 283 hectares with nectarines, peaches, plums and prunes being the main activities. Vegetable production comprises of pumpkins, tomatoes, herbs, capsicums, beans and broccoli. Nursery products are generally sent direct to their own supply networks, while the herbs, vegetables, cut-flowers and stone fruit would be sold directly through Sydney Markets or directly to suppliers.

APFGS identified the following planning issues to consider in relation to this cluster:

- Land use conflict and mitigation measures (noise, odour, visual etc.).
- Land value escalation impacting on returns on investment

MRA Study
20.4 Biodiversity Values of the North District MRA

Extensive areas of the North District are of HEV. The majority is located on public lands, although some areas of private land are also of HEV and have been identified on the Biodiversity Investment Opportunities (BIO) Map as land that is considered a priority investment area.

20.5 Water Quality of the North District MRA

Water Catchment

There are no areas in the North District identified as Sydney Catchment Area land.

Waterways

There is an extensive network of waterways throughout the District including waterways with a Stream Order of 4 or greater.

20.6 Mining and Extractive Industry in the North District MRA

There is no current or prospective mining activity in the District. Current activity relates to extractive industry near Maroota.

20.7 Landscapes

The area is dominated by the weathered landform of the Hornsby Plateaux together with the influence of the marine coastal environment, the estuarine environment of the Hawkesbury River in a post glacial context along its eastern and northern edges.

The geological formations of Hawkesbury sandstone with remnants of overlying Wianamatta group sediments and the underlying Narrabeen group have strongly influenced the land uses of suburban development with pockets of industrial urban development and pockets of rural uses taking advantage of the relatively better soils found on the weathered Wianamatta group on the plateaux and the Narrabeen group at the edges of the estuarine environment.

The relatively poor soils of the sandstone country have resulted in large areas dedicated as; national park, nature reserves and regional parks with a high proportion of indigenous vegetation with an open forest to woodland structure.

The tree canopy has persisted amongst the suburban development, particularly where lot sizes are relatively large.

The occurrence of volcanic dykes and diatremes has resulted in either early agricultural pursuit (Peats Crater) or quarrying for blue metal (dolerite).

The riverine flats along the margins of the Hawkesbury River and its tributaries have provided alluvial soils suitable for agriculture/horticulture on a small scale. Similarly the gentle slopes of the plateaux country
have supported rural uses such as agriculture/horticulture or quarrying depending on the nature of the soils.

Valleys are generally narrow with steep terraced sides and the major ones are rias which help form the complex estuary pattern with a strong sense of spatial enclosure. The steep sided enclosed valleys and gullies have allowed for the inconspicuous siting of particular facilities such as waste treatment plants and marinas.

The area is bisected with major road and rail systems and associated infrastructure and this is a common landscape type in all the major areas as an essential element for the functioning of the metropolitan complex.

20.8 Tourism in the North District MRA

No specific Destination NSW tourism data is available for LGAs in the North District. Refer to Section 11.2 for discussion of tourism in Western Sydney generally.

20.9 Other Values of the North District MRA

Refer to the Attached Maps of the North District MRA for maps of:

- Boundary of the North District MRA Land and LGAs;
- Public and Private Land in the MRA;
- Land and Soil Capability Class of Private Land in the MRA;
- Land Use of Private Land in the MRA including Agricultural Clusters;
- Land Use Zoning of Private Land in the MRA;
- Land Fragmentation of Private Land in the MRA;
- Biodiversity Values of Public and Private Land in the MRA;
- Waterway Hierarchy in the MRA;
- Flood Prone Land in the MRA;
- Bushfire Hazard in the MRA;
- Heritage Values in the MRA;
- Rural Towns and Villages in the MRA;
- Mining and extractive industries in the MRA;
- Waste Facilities in the MRA;
- Acid Sulfate Soil Risks in the MRA;
- Contaminated lands in the MRA; and
- Aboriginal Land Councils in the MRA.

20.10 Summary

The North District MRA is 81% public lands. Private land outside of rural villages is highly fragmented with the 60% of the area having lot sizes of less than 5ha.

Soils of the North District are LSC Class 4 or higher. The District contains no BSAL but contains part of the Multi Use Cluster Horticulture (Vegetable and Tree Fruits) – Middle Dural, Galston and Arcadia.

The major agricultural land use of private land (outside of rural villages) in the North District is ‘Other minimal land use’ and ‘grazing.'
Extensive areas of the North District are of HEV including areas of private land.

Extractive industries occur in the north west of the District at Maroota.

There soils of Hawkesbury-Nepean River and Pittwater are in the high risk category for Acid sulfate soils.
21 Considerations For Decision-Making

Identified urban growth and urban renewal areas provide sufficient land to meet housing demand for the medium to long term. Hence, the challenges facing MRA lands primarily relate to issues not associated with urban growth.

The MRA comprises both public and private lands. These lands provide different sets of values to the community and are facing different pressures.

For public lands, a value has been recognised through public policy, and regulation has been enacted to protect these values. While these values need to be protected from any impacts from adjoining landuses, threat to the values of these lands from a change in their own landuse and regulatory protection is unlikely.

Privately owned MRA lands have both private values that are determined by the interaction of supply and demand in the market, but may also provide public values to the community.

Urban influences are likely to be more significant determinant of private MRA land values than agricultural characteristics of the land. In particular, distance and travel time from Sydney City is likely to be a dominant determinant of value, with properties closer to Sydney City having higher values. Expectations about future subdivision potential may also be capitalised into land values, if there are expectations that subdivision outside urban growth areas will be permitted in the future.

Other major determinants of private MRA land values are likely to relate to characteristics of the land e.g. lot size, housing attributes, amenity etc.

The value of land for agricultural production is partly determined by its land capability. The Land and Soil Capability Assessment Scheme (OEH 2012) classifies land into eight classes. There is no Class 1 or Class 2 land in the MRA. 5.7% of private rural zoned land in the MRA is Class 3 land with 92% of this land being flood prone.

Agricultural clusters are one way of considering the agricultural value of land in the MRA that encompasses linkages, including processing and employment linkages. Seven clusters are identified in the MRA. However, no evidence of the operation of areas as industry clusters with agglomeration and network advantages has been documented. Nevertheless, at a minimum they represent areas of concentrated co-located agricultural production and coincide with 69% of the Class 3 and 19% of Class 4 land from the LSC Assessment Scheme.

BSAL mapping takes into account both Land and Soil Capability, soil fertility and access to a reliable water supply, and is likely to give the best indicator of high value agricultural lands. The area of BSAL land in the MRA is considerably less than the area of identified agricultural clusters.

While land capability, BSAL and clusters are indicators of the ability of land to accommodate different rural land uses and what is currently being produced, ultimately market forces primarily dictate the suitability of land for different agricultural activities and the viability agricultural activities and clusters.

Globalisation and trade in agriculture has put downward pressure on prices and led to a trend of fewer and larger farms and more intensive production. Small farms in peri-urban locations struggle to compete and hence there has been a relocation of fruit and vegetable production to rural areas where land is cheaper and there is more access to inputs to production such as water.
In NSW fruit and nut production (excluding grapes) is now primarily from the Riverina (40%), Richmond-Tweed (24%) and Murray (8%).

Vegetables for human consumptions (other than Mushrooms) is now primarily from the Central West (29%), Riverina (24%), and Murray (16%).

Across the private rural zoned land of the MRA the major land use is “other minimal landuse” followed by “grazing”. There are only small areas of intensive agricultural uses. The highest value food products are poultry for meat and eggs, and mushrooms (all produced in sheds) and unrelated to land capability. Nurseries, cut flowers or cultivated turf is the second most valuable agricultural activity in the MRA. Vegetables for human consumption (other than mushrooms) are the fifth main product followed by fruit and nuts (excluding grapes).

It is expected that there will be a continuing shift in the share of fruit and vegetable production to other regions of NSW, where land is cheaper and inputs such as water are more readily available. The maintenance of minimum subdivision sizes to promote agricultural production is unlikely to be successful, since current fragmentation and land values (influenced by proximity to Sydney City) are already prohibitive for farm amalgamation or ‘buy-in’ for agriculture investors.

The majority of the rural lands of the MRA will increasingly be primarily in demand as rural lifestyle properties, with some semi-commercial or non-commercial agricultural activities. Any intensification of rural lifestyle development could result in increased demand for the provision of infrastructure such as sewerage, water, telecommunications, waste facilities and roads, as well as increased demand for the goods and services provided by the rural villages of the MRA.

The use of the MRA lands for rural lifestyle properties and rural residential (whether additional subdivision is allowed or not) can also give rise to landuse conflicts between these properties and commercial/semi-commercial agricultural activities that can generate odours, noise, pollutants and pathogens as well as truck movements. Where commercial and semi-commercial agriculture occurs there is a need to ensure that it can continue, subject to market forces, without encroachment of incompatible landuses that will be adversely affected by agricultural activities.

Any increase in the fragmentation of lots for rural life style properties and rural residential may also provide a constraint on any long term future urban development potential of the MRA as they smaller lots attract higher land values than larger agricultural holdings and they provide a barrier to consolidation for urban development given that they have multiple owners and land titles.

Notwithstanding, offset schemes and permitting some subdivision may provide an opportunity to achieve conservation outcomes on private land and potentially fund the protection of other MRA values.

Whether MRA land is used for rural lifestyle properties, rural residential or commercial/semi-commercial agriculture these uses are potentially constrained by flood prone land, bushfire hazard, acid sulfate soils, ANEF noise contours for the planned Western Sydney Airport, European and Aboriginal heritage. These rural uses on private lands may also impact public values associated with biodiversity, water quality, heritage and landscape. These public good values are expected to increase in value as demand increases with population growth and increased community wealth and public good attributes become more scarce.

Regardless of the form of the rural uses, the MRA has significant landscape, tourism and recreation values for residents and tourists alike. With a forecast growing population in urban areas of Greater Sydney, visitation to the MRA is likely to expand, requiring planning and management to ensure that the attributes that are valued by the community are not also degraded by the community.

Part of the scope of this study was consideration of criteria to assist decision makers to:
• minimise the adverse economic impacts on existing primary industry and productive agriculture;
• consider critical natural resource constraints;
• provide adequate public open space and recreational activities and avoid creating unsustainable pressure on existing Crown Land areas and State forests;
• consider natural hazards, such as the need to evacuate people from flood/bushfire prone areas; how flood-prone areas will be avoided and not increasing flood risks in new housing areas (through early planning for stormwater management); and
• consider and plan to protect significant natural resources including water quality, riparian and aquatic habitats and marine estates.

However, no criteria can replace the complexities and trade-offs involved with strategic planning. Where different strategic planning options are available, evaluation frameworks such as Multi Criteria Analysis and Cost Benefit Analysis can provide inputs to decision-making, the former identifying the performance of options against predetermined criteria and the latter weighing up the community costs and benefits of alternatives. However, these are only inputs to decision making not substitutes for it.

What this report provides is analysis and spatial recognition of a range of economic, social and environmental values across the MRA landscape, together with spatial identification of a number of biophysical constraints to land use. This information provides a solid evidence base on which strategic planning for the MRA can be advanced.

Nevertheless, there are limitations in the existing information that may benefit from further study. In particular, spatial information on significant rural and other landscapes within the MRA is limited. Furthermore, information in Section 3 (Economic Values of MRA) and the main attributes contributing to this value, relied heavily on overseas studies. The GIS data collated for this study, together with property valuation information from the Valuation Services, Property NSW would be sufficient to undertake a specific hedonic pricing study for MRA lands. Such a study would enable the influence of a range of property attributes such as size, land and soil capability, area of native vegetation, distance to Sydney City, distance to urban growth areas etc. to be empirically quantified.
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Acid Sulfate Soils Management Advisory Committee

AGL 2014 Presentation to Dec 2014 CCC Meeting


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