Greater Sydney Commission

# Making the Western Parkland City:

## Initial Place-based Infrastructure Compact (PIC) Area

Technical Report

2020

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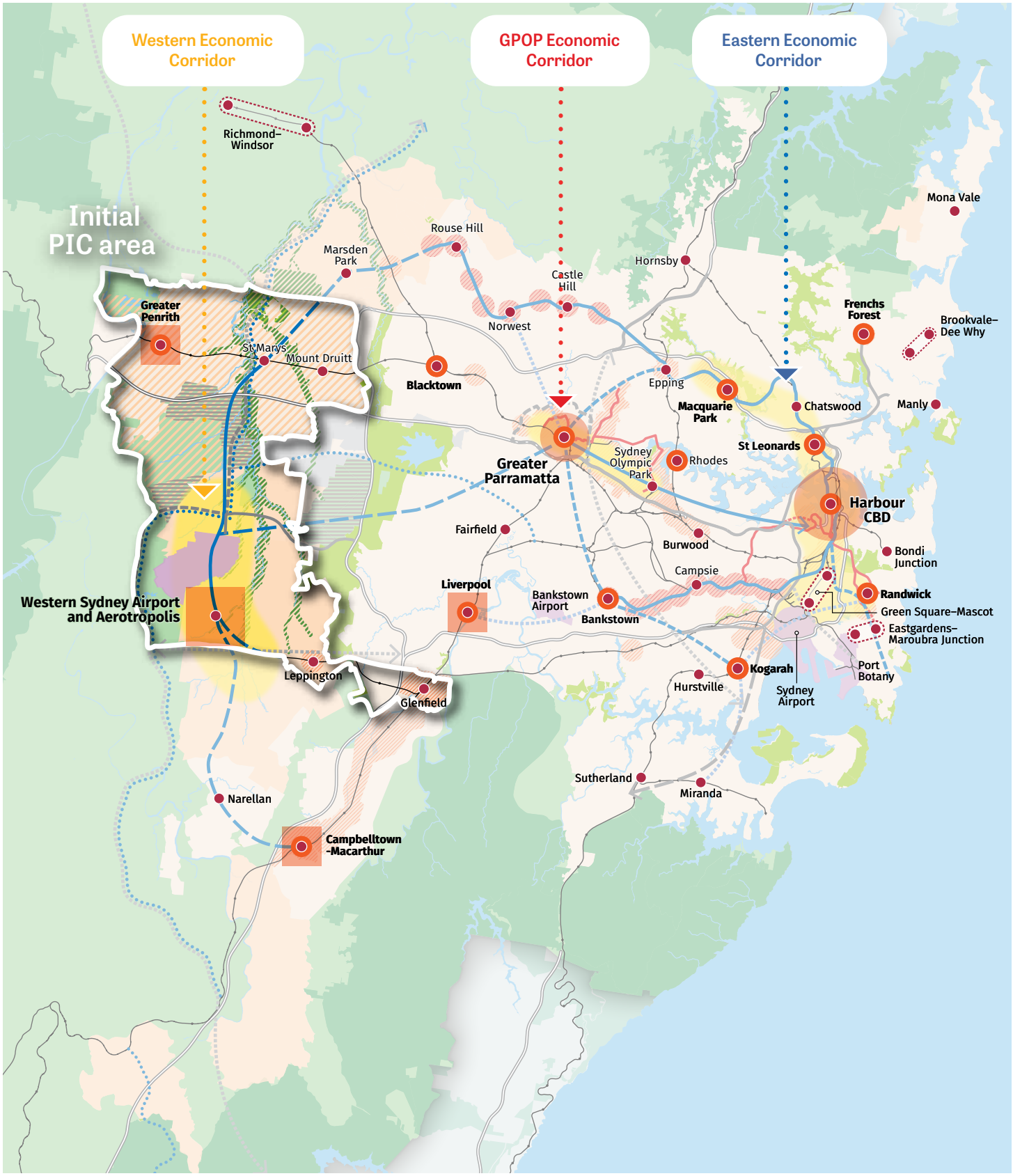
### Acknowledgement of Country

The Greater Sydney Commission acknowledges the traditional custodians of the lands that include Greater Sydney and the living culture of these lands. The Commission recognises that the traditional custodians have occupied and cared for this Country over countless generations and celebrates their continuing contribution to the life of Greater Sydney.

**Figure 1:** Initial PIC area



# Executive summary

This Initial Place-based Infrastructure Compact (PIC) area Technical Report provides the detailed findings of the initial stages of the Western Sydney PIC Program, established by the Greater Sydney Commission to plan for the future of the Western Parkland City as part of the Western Sydney City Deal.

It should be considered a companion document to the **draft PIC**, which describes the key findings and proposed actions that will form the basis of recommendations to the NSW Government.

This work uses the new PIC model, a highly collaborative model that identifies the most effective way to sequence growth with the provision of infrastructure in high transformation areas like the Western Parkland City.

Stakeholders have made it clear that publishing the inputs, assumptions and methods used in the PIC process through this Technical Report is essential to their understanding of the new PIC model, to have trust in the way the method was applied and to understand how this work translates into recommendations to government.

A robust PIC process requires the involvement and dedication of teams across all levels of government, as well as extensive technical analysis. In reporting the findings, this Technical Report represents the analysis and inputs from State agencies at a point in time. The first 18 months of the PIC process occurred alongside work across government to collectively achieve the vision for the Western Parkland City. In this regard, the Technical Report's findings were reported prior to the September 2020 rezoning of precincts under State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (Aerotropolis SEPP).

The PIC process began by working with State agencies and the eight councils of the Western City District - Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith, Wollondilly – as well Blacktown City Council to understand the Western Parkland City as a whole.

This work drew on an understanding of the existing metropolitan cluster – Greater Penrith, Liverpool and Campbelltown-Macarthur – as well as the emerging Western Sydney Aerotropolis that will support the new Western Sydney International (Nancy-Bird Walton) Airport. It looked at the Western Parkland City on the basis of these four clusters and considered how the opportunities of the new Airport and Aerotropolis will bring investment and renewal in the right places across the Western Parkland City.

This foundational work also drew on the importance of Wianamatta-South Creek as the connecting green spine that will be at the heart of planning for a cool, green connected Western Parkland City, and the enduring connections since time immemorial that Aboriginal communities have had on this land.

From this work, the PIC process identified that two areas – initially described as PIC 1 (the Western Sydney Aerotropolis Growth Area) and PIC 2 (Greater Penrith to Eastern Creek) – would be subject to the extensive analysis of the PIC model due to the connecting elements of both the planned Sydney Metro – Western Sydney Airport and Wianamatta-South Creek. This acknowledges that the entire Western Parkland City could not be progressed at the same time if strategic planning for infrastructure, places and people is to make best use of public resources and deliver infrastructure in step with population growth.

From this understanding of place, the PIC process commenced with a six-step model, of which this Technical Report details the findings for the first three. During the these three steps, the 28 identified precincts of PIC 1 and PIC 2 were essentially merged into what is know as the initial PIC area, as the findings indicated how both areas could complement each other as distinct places for jobs, industry and places to live.

### Step 1: Outcomes setting, scenario development and land use forecasting

This step established **six place outcomes** to drive future Western Parkland City that has:

1. Strong focus on wellbeing and inclusiveness
2. Aboriginal living culture and equitable participation
3. Jobs, skills and innovation – for everyone in the city
4. Well connected places - transport and digital
5. Scenic, productive and resilient landscapes
6. Connected, diverse and resilient communities

**Three scenarios were developed** based on the liveability, productivity and sustainability assumptions expected to shape the Western Parkland City to 2056.

#### Growing Parkland City:

A Western Parkland City created under existing planning opportunities without any further rezoning of land to deliver more suburban communities and jobs in centres, with some transport improvements through already committed infrastructure.

#### Thriving Aerotropolis:

A Western Parkland City is underpinned by a connected metropolitan cluster, where communities have access to new industries and career opportunities in a **thriving Aerotropolis**, with stronger centres in **Liverpool**, **Greater Penrith** and **Campbelltown-Macarthur**, that are well connected to surrounding compact, urban and renewed communities and centres.

#### Thriving Metropolitan Cluster:

A Western Parkland City is underpinned by the **metropolitan cluster**, where people have easy and better access to industry and jobs in **Liverpool**, **Greater Penrith** and **Campbelltown-Macarthur**, surrounding employment areas and the **emerging Aerotropolis**.

These scenarios were applied to a co-designed **land use forecasting** process that involved the Commission, councils (both directly and through the Western Sydney Planning Partnership), Department of Planning, Industry and Environment, and Transport for NSW. The forecasts reflect the strategic thinking about the spatial distribution of growth in the Western Parkland City.

Again, they represent a *point in time* and are based on 2016 population projections. The PIC model is such that as new projections are produced to acknowledge longer term trends and any enduring impacts on growth caused by the COVID-19 pandemic, they will be considered in the holistic, collaborative manner that underpins the PIC process.

The Technical Report details the findings of the forecasting activity in terms of each of the 28 precincts identified in the initial PIC area.

### Step 2: Cross-sector infrastructure needs, costings and funding sources

The Technical Report details the methodology and assumptions that provided an assessment of existing infrastructure and services in the initial PIC area and the capacity of infrastructure and services to accommodate growth.

The findings detail the work of agencies to identify requirements, apportion costs and determine funding sources for:


Transport


Water


Open space, bushland, waterways and tree planting


Energy


Digital


Waste


Education


Health


Cultural infrastructure


Justice


Fire and rescue


Police

The process for identifying the corresponding land requirements for this infrastructure was then applied to the agency work. These findings are reported for:

- each sector
- each scenario
- each precinct.

All infrastructure proposals are linked back to the Place Outcomes indicators, established during Step 1.

### Step 3: Analysis of scenarios and precincts to identify preferred sequencing

The economic and cost-effectiveness analysis of Step 3 provides background to the proposed sequencing plan for the initial PIC area. This analysis acknowledges the long-term horizon of the PIC process over 40 years.

The analysis found that the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios will bring about the greatest benefits over 40 years.

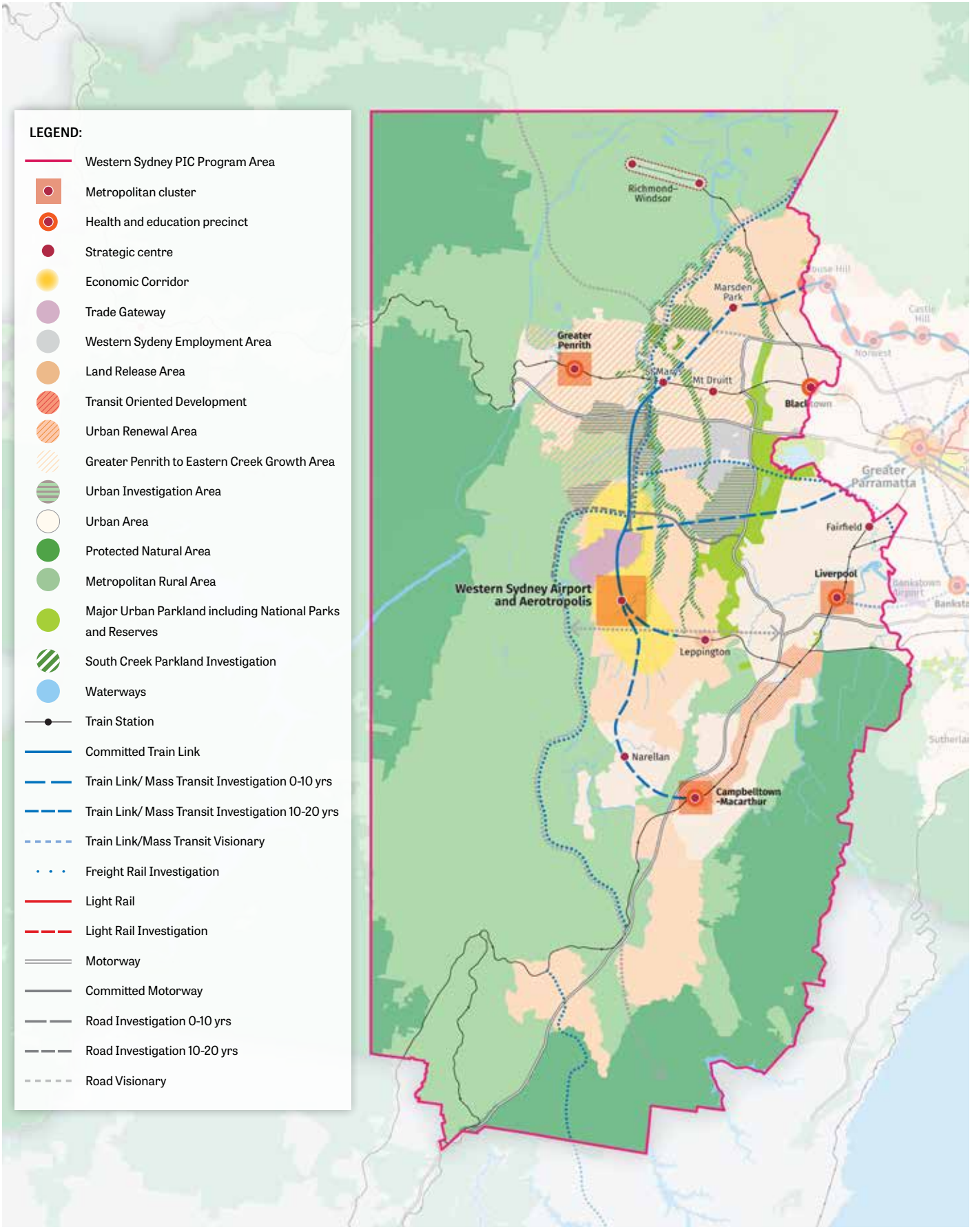
The net benefits for the community under these scenarios is $3.5 to $4 billion, compared to $-1.1 billion for the Growing Parkland City scenario, where growth is constrained to that permitted under existing planning controls, with no further rezoning of land around major new infrastructure.

### Next steps

The Technical Report and draft PIC, along with a consultation outcomes report, form the package of technical work that will be subject to public feedback.

These reports should be read together to provide a full understanding of how the PIC process brings together the complexities of city making and how best to transition Greater Sydney into a true metropolis of three cities.

**Figure 1-1:** Western Sydney PIC Program Area



# 1 Introduction

## 1.1 About the Western Sydney PIC Program

The Greater Sydney Commission established the Western Sydney Place-based Infrastructure Compact (PIC) Program in early 2019 as part of the Western Sydney City Deal.

The Western Sydney City Deal agreement between the Australian Government, NSW Government and eight local councils - Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly - represents a collaboration to plan for the Western Parkland City.

As part of this, the PIC Program uses the Greater Sydney Commission's new PIC model, a highly collaborative model that looks holistically at a place to identify the most effective way of sequencing growth to align with the provision of infrastructure over time.

This is a process that thinks beyond traditional land use and infrastructure planning; it thinks of the Western Parkland City in terms of how the integration of land uses and infrastructure will bring broad social benefits and protect the Western Parkland City's cool, green landscape.

The new PIC model was developed through a pilot process over two years between 2017 and 2019. Its pilot application in the Central River City was released for public feedback in November 2019.

While broad support for the new PIC model was consistent among stakeholders, this was subject to the Commission enabling greater collaboration and transparency in the process. The PIC process set out to address this early through:

- much stronger partnerships with councils through the City Deal
- earlier engagement with the community, peak groups, industry and regulators
- enhanced coordination across government and utility providers with greater transparency of technical inputs into key steps in the PIC model.

This **Technical Report** is another element that responds to this feedback. It represents a step change in level of transparency of technical inputs so that everyone can understand the full analysis and rationale behind the Commission's recommendations. It is a companion document to the **draft PIC**, which describes key findings and proposed actions.

This Technical Report also reflects the maturing collaboration between the partners involved in the PIC process and the engagement with stakeholders that has consistently shaped the processes and findings of this draft work.

The vision for the Western Parkland City requires coordinated, collaborative and strategic thinking that looks at the growing community's overall needs and aspirations. The PIC process:

- defined the program area – referred to as the initial PIC area
- set the objectives
- identified key partners to co-deliver the program
- defined the governance structure
- focused on the initial PIC area.

### Related Western Sydney City Deal commitments

The City Deal is a collaborative place-based approach to building and coordinating investment that will transform the region through planning reform, improve access to employment, housing, health, education and liveability outcomes in Western Sydney.

The Western Sydney PIC Program relates to the six themes of the City Deal and intersects with its 38 City Deal commitments.

- **Connectivity:** The Sydney Metro - Western Sydney Airport (St Marys to the Aerotropolis), which includes six stations and will open with the new Airport in 2026.
- **Jobs for the future:** A $5 million Investment Attraction Fund, a dedicated Western Sydney Investment Attraction Office, an Indigenous Business Hub and an Agribusiness Precinct Feasibility Study.
- **Skills and education:** The joint delivery of a world-class higher education and research presence by the NUW Alliance (University of Newcastle, University of NSW, University of Wollongong) in the Aerotropolis and a temporary TAFE NSW Skills Exchange near the Airport to provide training for airport construction workers; a permanent Vocational Education and Training (VET) facility in the Aerotropolis with a focus on construction, aviation and aeronautical-related engineering.
- **Liveability and environment:** A $150 million Liveability Program to fund vital community infrastructure and public spaces such as parks, sports facilities, rejuvenated town centres and cultural spaces. In addition, developing a strategy for Wianamatta-South Creek that will investigate its restoration and protection as part of the broader strategy of integrating land use and water management within the 63,000 hectare catchment
- **Planning and housing:** A $30 million Western Parkland City housing package to focus on planning approvals and sustainable growth, with initiatives such as the Western Sydney Planning Partnership and this PIC process.
- **Implementation and governance:** Enduring tri-government governance and community partnerships.

### Program area

The Western Sydney PIC Program includes the eight local government areas (LGAs) of the Western City District -Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly – as well as Blacktown LGA in the Central City District, to incorporate the whole Wianamatta-South Creek catchment.

### Program objectives

The objectives for the Western Sydney PIC Program are to:

- work collaboratively to co-create the Western Parkland City, including the Aerotropolis as a city supported by infrastructure over the next 20 years and beyond
- support the partnership and commitments of the City Deal to transform Western Sydney, and its focus on connectivity, jobs for the future, skills and education liveability, environment, planning and housing
- support the vision, objectives and planning priorities of the *Western City District Plan*, including the creation of a Western Economic Corridor
- support the unique metropolitan cluster of Greater Penrith, Liverpool, Campbelltown-Macarthur and the Western Sydney Aerotropolis
- help to facilitate a range of housing, located so that residents can easily access to public transport and services
- enhance Wianamatta-South Creek as the green corridor for the Western Parkland City, to keep water in the landscape and mitigate urban heat
- identify early the infrastructure and services needed to grow and transform the Western Parkland City, the costs involved and how they can be feasibly coordinated and funded
- identify how to sequence growth aligned to infrastructure to make the best use of public resources while bringing more benefits to more people in the Western Parkland City.

These objectives have guided the PIC process and provide a basis for its evaluation.

Partners have worked together through the **Western Sydney PIC Collaboration Group**. The Commission's **PIC Project Team** coordinates the activities of the expansive network of hundreds of technical officers from partner organisations.

## 1.2 Structure of this report

The Technical Report is a companion document to the draft PIC and details the full analysis undertaken through partnerships with State agencies, councils and stakeholders. It begins by describing the PIC Program area – the Western Parkland City and Blacktown LGA – and how the PIC model was applied. Chapters 4 to 6 detail the findings of the first three steps of the PIC model's six steps, including the detailed methodology and assumptions that underpin the identified infrastructure proposals and funding.

The Technical Report is supported by extensive technical studies, detailed in the appendices.

### Presenting the package of technical work supporting the draft PIC

The Greater Sydney Commission led the preparation the initial findings of the Western Sydney PIC Program and is now seeking public feedback.

This feedback will inform the Commission's recommendations to the NSW Government. These recommendations, by incorporating public feedback, will help the NSW Government in its decision-making processes for shaping a cool, green Western Parkland City, where the planning for land uses and the provision of infrastructure is aligned in a way that protects precious landscapes, enables better and more sustainable connections, renews or creates new places, and puts people at the centre of decision making.

Three reports support the consultation process:

**Draft PIC: Key findings and proposed actions**

- Place outcomes for the Western Parkland City
- Proposed sequencing plan to align growth with the provision of infrastructure
- Proposed program approach for coordinated delivery

**Technical report: Evidence and analysis underpinning the draft PIC (this document)**

- Assumed dwelling, population and job forecasts
- Proposed infrastructure and service needs, and the approach take to costing and apportioning costs
- Economic evaluation methodology and results to inform sequencing

**Consultation outcomes report: Listening to inform the process**

- Engagement program
- Materials used in the engagement
- Feedback provided through the process

These reports should be read together.

# 2 Starting with the Western Parkland City

## From the outset, councils representing their communities made it clear that the Western Sydney PIC Program must benefit the entire region.

Councils advocated for a process that ensured:

- the new cluster of activity around the new Western Sydney Airport and Aerotropolis benefits the entire Western Parkland City and complements the region's diversity of industries
- the strategic centres of Liverpool, Greater Penrith and Campbelltown-Macarthur, which have been the foundation for Western Sydney's growth for generations, continue to grow as distinct and vibrant places for business, work, education, retail and leisure
- that planning encompasses the whole north-south Metro line all the way from Schofields in the north, through the Aerotropolis to Campbelltown-Macarthur and a connection to Leppington in the south.

This is consistent with *Greater Sydney Region Plan* and the *Western City District Plan* that establish that the Western Parkland City will be founded on Liverpool, Greater Penrith and Campbelltown-Macarthur and supported by their commercial, health and education assets.

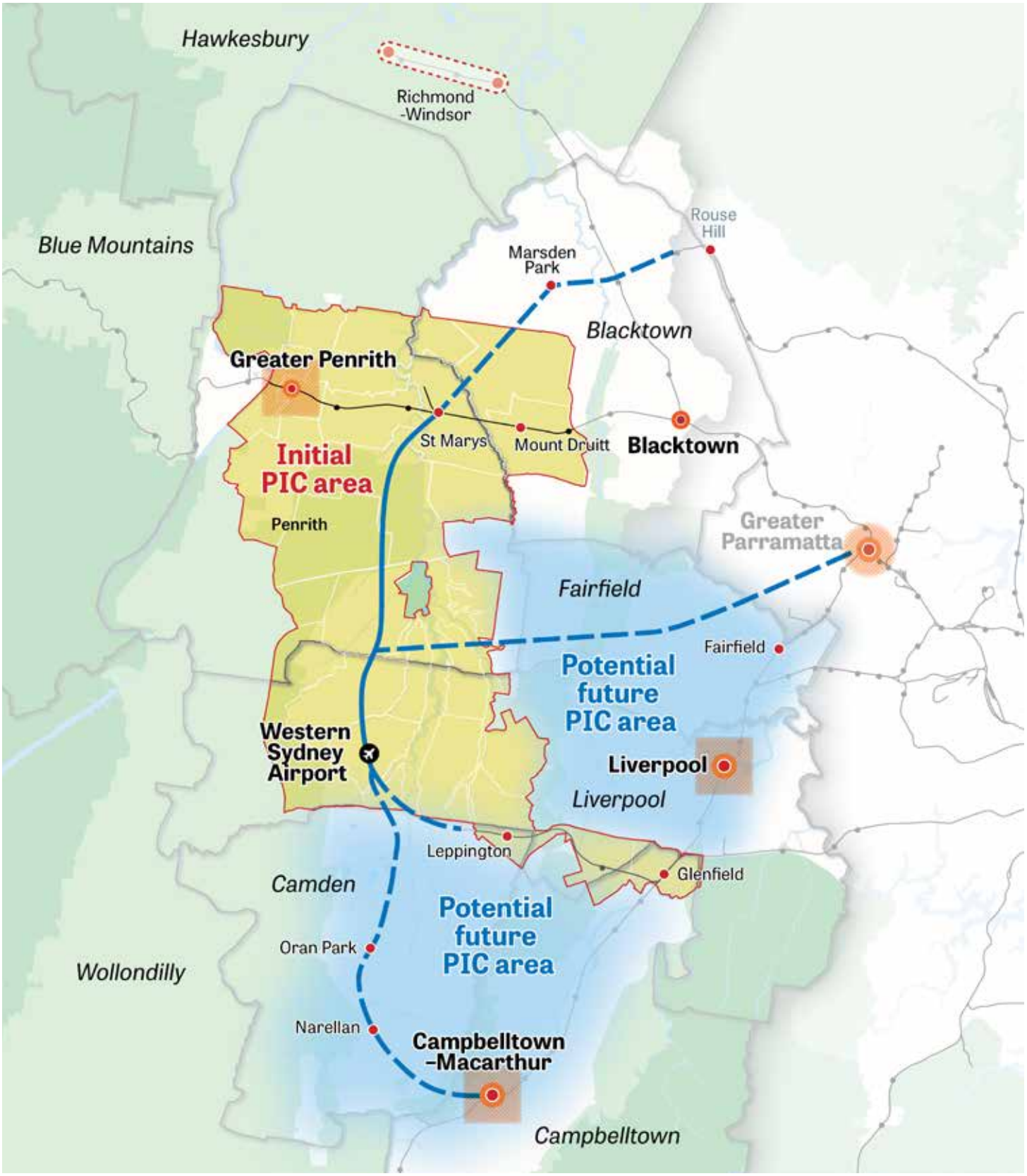
These centres, along with the emerging Western Sydney Aerotropolis, form the **metropolitan cluster** serving the Western Parkland City. This unique cluster provides the potential to **rebalance opportunities** for all residents to have greater access to jobs, education, businesses and services, no matter where they live.

Liverpool, Greater Penrith and Campbelltown-Macarthur evolved, especially in terms of their built form and urban structure, following European settlement. Conversely, the Aerotropolis will emerge as a planned place, shifting the dynamic of Western Sydney and complementing the existing cluster.

The *Western Parkland City Analysis* report in **Appendix 1** documents work to engage partners across the whole Western Parkland City and better understand the diversity of this vast, unique metropolitan area.

The Western Sydney PIC Program commenced as councils were developing their local strategic planning statements, the documents that reflect councils' and their communities' ambitions for their local area, and how each area sits within the strategic-level planning of the *Greater Sydney Region Plan* and district plans. The PIC process, through ongoing consultation with councils and State agencies, as best as possible incorporated the early understandings from the local strategic planning statements.

**Figure 2-1:** Initial PIC area and potential future PIC areas for the Western Sydney PIC Program




| | | |
|---|---|---|
| Metropolitan Centre | Committed Train Link | Potential future PIC area |
| Metropolitan Cluster | Train Link/Mass transit investigation | Waterway |
| Strategic Centre | Local Government Area boundary | 1:100 year flood South Creek |
| Rail line and station (existing) | Initial PIC area | Western Sydney Parklands |

## Getting started on the initial PIC

The PIC Program identified several option areas that could be subject to the detailed analysis and assessment that form part of the PIC model – these are shown in *Figure 2-1*.

To make best use of resources – while acknowledging existing zoning, planning and development; potential infrastructure investment; and existing budgetary and other constraints – it was clear that all four potential areas could not be progressed at once. Instead, the area subject to this initial phase of the Western Sydney PIC Program is known as the initial PIC area.

The initial PIC area is the central area of the Western Parkland City. It comprises nearly 36,000 hectares – a rich mixture of urban and rural land – is already home to about 279,000 people who live in 97,000 homes. It generates around 83,000 jobs.

It was selected as the place for the initial PIC due to:

- the funding commitment to Sydney Metro – Western Sydney Airport, which the connects area, and announcement of six station locations on the line
- the further connecting element of Wianamatta-South Creek, where early work can begin to create a true city in its landscape as the Aerotropolis evolves
- the opportunity to accelerate a necessary focus on jobs, skills and innovation around the Airport to attract the private investment that will drive a true rebalancing of Greater Sydney This initial PIC area comprises three areas, known broadly as:
- **Greater Penrith to Eastern Creek** around 19,200 hectares north of the Airport, which will support urban renewal, new land releases and a burgeoning health, education and innovation hub.
- **Western Sydney Aerotropolis Growth Area** spanning 12,800 hectares around the Airport including the Airport precinct and the western edge of the Western Sydney Employment Area, which will support an increase in jobs and skills across a breadth of industries.
- **Austral to Glenfield Corridor** spanning 3,650 hectares east of the Aerotropolis which will support new communities around existing rail stations and transit corridors.

The Western Sydney PIC Program is intended as an enduring program for the Western Parkland City - its scope will be continually monitored and reviewed. As this occurs, the intent is for the remaining option areas in *Figure 2-1* to benefit from the use of the new PIC model.

## Aboriginal cultural heritage

Aboriginal people have had a continuous connection with the Country encompassed by the Western Parkland City for more than 60,000 years. They have cared for Country and lived in deep alignment with this landscape, sharing and practicing culture while using it as a space for movement and trade.

The Western Sydney PIC Program acknowledges that four groups have primary custodial care obligations for the Western Parkland City: Dharug, Dharawal, Gundungurra and Darkinjung. The PIC Program also acknowledges others who have passed through this Country for trade and care purposes: Coastal Sydney people, Wiradjuri and Yuin.

Western Sydney is home to the highest number of Aboriginal people in any region in Australia. Diverse, strong and connected Aboriginal communities have established families in this area over generations, even if their connection to Country exists elsewhere.

The 32,459 Aboriginal people in the Western Parkland City represent around three per cent of the Western Parkland City population.[1] As illustrated in *Figure 2-3* there are areas with higher densities of Aboriginal residents living in Penrith, Blacktown, Campbelltown and Liverpool LGAs.

Compared to the Greater Sydney community overall, the Aboriginal people of the Western Parkland City are younger and the population is increasing with a median age of 21, and with 42 per cent of households including children.[2] However, these communities, compared to the Greater Sydney community overall, are more vulnerable and need more support to build the core foundations of wellbeing. Around 25 per cent of Aboriginal people in the Western Parkland City live in social housing, compared with five per cent of Greater Sydney residents. Unemployment for Aboriginal people in the Western Parkland City sits at five per cent, compared to the three per cent for the Greater Sydney community. Seven per cent of the Aboriginal community in the Western Parkland City hold a university qualification compared to 25 per cent of the Greater Sydney community overall.[3]

Aboriginal communities, their culture and obligations for Country are an essential part of knowing and planning for the Western Parkland City as a place.

[1] Source: Australian Bureau of Statistics 2016 Census
[2] Ibid.
[3] Ibid.

# Aboriginal communities today

## Local snap shots

Across the Parkland City there are areas with higher densities of Aboriginal residents. Additional information is provided about these communities where possible.

### Hawkesbury

Highest density areas:

1 - Section of Yarramundi-Londonderry (6.8 per cent for total SA2), details provided in section on Penrith below

2 - Windsor-Bligh Park (5.9 per cent)

This higher density could be associated with:

- A strong presence of people living on Country
- The proximity of John Moroney Correctional Complex, which has a high proportion of inmates who identify as Aboriginal.

### Penrith

Highest density areas:

1 - Yarramundi-Londonderry (6.8 per cent)

2 - Cambridge Park (5.5 per cent)

3 - St Marys - North St Marys (5.5 per cent)

4 - Penrith (5.0 per cent)

Higher densities of Aboriginal communities living in these areas of Penrith may be associated with:

- A large proportion of Aboriginal job seekers coming to the Penrith area for work. Aboriginal participation targets have increased the job opportunities for Aboriginal people across New South Wales, and this is evident in the Western Sydney area including Penrith where there are a number of large infrastructure projects
- A large number of Aboriginal corporations and service providers based in Penrith
- The John Moroney Correctional Complex is located in the Yarramundi-Londonderry area.

### Wollondilly

Highest density areas:

1 - Warragamba-Silverdale (3.6 per cent)

2 - Picton-Tahmoor-Buxton (3.6 per cent)

3 - Bargo (3.5 per cent)

Several programs to support the community

- A large number Aboriginal communities who have lived in the area long-term and have continued with cultural practice.

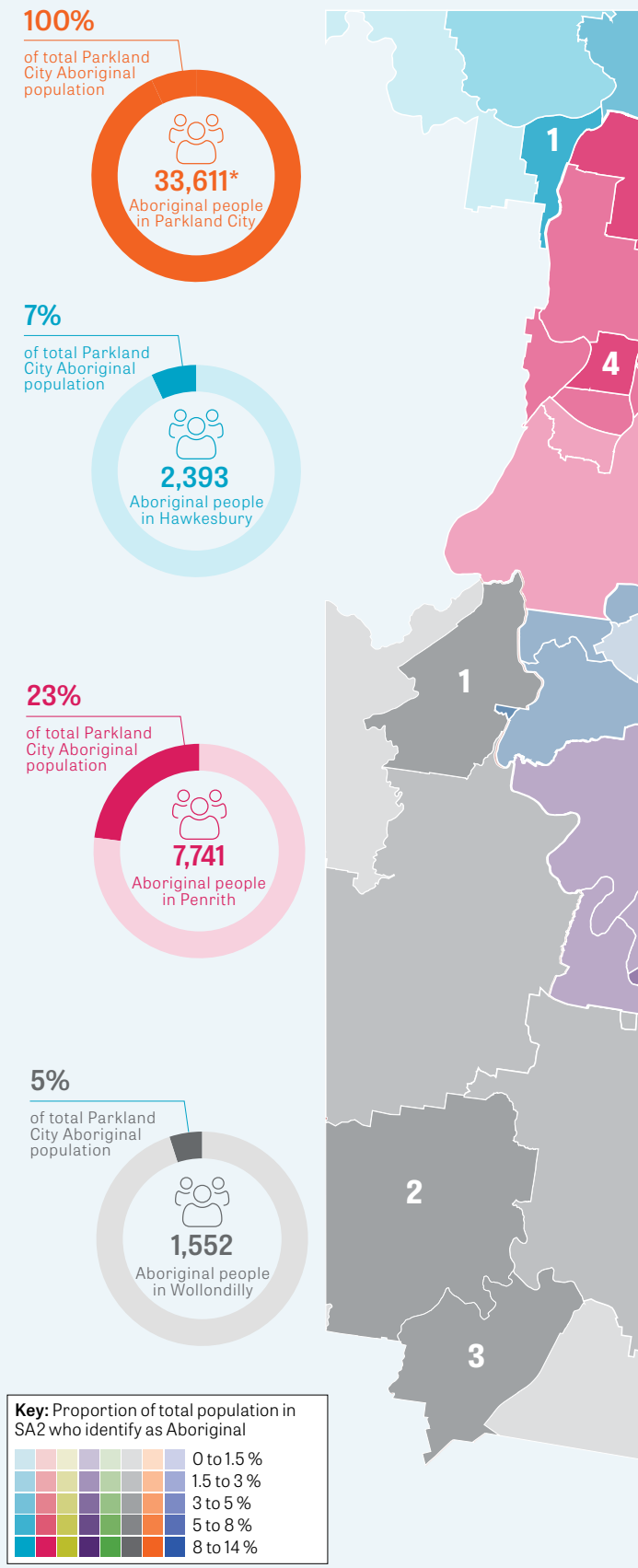
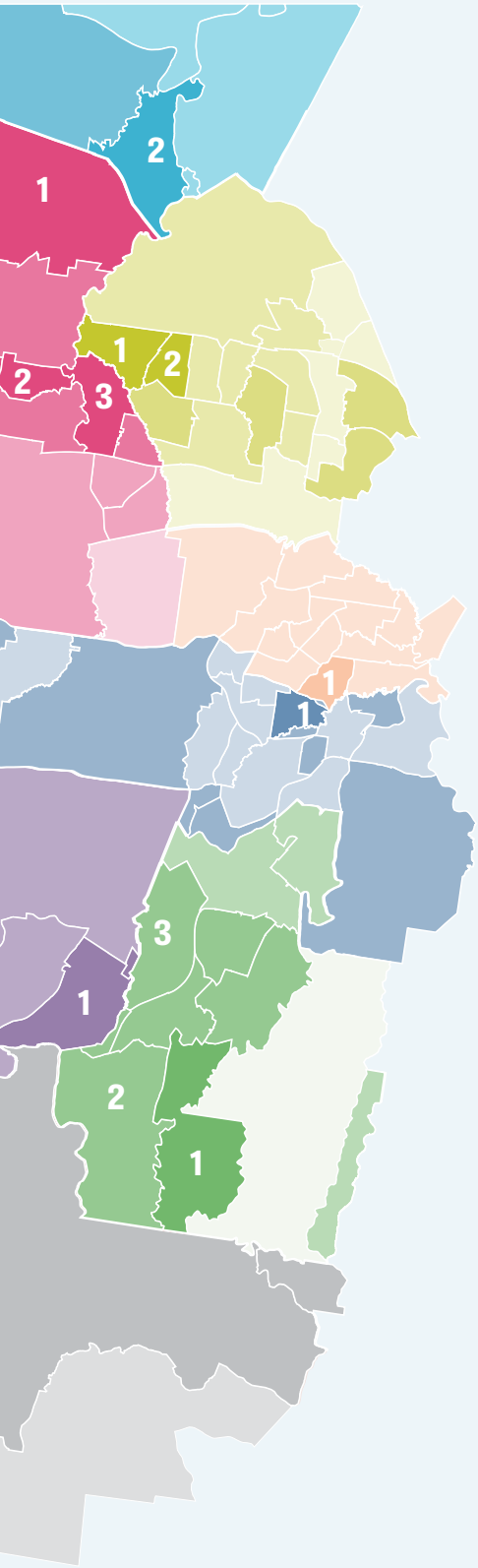


**Figure 2-3:** Aboriginal communities in the Western Parkland City

*All data presented in this section is sourced from the Australian Bureau of Statistics 2016 Census unless otherwise stated. It includes all responses from those in the study area who identify as Aboriginal or Torres Strait Islander, which for the purpose of this study are referred to as Aboriginal.*
** The total Aboriginal population for Western Parkland City shown is based on the total Aboriginal populations for Hawkesbury, Penrith, Blacktown, Fairfield, Liverpool, Camden, Campbelltown and Wollondilly LGAs.*




28%
of total Parkland City Aboriginal population
9,526
Aboriginal people in Blacktown

4%
of total Parkland City Aboriginal population
1,483
Aboriginal people in Fairfield

9%
of total Parkland City Aboriginal population
3,012
Aboriginal people in Liverpool

6%
of total Parkland City Aboriginal population
1,933
Aboriginal people in Camden

18%
of total Parkland City Aboriginal population
5,971
Aboriginal people in Campbelltown

## Blacktown

Highest density areas:

1 - Lethbridge Park - Tregear (8.5 per cent)

2 -Bidwill-Hebersham-Emerton (8.6 per cent)

This could be linked to:

- Blacktown is known to be a living place for Aboriginal people pre-contact.
- Aboriginal communities may have come to live in close proximity to sites where people were taken from their families (e.g. Blacktown Native Institution).

## Fairfield

Highest density areas:

1 - Mount Pritchard (1.5 per cent)

- This area is in close proximity to the original location of Green Valley housing estate.

## Liverpool

Highest density areas:

1 - Ashcroft-Busby-Miller (4.3 per cent)

- This area is the location of the former Green Valley housing estate, which was the largest social housing estate of its time and had a large proportion of Aboriginal residents.

## Camden

Highest density areas:

1 - Mount Annan – Currans Hill (3.2 per cent)

- The high population of Aboriginal people living in this area is likely linked to its proximity to Campbelltown.

## Campbelltown

Highest density areas:

1 - Bradbury-Wedderburn (6.3 per cent)

2 - Rosemeadow-Glen Alpine (4.2 per cent)

3 - Claymore-Eaglevale-Raby (4.2 per cent)

This could be explained by:

- At the end of World War II, a large number of Aboriginal veterans relocated to the Campbelltown area, due to its proximity to the defence base located nearby in Holsworthy
- Social housing estates located in Airds and Macquarie Fields have a high number of Aboriginal residents
- There are some Aboriginal corporations and service providers in Campbelltown, particularly Airds.

## 2.1 The metropolitan cluster concept

The *Greater Sydney Region Plan* establishes that the Western Parkland City will be founded on the existing **metropolitan cluster** of Liverpool, Greater Penrith and Campbelltown-Macarthur and their commercial, health and education assets, as well as the emerging Western Sydney Aerotropolis.

This unique cluster provides the potential to **rebalance opportunities** for all residents to easily access jobs, education, businesses and services, no matter where they live.

Drawing out the 'metropolitan cluster' concept informed the first phase of work on the Western Sydney PIC Program, as is detailed in **Appendix 1.** This analysis allowed for a better collective understanding of what transformation may be like under the intent of the *Greater Sydney Region Plan*, the commitments of the City Deal and under each council's local strategic planning statements.

The PIC process thinks of the metropolitan cluster in four parts that broadly, though not specifically, align with the following LGAs:

- North (Blue Mountains, Hawkesbury and **Penrith** LGAs)
- East (**Liverpool**, Fairfield and Blacktown LGAs)
- South (Camden, **Campbelltown** and Wollondilly LGAs)
- Western Sydney Airport and **Aerotropolis** (parts of Liverpool and Penrith LGAs).

**Figure 2-2:** The metropolitan cluster of the Western Parkland City

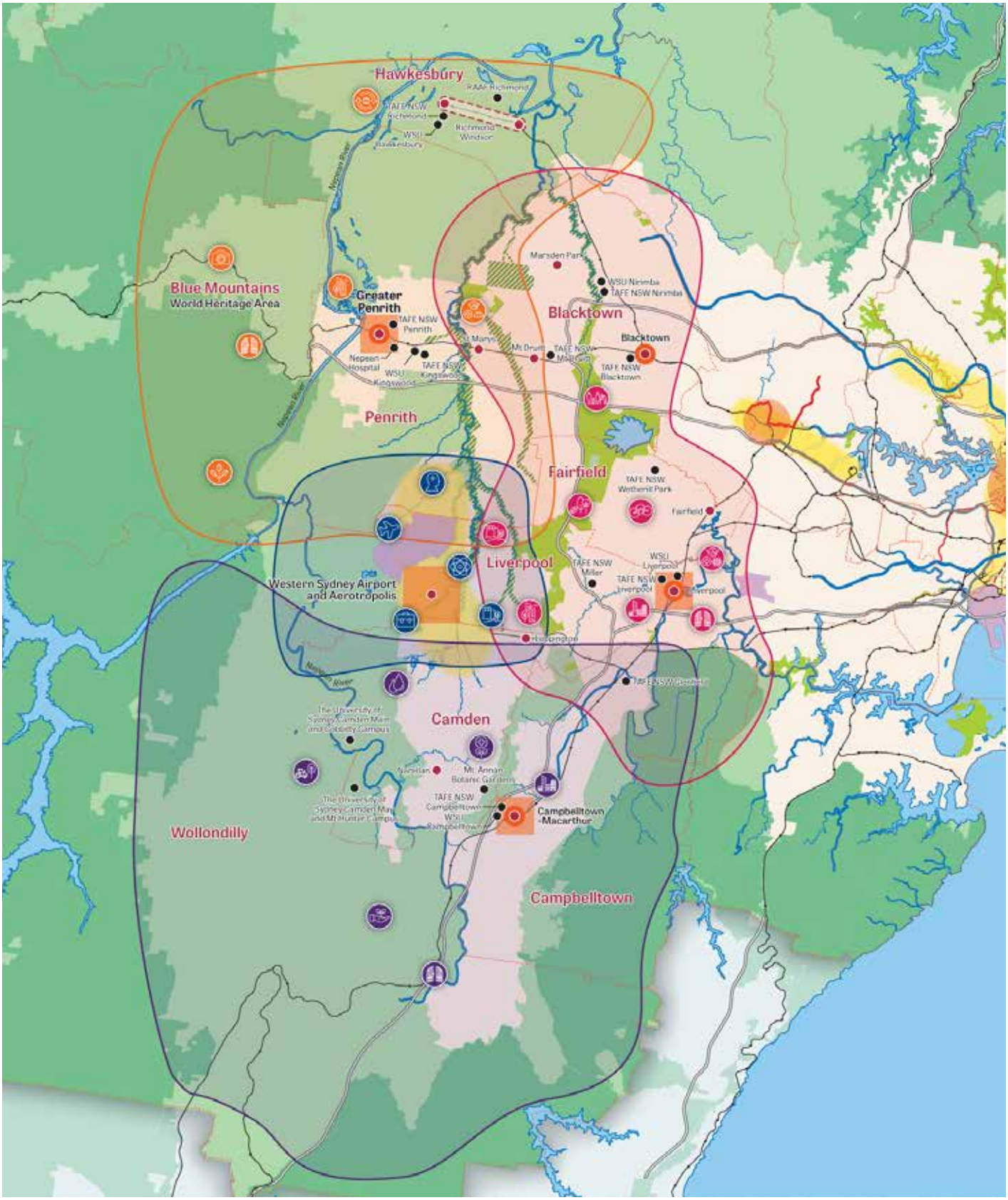


**Figure 2-3:** The north cluster of the Western Parkland City


## North: Penrith, Blue Mountains and Hawkesbury LGAs

The northern LGAs form a western gateway to Greater Sydney and a connector to Western NSW. They are shaped by internationally renowned and protected natural assets, including the Greater Blue Mountains World Heritage Area, the Hawkesbury-Nepean and Wianamatta-South Creek. This area also includes agricultural land.

Greater Penrith is a cosmopolitan and cultural place that offers relaxed living and a diversity of job opportunities. The broader area offers diverse lifestyles from smaller village communities like those along the Hawkesbury River to suburban areas like St Marys. Development has generally focused on motorways and rail lines, in rural villages and in the North West Growth Area.

Economically, the area provides hubs of industries, including defence, equine services, education, science, innovation, health, agriculture and agribusiness, and commercial, industrial and urban services. The area is an emerging tourism destination.

The T1 Richmond and Western Line and M4 Western Motorway provide east-west connections to centres such as the Parramatta and Sydney CBD. Connectivity is limited with the rest of the Western Parkland City; The Northern Road is the primary link between Penrith, Campbelltown-Macarthur and the future Aerotropolis. Sydney Metro - Western Sydney Airport will address the lack of north-south public transport while creating connections to the Airport and Aerotropolis.

Place-based planning will enhance the unique character of rural and suburban communities. People will benefit from investment in social, health and education services and better access to natural areas. Growth will be focused on Greater Penrith and to the south of the cluster closer to the Airport.

**Figure 2-4:** The east cluster of the Western Parkland City


## East: Liverpool, Fairfield and Blacktown LGAs

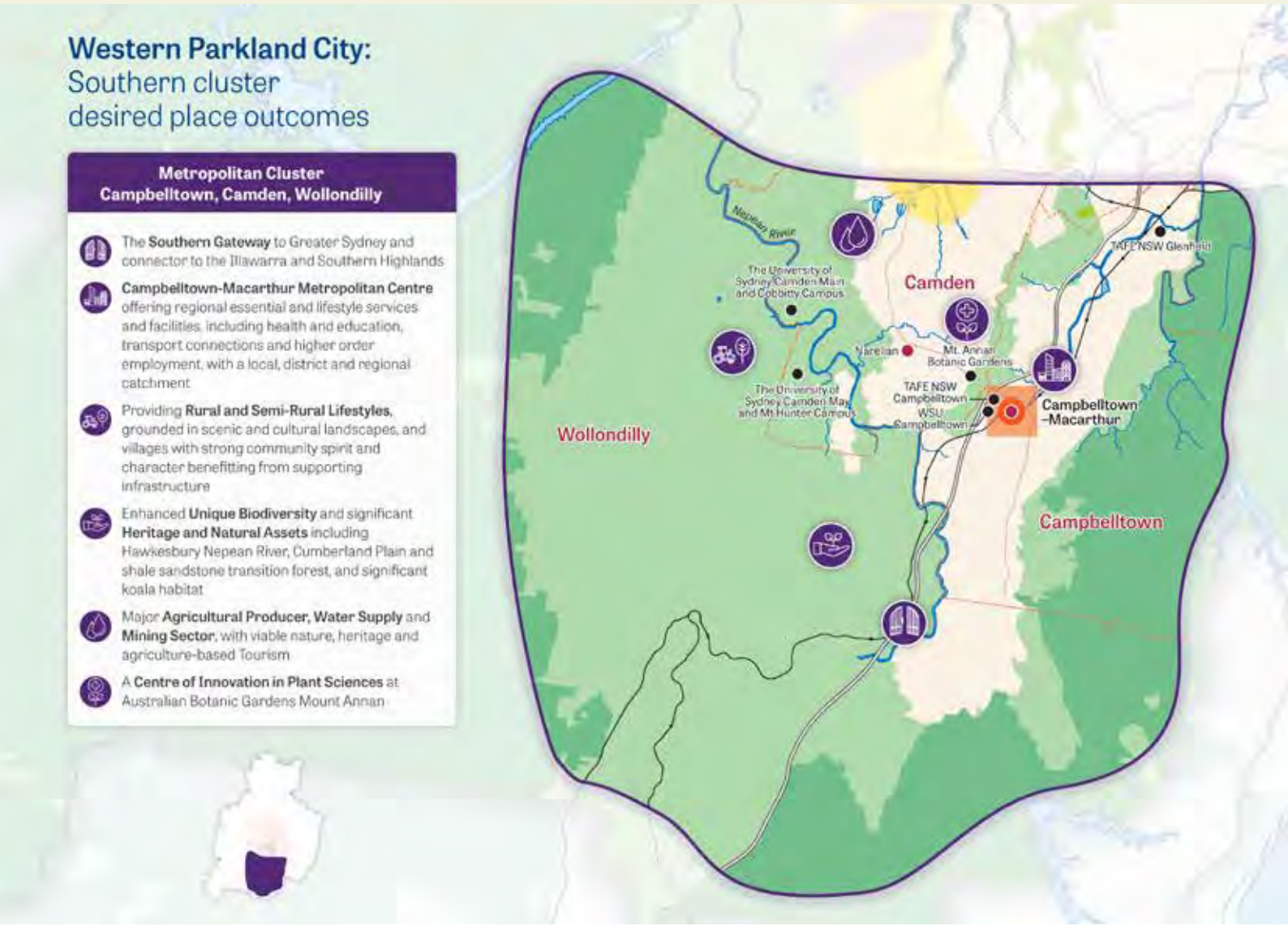
The eastern LGAs connect the Western Parkland City to the Central River City and Eastern Harbour City. Liverpool is home to a health and education precinct around Liverpool Hospital; Warwick Farm precinct; growing commerce, business, tourism and hospitality industries; and essential and lifestyle services and facilities. The area around Blacktown is highly urbanised, with connections to the North West Growth Area. Housing is generally low density with higher densities towards urban centres along rail lines.

The area includes rail connections to Greater Penrith, Campbelltown-Macarthur, Parramatta CBD and Sydney CBD, and motorways and freight rail links to and from employment lands. The proximity of Liverpool to the Aerotropolis creates opportunities industrial services and a skilled labour market, particularly during the early stages of development.

Public areas around public transport hubs in strategic centres like Fairfield and Mount Druitt can be revitalised and more opportunities for people to walk or cycle can be created. Higher density housing will be focused on employment, education and transport hubs.

The Western Sydney Parklands offer sporting and recreation facilities for the entire Western Parkland City. This asset, combined with a connected green network that can be created given the extent of publicly owned local and regional open space and the enhanced connections along the Georges River, will connect more people to nature, while also providing opportunities to manage flooding issues and alleviate urban heat.

**Figure 2-5:** The south cluster of the Western Parkland City




## South: Campbelltown, Camden and Wollondilly LGAs

Campbelltown, Camden and Wollondilly LGAs form the southern gateway to Greater Sydney and a connector to the Illawarra and Southern Highlands.

The area is a major agricultural area, provides much of Greater Sydney's drinking water and supports mining and other resource sectors, as well as viable nature, heritage and agriculture-based tourism. The Centre of Innovation in Plant Sciences, a nationally significant botanical research centre, is located at Australian Botanic Gardens Mount Annan.

Campbelltown-Macarthur offers regional essential and lifestyle services and facilities, including health and education institutions, transport connections and higher-order employment.

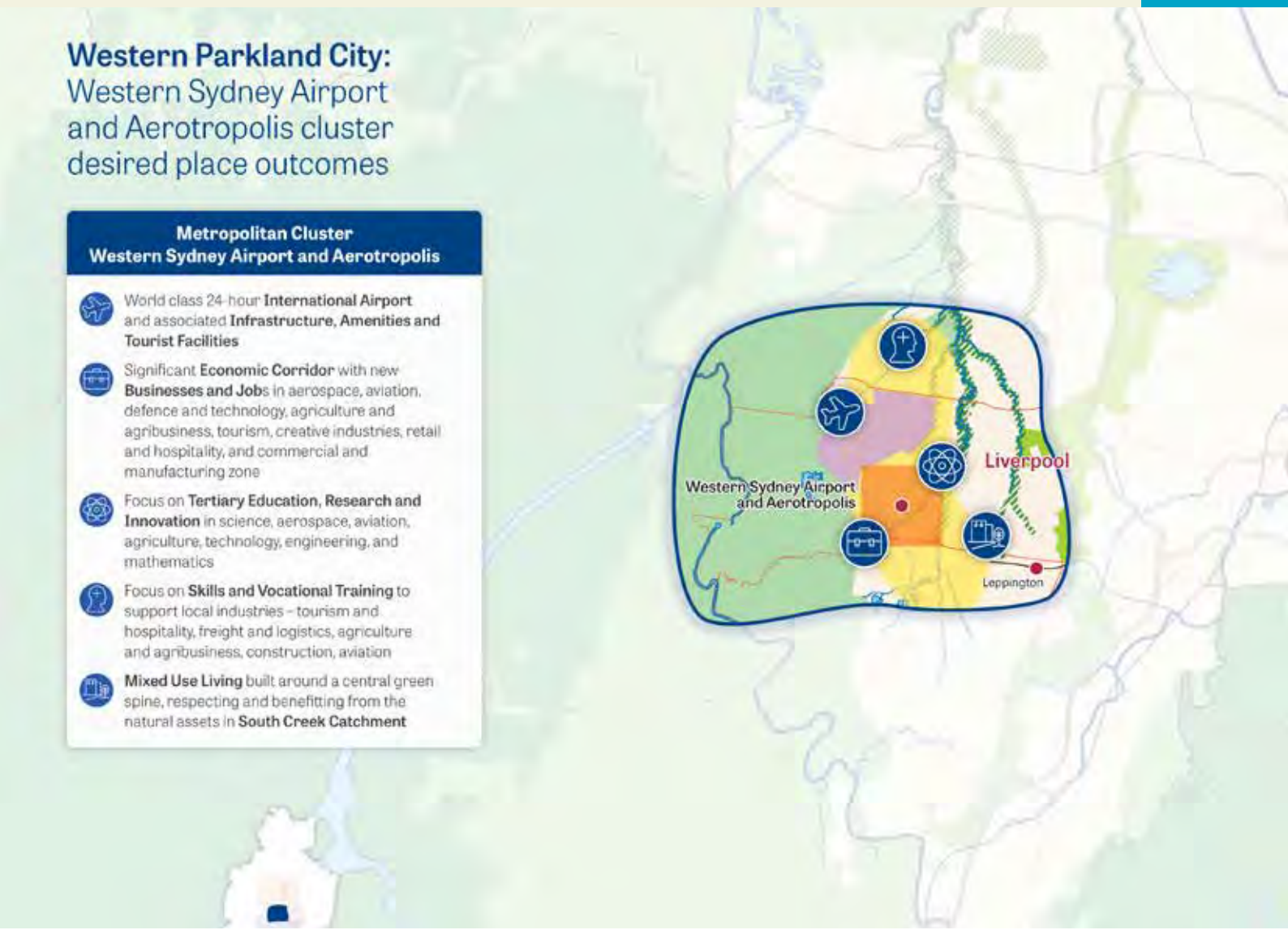
The T8 Airport and South Line connects people from urban areas to Liverpool and Sydney CBD via Glenfield. The M31 Hume Motorway is the primary corridor for traffic and freight in the area, with The Northern Road linking Campbelltown-Macarthur, Greater Penrith and the future Aerotropolis.

Outside urban areas, people enjoy rural and semi-rural lifestyles. Unique heritage and natural assets include Camden township, Hawkesbury Nepean River, Cumberland Plain and shale sandstone transition forest and significant koala habitats.

Precinct planning is underway in areas such as Wilton, Menangle and South West Growth Area precincts such as Oran Park, Turner Road, Catherine Fields (Part) and Leppington and development may be focused along The Northern Road corridor. Additional development is generally restricted by natural landscape features.

Alternative stormwater and wastewater treatment technologies will be required to lessen environmental impacts, mitigate flooding and address urban heat as rural areas transition to urban areas.

**Figure 2-6:** The airport and aerotropolis cluster of the Western Parkland City




## Western Sydney Airport and Aerotropolis cluster

The Western Sydney Airport and Aerotropolis cluster is set for the greatest transformation as it transitions from largely rural land to a 24-hour international airport with associated infrastructure, amenities and tourist facilities.

The Airport will provide the impetus for skills and vocational training to support local tourism and hospitality, freight and logistics, agriculture and agribusiness, construction and aviation industries. Aircraft noise will be a key planning consideration. As the Airport becomes an international gateway, a diverse range of transport options and fast connections to the major centres of Greater Sydney and NSW will be essential. Connections to the local area to support economic activity.

Wianamatta-South Creek will be a place for people and nature, while also providing sustainability functions to address flooding risks. Emerging innovative technologies will reduce carbon emissions, use water efficiently and foster a research environment that seeks to meet, improve and exceed desired sustainability outcomes.

**Figure 3-1:** The six-step method

The six-step method is:

**Step 1**: Setting the vision and place outcomes, developing different scenarios and forecasting land use change for 10, 20 and 40 years.

**Step 2**: Identifying infrastructure needs and estimated capital costs and integrating them for precincts under each of the scenarios developed in Step 1.

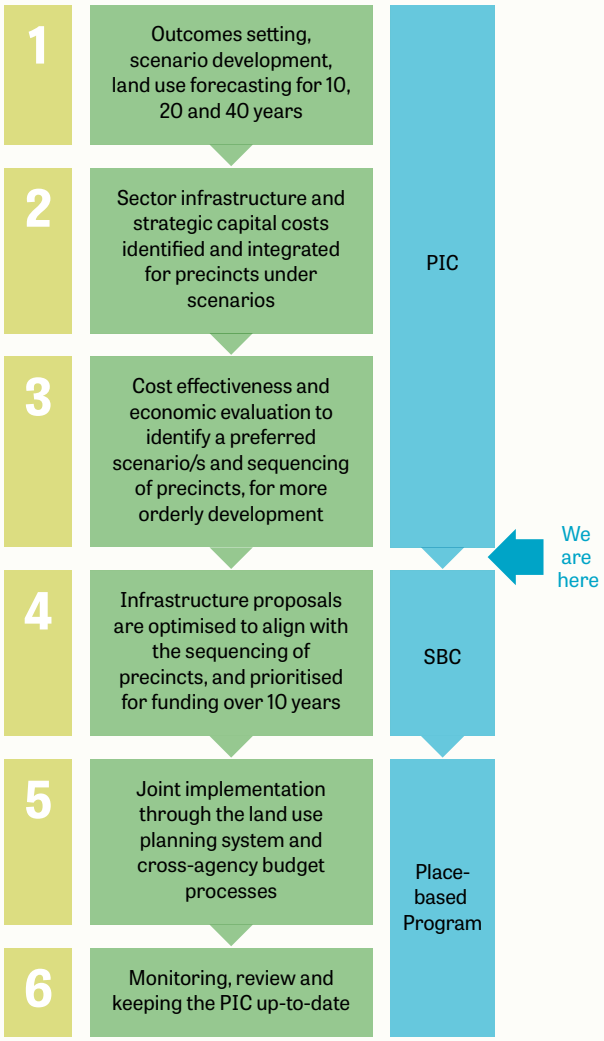
**Step 3**: Evaluating the costs and benefits to identify a preferred scenario or scenarios and the high-level sequencing of precincts for more orderly development.

**Step 4**: Refining infrastructure proposals to align with the high-level sequencing of precincts and prioritisation for funding over 10 years through a Strategic Business Case/s (SBC/s).

**Step 5**: Concurrent implementation of the PIC and Strategic Business Case/s through the land use planning system and NSW Budget processes.

**Step 6**: Monitoring development in the place and reviewing the PIC as market conditions, community preferences and policy decisions evolve.

Of these steps, this paper details the first three steps, reflecting the work to date.



# 3 Applying the new PIC model

## Fundamentally, the PIC process relies on people working together and sharing information so that a shared knowledge of a place can be developed.

It uses a six-step method that emerged from practical testing and application during the pilot. It also utilises the 'Co.Lens', the Commission's purpose-built tool that stores the data, information and advice generated through the PIC model.

Of these steps, this Technical Report details the first three, reflecting the steps that have been applied through the PIC model to date. *Figure 3-2* outlines the process to develop the draft PIC for public feedback and the steps that will follow.

**Figure 3-2:** The three-year PIC process

| 2019 | 2020 | 2021 |
|---|---|---|
| • Define program | • Undertake economic evaluation to determine benefits of land use change | • Finalise the findings from the initial PIC area for consideration by the NSW Government |
| • Select initial PIC areas | • Engage with stakeholders | • Commence joint implementation through land use and budget processes |
| • Set outcomes and develop scenario | • Hold collaborative staging workshops | • Review program and capacity to develop further PIC areas |
| • Undertake baseline infrastructure assessment | • Consolidate findings, actions and documentation | |
| • Co-design land use forecasts | • Release draft PIC for public feedback | |
| • Undertake infrastructure and services assessment | | |
| • Hold collaborative infrastructure and staging workshops | | |

# 4 Step 1: Outcomes setting, scenario development and land use forecasting

## 4.1 Outcomes setting

The Western Sydney PIC Program is founded on place outcomes that represent a collaboration with councils to arrive at the essence of what the PIC Program should strive to achieve. These ambitions reflect the intent of the 10 Directions of the *Greater Sydney Region Plan*, the supporting *Western City District Plan* and councils' local and community planning.

The **six place outcomes** drive a future Western Parkland City that has:

1. Strong focus on wellbeing and inclusiveness
2. Aboriginal living culture and equitable participation
3. Jobs, skills and innovation – for everyone in the city
4. Well connected places - transport and digital
5. Scenic, productive and resilient landscapes
6. Connected, diverse and resilient communities

These were informed by the engagement undertaken with councils, who made it clear that the PIC process needs to acknowledge that investment in the Airport and Aerotropolis must bring benefits to the entire Western Parkland City.

The *Western Parkland City Analysis* report in **Appendix 1** details the basis of this work.

Working with State agencies and utility providers and thinking about the place outcomes and the appropriate indicators to complement those already in the *Pulse of Greater Sydney*, further indicators were developed with infrastructure agencies and utility providers.

*Figure 4-1* illustrates the alignment between the Western Sydney PIC Program place outcomes, the 10 Directions of the *Greater Sydney Region Plan* and the **four Pulse indicators.** *Figure 4-2* illustrates the **16 Western Sydney system and service indicators** developed with State agencies and utility providers.

Baseline data was collected to provide real insights in the Western Parkland City, how it compares to Greater Sydney, and to practically set the **26 Western Sydney measures** to monitor the potential impacts of growth and investment over time.

**Appendix 2** outlines the current baseline performance for the initial PIC area, where the data is available, and most often for the Western City District compared to Greater Sydney.

### The Pulse of Greater Sydney

The Pulse of Greater Sydney is the first comprehensive monitoring and reporting framework for Greater Sydney.

It establishes performance indicators for different elements of Greater Sydney's **liveability, productivity** and **sustainability** as the city evolves into a metropolis of three cities.

It considers progress in terms of the implementation of the *Greater Sydney Region Plan* and the supporting District Plans.

### Outcome budgeting in NSW

The development of measurable place outcomes – and the connection of these place outcomes to the overall PIC process, including the extensive analysis of forecast costs – links with an ongoing NSW Government reform program around outcome budgeting.

Outcome Budgeting was announced as a reform initiative in the 2017-18 Budget.

It recognises that the allocation of public resources should be based on the **outcome achieved for people**, not the amount spent nor the volume of services delivered, and budget decisions should be made on that basis.

This new framework focuses budget decisions on the right outcomes and that agencies manage and deliver outputs that support those outcomes.

**Figure 4-1:** Western Parkland City place outcomes framework

**Liveability**

1. Strong focus on well-being and inclusiveness
2. Aboriginal living culture and equitable participation

**Productivity**

3. Jobs, skills and innovation – for every-one in the city
4. Well connected places – transport and digital

**Sustainability**

5. Scenic, productive and resilient landscapes
6. Connected, diverse and resilient communities

**Figure 4-2:** Place Outcomes Framework – Indicators and measures


1. Strong focus on wellbeing and inclusiveness

2. Aboriginal living culture and equitable participation

3. Jobs, skills and innovation – for everyone in the city

4. Well connected places – transport and digital

*Greater Sydney Indicators (P)*

*Greater Sydney Measures (M)*

- **P1** Jobs, education and housing
  - M1 Job containment and distribution by type
  - M2 Education participation
  - M3 Housing types
- **P2** 30-minute city
  - M4 Access to metropolitan and strategic centres
  - M5 Proportion of trips by walking
  - M6 Travel mode to work
- **P3** Walkable places
  - M7 Access to open space
- **P4** Addressing urban heat
  - M8 Number of hot days (>35°C)
  - M9 Urban heat
  - M10 Tree canopy cover in the urban area

*Western Sydney Indicators (P)*

*Western Sydney Measures (M)*

- **P5** Physical population health
  - M11 Overweight and obesity rates
- **P6** Population health and wellbeing
  - M12 Outpatient and community care
  - M13 Improving service levels in hospitals
- **P7** A safer community
  - M14 Crime rates
- **P8** Efficient justice services to meet the needs of people
  - M15 Efficient resolution of legal disputes
  - M16 Time to justice
  - M17 Court backlog
- **P9** Prevalence of cultural infrastructure
  - M18 Cultural infrastructure near transport nodes
- **P10** Accessible affordable and social housing
  - M19 Social and affordable housing that is well located
- **P11** Aboriginal participation
  - M20 Value of contracting by Aboriginal business in construction projects
  - M21 Value of contracting by Aboriginal business in goods and services contracts

*Western Sydney Indicators (P)*

*Western Sydney Measures (M)*

- **P12** Reliable, efficient and safe movement of people and goods
  - M22 Fatal and serious crashes on the transport network
  - M23 Public transport and active transport use
  - M24 A reliable transport network
- **P13** Reliable digital connectivity
  - M25 Australian Digital Inclusion Index (ADII)
- **P14** Provision of quality education
  - M26 Education space standards for emerging demand
  - M27 Skills-based training that leads to jobs, up-skilling and re-skilling
- **P15** Supporting optimal learning and student performance
  - M28 Maintenance of government schools

5. Scenic, productive and resilient landscapes

6. Connected, diverse and resilient communities

*Western Sydney Indicators (P)*

*Western Sydney Measures (M)*

- P16 An environmentally efficient and healthy city
  - M29 Air quality
  - M30 Emissions profiles of greenfield and urban renewal areas
  - M31 Waste generation
- P17 Clean, affordable and reliable energy
  - M32 Energy consumption and renewable energy generation
- P18 A city that is resilient
  - M33 Community exposure to climate risk
- P19 A city with healthy waterways and enhanced biodiversity
  - M34 Protection of ecosystems and biodiversity
  - M35 Waterways and water dependent ecosystems
- P20 A city with sustainable water
  - M36 Water resource recovery
- P21 A cool and green city
  - M37 Access to high quality public open space and recreation facilities
  - M38 Green grid connections

## 4.2 Scenario development

Three scenarios were developed based on the liveability, productivity and sustainability assumptions expected to shape the Western Parkland City over the next 10, 20 and 40 years.

These include assumptions about when city-shaping infrastructure might be provided, which influences the broad location and the amount of population, housing and jobs growth that may occur.

The *Western Parkland City Analysis report* in **Appendix 1** provides detail on this work.

Three scenarios for the distribution of future growth in the Western Parkland City are based on extensive work with the partners involved and engagement throughout the PIC Program. These three scenarios are:

### Growing Parkland City:

A Western Parkland City created under existing planning opportunities without any further rezoning of land to deliver more suburban communities and jobs in centres, with some transport improvements through already committed infrastructure.

### Thriving Aerotropolis:

A Western Parkland City is underpinned by a connected metropolitan cluster, where communities have access to new industries and career opportunities in a **thriving Aerotropolis**, with stronger centres in **Liverpool**, **Greater Penrith** and **Campbelltown-Macarthur**, that are well connected to surrounding compact, urban and renewed communities and centres.

### Thriving Metropolitan Cluster:

A Western Parkland City is underpinned by the **metropolitan cluster**, where people have easy and better access to industry and jobs in **Liverpool**, **Greater Penrith** and **Campbelltown-Macarthur**, surrounding employment areas and the **emerging Aerotropolis**.

Each scenario recognises that future levels of growth will likely respond to varying levels of public and private investment in the Western Parkland City.

## Towards the Parkland City vision

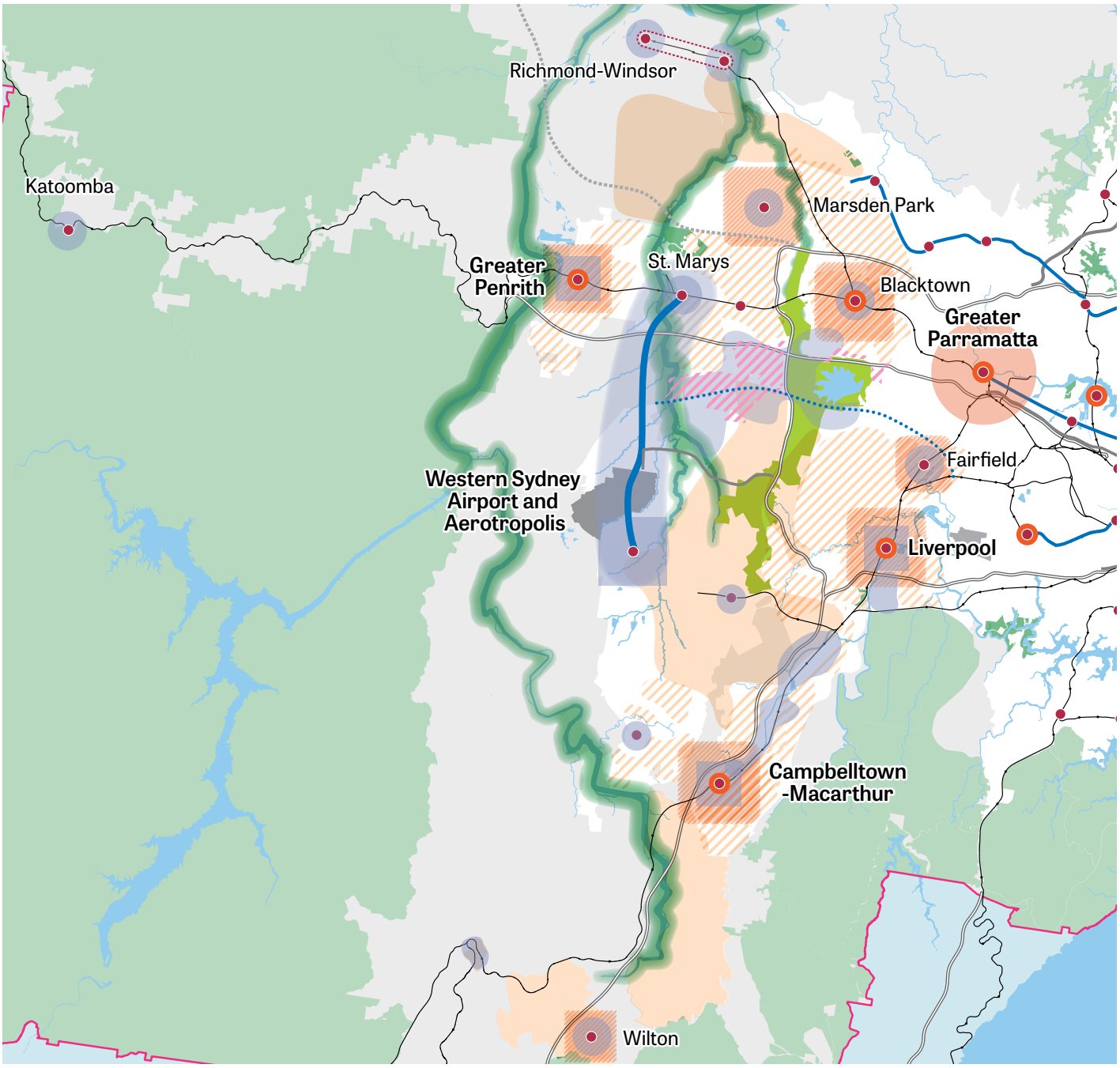
### Growing Parkland City

Under this scenario, the Western Parkland City evolves through the existing planning opportunities to create more suburban communities and jobs in centres. It includes some improvements to access through committed transport projects, including the Airport and Sydney Metro - Western Sydney Airport. It is assumes a business as usual approach to the provision of utility services and green infrastructure.

**Table 4-1:** Infrastructure and service assumptions – 20 years

| | |
|---|---|
| **Liveability** | • Better urban design and new services and facilities as places renewed and revitalised<br>• Business as usual approach to the provision of open space and tree canopy<br>• Progressive renewal of social housing in Penrith, Blacktown, Fairfield, Liverpool and Campbelltown LGAs |
| **Productivity** | • Business as usual telecommunications<br>• Liverpool Innovation Precinct<br>• Western Sydney Centre of Innovation in Plant Sciences at Mount Annan<br>• Western Sydney Airport<br>• Sydney Metro - Western Sydney Airport with stations at St Marys, Orchard Hills, Luddenham, Western Sydney International Business Park, Western Sydney International Airport Terminal, and Western Sydney Aerotropolis<br>• M12 Motorway<br>• The Northern Road and Bringelly Road upgrades<br>• Moorebank Intermodal Terminal |
| **Sustainability** | • Business as usual – water, wastewater, stormwater, electricity, gas and waste |

**Figure 4-3:** Growing Parkland City




| | | |
|---|---|---|
| Metropolitan Centre | Compact Urban Centres | Waterways |
| Metropolitan Cluster | Compact Urban Areas | Train Station |
| Health and Education Precinct | Primary Job Areas | Committed Train Link |
| Strategic Centre | Urban Area | Train Link/Mass transit investigation |
| Trade Gateway | Metropolitan rural area | Freight Rail Investigation |
| Western Sydney Employment Area | Major Urban Parkland including National Parks and reserves | Motorway |
| Suburban Areas | Creeks and adjoining open space | Committed Motorway |

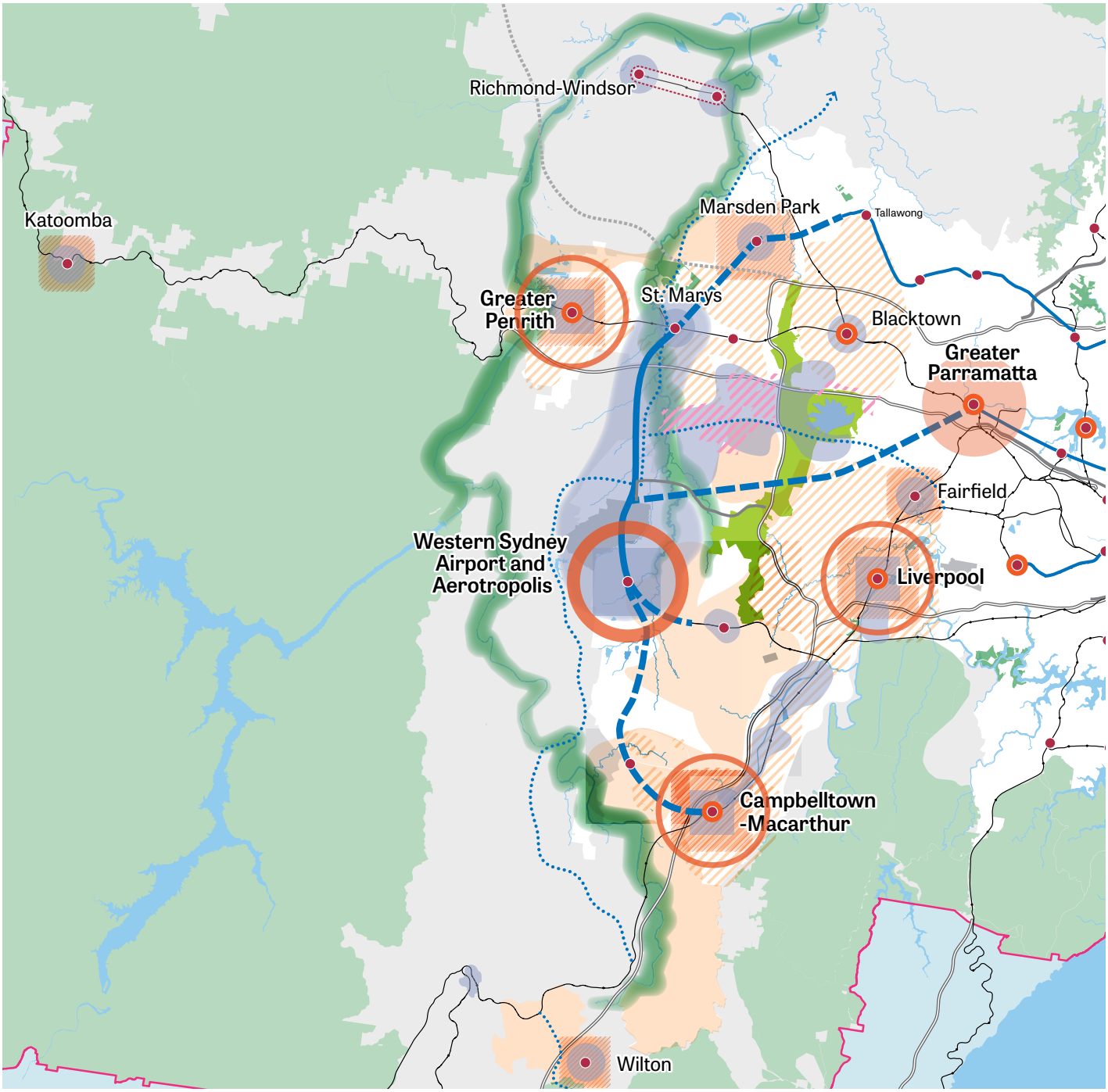
Achieving the Parkland City vision

## Thriving Aerotropolis

Under this scenario, the Western Parkland City is anchored by new industry and jobs in a thriving new Aerotropolis, that is better connected to new compact and renewed places to the north, south and east. It assumes Sydney Metro – Western Sydney Airport extensions to Tallawong and Campbelltown-Macarthur, an east-west rail link between Aerotropolis and Parramatta, and a new visionary approach to green infrastructure, utility services and the circular economy.

**Table 4-2:** Thriving Aerotropolis Infrastructure and service assumptions – 20 years

| | |
|---|---|
| **Liveability** | • A design-led approach focused high quality of urban design with new services and facilities as places urbanised, renewed and revitalised<br>• Wianamatta-South Creek Corridor with a system of parks, walking and cycling trails, community facilities, ecological services, including nutrient capture, urban cooling and local habitat<br>• Renewal of social housing estates in the Penrith, Blacktown, Fairfield, Liverpool and Campbelltown LGAs linked to catalyst infrastructure with greater diversity of housing and mixed tenure |
| **Productivity** | • Liverpool Innovation Precinct<br>• Western Sydney Centre of Innovation in Plant Sciences at Mount Annan<br>• New Western Sydney Education Super Precinct (Multiversity) in Aerotropolis<br>• TAFE NSW Western Sydney Construction Hub<br>• Permanent Vocational Education and Training facility in Aerotropolis, focused on aviation and aeronautical-related engineering<br>• Digital smart city infrastructure<br>• Western Sydney Airport<br>• Sydney Metro - Western Sydney Airport – with stations at St Marys, Orchard Hills, Luddenham, Western Sydney International Business Park, Western Sydney International Airport Terminal, and Western Sydney Aerotropolis<br>• Sydney Metro - Western Sydney Airport extensions: St Marys to Tallawong and Aerotropolis to Campbelltown/Macarthur<br>• East-West Rail Link - Parramatta to Airport/Aerotropolis<br>• South West Rail Link Extension<br>• M12 Motorway<br>• Outer Sydney Orbital Stage 1<br>• The Northern Road upgrade<br>• Bringelly Road upgrade<br>• Rapid bus services: Penrith, Liverpool, Campbelltown, Blacktown to Airport<br>• Moorebank Intermodal Terminal<br>• Western Sydney Freight Line |
| **Sustainability** | • New integrated water cycle management in Wianamatta-South Creek catchment for Aerotropolis and major land release areas<br>• Mainstream integrated water cycle management for Wianamatta-South Creek catchment, including new release areas and urban renewal areas<br>• Enhanced resource recovery, energy generation and shift to circular economy infrastructure and hubs<br>• Integrated water cycle management for the wider Western Parkland City |




| | | |
|---|---|---|
| Metropolitan Centre | Compact Urban Centres | Waterways |
| Metropolitan Cluster | Compact Urban Areas | Train Station |
| Health and Education Precinct | Primary Job Areas | Committed Train Link |
| Strategic Centre | Urban Area | Train Link/Mass transit investigation |
| Trade Gateway | Metropolitan rural area | Freight Rail Investigation |
| Western Sydney Employment Area | Major Urban Parkland including National Parks and reserves | Motorway |
| Suburban Areas | Creeks and adjoining open space | Committed Motorway |

Achieving the Parkland City vision

## Thriving Metropolitan Cluster

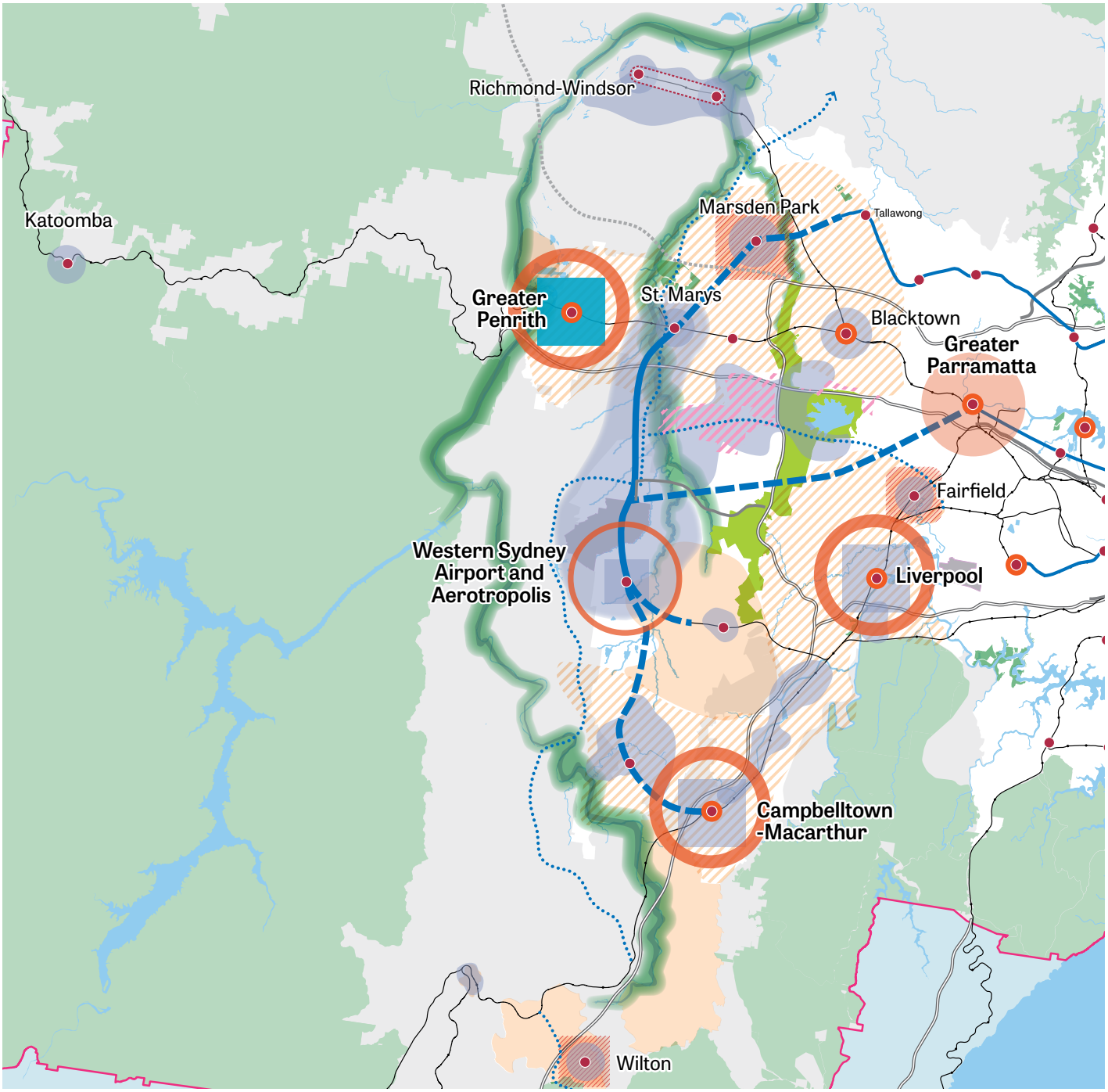
Under this scenario, the Western Parkland City is a place where people can easily access a diversity of jobs, education, training and services in the thriving centres of Liverpool, Greater Penrith and Campbelltown-Macarthur, as well as the emerging Western Sydney Aerotropolis.

The Western Parkland City grows with new communities and renewed places that are better connected with a range of new transit services. It is assumes Sydney Metro - Western Sydney Airport extensions to Tallawong and Campbelltown-Macarthur, an east-west rail link between the Aerotropolis and Parramatta, and a new visionary approach to green infrastructure, utility services and the circular economy.

**Table 4-3:** Thriving Aerotropolis Infrastructure and service assumptions – 20 years

| | |
|---|---|
| **Liveability** | • A design-led approach focused high quality of urban design with new services and facilities as places urbanised, renewed and revitalised<br>• Wianamatta-South Creek Corridor with a system of parks, walking and cycling trails, community facilities, ecological services, including nutrient capture, urban cooling and local habitat<br>• Renewal of social housing estates in the Penrith, Blacktown, Fairfield, Liverpool and Campbelltown LGAs linked to catalyst infrastructure with greater diversity of housing and mixed tenure |
| **Productivity** | • Liverpool Innovation Precinct<br>• Western Sydney Centre of Innovation in Plant Sciences at Mount Annan<br>• New Western Sydney Education Super Precinct (Multiversity) in Aerotropolis<br>• TAFE NSW Western Sydney Construction Hub<br>• Permanent Vocational Education and Training facility in Aerotropolis, focused on aviation and aeronautical-related engineering<br>• Digital smart city infrastructure<br>• Western Sydney Airport<br>• Sydney Metro - Western Sydney Airport – with stations at St Marys, Orchard Hills, Luddenham, Western Sydney International Business Park, Western Sydney International Airport Terminal, and Western Sydney Aerotropolis<br>• Sydney Metro - Western Sydney Airport extensions: St Marys to Tallawong and Aerotropolis to Campbelltown/Macarthur<br>• East-West Rail Link - Parramatta to Airport/Aerotropolis<br>• South West Rail Link Extension<br>• M12 Motorway<br>• Outer Sydney Orbital Stage 1<br>• The Northern Road upgrade<br>• Bringelly Road upgrade<br>• Rapid bus services: Penrith, Liverpool, Campbelltown, Blacktown to Airport<br>• Moorebank Intermodal Terminal<br>• Western Sydney Freight Line |
| **Sustainability** | • New integrated water cycle management in Wianamatta-South Creek catchment for Aerotropolis and major land release areas<br>• Mainstream integrated water cycle management for Wianamatta-South Creek catchment, including new release areas and urban renewal areas<br>• Enhanced resource recovery, energy generation and shift to circular economy infrastructure and hubs<br>• Integrated water cycle management for the wider Western Parkland City |

**Figure 4-5:** Thriving Metropolitan Cluster




| | | |
|---|---|---|
| Metropolitan Centre | Compact Urban Centres | Waterways |
| Metropolitan Cluster | Compact Urban Areas | Train Station |
| Health and Education Precinct | Primary Job Areas | Committed Train Link |
| Strategic Centre | Urban Area | Train Link/Mass transit investigation |
| Trade Gateway | Metropolitan rural area | Freight Rail Investigation |
| Western Sydney Employment Area | Major Urban Parkland including National Parks and reserves | Motorway |
| Suburban Areas | Creeks and adjoining open space | Committed Motorway |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## 4.3 Land use forecasts

A co-design process informed land use forecasts that reflected the latest strategic thinking about the spatial distribution of growth in the Western Parkland City. This process involved the Commission, councils (both directly and through the Planning Partnership), Department of Planning, Industry and Environment, and Transport for NSW.

This spatial redistribution is guided by the understanding of planned major future service and infrastructure investment, and the rebalancing of Greater Sydney's population and jobs growth to the west as envisaged by the *Greater Sydney Region Plan*.

Developing new land use forecasts was essential as the existing common planning assumption travel zone projections (TZP16 v1.51) were based on 2016 population projections that were released before the new thinking emerged around the vision of Greater Sydney as a metropolis of three cities.

Total projections for Greater Sydney's population, jobs and homes from these 2016 projections were used for land use forecasting process that was completed in October 2019, prior to the release of December 2019 population projections and the Transport for NSW 2019 travel zone projections (TZP19).

The *Western Sydney PIC Land Use Scenarios report* in **Appendix 3** documents the forecasts for each scenario across multiple geographies, from district, LGA and travel zones. The forecasts are prepared for 2036 and 2056, broken down into five-yearly increments. They also include age/sex profile and employment breakdown by four broad industry categories (knowledge intensive, health and education, population serving and industrial).

### Western City District and Blacktown LGA

*Table 4-4* to *Table 4-6* show the range of population, housing and job forecasts for each LGA under the three scenarios over 20 and 40 years.

**Table 4-4:** Forecast population for the Western City District plus Blacktown LGA under each scenario – 20 and 40 years (from 2016)

| LGA | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 |
| Blacktown | 350,788 | +178,508 | +290,785 | +199,209 | +375,826 | +183,173 | +328,171 |
| Blue Mountains | 78,620 | +2,920 | +11,969 | +1,551 | +10,146 | +1,343 | +8,195 |
| Camden | 80,099 | +86,143 | +172,650 | +115,603 | +210,059 | +117,682 | +202,260 |
| Campbelltown | 162,286 | +45,027 | +107,540 | +49,957 | +113,459 | +53,682 | +126,096 |
| Fairfield | 206,396 | +33,047 | +100,750 | +27,455 | +97,535 | +27,052 | +85,076 |
| Hawkesbury | 67,038 | +7,471 | +21,433 | +7,077 | +19,332 | +6,866 | +16,487 |
| Liverpool | 211,504 | +85,449 | +224,031 | +126,785 | +322,531 | +124,092 | +277,963 |
| Penrith | 201,043 | +82,199 | +117,417 | +142,244 | +296,099 | +155,853 | +332,464 |
| Wollondilly | 49,920 | +8,127 | +29,603 | +14,349 | +47,370 | +14,495 | +40,161 |
| **Total** | **1,407,694** | **+528,891** | **+1,076,178** | **+684,230** | **+1,492,357** | **+684,238** | **+1,416,873** |

**Table 4-5:** Forecast dwellings for the Western City District plus Blacktown LGA under each scenario – 20 and 40 years (from 2016)

| LGA | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 |
| Blacktown | 114,581 | +64,085 | +101,924 | +71,381 | +132,144 | +65,980 | +115,647 |
| Blue Mountains | 34,733 | +3,501 | +7,505 | +2,856 | +6,662 | +2,750 | +5,716 |
| Camden | 27,028 | +29,244 | +65,356 | +38,156 | +76,440 | +38,829 | +73,132 |
| Campbelltown | 56,732 | +16,831 | +40,459 | +18,459 | +42,537 | +20,068 | +47,299 |
| Fairfield | 64,958 | +20,642 | +43,045 | +18,639 | +42,008 | +18,491 | +37,494 |
| Hawkesbury | 25,010 | +3,804 | +9,596 | +3,626 | +8,678 | +3,545 | +7,462 |
| Liverpool | 67,893 | +32,882 | +83,468 | +47,769 | +118,311 | +47,483 | +103,012 |
| Penrith | 72,741 | +30,481 | +43,071 | +57,390 | +112,008 | +62,054 | +124,282 |
| Wollondilly | 17,350 | +3,340 | +12,138 | +5,585 | +18,093 | +5,621 | +15,632 |
| **Total** | **481,025** | **+204,810** | **+406,563** | **+263,861** | **+556,880** | **+264,821** | **+529,675** |

**Table 4-6:** Forecast jobs for the Western City District plus Blacktown LGA under each scenario – 20 and 40 years (from 2016)

| LGA | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 | 2016 - 2036 | 2016-2056 |
| Blacktown | 127,244 | +59,238 | +104,499 | +71,619 | +139,143 | +65,693 | +115,902 |
| Blue Mountains | 21,300 | +2,616 | +4,912 | +3,049 | +7,137 | +2,623 | +4,923 |
| Camden | 29,173 | +21,793 | +51,005 | +24,267 | +71,078 | +26,360 | +58,386 |
| Campbelltown | 57,040 | +12,032 | +29,580 | +14,069 | +34,010 | +22,139 | +45,296 |
| Fairfield | 69,318 | +16,612 | +30,743 | +20,256 | +41,486 | +21,114 | +37,453 |
| Hawkesbury | 28,838 | +5,614 | +11,219 | +5,823 | +14,245 | +6,026 | +10,432 |
| Liverpool | 80,694 | +36,174 | +75,260 | +62,067 | +177,930 | +58,988 | +136,491 |
| Penrith | 80,812 | +22,884 | +36,215 | +46,663 | +95,998 | +43,471 | +86,477 |
| Wollondilly | 13,430 | +10,527 | +15,730 | +13,110 | +24,739 | +12,877 | +24,586 |
| **Total** | **507,849** | **+187,491** | **+359,163** | **+260,923** | **+605,766** | **+259,290** | **+519,947** |

## Initial PIC area

*Tables 4-7 to 4-9* summarise the forecast growth to 2056 for the initial PIC area – essentially an almost doubling of today's population, housing and jobs over 20 years.

**Table 4-7:** Greater Penrith to Eastern Creek 20 and 40-year forecast growth

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 253,642 | +85,498 | +123,417 | +171,772 | +395,271 | +172,166 | +401,424 |
| **Jobs** | 75,119 | +14,109 | +23,164 | +24,617 | +49,385 | +34,266 | +74,404 |
| **Homes** | 88,369 | +30,906 | +43,882 | +60,950 | +137,252 | +61,047 | +139,045 |

**Table 4-8:** Western Sydney Aerotropolis Growth Area 20 and 40-year forecast growth

| | | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 7,645 | +7,525 | +11,588 | +30,202 | +77,653 | +21,683 | +47,235 |
| **Jobs** | 3,609 | +10,947 | +24,192 | +45,211 | +135,202 | +26,710 | +67,394 |
| **Homes** | 2,452 | +2,746 | +4,188 | +10,896 | +26,797 | +7,753 | +16,168 |

**Table 4-9:** Austral to Glenfield Corridor 20 and 40-year forecast growth

| | | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 17,647 | +48,578 | +99,349 | +55,773 | +115,708 | +73,982 | +126,833 |
| **Jobs** | 4,405 | +12,967 | +26,800 | +15,518 | +36,692 | +18,782 | +35,838 |
| **Homes** | 5,884 | +16,549 | +33,505 | +19,128 | +38,859 | +25,038 | +42,848 |

### Precincts

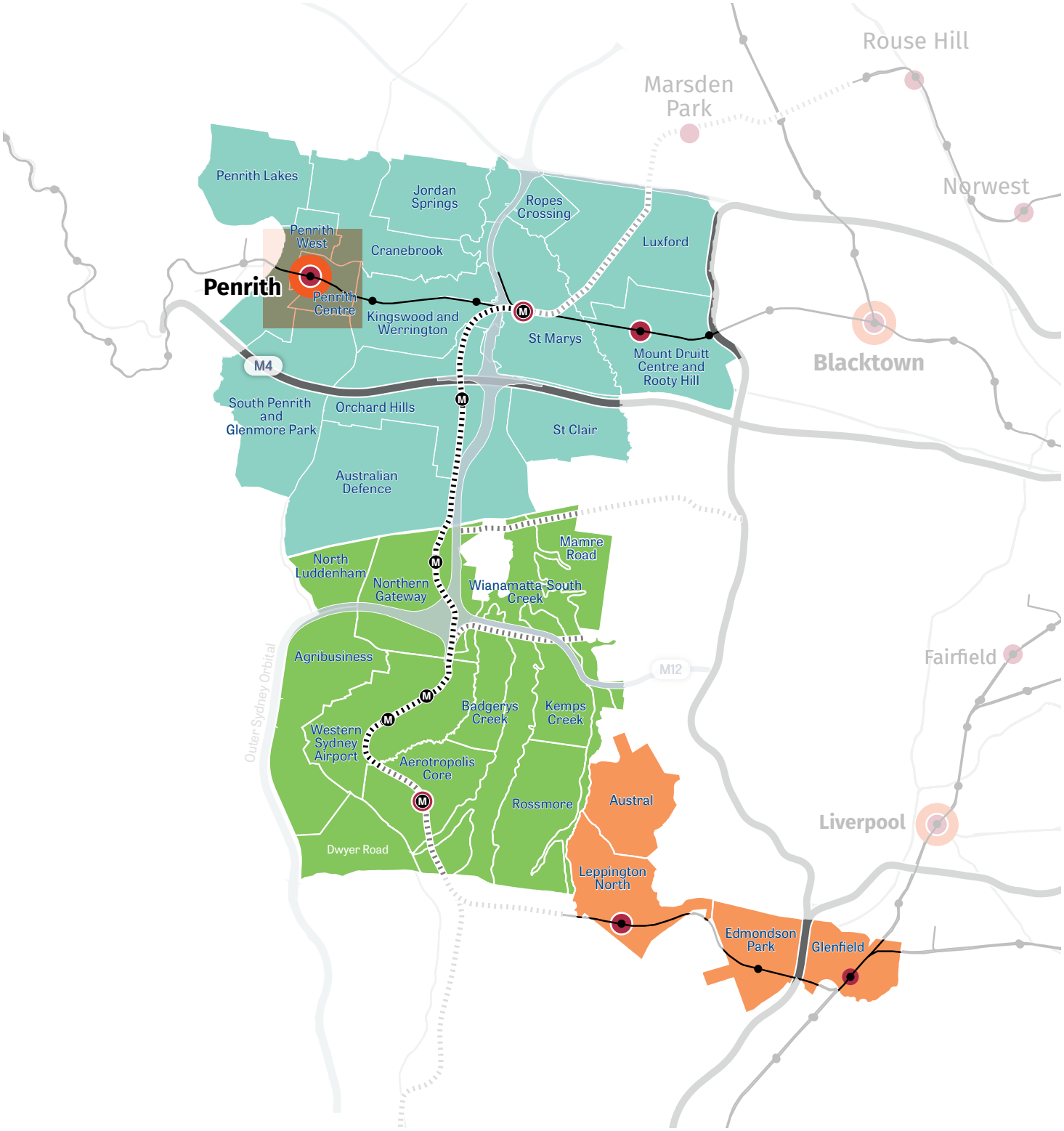
To facilitate strategic planning at a sub-district scale the initial PIC area is organised into 28 precincts (*Figure 4-6*).

Each of these precincts is described in terms of its current zoning (noting some were rezoned under the *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020* (Aerotropolis SEPP) in September 2020), assumed forecast growth and their likely future character.

The Western Sydney Aerotropolis Plan defines the southern portion of the Agribusiness Precinct as Dwyer Road Precinct.

All mapped infrastructure proposals broadly reflect the infrastructure and service proposals identified in the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios. All proposals are **subject to further investigation and funding decisions**.

**Figure 4-6:** The 28 precincts in the initial PIC area




| | | |
|---|---|---|
| Metropolitan Cluster | Potential future rail/metro (indicative) | Greater Penrith to Eastern Creek |
| Strategic Centre | Outer Sydney Orbital (proposed) | Western Sydney Aerotropolis Growth Area |
| Precinct boundary | Rail line and station (existing) | Austral to Glenfield Corridor |
| Sydney Metro – Western Sydney Airport | Motorway (existing) | |

## Penrith Centre

Penrith Centre Precinct is focused on Penrith CBD. It has a retail and commercial core south of the rail line, with civic and education uses. There are medium to high density residential uses to the north and low to medium density uses to the south-east.

The Precinct will see more compact mixed uses in the CBD with medium and high density residential within a walk of the station. Growth would be higher under a Thriving Metropolitan Cluster scenario. Land use forecasts for Penrith Centre can only be met if the actions in the Adaptive Management Framework for each threshold has been achieved and the flood risk within the Penrith City Centre is managed to realise growth opportunities. Evacuation under major flood event (1 in 100 chance per year) is being investigated under the Hawkesbury-Nepean Valley Flood Risk Management Strategy and the Penrith City Centre Taskforce.

**Figure 4-7:** Penrith Centre Precinct

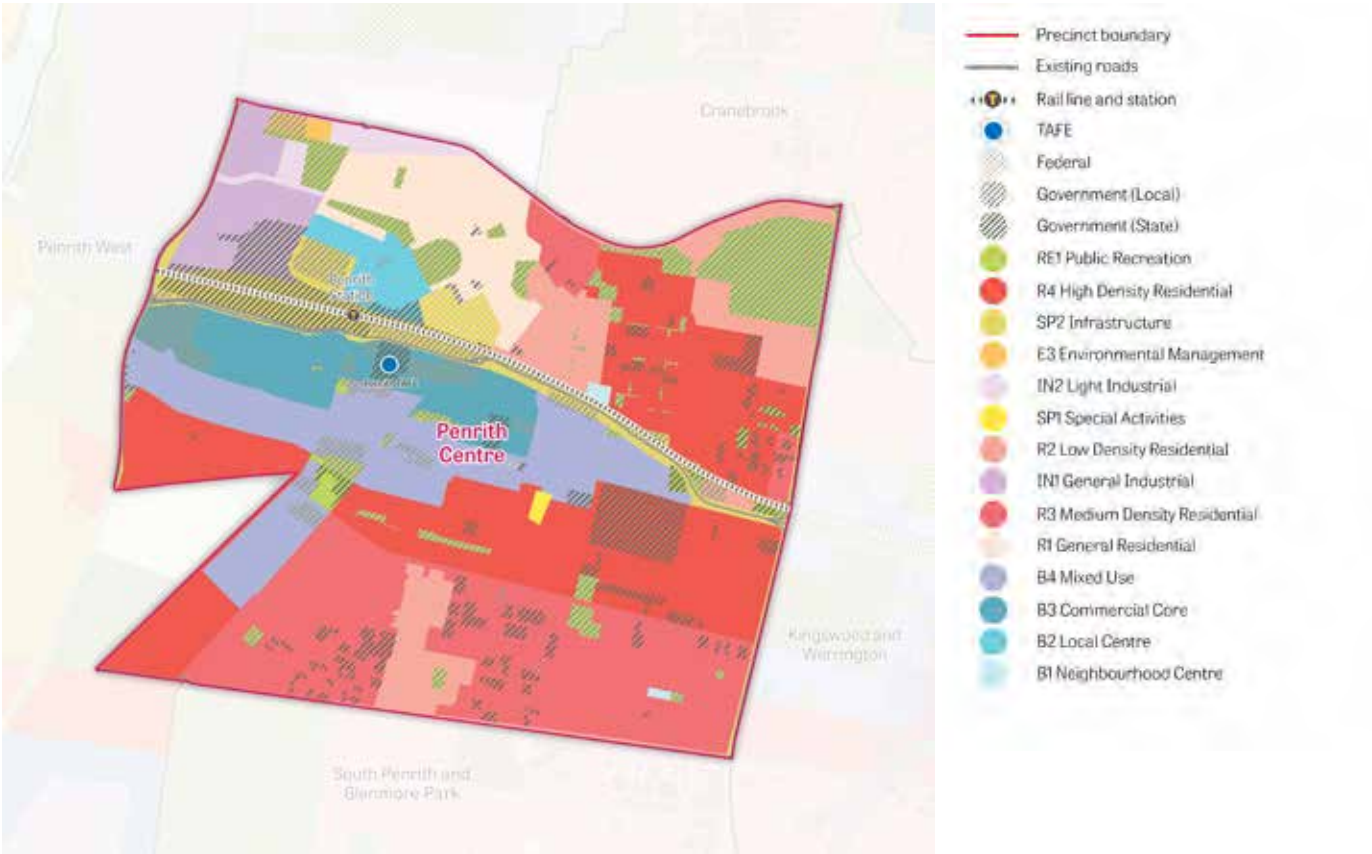



**Table 4-10:** Penrith Centre Precinct land breakdown

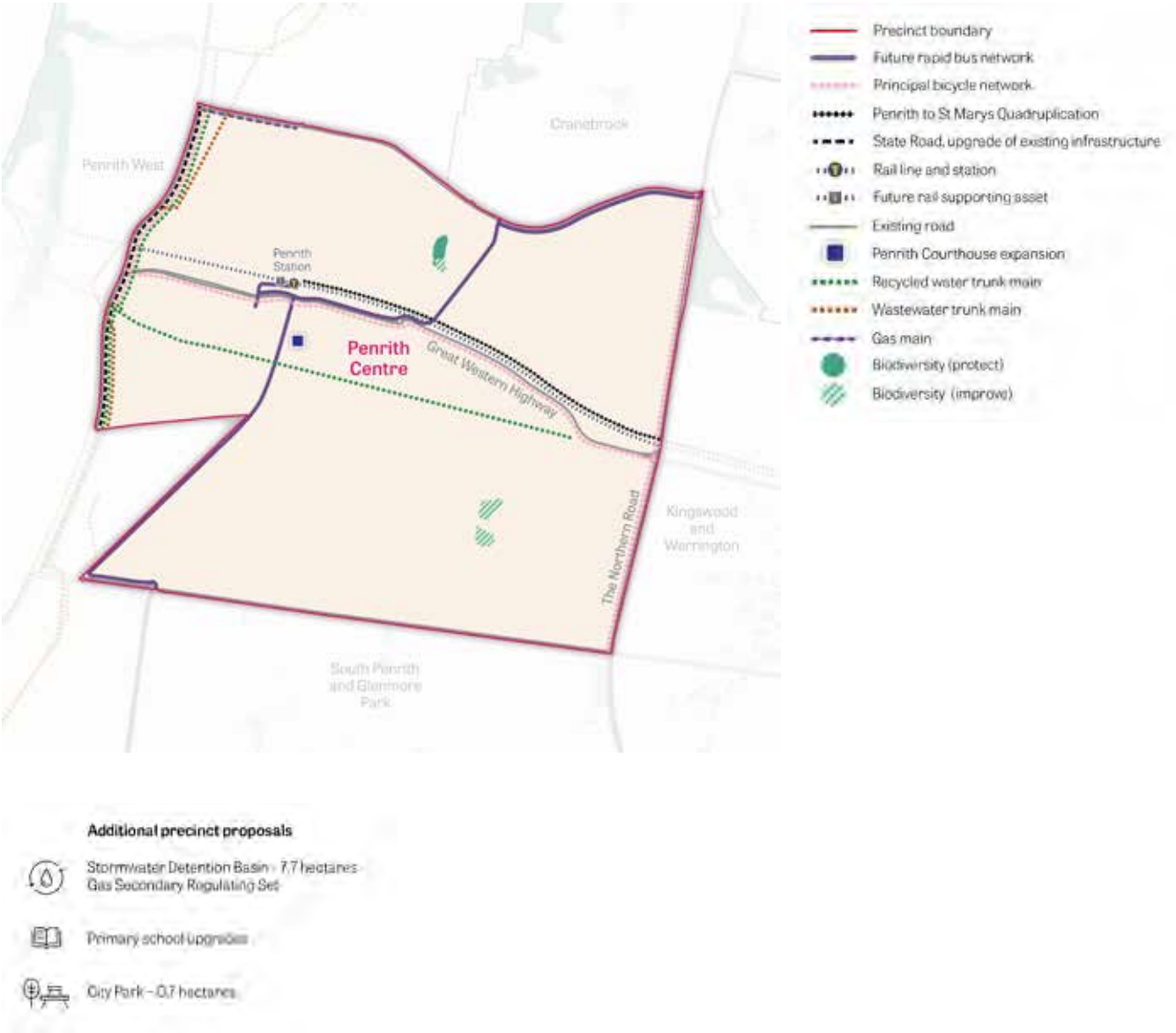
| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 409 | 94 | **2020** | 29% High, 51% Moderate, 20% Low |
| **Percentage of precinct** (%) | 100 | 23 | **2100** | 20% Acute, 9% High, 5% Moderate, 66% Low |

**Table 4-11:** Penrith Centre Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 8,225 | +8,093 | +8,544 | +13,242 | +19,606 | +15,451 | +24,762 |
| **Jobs** | 13,105 | +2,153 | +2,670 | +2,842 | +4,194 | +3,945 | +9,838 |
| **Homes** | 4,186 | +4,203 | +4,437 | +6,748 | +9,891 | +7,813 | +12,494 |

*The projected figures can only be delivered if the actions in the Adaptive Strategy for each threshold has been achieved

**Figure 4-8:** Penrith Centre Precinct infrastructure proposals identified in the PIC process




Further investigations for specific flooding evacuation route requirements to support the Penrith City Centre are required. This could include the need to redesign parts of the road-based transport network. There will be opportunities to incorporate additional requirements as they are identified in the ongoing implementation and monitoring of the PIC.

## Penrith West

Penrith West Precinct is mainly an industrial and retail area, with some low to medium density residential uses south of Penrith City Centre and recreational and sporting uses such as Penrith Stadium. Residential growth is expected to be largely driven by the Panthers development, with employment growth in the North Penrith and Jamisontown industrial areas.

Flooding constraints associated with the Nepean River, Peach Tree Creek, Surveyors Creek and Boundary Creek are a barrier to further growth.

**Figure 4-9:** Penrith West Precinct

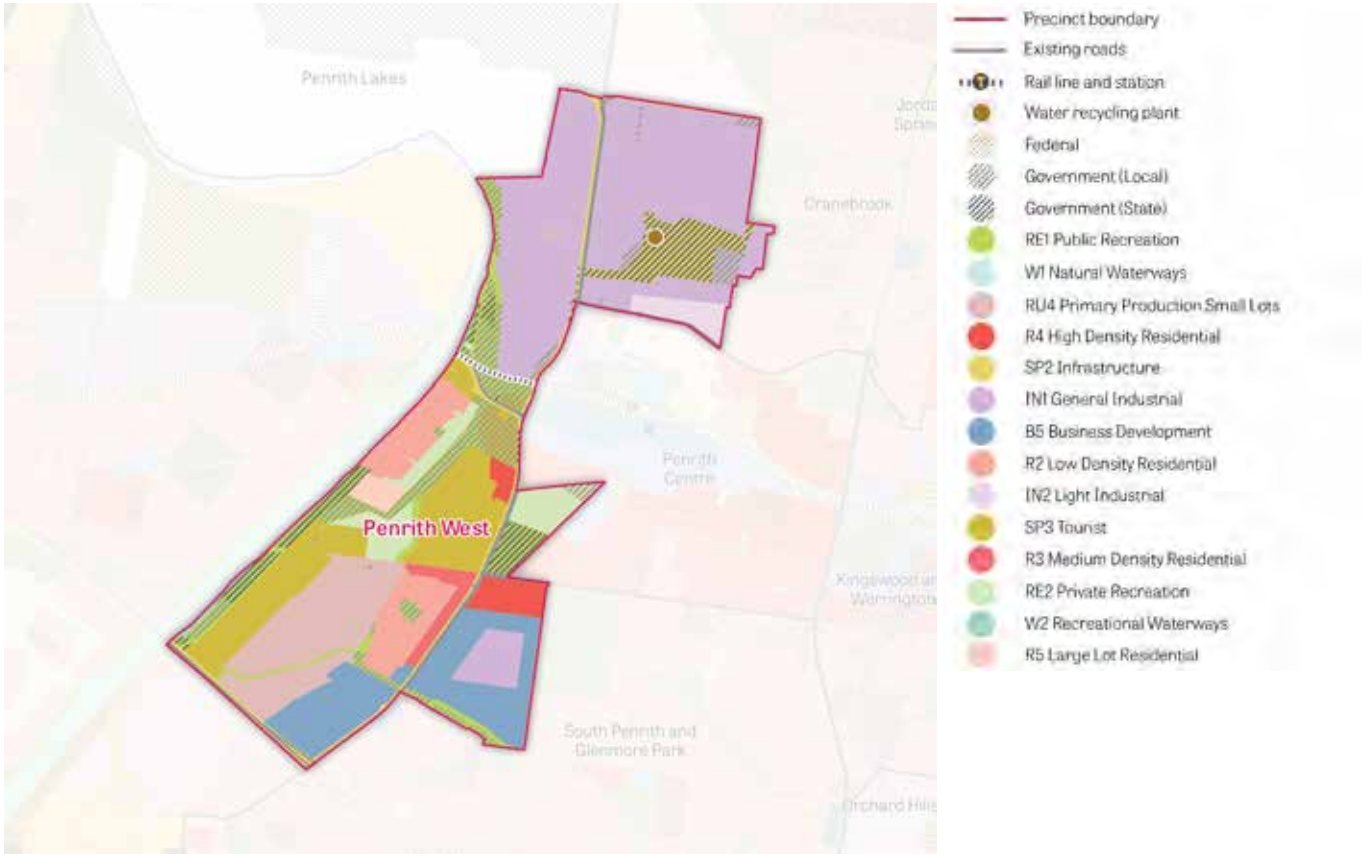


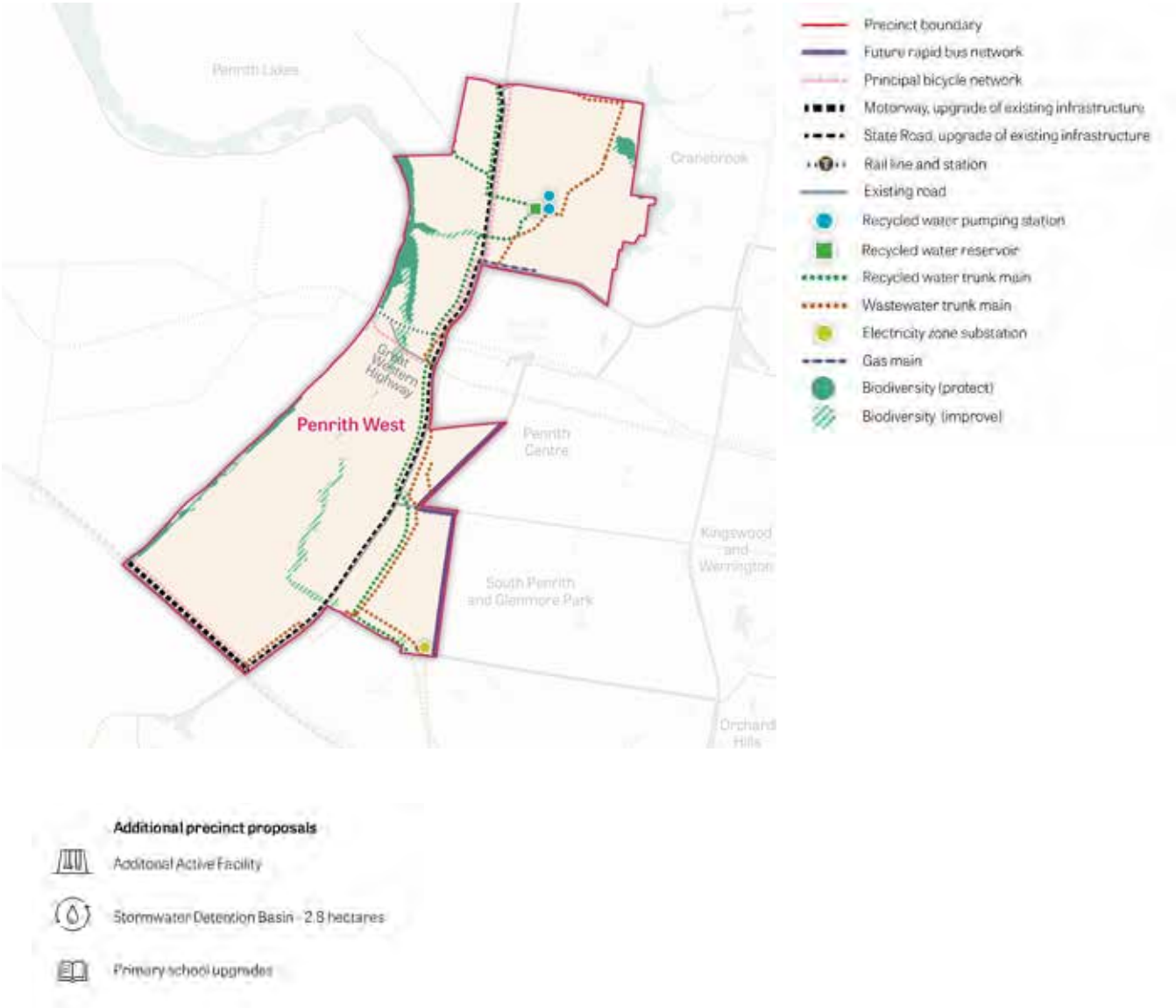

**Table 4-12:** Penrith West Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 753 | 124 | **2020** | 6% Acute, 94% High |
| **Percentage of precinct** (%) | 100 | 16 | **2100** | 15% Acute, 84% High |

**Table 4-13:** Penrith West Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 3,556 | +2,293 | +2,563 | +2,325 | +2,717 | +2,347 | +2,884 |
| **Jobs** | 10,038 | +840 | +1,680 | +1,442 | +2,884 | +2,706 | +5,412 |
| **Homes** | 1,653 | +843 | +943 | +859 | +1,005 | +868 | +1,068 |

**Figure 4-10:** Penrith West Precinct infrastructure proposals identified in the PIC process




Further investigations for specific flooding evacuation route requirements to support the Penrith City Centre are required. This could include the need to redesign parts of the road-based transport network. There will be opportunities to incorporate additional requirements as they are identified in the ongoing implementation and monitoring of the PIC.

## Penrith Lakes

Penrith Lakes Precinct contains sporting, recreational and education uses including the Sydney International Regatta Centre, Penrith Lakes Regional Park and Penrith Lakes Environmental Education Centre.

Work is underway on a Penrith Lakes employment area. Nominal growth is expected due to flooding constraints in the few sites not taken for sporting, recreational or environmental uses.

**Figure 4-11:** Penrith Lakes Precinct

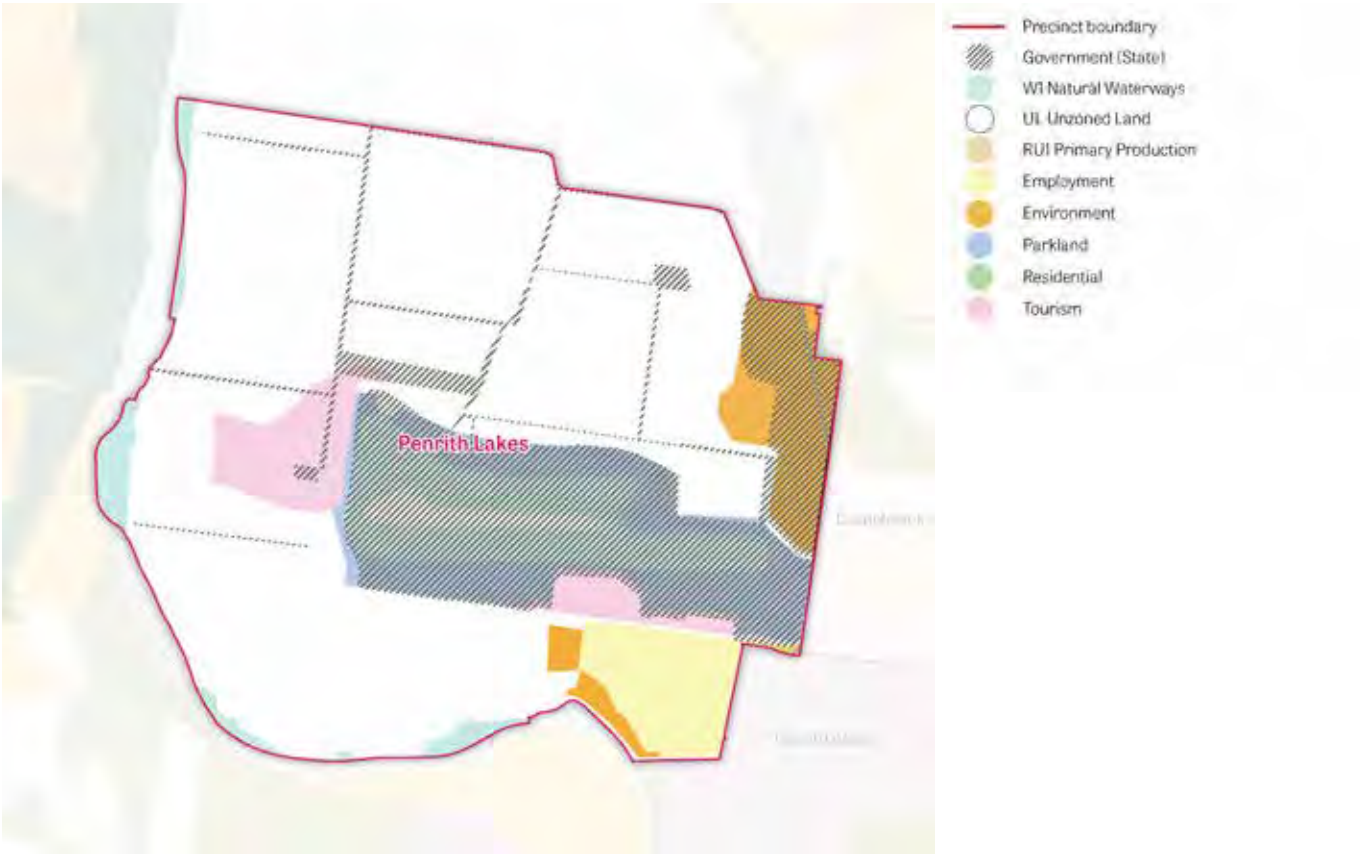



**Table 4-14:** Penrith Lakes Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,109 | 268 | **2020** | 10% Acute, 4% High, 6% Moderate, 80% Low |
| **Percentage of precinct** (%) | 100 | 24 | **2100** | 12% Acute, 3% High, 5% Moderate, 80% Low |

**Table 4-15:** Penrith Lakes Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Jobs** | 318 | +44 | +63 | +58 | +101 | +45 | +68 |
| **Homes** | 7 | 0 | 0 | 0 | 0 | 0 | 0 |

**Figure 4-12:** Penrith Lakes Precinct infrastructure proposals identified in the PIC process

## South Penrith and Glenmore Park

This is an established low to medium density residential area with small local centres and vegetation and riparian zones associated with Surveyors Creek, School House Creek, Mulgoa Creek and Mulgoa Nature Reserve. Growth is expected through Glenmore Park Stage 3 and in areas adjoining Penrith Centre south of Jamison Road.

**Figure 4-13:** South Penrith and Glenmore Park Precinct

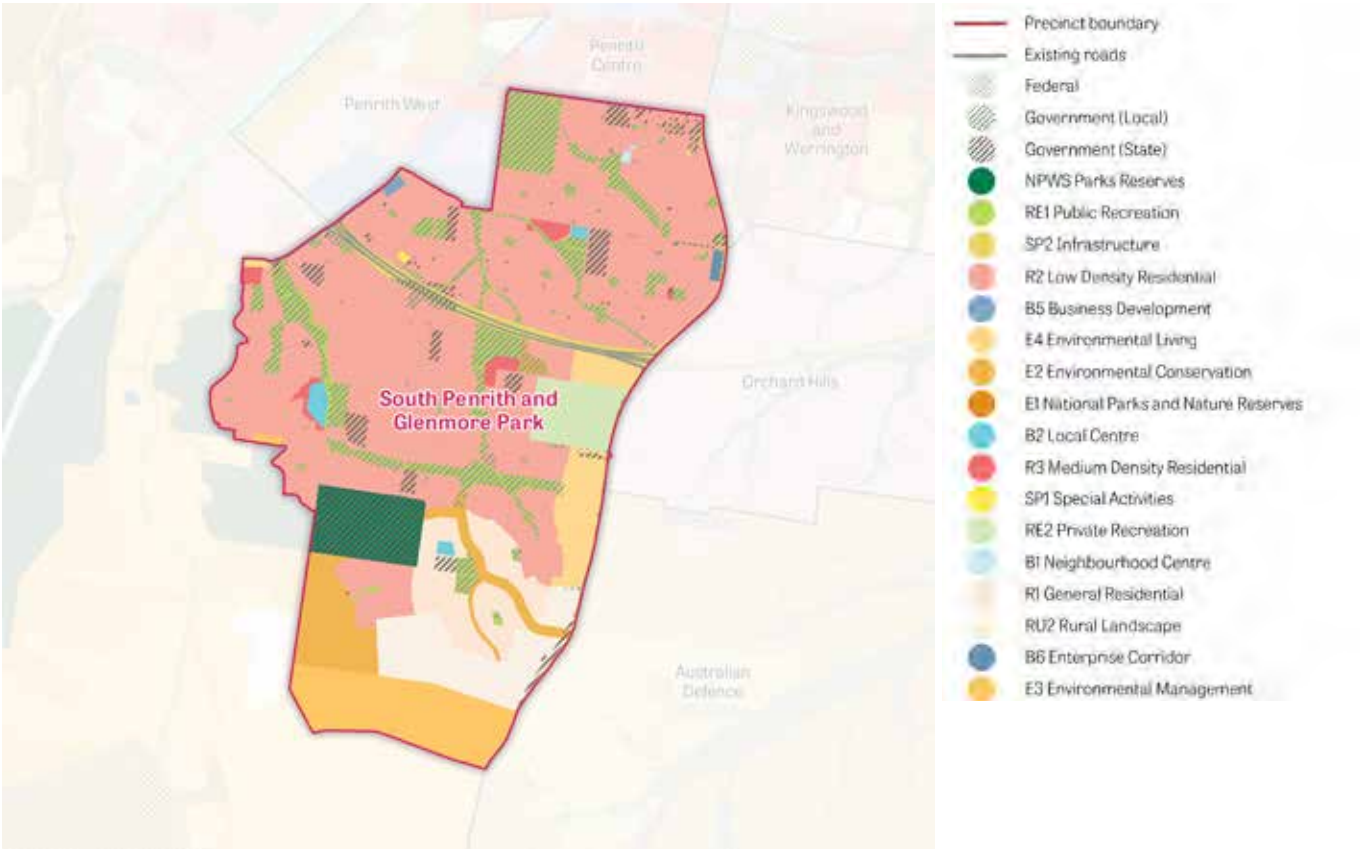


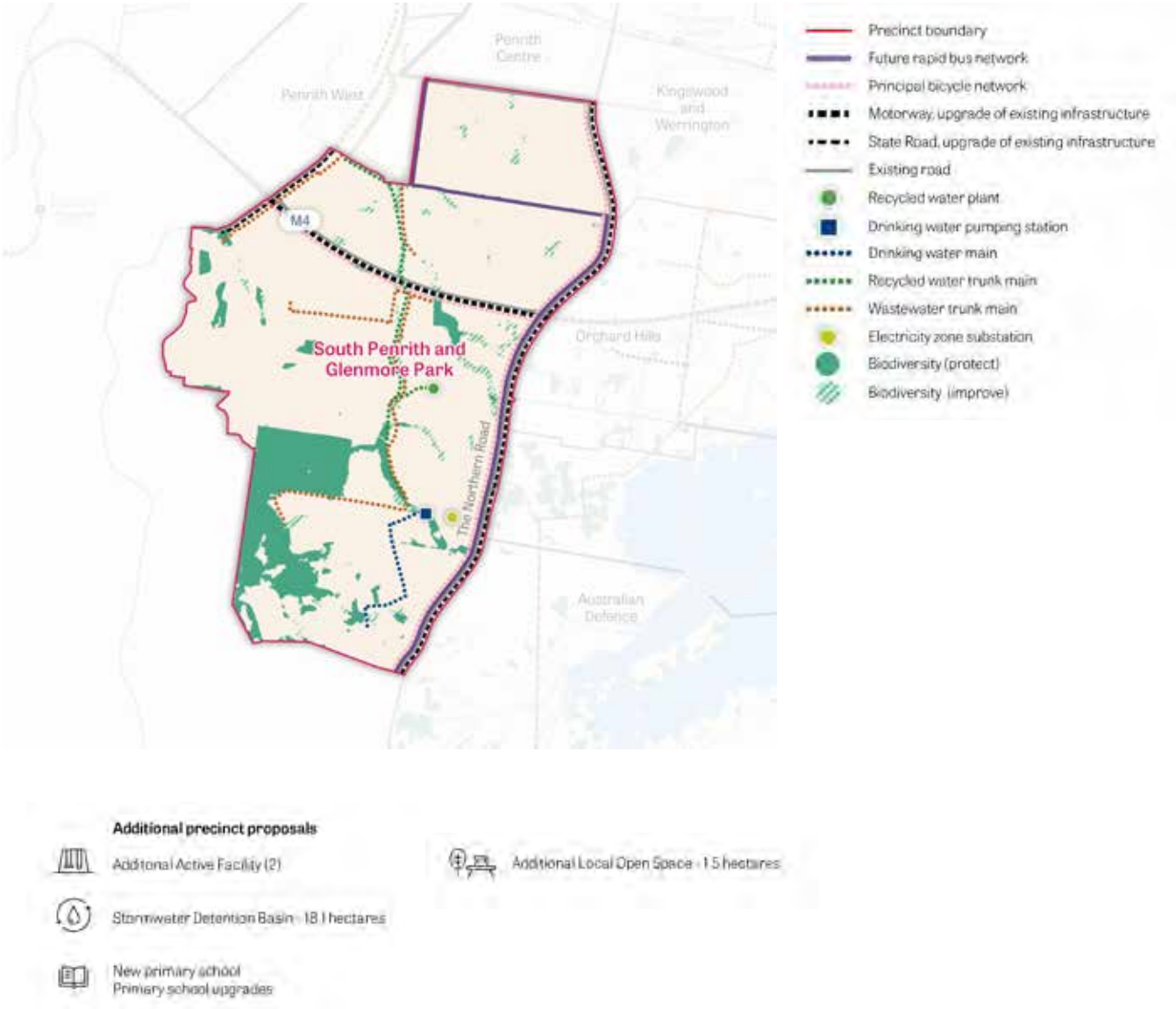

**Table 4-16:** South Penrith and Glenmore Park Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,974 | 347 | **2020** | 4% High, 51% Moderate, 45% Low |
| **Percentage of precinct** (%) | 100 | 18 | **2100** | 4% High, 10% Moderate, 86% Low |

**Table 4-17:** South Penrith and Glenmore Park Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 36,009 | +8,630 | +10,947 | +13,416 | +21,507 | +14,747 | +27,409 |
| **Homes** | 4,509 | +916 | +1,029 | +1,288 | +2,289 | +2,034 | +4,254 |
| **Jobs** | 12,411 | +2,960 | +3,763 | +4,787 | +7,748 | +5,287 | +9,882 |

**Figure 4-14:** South Penrith and Glenmore Park Precinct infrastructure proposals identified in the PIC process



## Cranebrook

Cranebrook Precinct includes Cranebrook, Cambridge Gardens, Werrington Downs, Werrington County and parts of Cambridge Park and Penrith. It contains mainly low to medium density residential areas with small neighbourhood centres and several civic spaces and retail, health and educational facilities.

While there is a significant amount of strata-titled residential and recent development in the west and northern parts of the Precinct, renewal opportunities exist to accommodate modest new growth in other areas.

**Figure 4-15:** Cranebrook Precinct

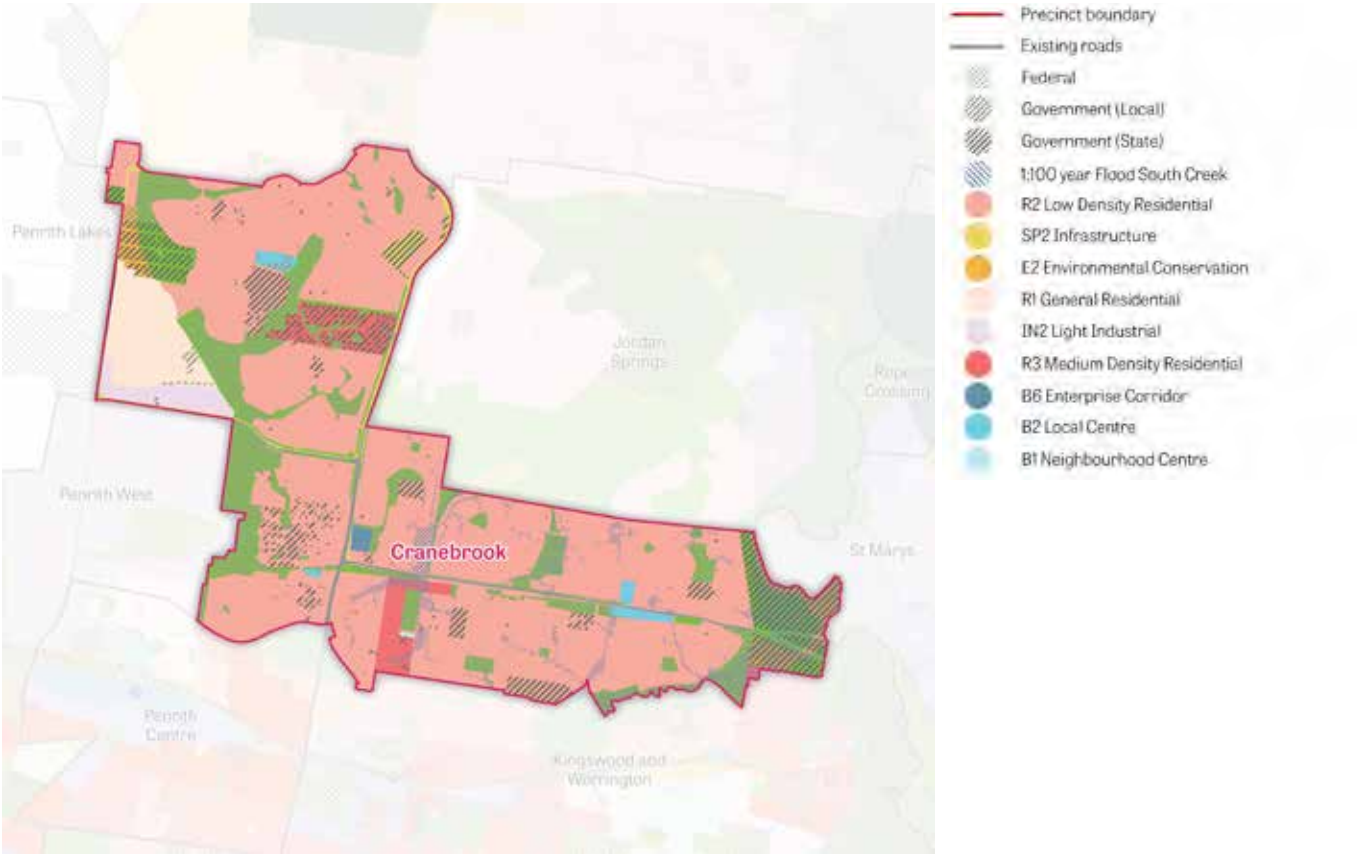


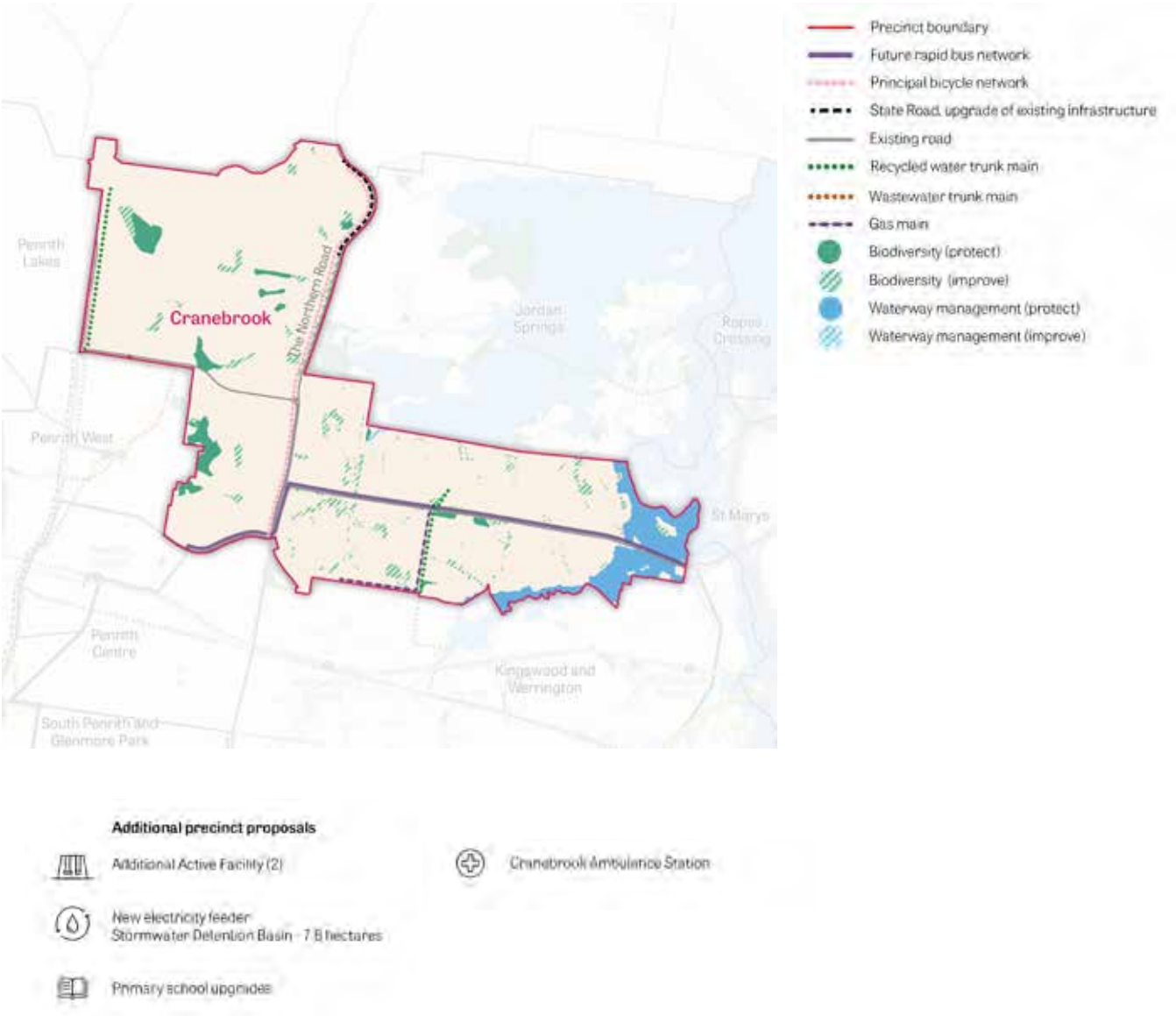

**Table 4-18:** Cranebrook Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,256 | 315 | **2020** | 7% High, 62% Moderate, 31% Low |
| **Percentage of precinct** (%) | 100 | 25 | **2100** | 3% Acute, 4% High, 1% Moderate, 92% Low |

**Table 4-19:** Cranebrook Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 27,922 | +1,693 | +2,548 | +4,112 | +11,732 | +3,069 | +7,037 |
| **Jobs** | 2,078 | +171 | +282 | +295 | +901 | +393 | +1,000 |
| **Homes** | 10,070 | +617 | +930 | +1,478 | +4,221 | +1,107 | +2,529 |

**Figure 4-16:** Cranebrook Precinct infrastructure proposals identified in the PIC process



## Jordan Springs

Jordan Springs is a recently developed low-to-medium density residential area buffered by bushland. It has a small neighbourhood retail, health and educational facilities. It is bound by Wianamatta Regional Park with vegetation and riparian zones associated with the Wianamatta-South Creek corridor, providing pleasant landscape areas for the growing community. Nominal growth is expected given it is a recently established community.

**Figure 4-17:** Jordan Springs Precinct

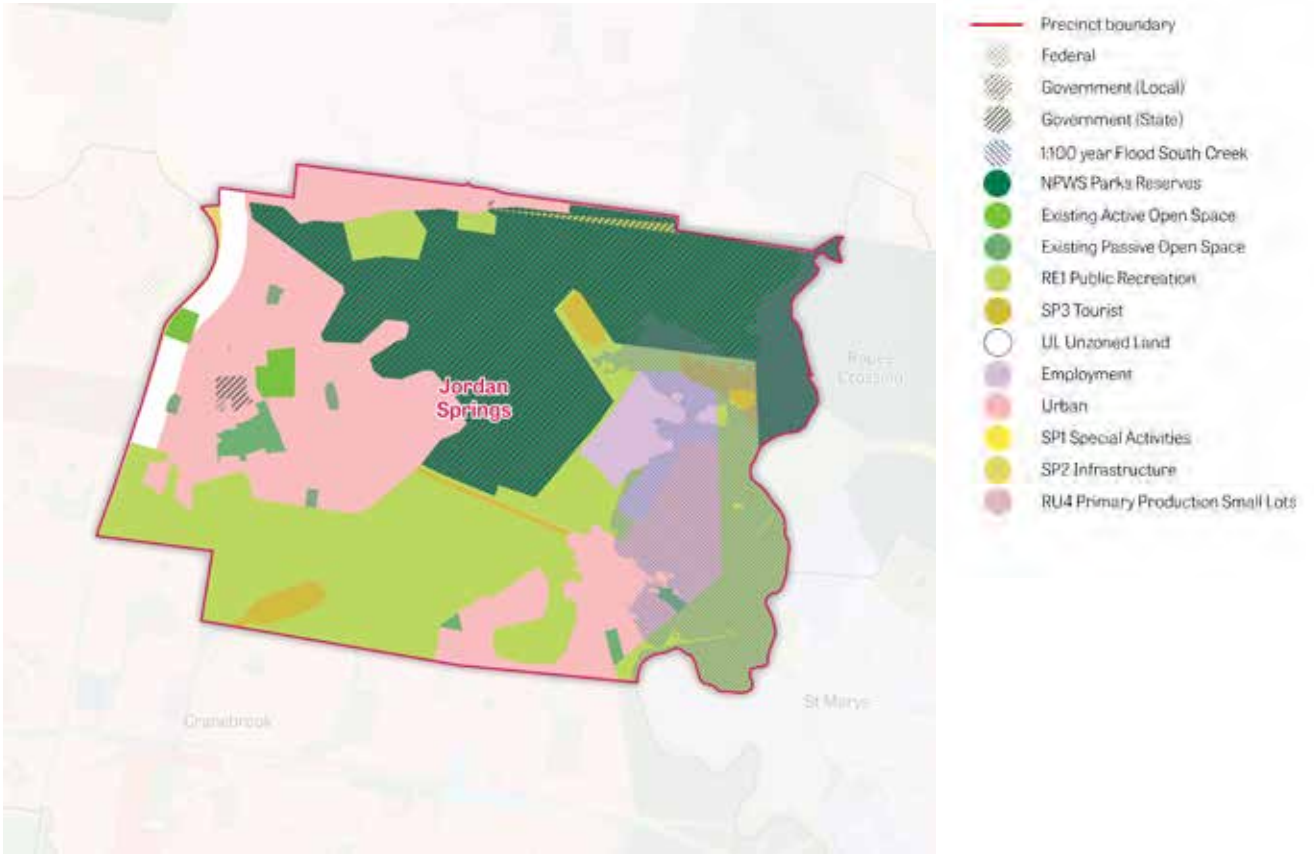


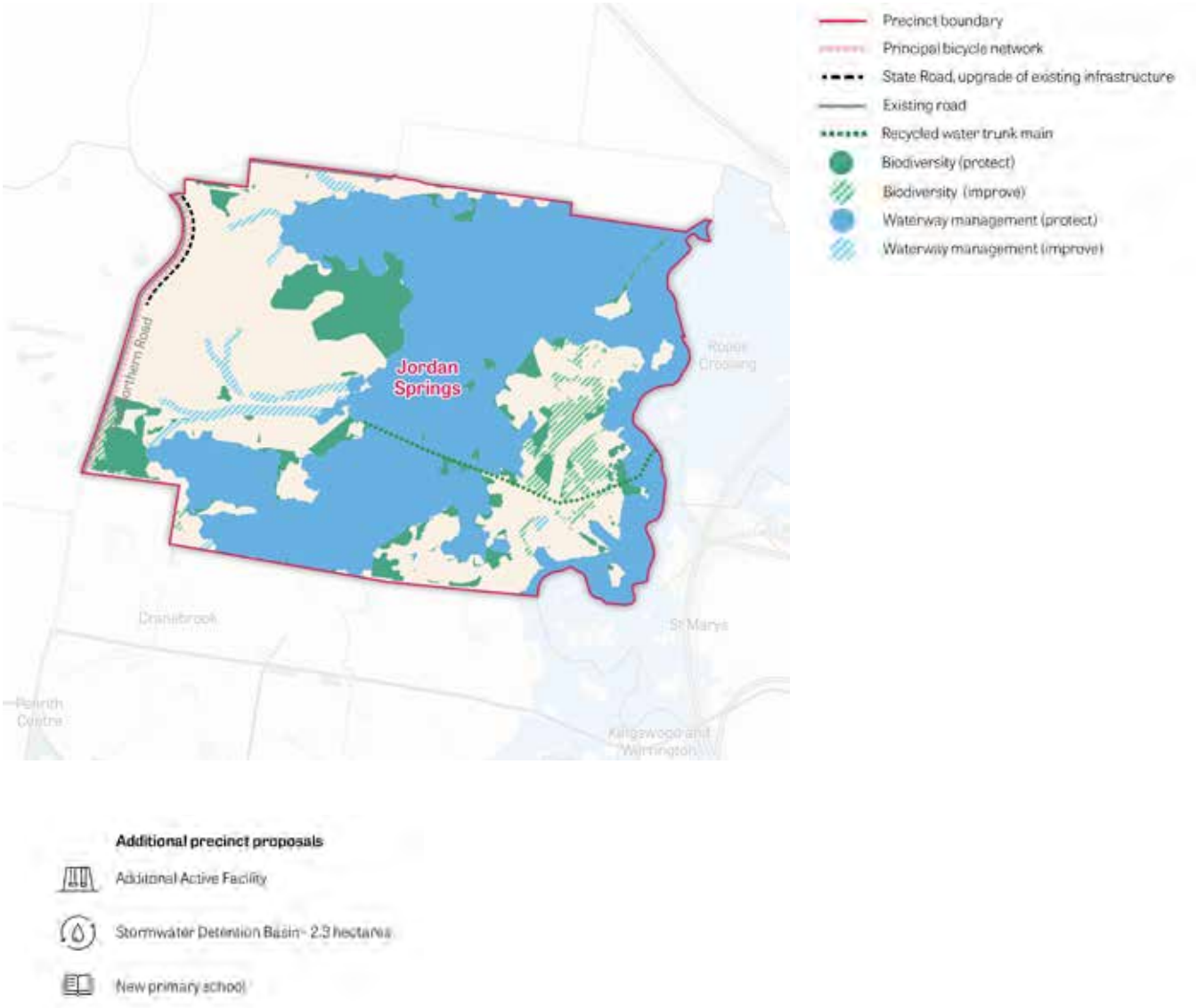

**Table 4-20:** Jordan Springs Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 980 | 294 | **2020** | 20% High, 77% Moderate, 3% Low |
| **Percentage of precinct** (%) | 100 | 30 | **2100** | 10% Acute, 25% High, 44% Moderate, 21% Low |

**Table 4-21:** Jordan Springs Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 4,664 | +9,023 | +9,023 | +9,023 | +9,023 | +9,023 | +9,023 |
| **Jobs** | 529 | +325 | +475 | +346 | +506 | +401 | +703 |
| **Homes** | 1,638 | +3,168 | +3,168 | +3,168 | +3,168 | +3,168 | +3,168 |

**Figure 4-18: J**ordan Springs Precinct infrastructure proposals identified in the PIC process



## Ropes Crossing

Ropes Crossing Precinct is a recently developed low-to-medium density residential area buffered by bushland. It has a small neighbourhood retail, health and educational facilities, including Ropes Crossing Community Hub and Ropes Crossing Public School.

The Precinct is bound by Wianamatta Regional Park with vegetation and riparian zones providing landscape areas for the growing community. Nominal growth is expected given the Precinct's recent establishment.

**Figure 4-19:** Ropes Crossing Precinct

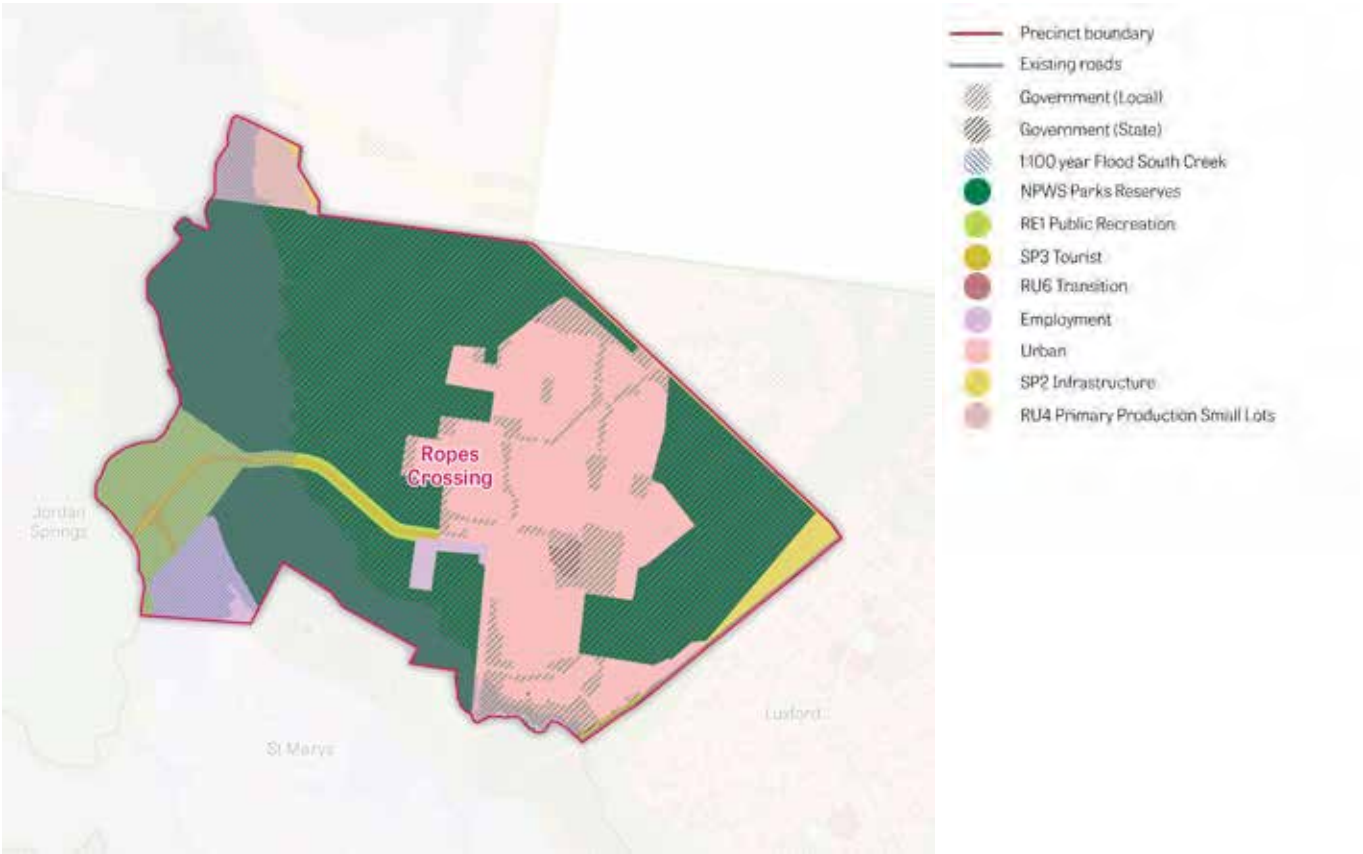


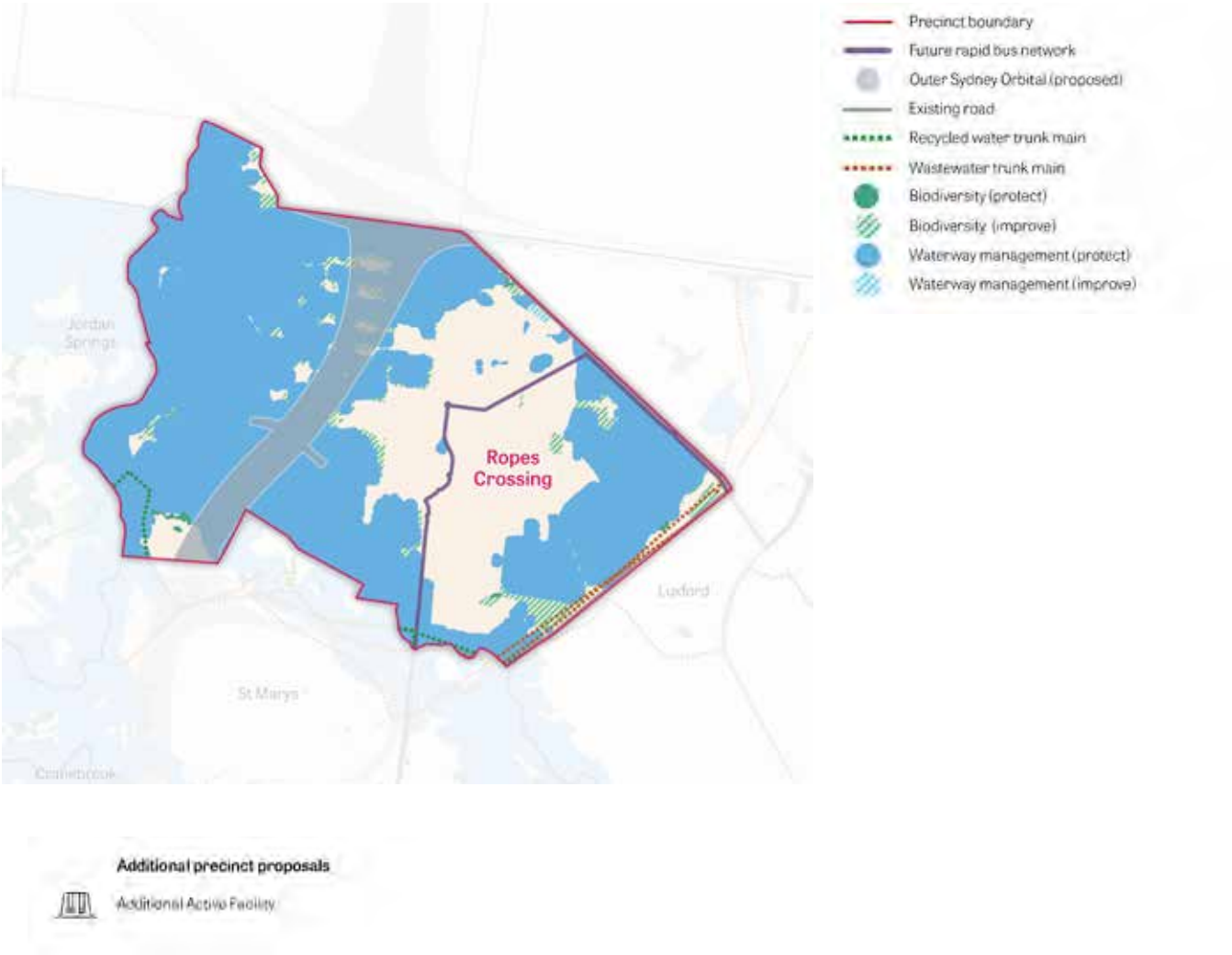

**Table 4-22:** Ropes Crossing Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 550 | 344 | **2020** | 31% High, 65% Moderate, 4% Low |
| **Percentage of precinct** (%) | 100 | 63 | **2100** | 12% Acute, 26% High, 32% Moderate, 30% Low |

**Table 4-23:** Ropes Crossing Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 6,073 | +138 | +138 | +138 | +138 | +138 | +138 |
| **Jobs** | 364 | +31 | +56 | +31 | +56 | +56 | +110 |
| **Homes** | 1,908 | +30 | +30 | +30 | +30 | +30 | +30 |

**Figure 4-20:** Ropes Crossing Precinct infrastructure proposals identified in the PIC process



## Kingswood and Werrington

This Precinct includes medium to high density residential areas on the T1 Western Line, connecting to health and education uses such as Nepean Hospital, Western Sydney University and NSW TAFE Nepean - Kingswood; local retail at the station, around the hospital and the university; and open space, vegetation areas and riparian zones associated with the Wianamatta-South, Claremont and Werrington creeks.

Significant growth is expected around Nepean Hospital, the university and its surrounding mixed use area. The Precinct contains around 101 hectares of developable publicly owned land.

**Figure 4-21:** Kingswood and Werrington Precinct

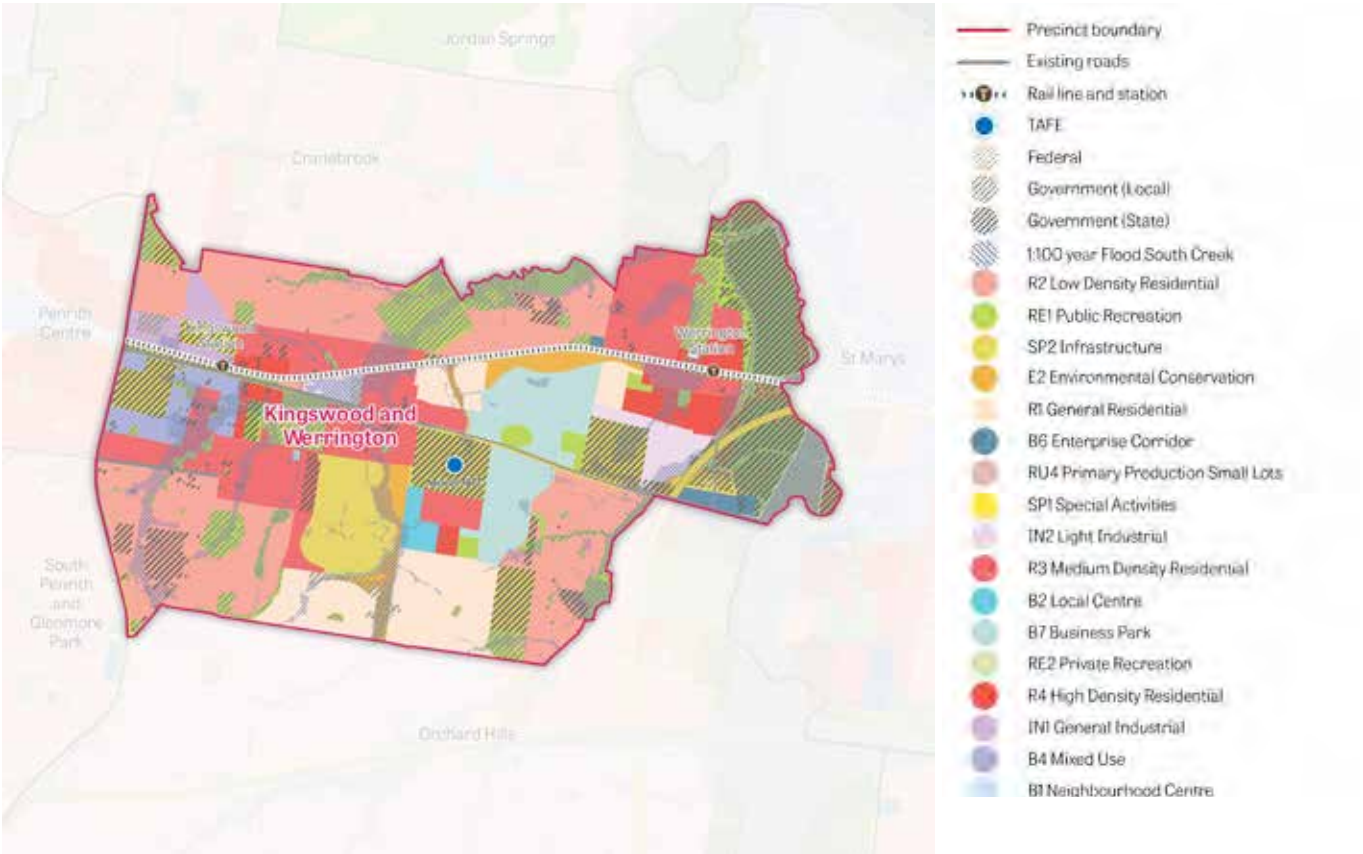



**Table 4-24:** Kingswood and Werrington Precinct land breakdown

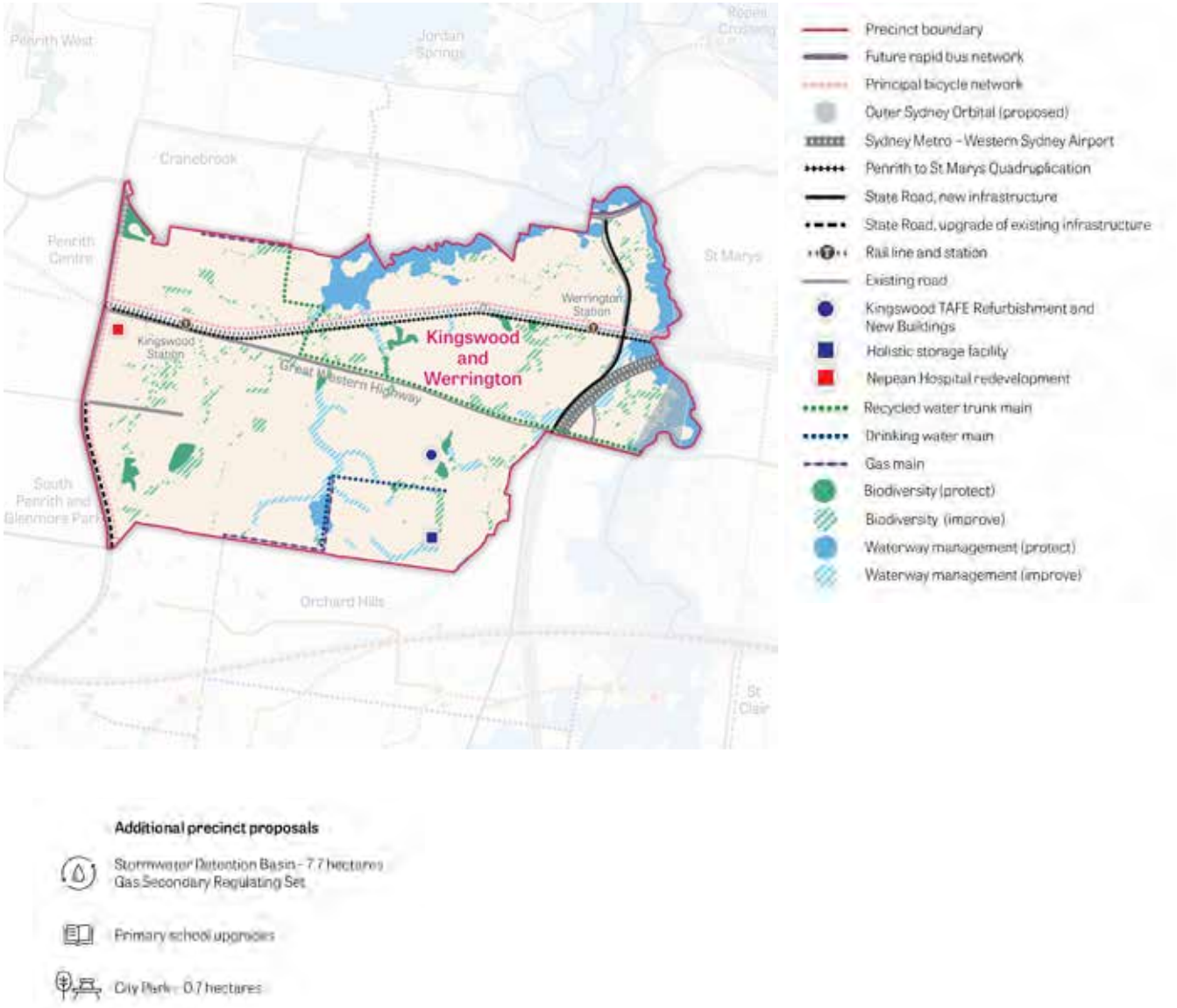
| | Total precinct area | Government owned |
|---|---|---|
| **Approximate area** (ha) | 1,244 | 378 |
| **Percentage of precinct** (%) | 100 | 30 |

| Climate risk rating (%) | |
|---|---|
| **2020** | 1% Acute, 23% High, 59% Moderate, 17% Low |
| **2100** | 10% Acute, 13% High, 0% Moderate, 77% Low |

**Table 4-25:** Kingswood and Werrington Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 18,040 | +12,552 | +21,416 | +20,184 | +41,063 | +25,212 | +54,820 |
| **Jobs** | 8,451 | +2,707 | +5,415 | +3,864 | +7,728 | +5,773 | +11,547 |
| **Homes** | 7,018 | +4,387 | +7,487 | +7,340 | +14,941 | +9,174 | +19,970 |

**Figure 4-22:** Kingswood and Werrington Precinct infrastructure proposals identified in the PIC process



## Australian Defence

The Precinct contains the Orchard Hills Defence Establishment and is expected to continue to function as a military facility and remain in Australian Government ownership.

**Figure 4-23:** Australian Defence Precinct

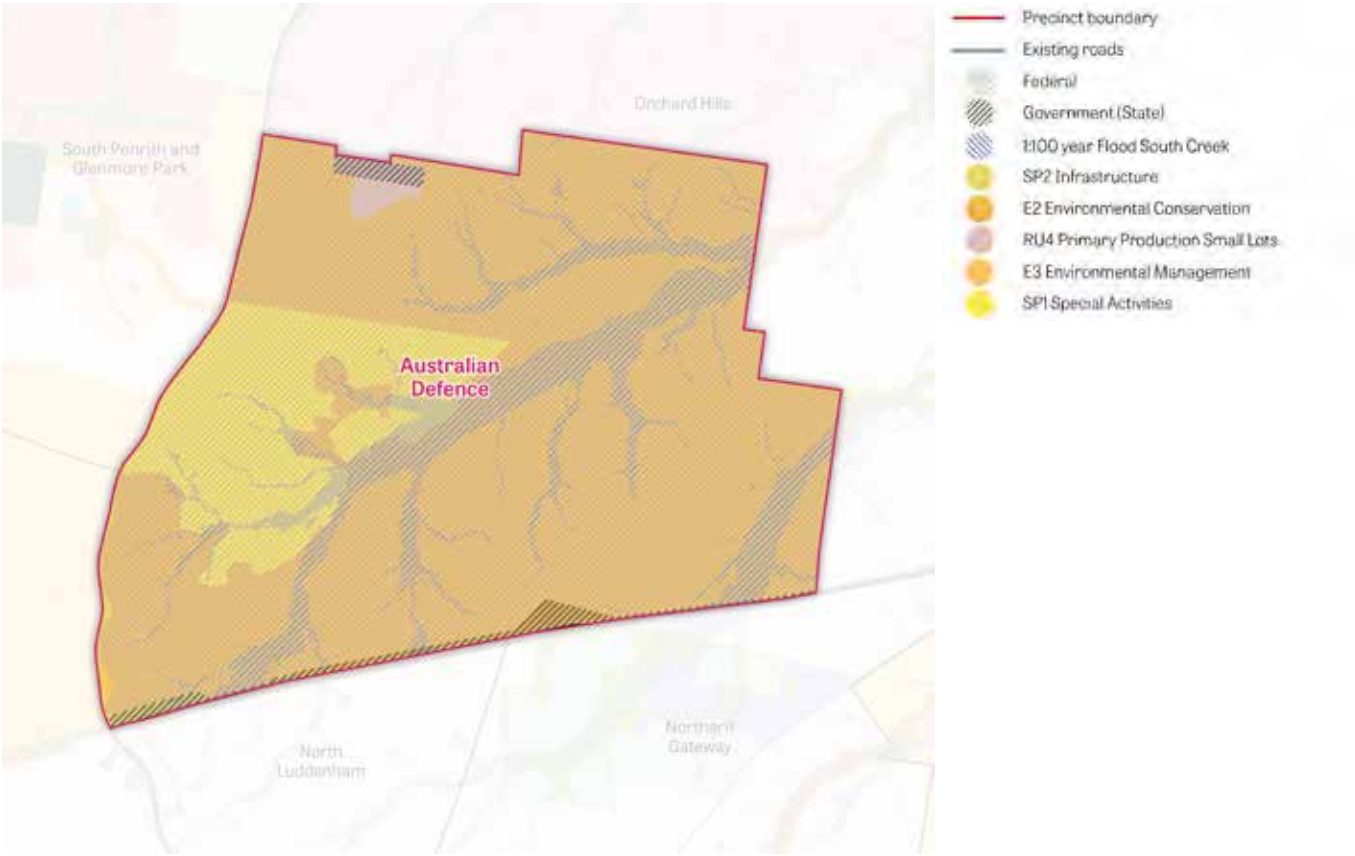
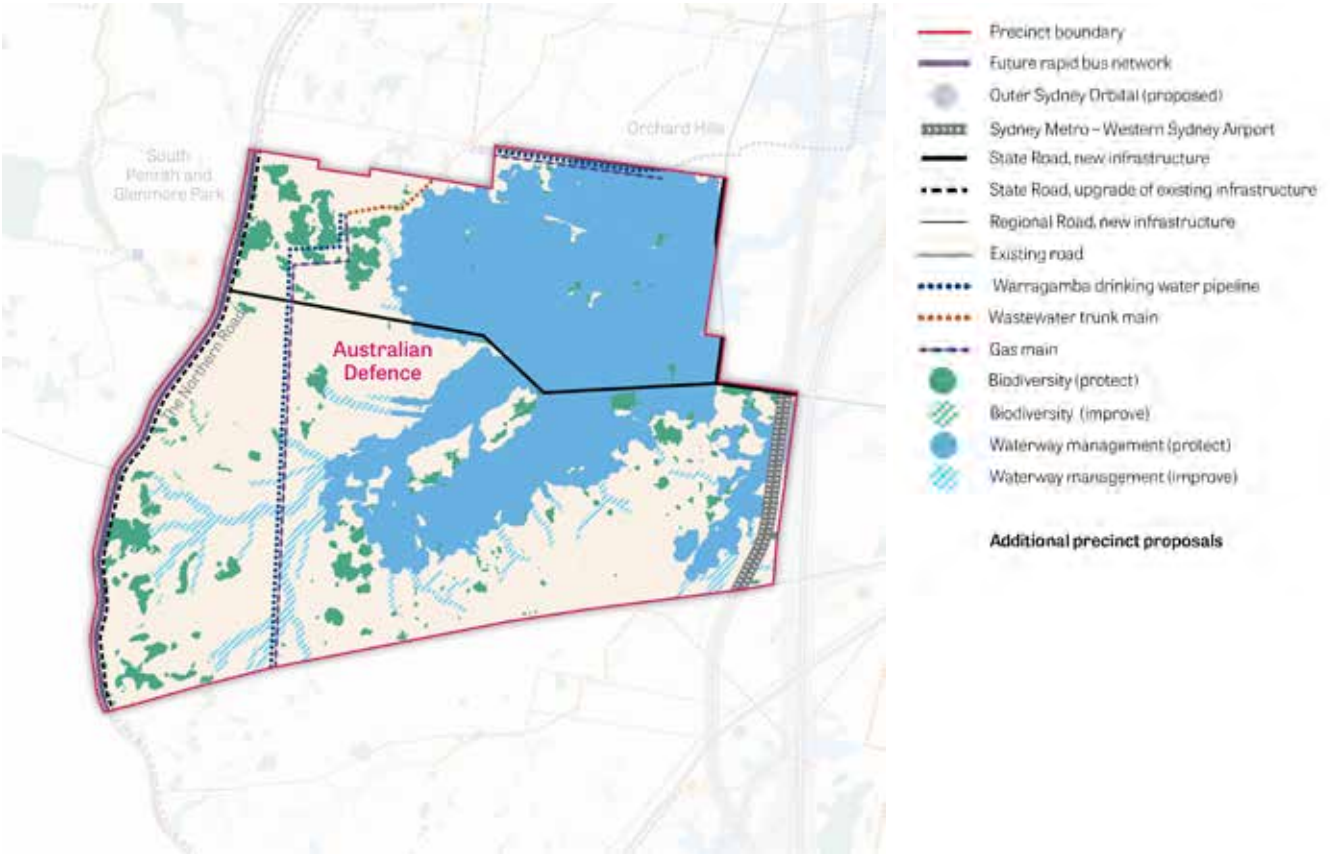



**Table 4-26:** Australian Defence Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 2,032 | 2,018 | **2020** | 96% Moderate, 4% Low |
| **Percentage of precinct** (%) | 100 | 99 | **2100** | 43% Moderate, 57% Low |

**Figure 4-24:** Australian Defence Precinct infrastructure proposals identified in the PIC process



## St Marys

St Marys Precinct is centred on the strategic centre of St Marys and the rail station, with the main local retail and mixed use strip south of the station and industrial uses to the north. Other parts are low and medium residential, with strata-titled residential and recent development south of the rail line.

The new Metro station will catalyse renewal and create opportunities for more jobs and a diversity of housing. Around 100 hectares of developable government land could be leveraged for opportunities to support growth.

**Figure 4-25:** St Marys Precinct

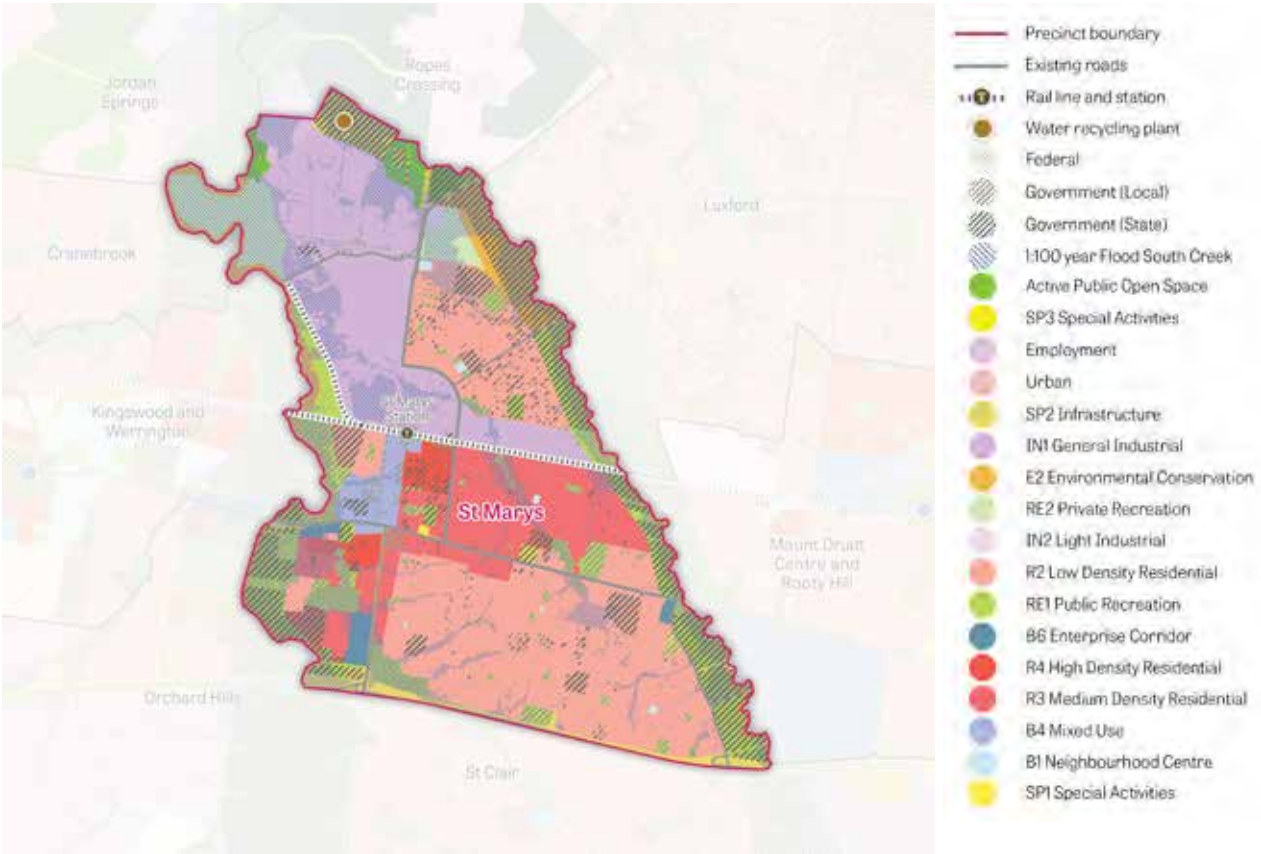



**Table 4-27:** St Marys Precinct land breakdown

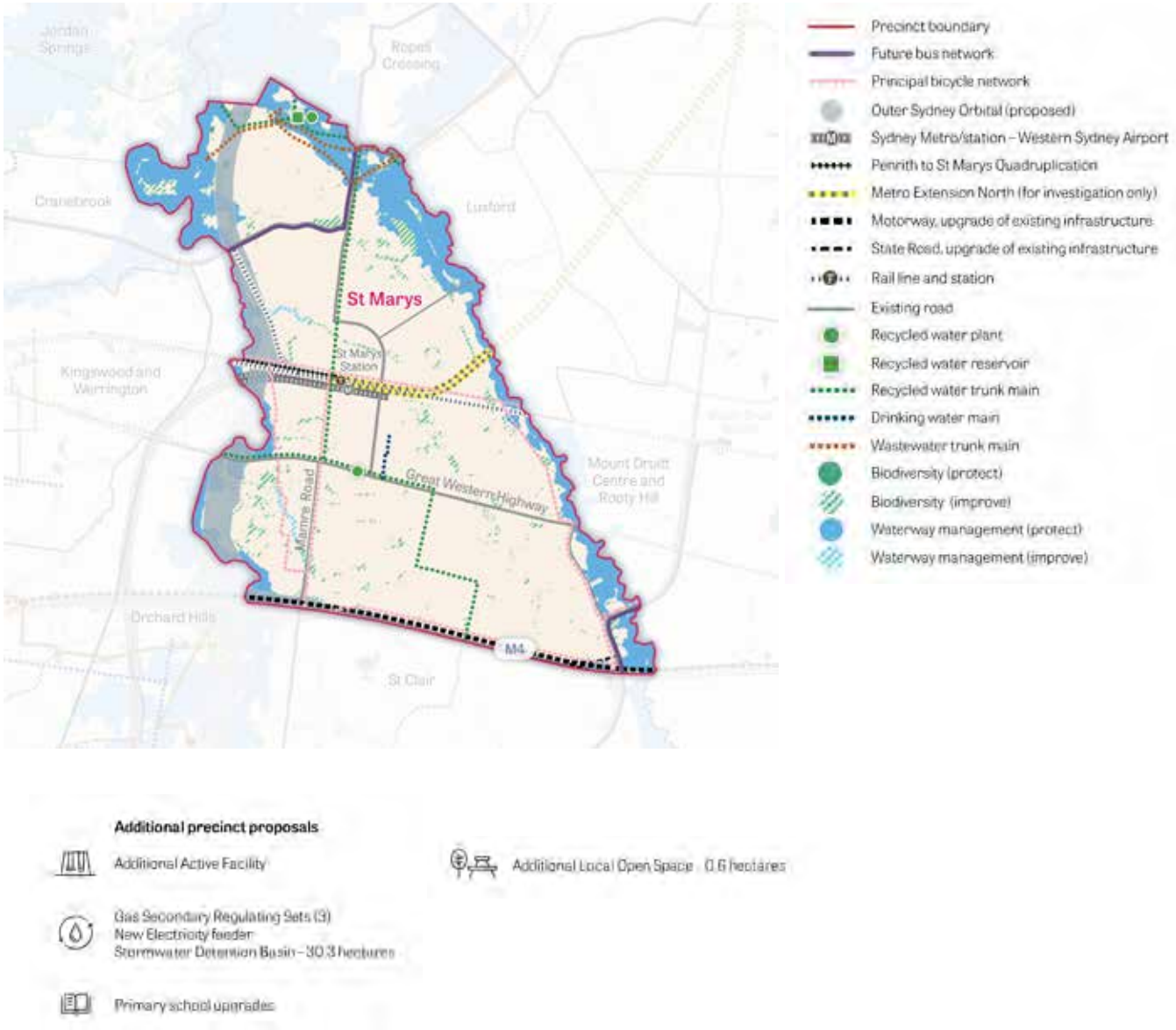
| | Total precinct area | Government owned |
|---|---|---|
| **Approximate area** (ha) | 1,752 | 451 |
| **Percentage of precinct** (%) | 100 | 26 |

| Climate risk rating (%) | |
|---|---|
| **2020** | 6% Acute, 31% High, 40% Moderate, 23% Low |
| **2100** | 21% Acute, 16% High, 63% Low |

**Table 4-28:** St Marys Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 25,492 | +16,794 | +22,821 | +24,403 | +49,915 | +21,612 | +42,203 |
| **Homes** | 10,689 | +3,230 | +4,930 | +5,516 | +8,684 | +7,821 | +12,620 |
| **Jobs** | 9,948 | +7,006 | +9,523 | +10,237 | +20,987 | +9,063 | +17,743 |

**Figure 4-26:** St Marys Precinct infrastructure proposals identified in the PIC process



## St Clair

St Clair Precinct encompasses both St Clair and the residential portion of Erskine Park. It is a low-density residential area with dispersed educational facilities and civic, retail and health centres. Major attractors include St Clair Shopping Centre.

Moderate levels of growth are expected in this well-established area. Some renewal opportunities exist including 34 hectares of developable government land to accommodate modest new growth in this established precinct.

**Figure 4-27:** St Clair Precinct

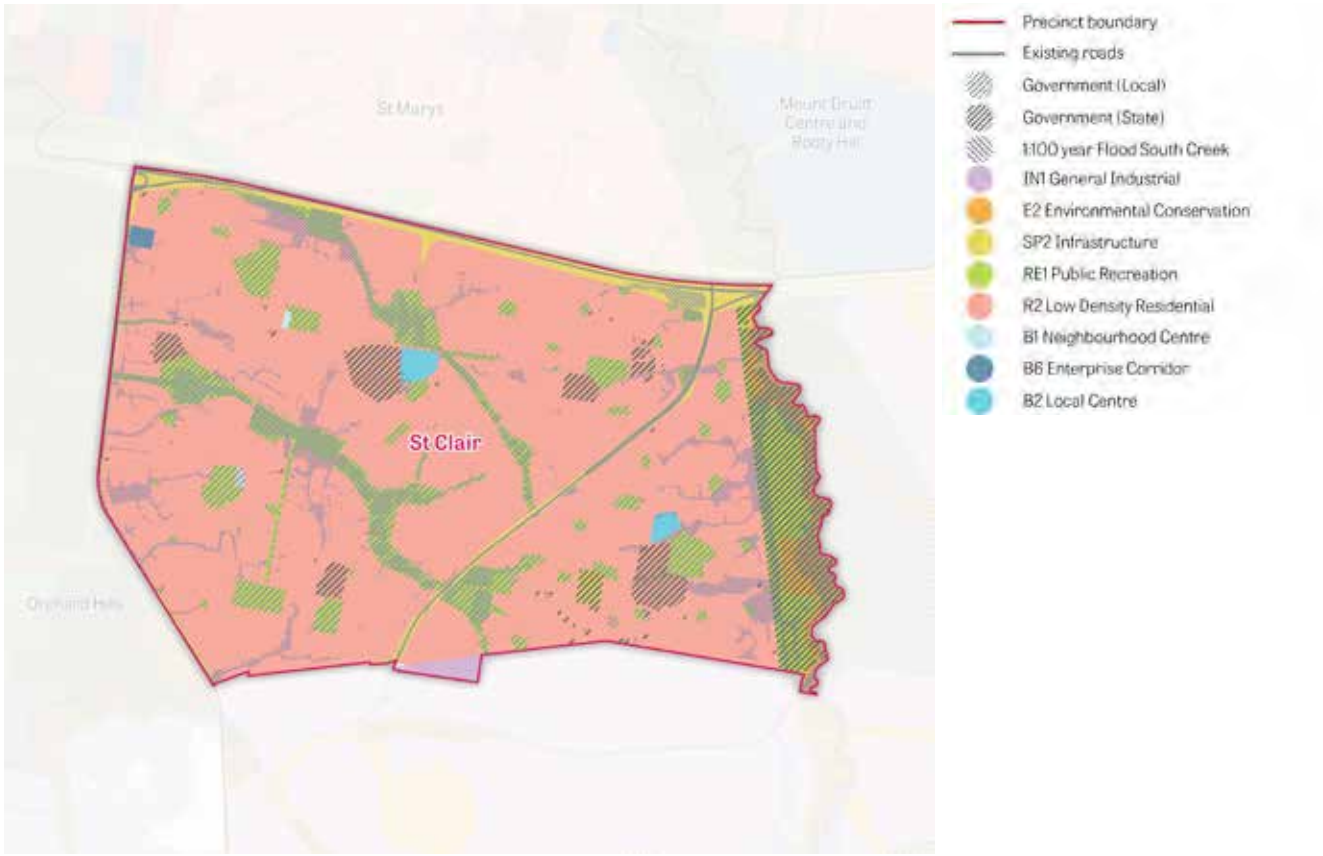


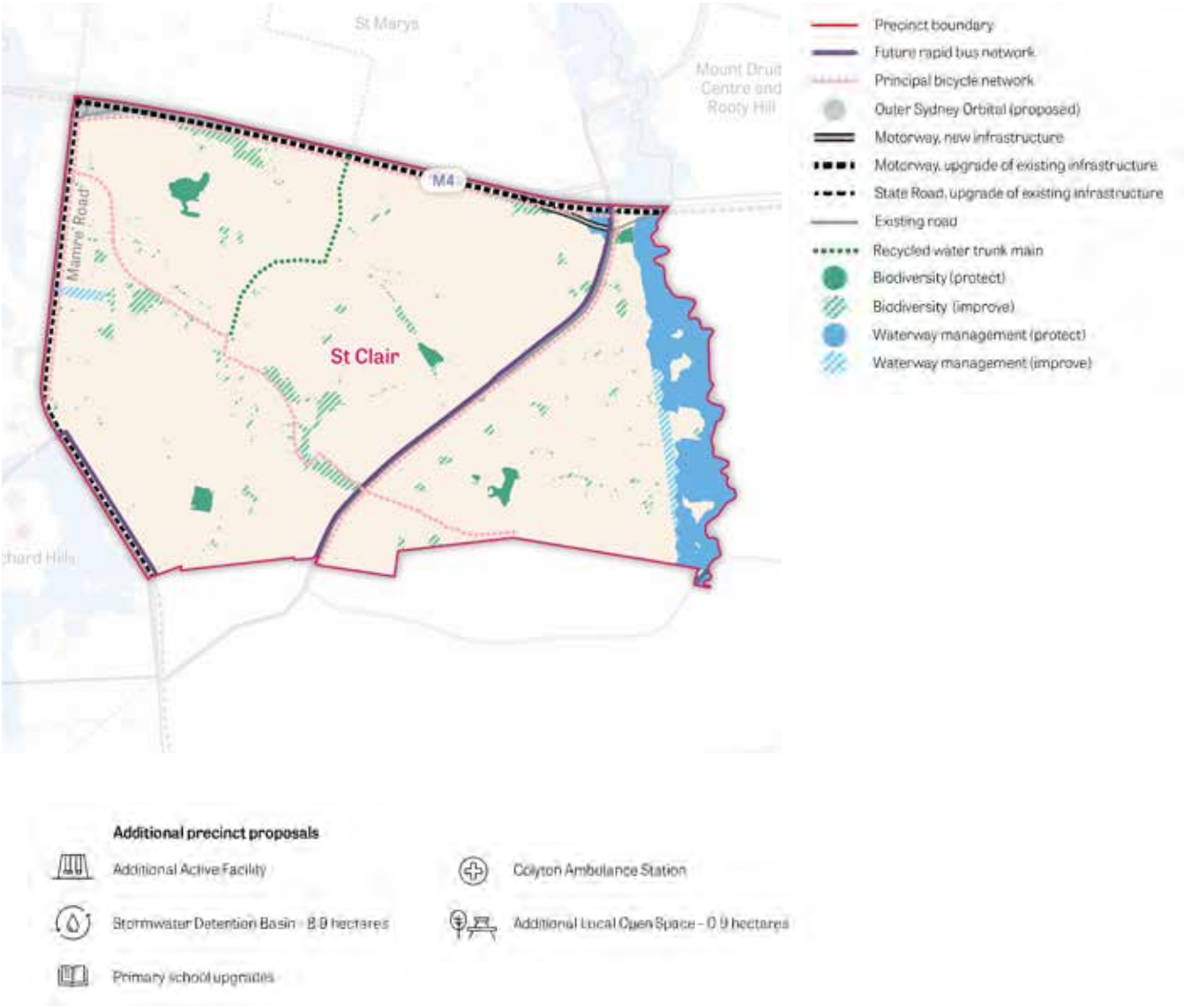

**Table 4-29:** St Clair Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,019 | 217 | **2020** | 7% High, 54% Moderate, 39% Low |
| **Percentage of precinct** (%) | 100 | 21 | **2100** | 2% Acute, 6% High, 92% Low |

**Table 4-30:** Clair Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 25,448 | +1,104 | +2,538 | +5,473 | +14,503 | +3,418 | +8,836 |
| **Homes** | 2,523 | +163 | +365 | +526 | +1,424 | +531 | +1,365 |
| **Jobs** | 8,228 | +347 | +810 | +1,753 | +4,662 | +1,091 | +2,837 |

**Figure 4-28:** St Clair Precinct infrastructure proposals identified in the PIC process



## Luxford

Luxford Precinct is an established area with social housing and a dispersed mix of civic and educational uses. Low to medium density housing is served by centres at Emerton Village Shopping Centre and Plumpton Marketplace, and open spaces such as Whalan Reserve and Popondetta Park.

Luxford Precinct contains about 231 hectares of government-owned land for social housing, with a contiguous site pattern that may enable amalgamation to leverage investment in future Sydney Metro extensions.

**Figure 4-29:** Luxford Precinct

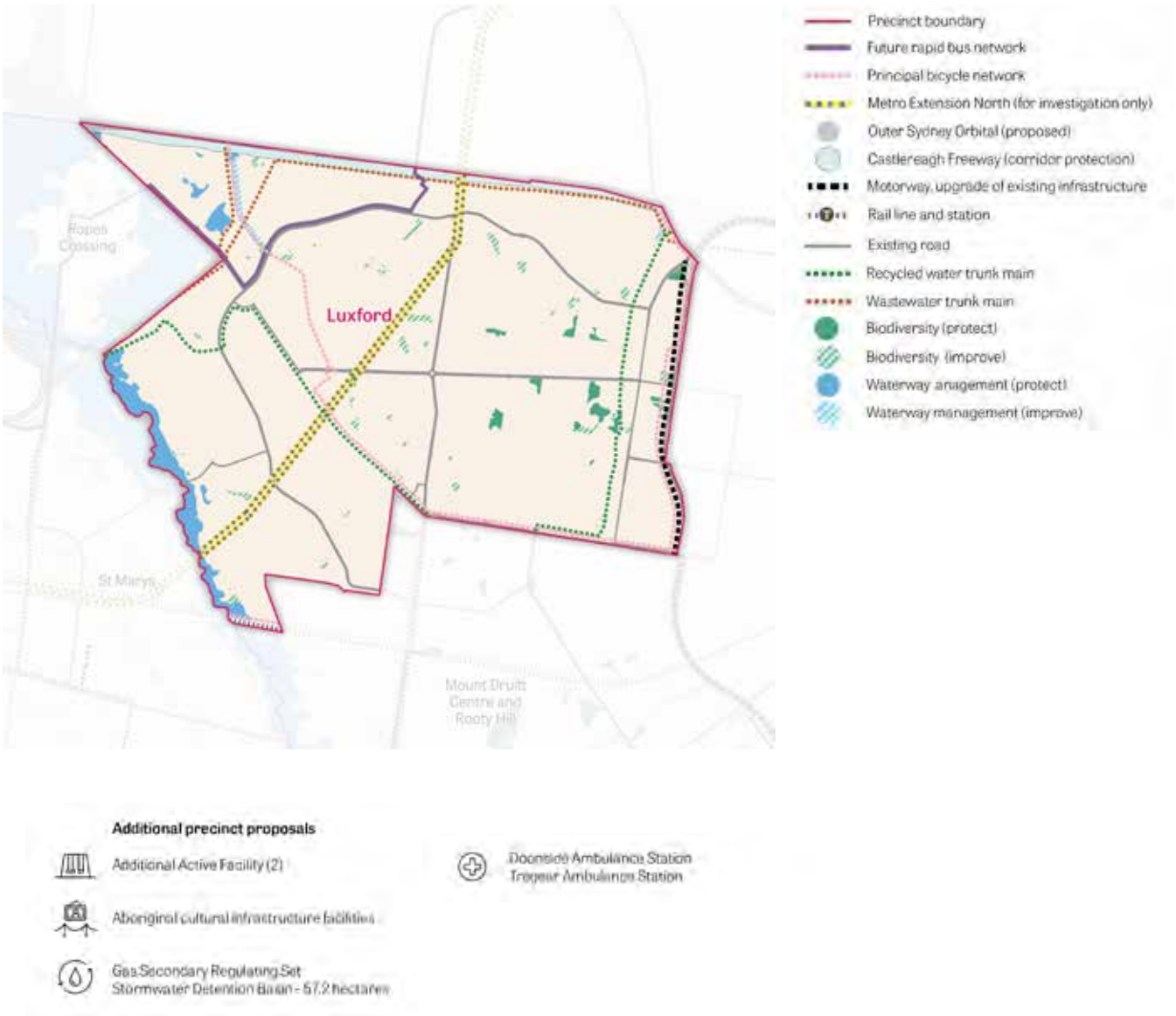

**Table 4-31:** Luxford Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 2,090 | 788 | **2020** | 6% High, 74% Moderate, 20% Low |
| **Percentage of precinct** (%) | 100 | 38 | **2100** | 4% Acute, 2% High, 2% Moderate, 92% Low |

**Table 4-32:** Luxford Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 57,552 | +2,569 | +3,301 | +18,256 | +65,699 | +9,318 | +44,731 |
| **Jobs** | 4,752 | +415 | +691 | +1,370 | +5,160 | +1,187 | +5,287 |
| **Homes** | 18,658 | +643 | +869 | +6,019 | +22,159 | +2,971 | +15,027 |

**Figure 4-30:** Luxford Precinct infrastructure proposals identified in the PIC process



## Mount Druitt Centre and Rooty Hill

This Precinct is sits on the T1 Western Line. It includes retail, health and education offerings such as Mount Druitt Hospital and TAFE NSW Mount Druitt. The Precinct also includes parts of the Mount Druitt and Minchinbury industrial estates, low density residential uses to the south, and medium to high density residential to the north, some of which were recently developed. Mount Druitt CBD was rezoned in May 2020, signalling the start of renewal and growth.

**Figure 4-31:** Mount Druitt Centre and Rooty Hill Precinct

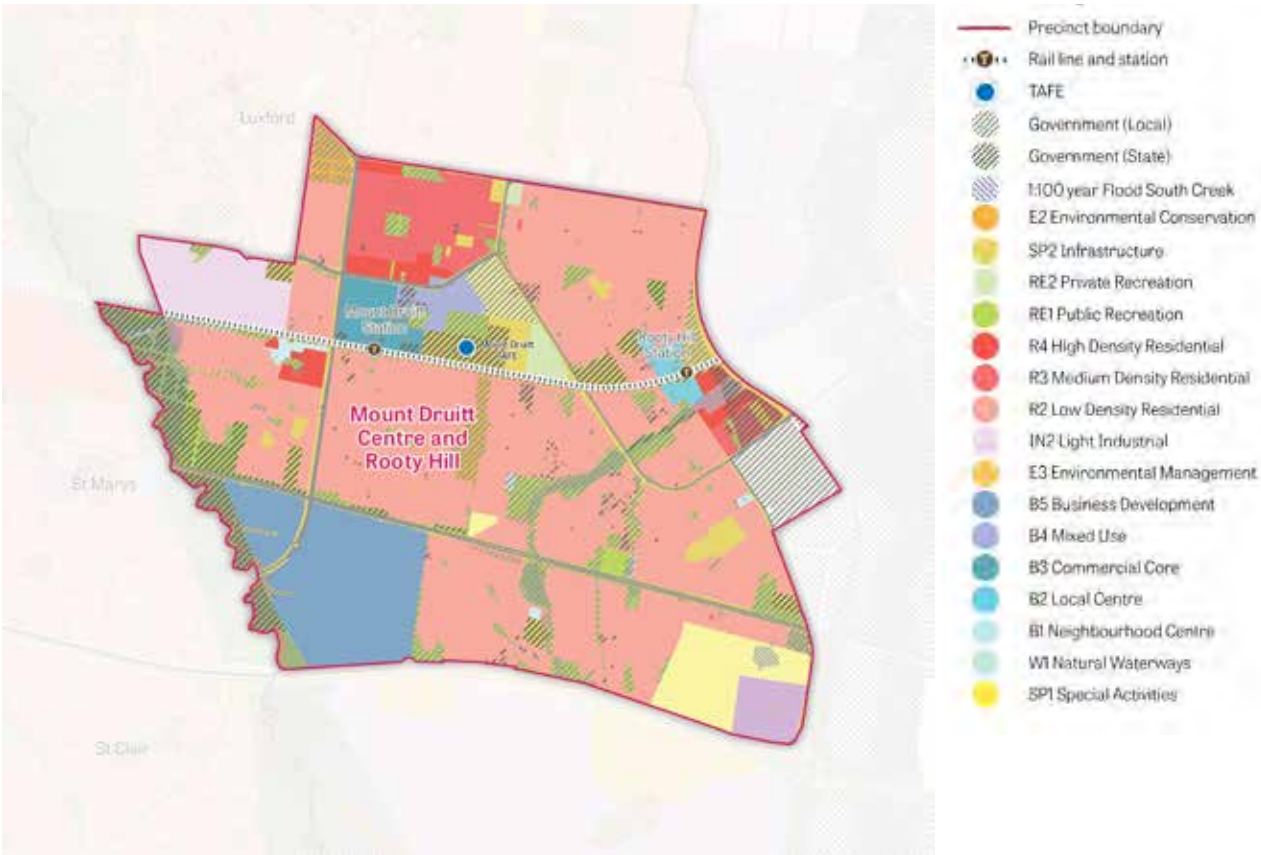


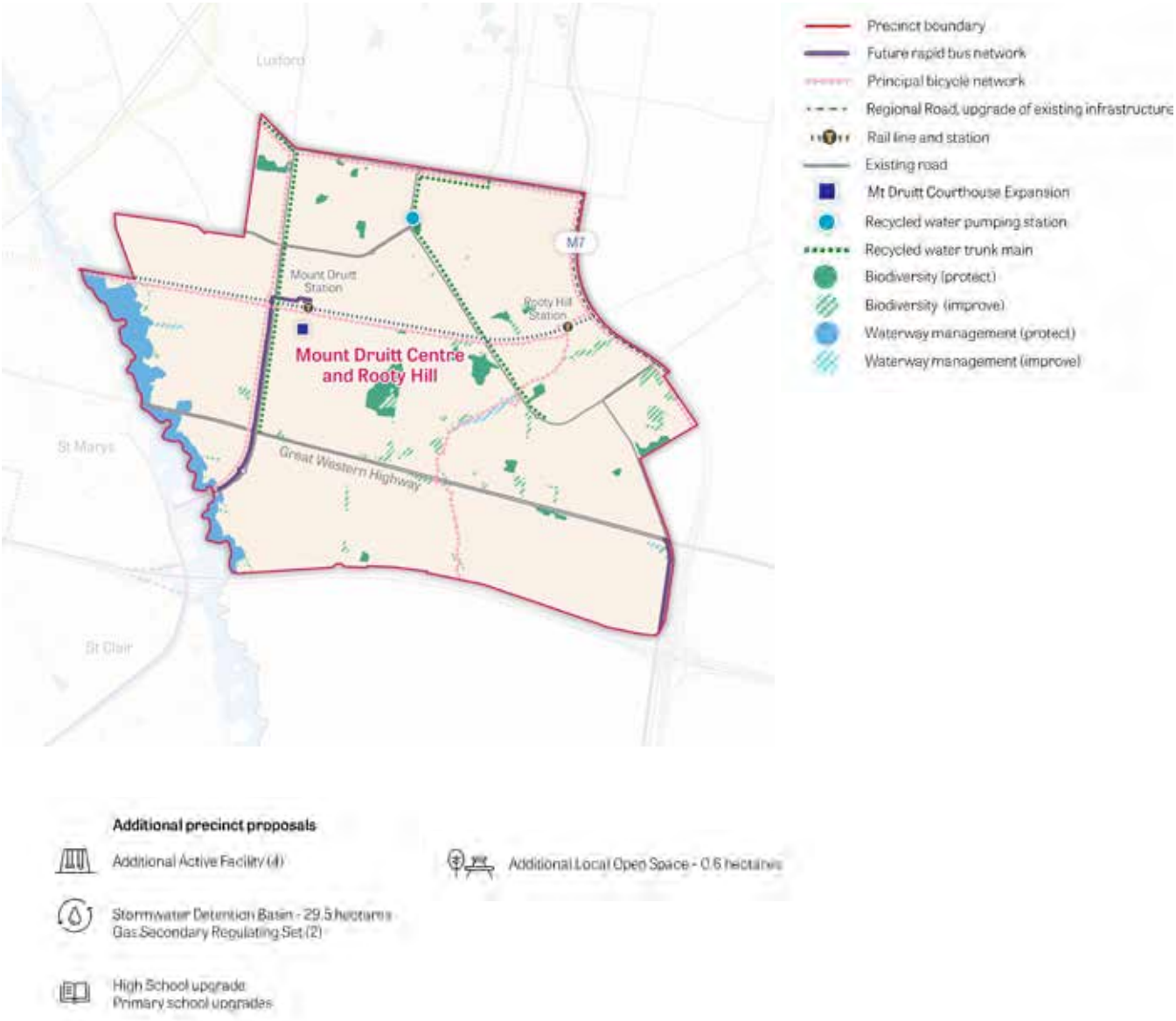

**Table 4-33:** Mount Druitt Centre and Rooty Hill Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,571 | 285 | **2020** | 10% High, 60% Moderate, 30% Low |
| **Percentage of precinct** (%) | 100 | 18 | **2100** | 4% Acute, 7% High, 89% Low |

**Table 4-34:** Mount Druitt Centre and Rooty Hill Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 36,409 | +10,284 | +24,573 | +23,678 | +62,965 | +16,763 | +42,352 |
| **Jobs** | 16,091 | +2,200 | +4,400 | +4,579 | +9,158 | +5,775 | +11,549 |
| **Homes** | 11,311 | +3,136 | +7,583 | +7,306 | +19,537 | +5,165 | +13,143 |

**Figure 4-32:** Mount Druitt Centre and Rooty Hill Precinct infrastructure proposals identified in the PIC process



## Orchard Hills

Orchard Hills Precinct is mainly greenfield with large rural residential lots and newer low to medium density residential areas at Claremont Meadows. It will be a residential area with many people moving to the area to take advantage of Metro services and a new compact mixed use centre with local retail, health and services. Medium and high density residential areas will be within walking distance.

Other parts of the Precinct will be gradually developed for low and medium density residential, with neighbourhood centres, education facilities and open space. Significant land is required for transport.

**Figure 4-33:** Orchard Hills Precinct

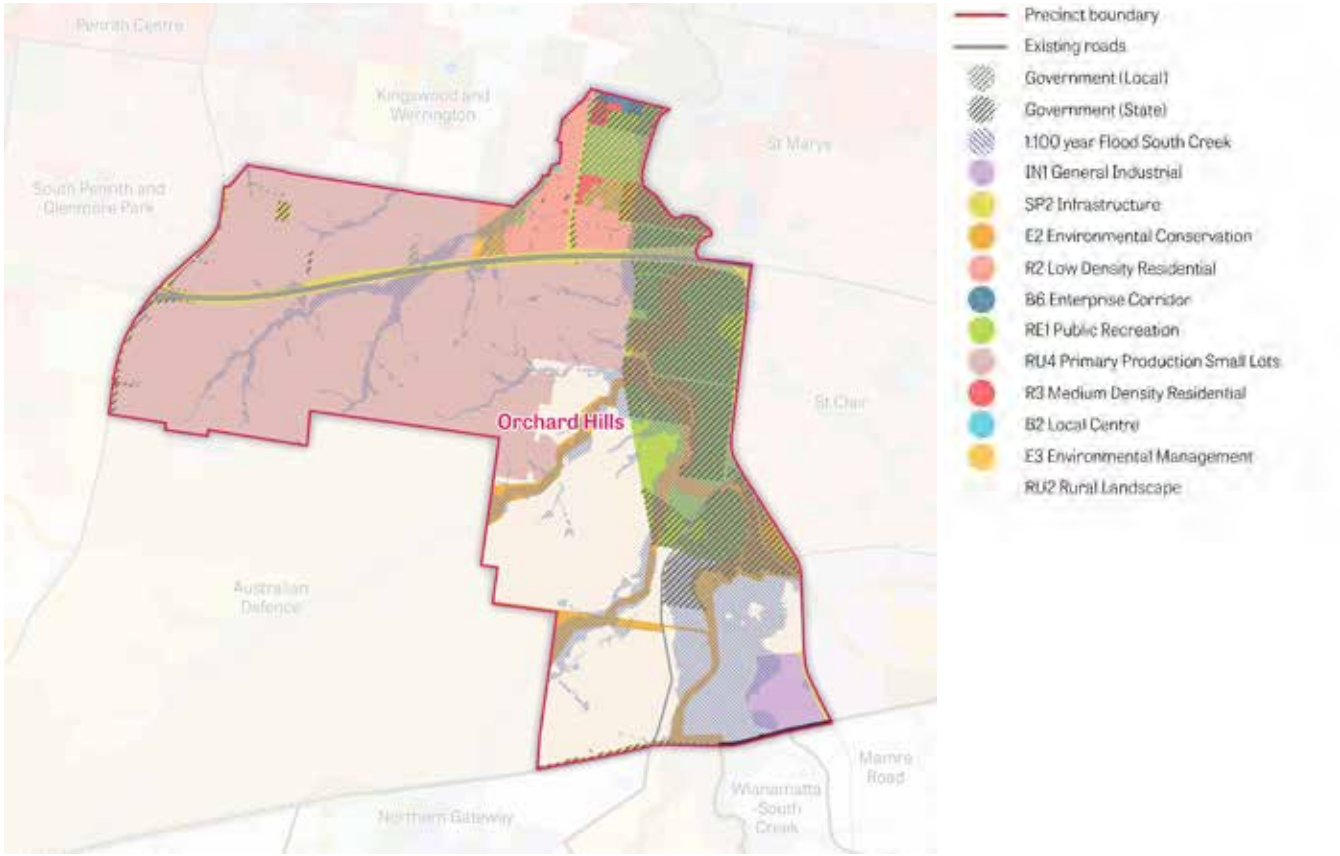


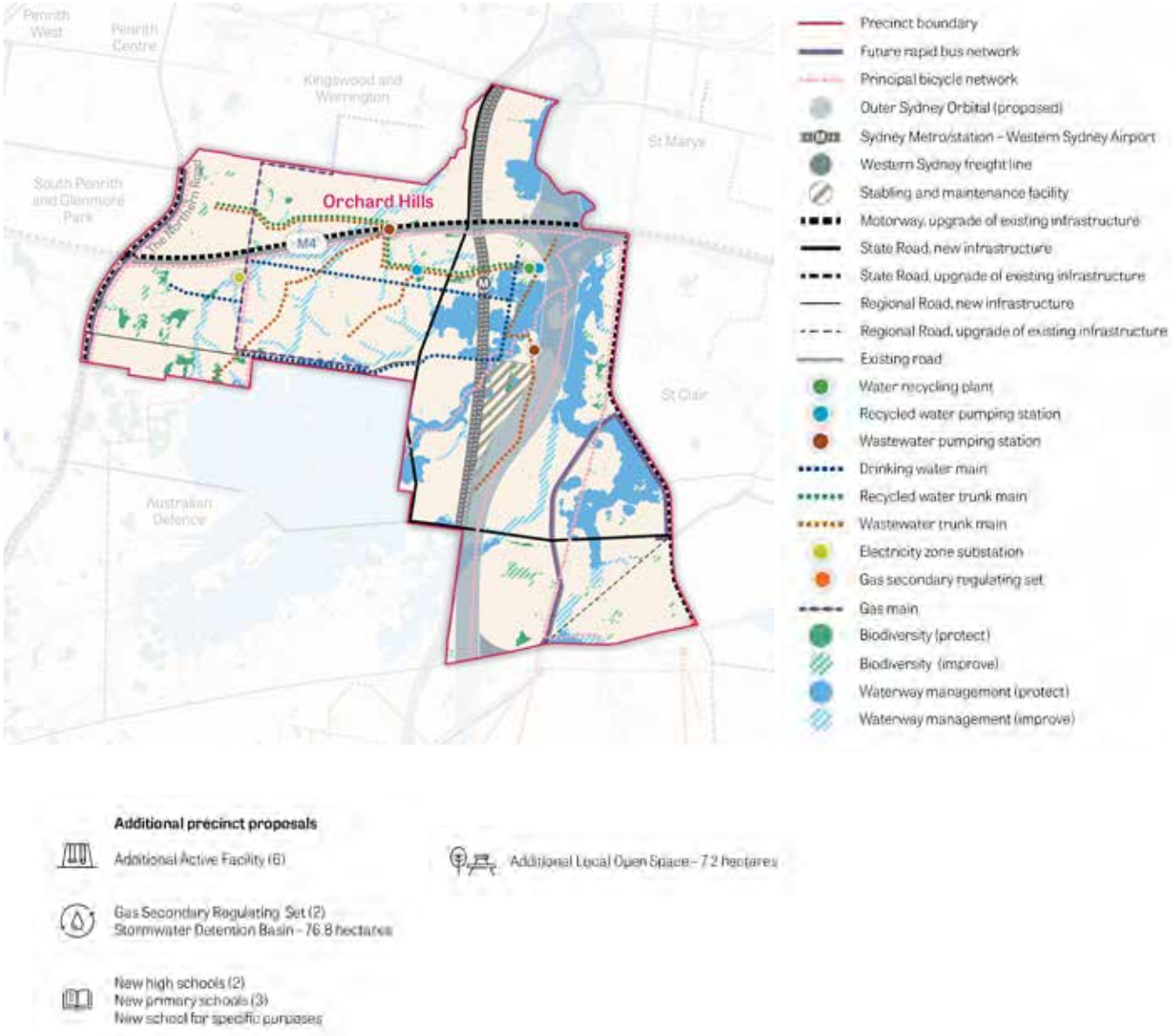

**Table 4-35:** Orchard Hills Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 2,513 | 545 | **2020** | 29% High, 51% Moderate, 20% Low |
| **Percentage of precinct** (%) | 100 | 22 | **2100** | 20% Acute, 9% High, 5% Moderate, 66% Low |

**Table 4-36:** Orchard Hills Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 | 2016 - 2036 | 2016 -2056 |
| **People** | 4,213 | +12,324 | +15,004 | +37,522 | +96,403 | +51,065 | +137,228 |
| **Jobs** | 1,152 | +915 | +1,108 | +2,459 | +6,301 | +3,601 | +10,653 |
| **Homes** | 1,329 | +3,567 | +4,339 | +11,225 | +28,903 | +15,310 | +41,153 |

**Figure 4-34:** Orchard Hills Precinct infrastructure proposals identified in the PIC process



## Agribusiness

The Agribusiness Precinct will support high-value agriculture-related businesses to leverage proximity to a 24/7 airport, access to national and international markets and quality road freight access. The Precinct could enable potential landside to air-side links as well as opportunities for agribusiness-related industries.

The existing rural character of Luddenham Village will be retained, with limited residential development outside areas affected by aircraft noise.

The Western Sydney Aerotropolis Plan defines the southern portion of the Agribusiness Precinct as Dwyer Road Precinct which is identified as suitable for enterprise in the long term.

**Figure 4-35:** Agribusiness Precinct – Before rezoning under the Aerotropolis SEPP

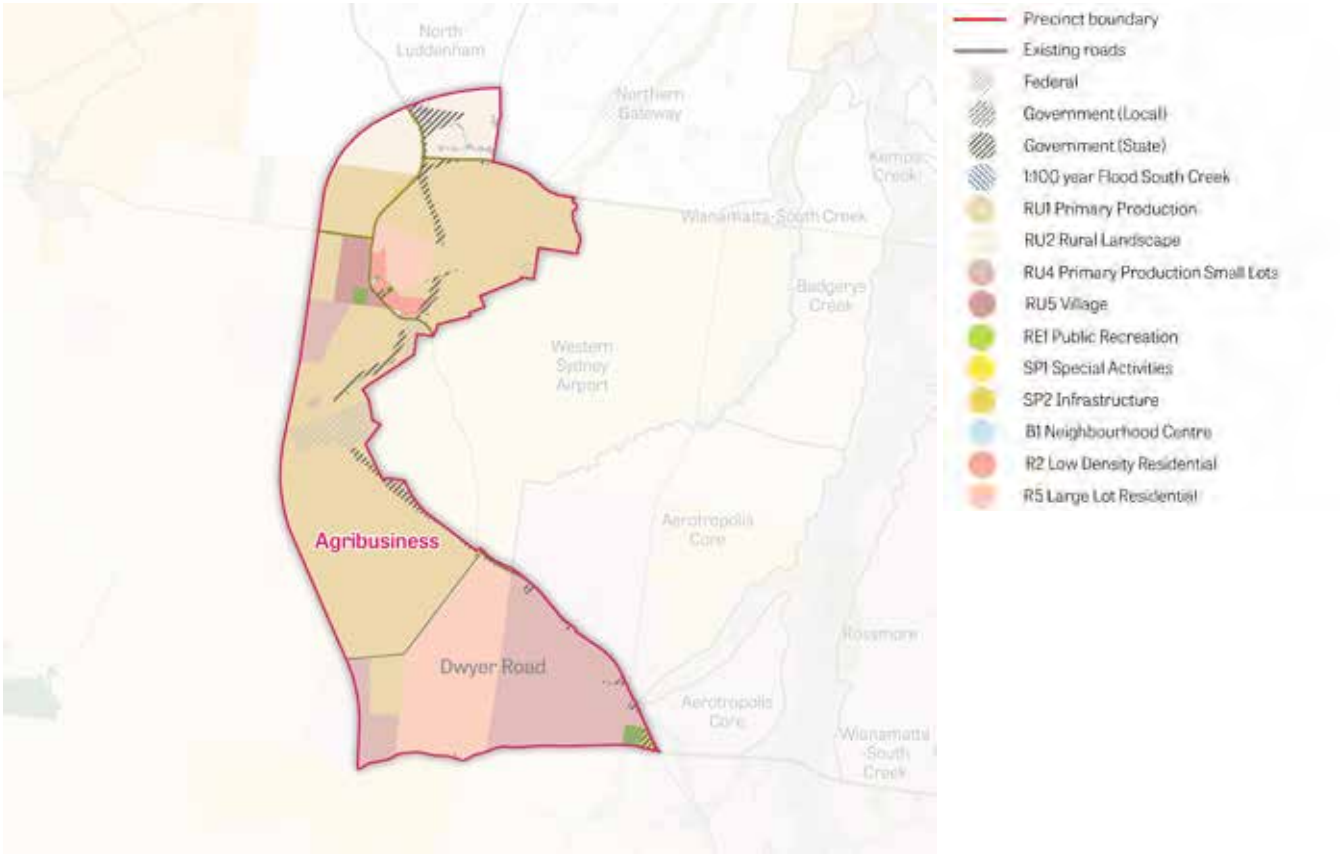


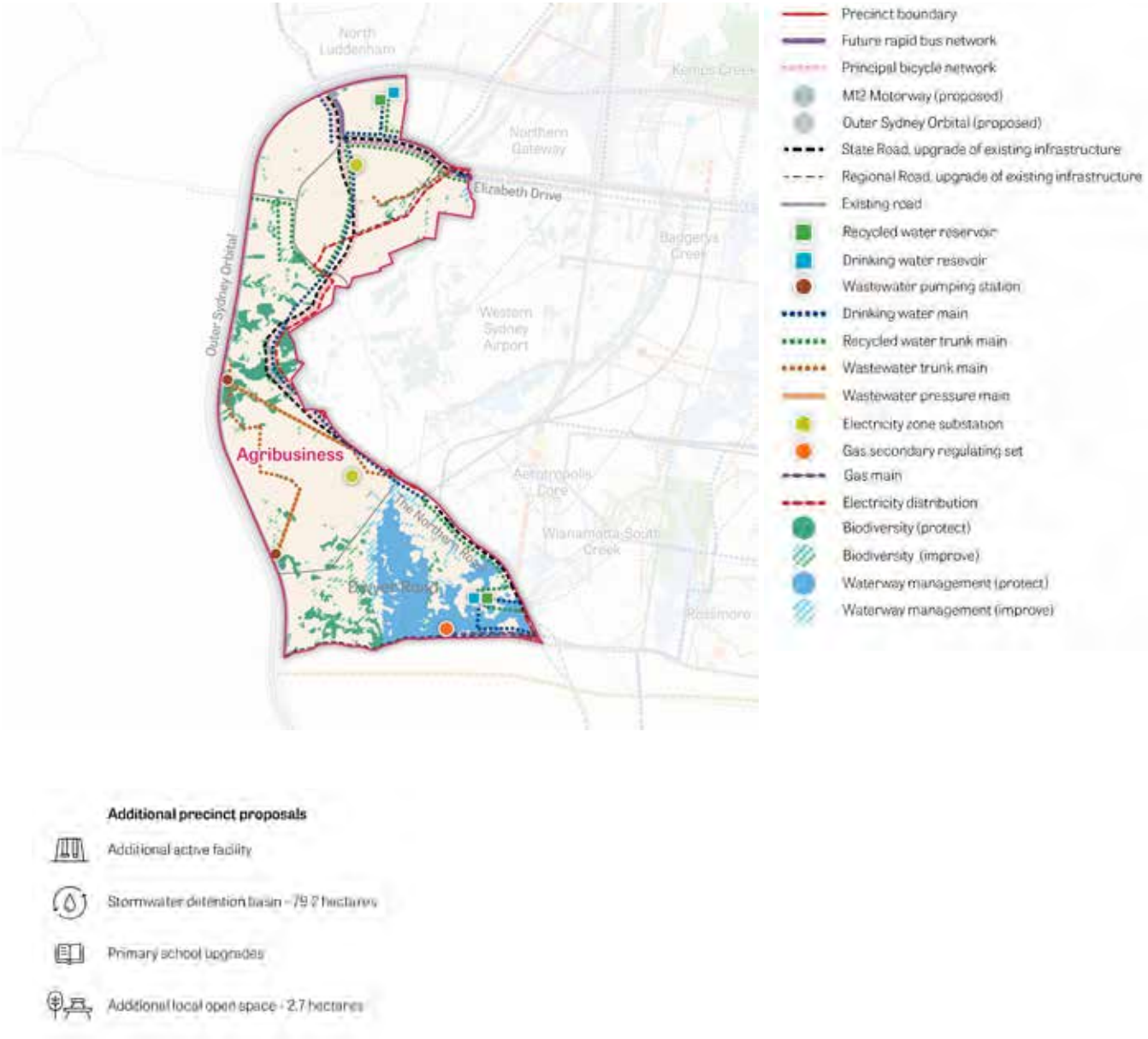

**Table 4-37:** Agribusiness Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 2,342 | 168 | **2020** | 3% High, 96% Moderate, 1% Low |
| **Percentage of precinct** (%) | 100 | 7 | **2100** | 3% High, 53% Moderate, 44% Low |

**Table 4-38:** Agribusiness Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 1,722 | +147 | +182 | +1,597 | +2,078 | +1,713 | +2,087 |
| **Jobs** | 330 | +519 | +1,127 | +5,075 | +13,514 | +4,984 | +10,763 |
| **Homes** | 607 | +63 | +76 | +681 | +869 | +720 | +859 |

**Figure 4-36:** Agribusiness Precinct infrastructure proposals identified in the PIC process



## Northern Gateway

The Northern Gateway Precinct is the major airport interface and will include a new strategic centre, capitalising on rezoned land for Sydney Science Park and the new Luddenham Sydney Metro station. People will live in the mixed use strategic centre around the Metro station, outside aircraft noise-affected areas. The Precinct will complement the Aerotropolis Core with high technology jobs in health, education, knowledge and research. This jobs-rich Precinct will harness other economic opportunities catalysed by the Airport. Significant land is required for transport.

Growth would be much higher under a Thriving Aerotropolis scenario, reflecting stronger Aerotropolis focus and its position in accommodating people and jobs in the Western Parkland City.

**Figure 4-37:** Northern Gateway Precinct – Before rezoning under the Aerotropolis SEPP

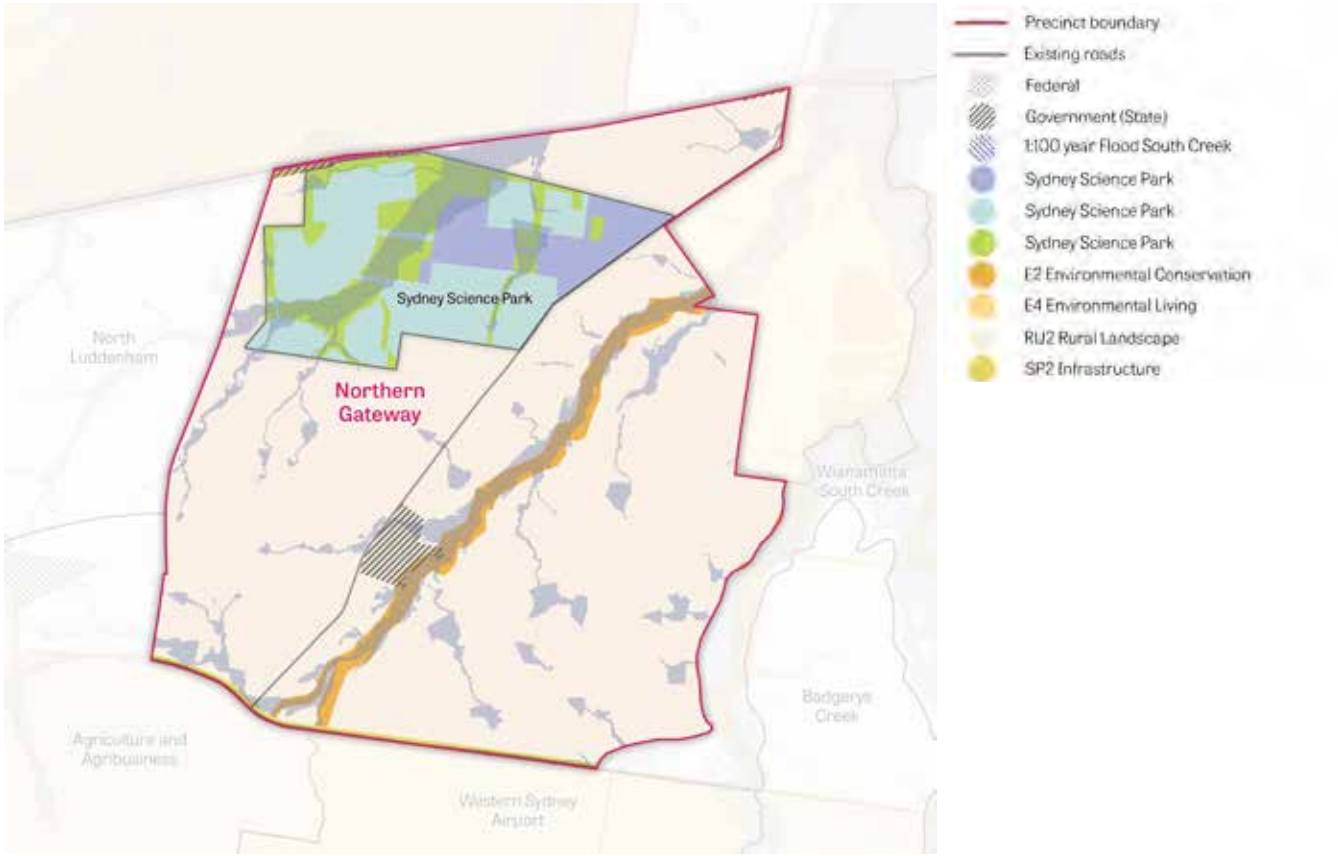


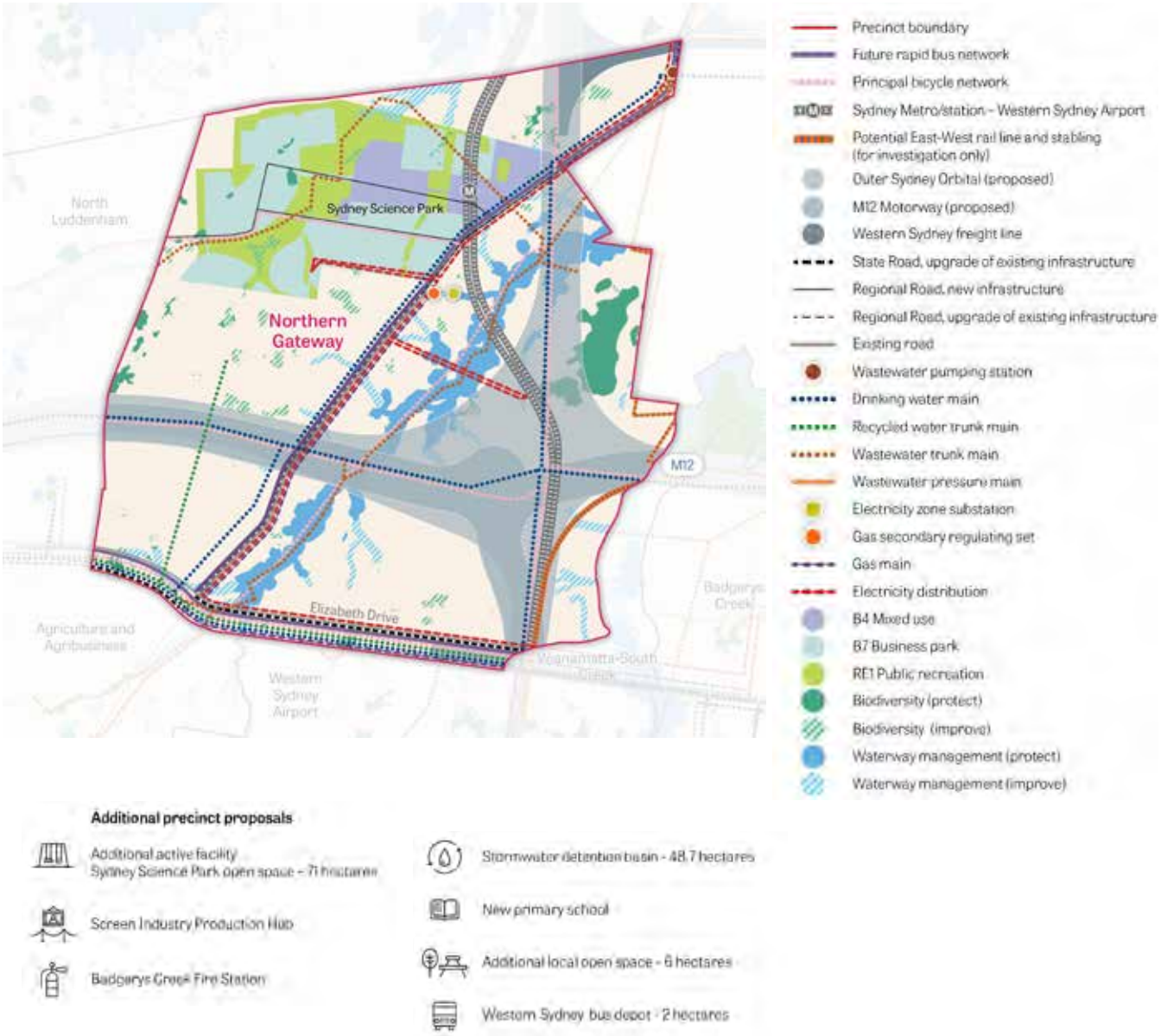

**Table 4-39:** Northern Gateway Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,594 | 23 | **2020** | 3% Moderate, 97% Low |
| **Percentage of precinct** (%) | 100 | 1 | **2100** | 1% Acute, 1% High, 93% Moderate, 5% Low |

**Table 4-40:** Northern Gateway Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 246 | +7,167 | +10,240 | +10,017 | +16,297 | +9,236 | +12,438 |
| **Jobs** | 221 | +5,768 | +7,399 | +13,908 | +18,848 | +6,107 | +7,399 |
| **Homes** | 80 | +2,612 | +3,720 | +3,760 | +5,957 | +3,362 | +4,480 |

**Figure 4-38:** Northern Gateway Precinct infrastructure proposals identified in the PIC process



## Aerotropolis Core

This Precinct will transform into a global airport city centred around a new Metro station, and one of four centres in the metropolitan cluster. It will support commercial offices and business in advanced manufacturing, aerospace and defence industries, with enabling professional services, health and education jobs. It will be an attractive place for people, with entertainment, retail and accommodation offerings, civic and cultural activities, and world-class open spaces. People will live in areas outside aircraft noise affected areas around Thompsons and Wianamatta-South creeks, an easy walk to the Metro station, local services and retail and commercial development. Growth would be much higher under the Thriving Aerotropolis scenario.

**Figure 4-39:** Aerotropolis Core Precinct – Before rezoning under the Aerotropolis SEPP

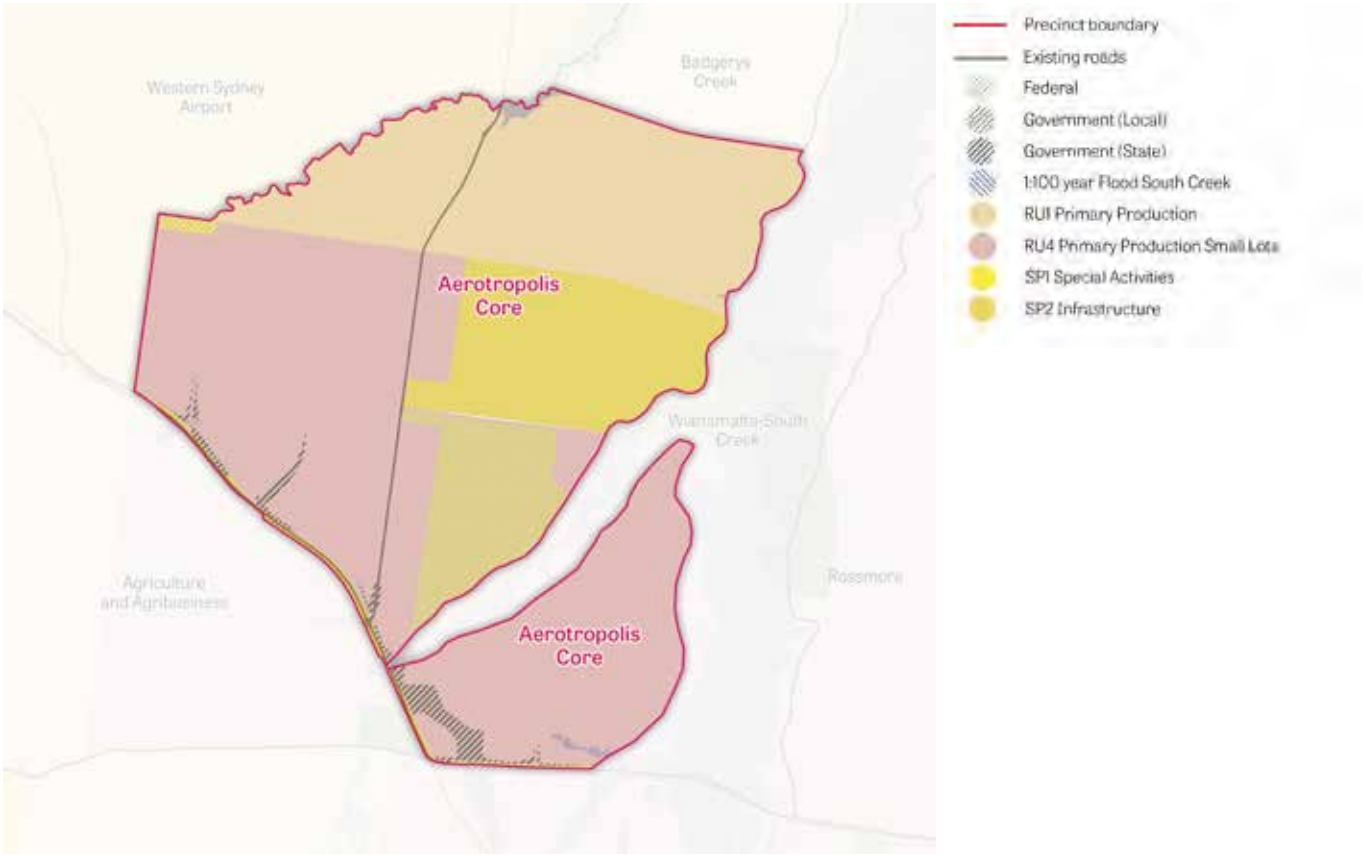


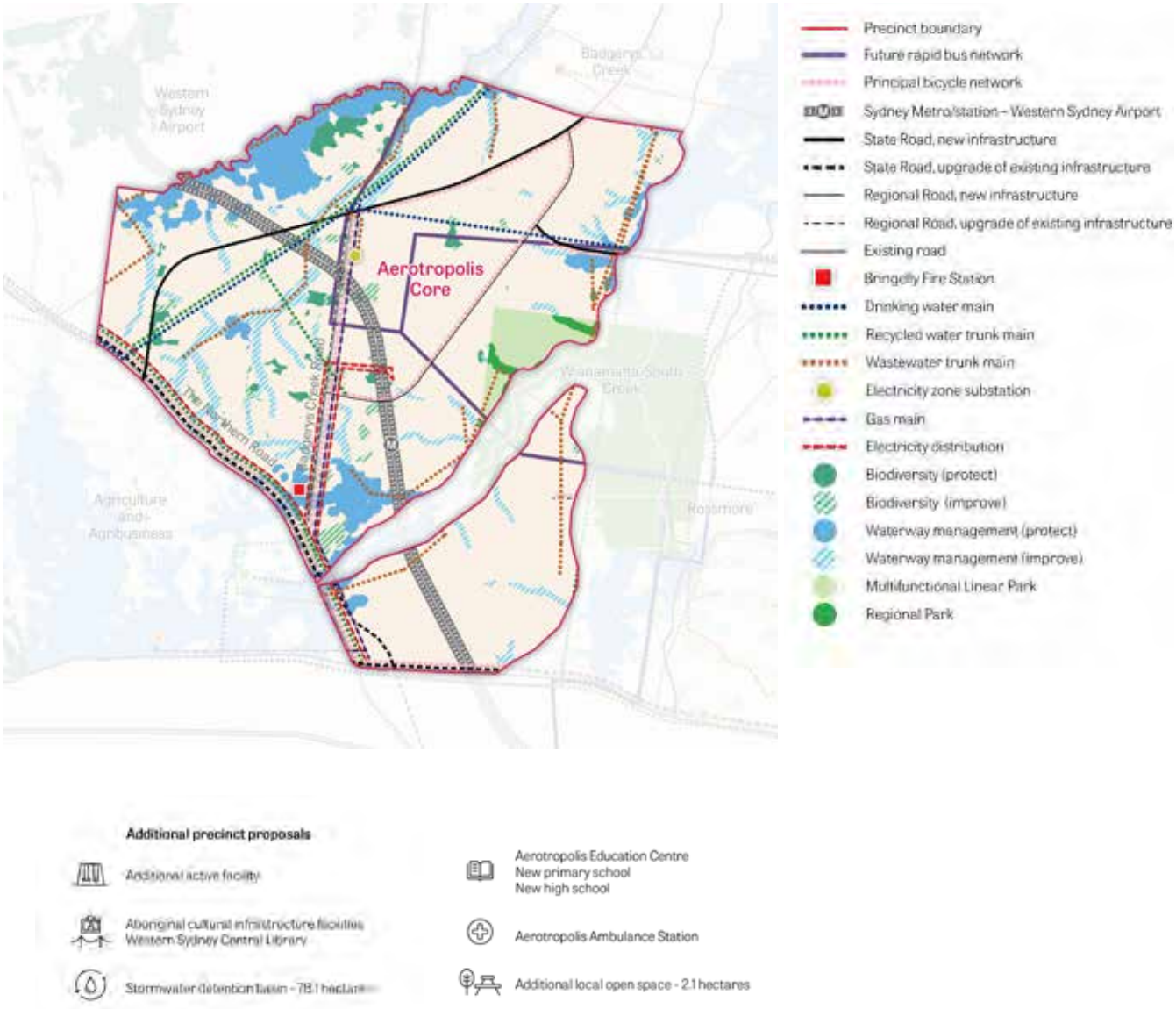

**Table 4-41:** Aerotropolis Core Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,312 | 124 | **2020** | 99% Moderate, 1% Low |
| **Percentage of precinct** (%) | 100 | 9 | **2100** | 88% Moderate, 11% Low |

**Table 4-42:** Aerotropolis Core Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 1,278 | +315 | +810 | +8,852 | +22,534 | +3,607 | +8,095 |
| **Jobs** | 604 | +394 | +862 | +11,827 | +49,323 | +4,926 | +14,289 |
| **Homes** | 373 | +126 | +306 | +3,374 | +8,327 | +1,450 | +3,060 |

**Figure 4-40:** Aerotropolis Core Precinct infrastructure proposals identified in the PIC process



## Badgerys Creek

Badgerys Creek Precinct will transition gradually. Some existing agriculture and extractive industries will remain in the foreseeable future or may transition to less sensitive employment uses. Its proximity to the Airport and the Aerotropolis Core, with access to the nearby M12 and possible future upgrade of Elizabeth Drive, will attract industries orientated to support airport operations, urban services, construction, and support services for new business and residents at the Aerotropolis Core.

**Figure 4-41:** Badgerys Creek Precinct – Before rezoning under the Aerotropolis SEPP

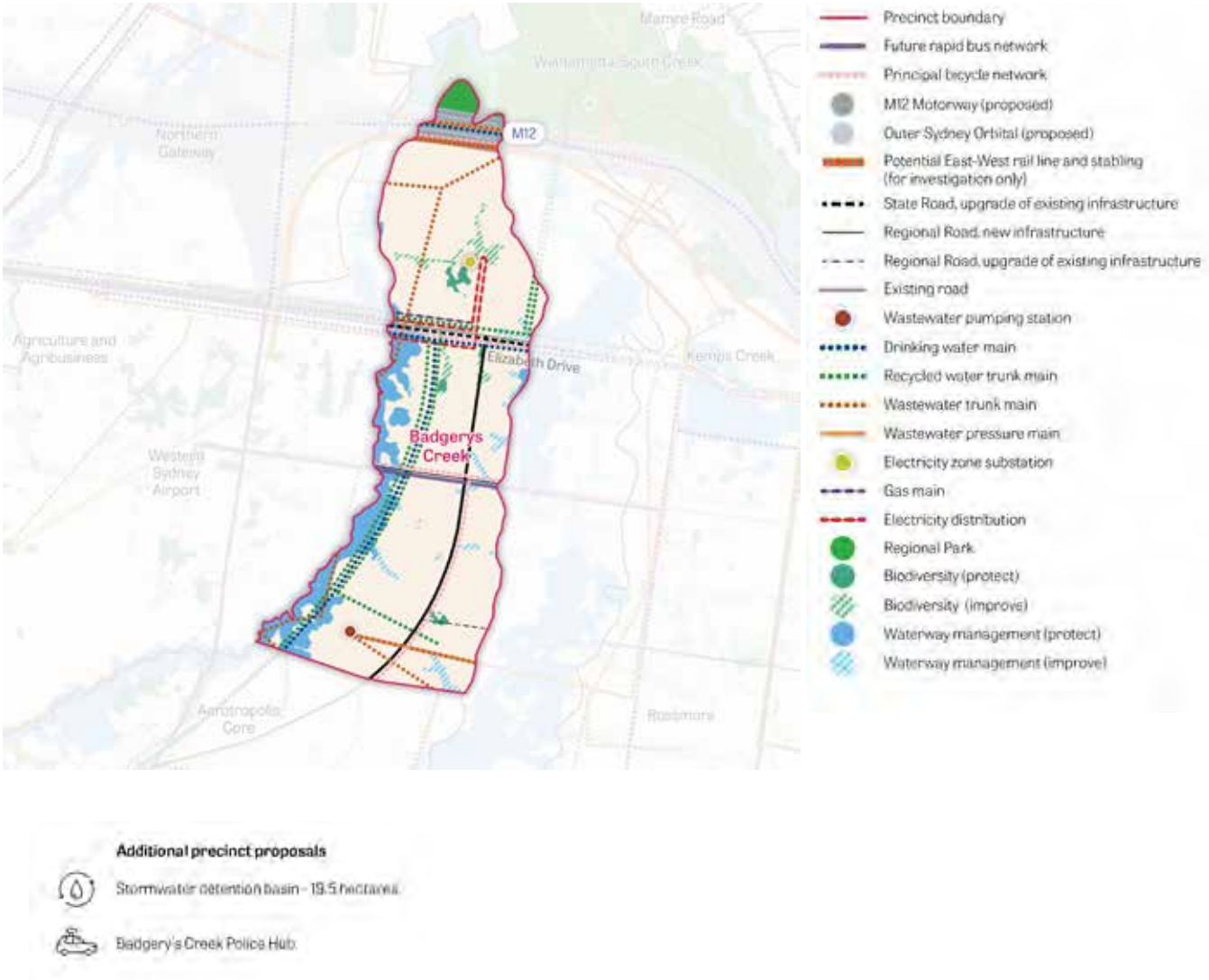

**Table 4-43:** Badgerys Creek Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 589 | 16 | **2020** | 7% High, 89% Moderate, 4% Low |
| **Percentage of precinct** (%) | 100 | 3 | **2100** | 3% Acute, 4% High, 3% Moderate, 90% Low |

**Table 4-44:** Badgerys Creek Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 200 | -153 | -184 | -147 | -174 | -152 | -174 |
| **Jobs** | 154 | +94 | +280 | +1,844 | +9,265 | +935 | +3,051 |
| **Homes** | 72 | - 56 | - 68 | -54 | - 67 | -57 | -66 |

**Figure 4-42:** Badgerys Creek Precinct infrastructure proposals identified in the PIC process



## Mamre Road

Mamre Road Precinct was rezoned in June 2020 as an extension to the Western Sydney Employment Area, with a focus on warehousing, freight and logistics, high technology industry and manufacturing.

Development will likely commence in the north to leverage the planned Western Sydney Freight Line, a future intermodal terminal, and the proposed Southern Link Road.

**Figure 4-43:** Mamre Road Precinct - Before rezoning

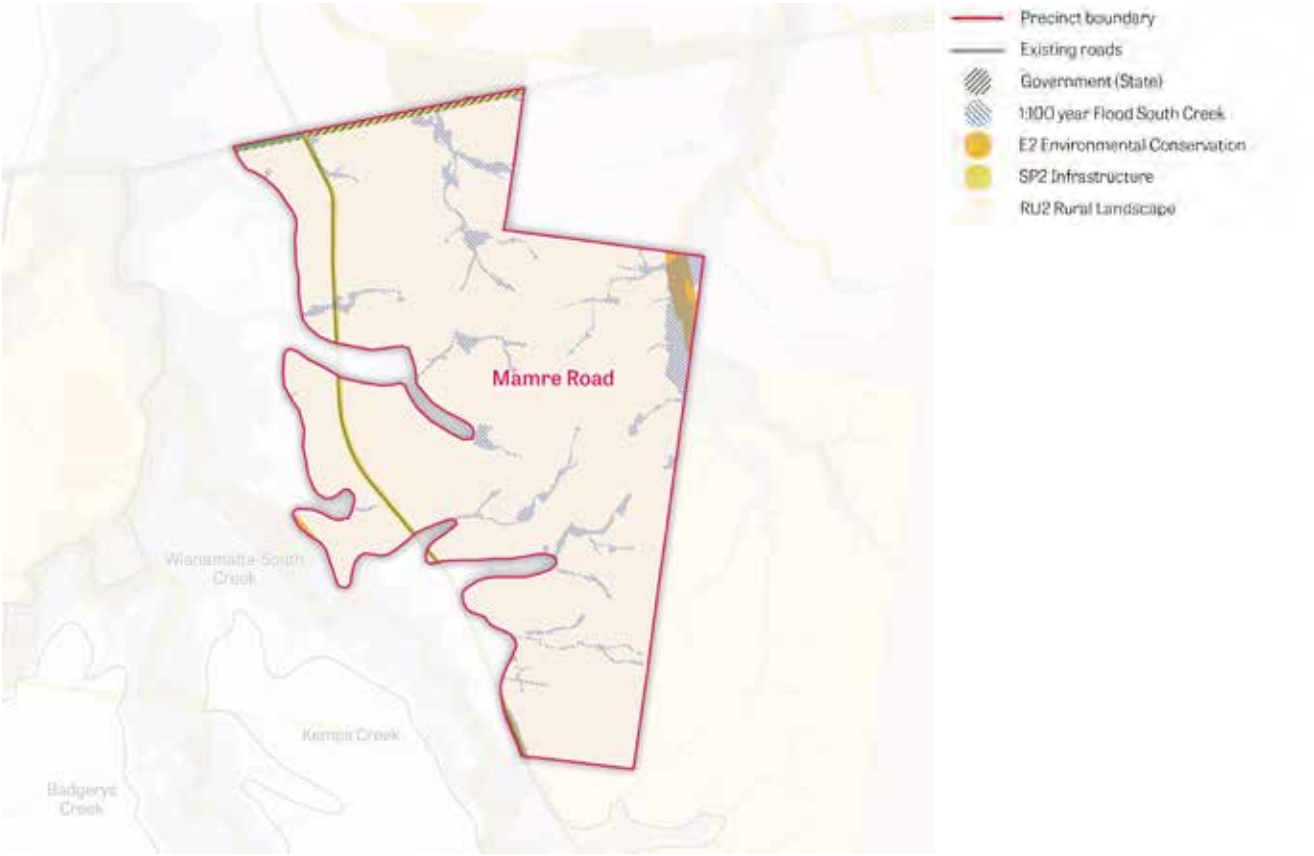


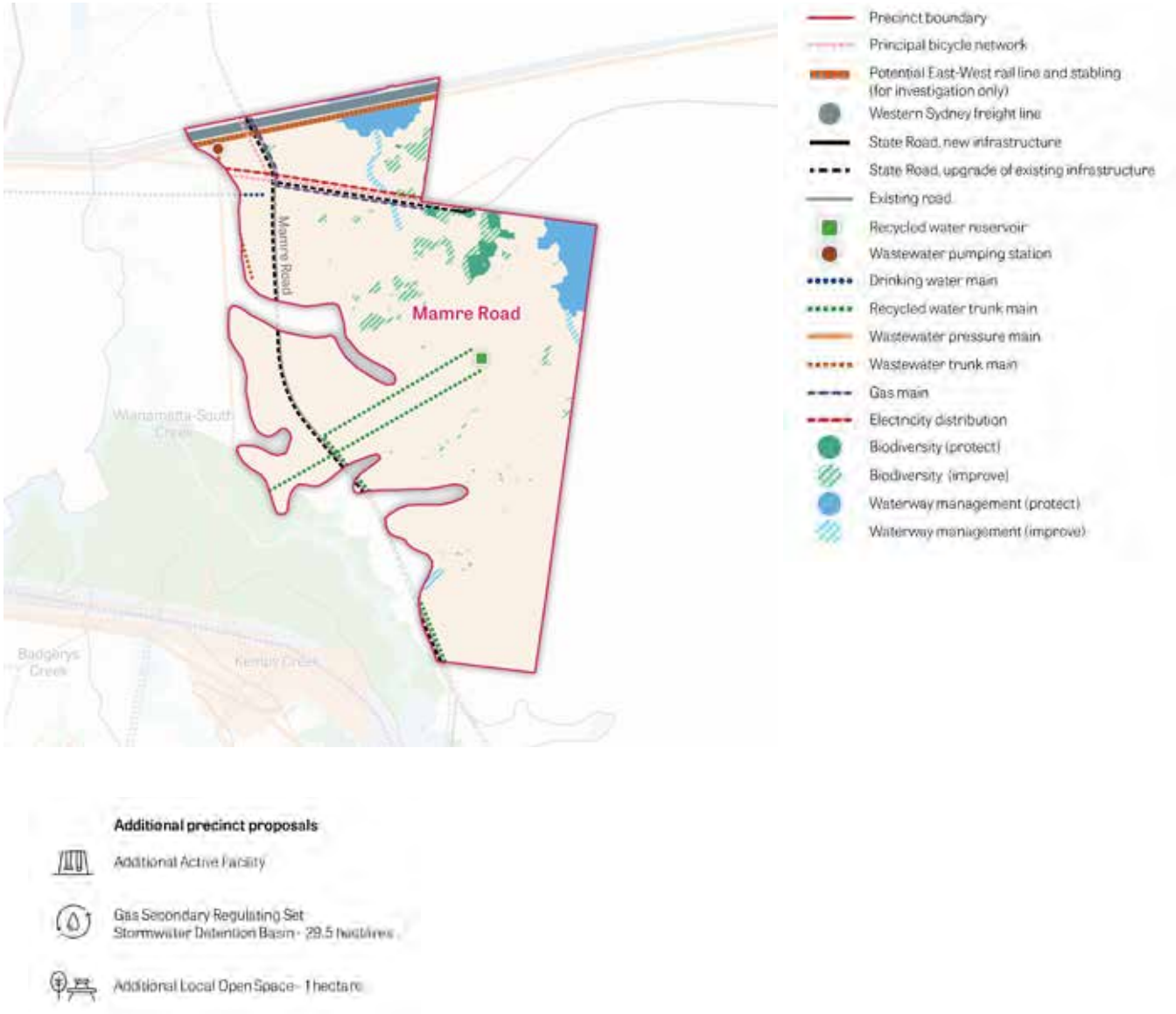

**Table 4-45:** Mamre Road Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 744 | 8 | **2020** | 2% High, 98% Moderate |
| **Percentage of precinct** (%) | 100 | 1 | **2100** | 2% High, 2% Moderate, 96% Low |

**Table 4-46:** Mamre Road Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 211 | +2 | +6 | +24 | +72 | +22 | +61 |
| **Jobs** | 524 | +291 | +829 | +3,954 | +12,892 | +3,129 | +8,292 |
| **Homes** | 51 | +1 | +2 | +12 | +19 | +11 | +17 |

**Figure 4-44:** Mamre Road Precinct infrastructure proposals identified in the PIC process



## North Luddenham

North Luddenham Precinct will likely remain rural until land is needed for housing and employment beyond rezoned and initial precincts. It will develop as an extension of the Northern Gateway and Agribusiness precincts, leveraging direct access to The Northern Road upgrade and M12 Motorway. It could cater for employment uses, urban services, commercial offices, warehousing and logistics, high technology, or research or development associated with food production and processing.

**Figure 4-45:** North Luddenham Precinct

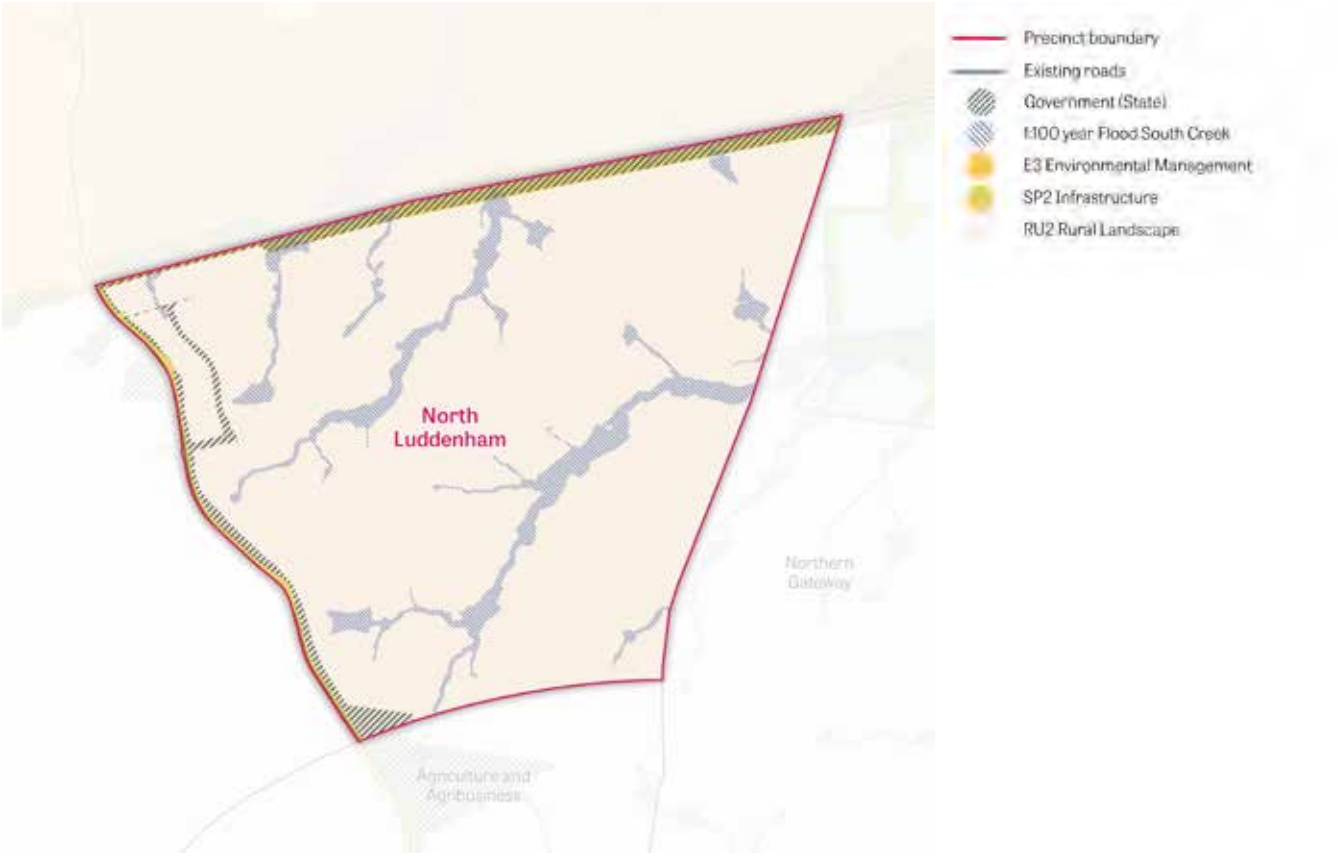


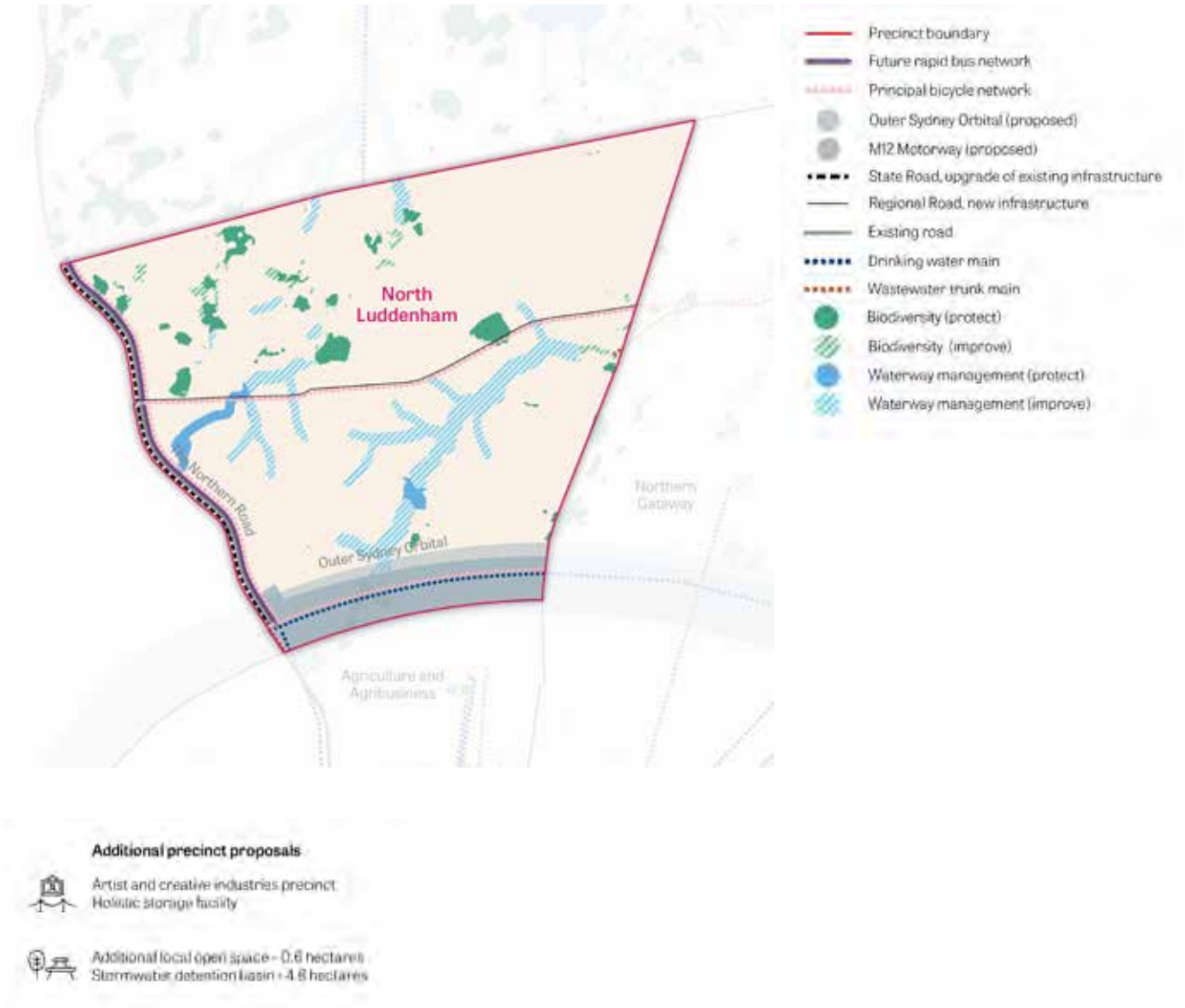

**Table 4-47:** North Luddenham Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 507 | 27 | **2020** | 100% Moderate |
| **Percentage of precinct** (%) | 100 | 5 | **2100** | 99% Moderate, 1% Low |

**Table 4-48:** North Luddenham Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 103 | +31 | +48 | +94 | +845 | +39 | +425 |
| **Jobs** | 73 | +292 | +378 | +724 | +2,276 | +318 | +739 |
| **Homes** | 35 | +16 | +24 | +46 | +397 | +20 | +201 |

**Figure 4-46:** North Luddenham Precinct infrastructure proposals identified in the PIC process



## Kemps Creek

Kemps Creek Precinct will not experience immediate change, with only a transitional shift from uses such as extractive industries to employment uses that are less sensitive to aircraft noise. With access to the possible upgrade to Elizabeth Drive and interchange with the M12 Motorway, the Precinct could offer a mix of urban services and commercial development such as smaller innovative and creative industries that seek more affordable, out of centre accommodation with accessibility and amenity.

Kemps Creek Precinct will also offer an active interface for people to enjoy access to Wianamatta-South Creek, Kemps Creek and the Western Sydney Parklands.

**Figure 4-47:** Kemps Creek Precinct

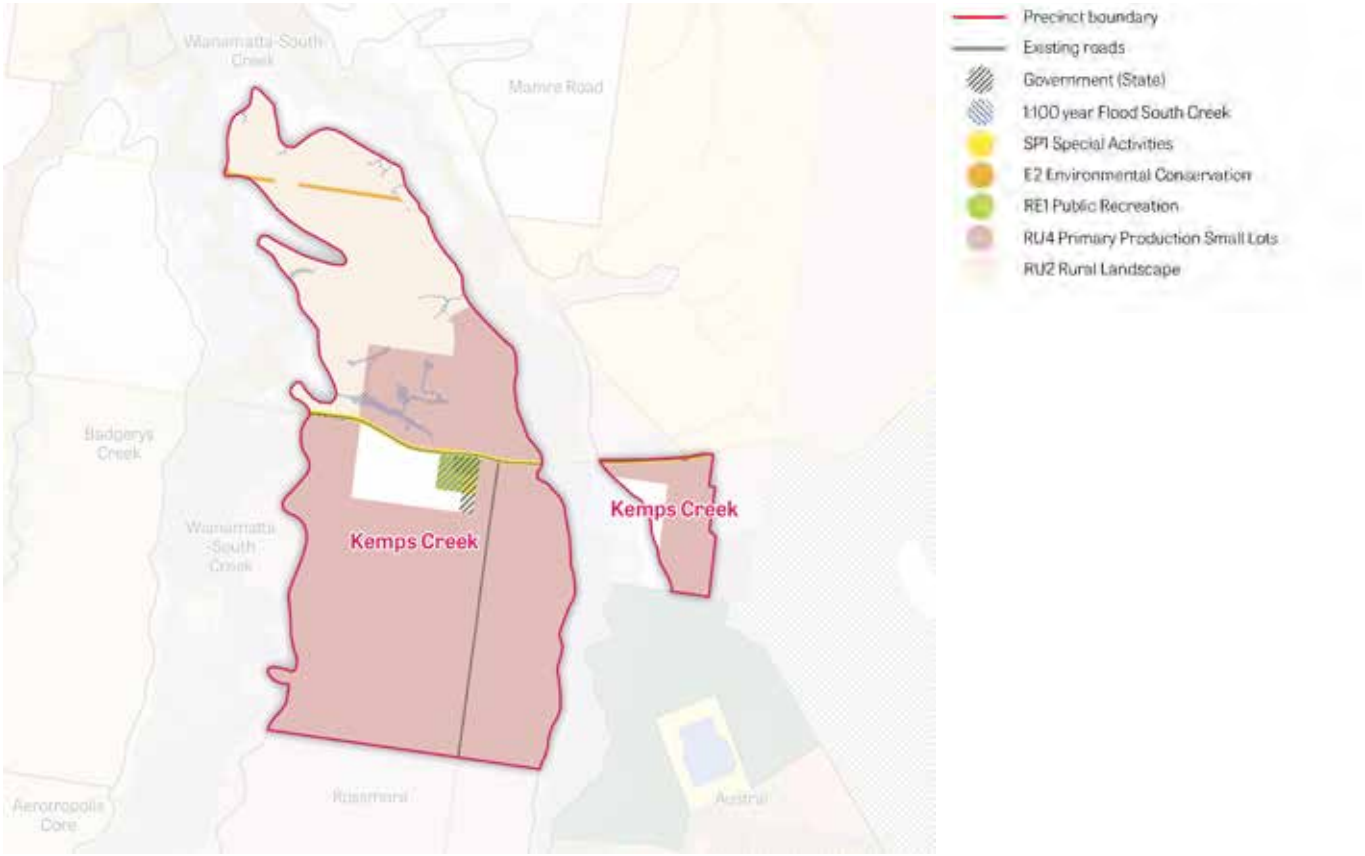


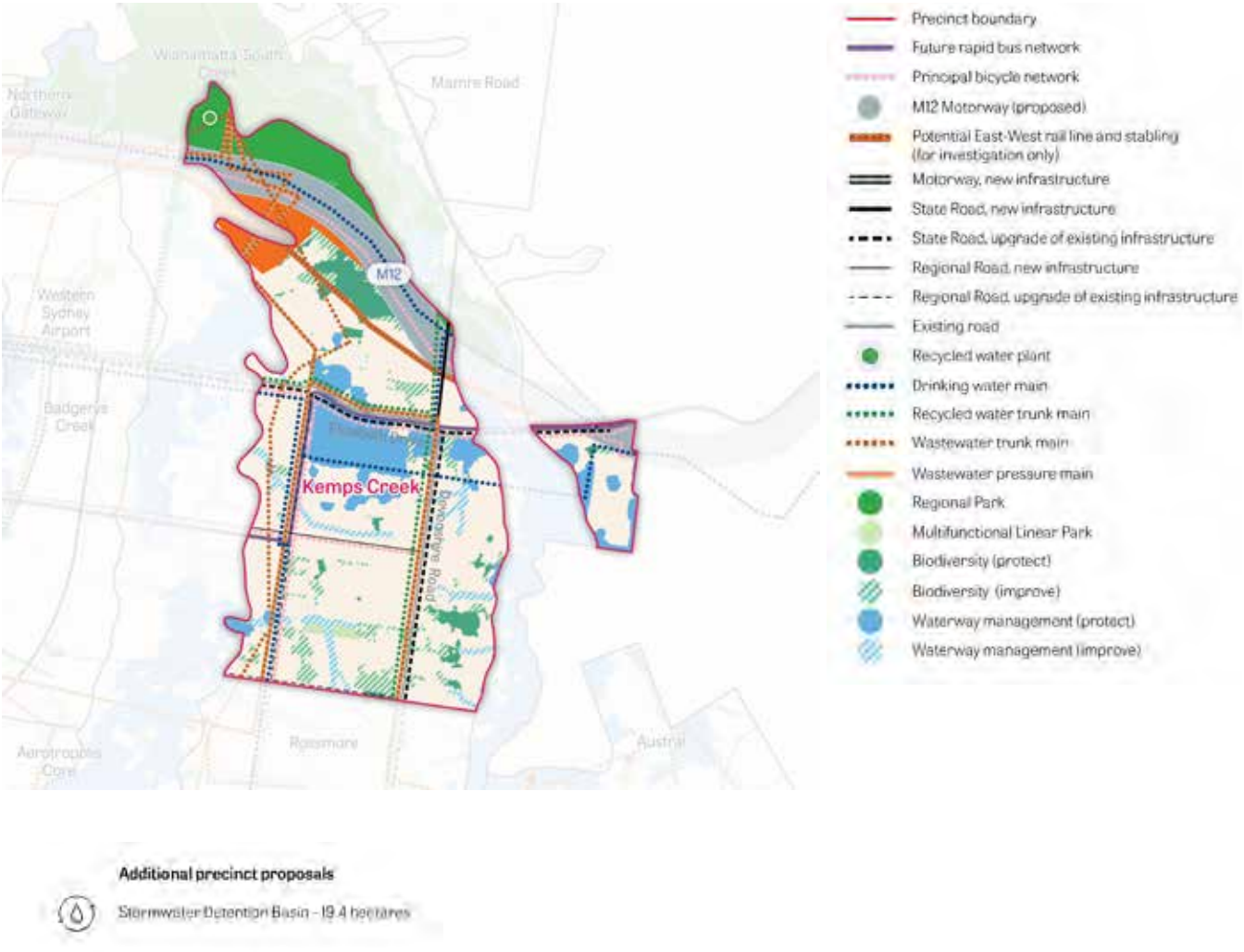

**Table 4-49:** Kemps Creek Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 819 | 10 | **2020** | 1% High, 98% Moderate, 1% Low |
| **Percentage of precinct** (%) | 100 | 1 | **2100** | 1% High, 34% Moderate, 65% Low |

**Table 4-50:** Kemps Creek Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 1,422 | -364 | -777 | -333 | -774 | -356 | -689 |
| **Jobs** | 845 | +316 | +962 | +1,546 | +6,537 | +1,068 | +3,593 |
| **Homes** | 451 | -128 | -261 | -118 | -259 | -125 | -232 |

**Figure 4-48:** Kemps Creek Precinct infrastructure proposals identified in the PIC process



## Rossmore

Rossmore is likely to remain rural until land is required for housing and employment beyond rezoned or initial precincts. It will offer a diversity of housing, compact mixed use centres and places for local jobs, community infrastructure and services. People living in Rossmore will benefit from access to rapid bus services along the planned Fifteenth Avenue transit corridor identified in Liverpool City Council's Local Strategic Planning Statement, creating opportunity for higher density development along the route with connections to Liverpool city centre, the Aerotropolis Core and the Airport, and services to other employment destinations within the Aerotropolis. It will also offer places for people to enjoy access to Wianamatta-South Creek, Kemps Creek and the Western Sydney Parklands.

**Figure 4-49:** Rossmore Precinct

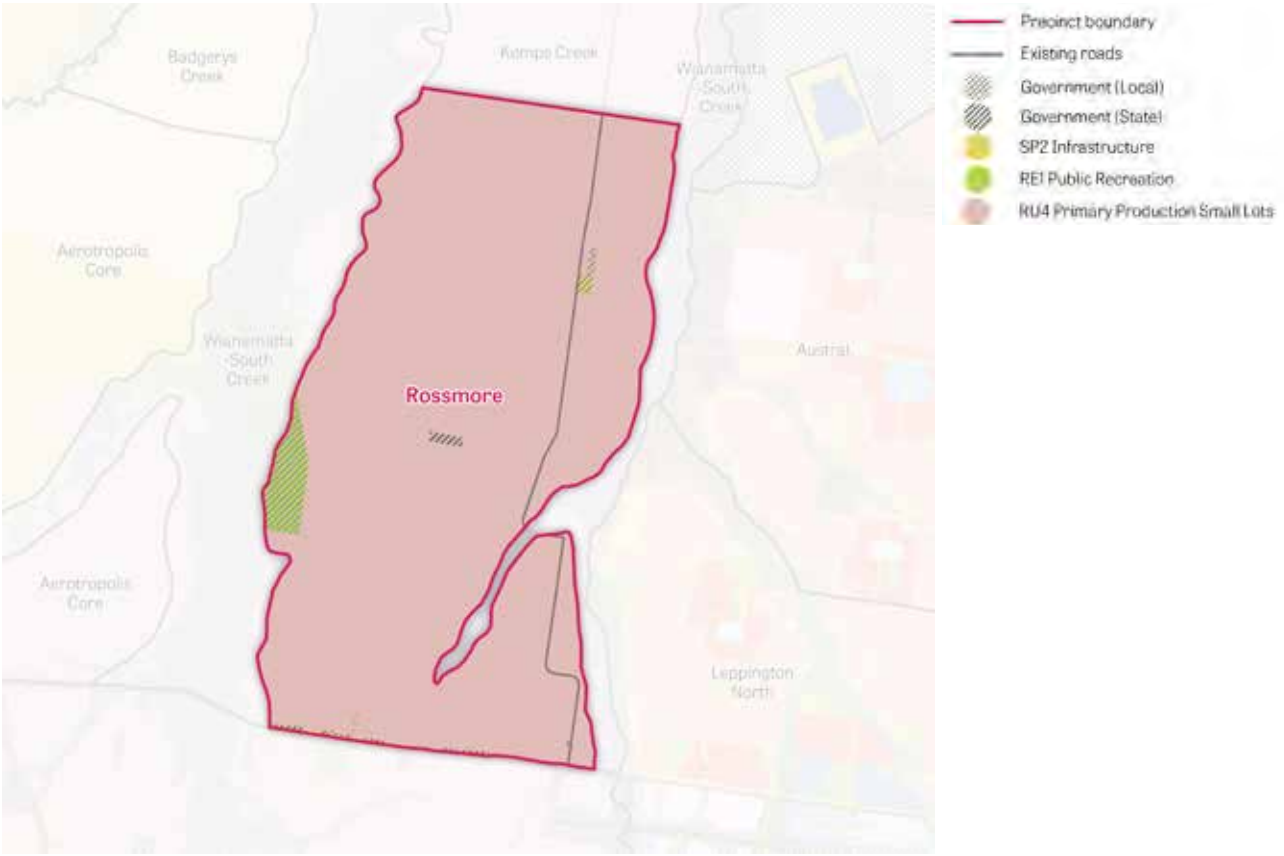


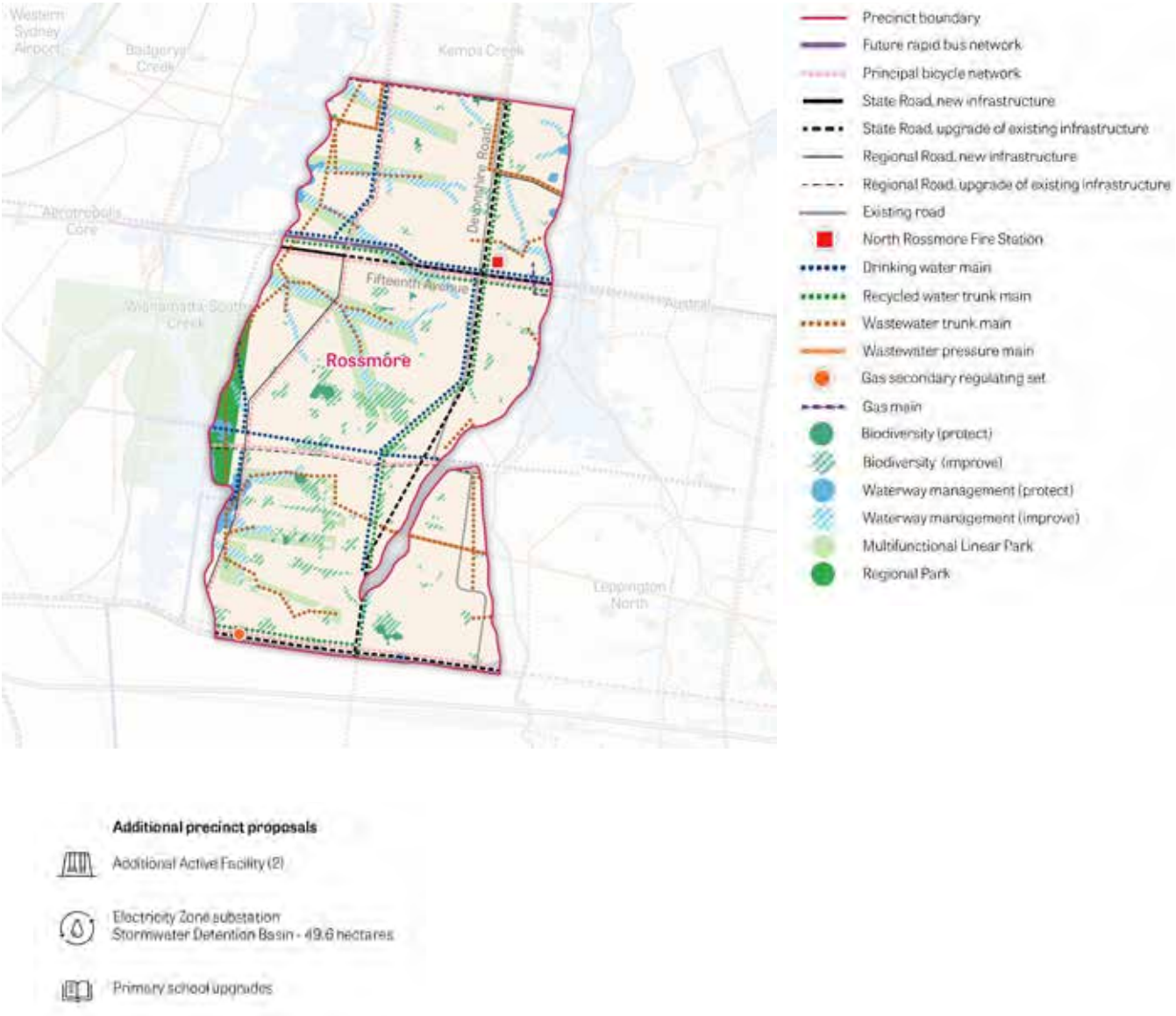

**Table 4-51:** Rossmore Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,245 | 32 | **2020** | 100% Moderate |
| **Percentage of precinct** (%) | 100 | 3 | **2100** | 93% Moderate, 7% Low |

**Table 4-52:** Rossmore Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 2,410 | +426 | +1,313 | +10,146 | +36,825 | +7,620 | +25,041 |
| **Jobs** | 848 | +71 | +128 | +800 | +2,511 | +725 | +1,389 |
| **Homes** | 756 | +134 | +413 | +3,217 | +11,578 | +2,394 | +7,873 |

**Figure 4-50:** Rossmore Precinct infrastructure proposals identified in the PIC process



## Wianamatta-South Creek

The Precinct is an important part of the broader Wianamatta–South Creek corridor of creeks, tributaries, parks and conservation areas - a defining element of the Western Parkland City.

It contains high value vegetation and waterways. There will be a focus on improving waterway health through revegetation, enhancing biodiversity value and providing a high quality open space network with sports fields, walking and cycling trails.

**Figure 4-51:** Wianamatta – South Creek Precinct - Before rezoning under the Aerotropolis SEPP

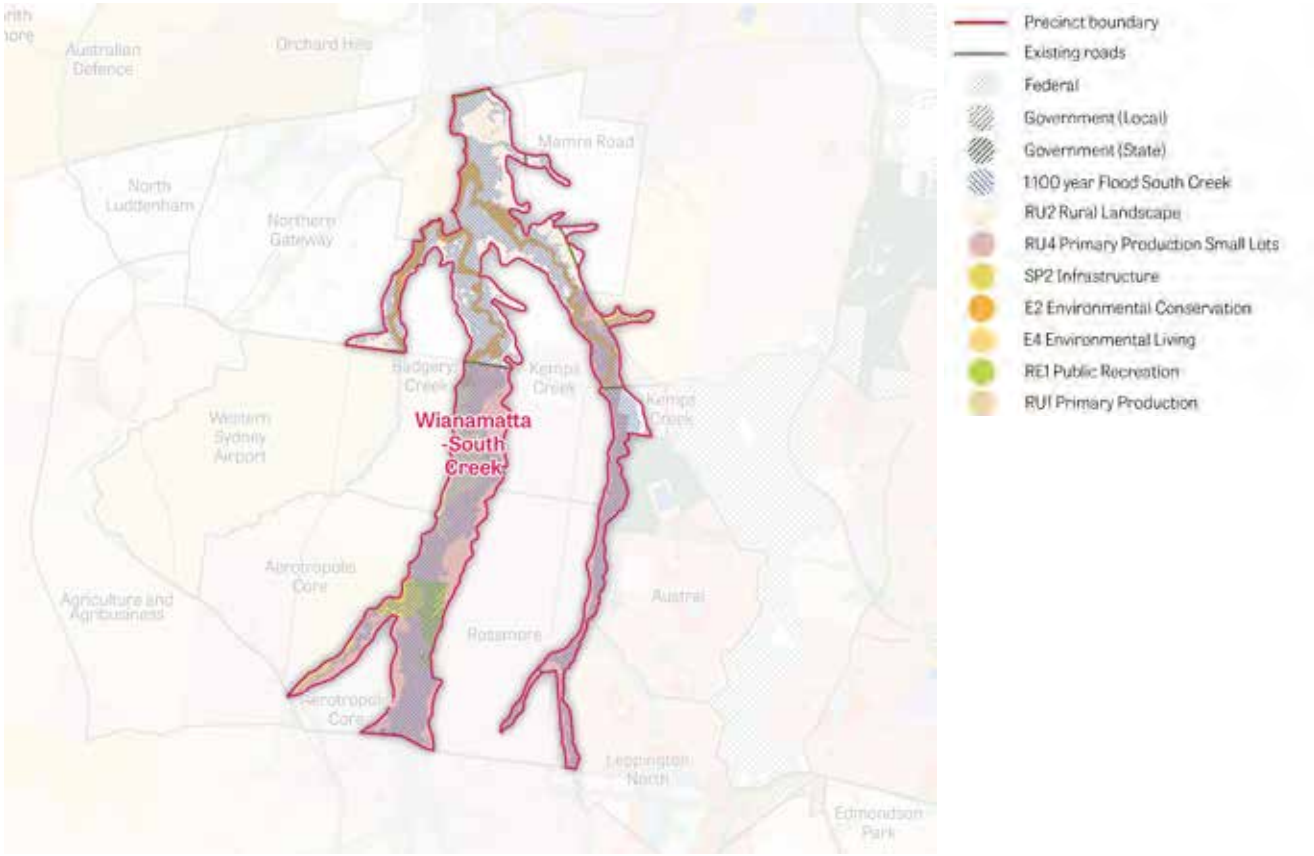
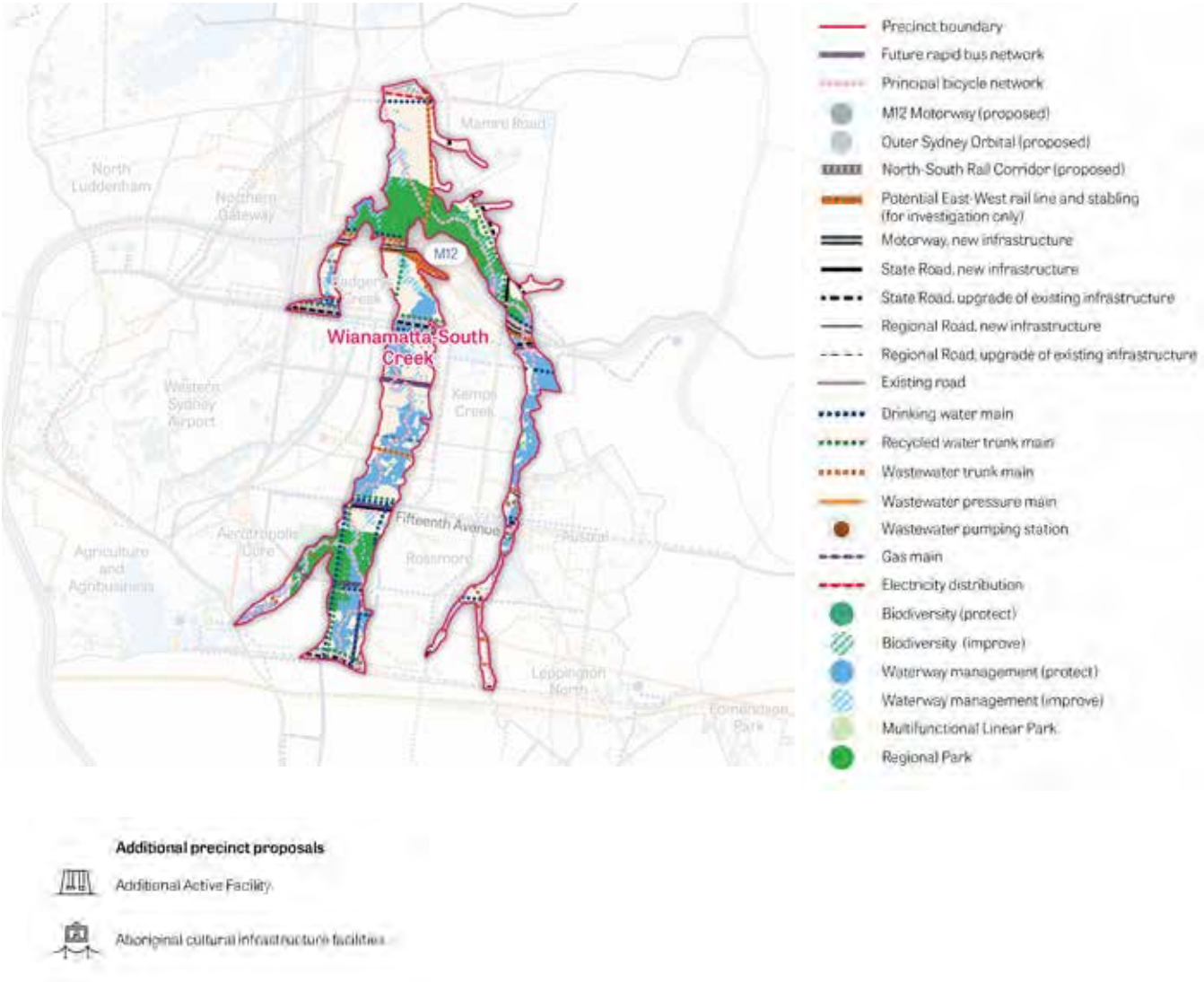



**Table 4-53:** Wianamatta – South Creek Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,952 | 86 | **2020** | 86% High, 13% Moderate, 1% Low |
| **Percentage of precinct** (%) | 100 | 4 | **2100** | 39% Acute, 40% High, 13% Moderate, 8% Low |

**Figure 4-52:** Wianamatta-South Creek Precinct infrastructure proposals identified in the PIC process



## Western Sydney Airport

This Precinct encompasses the future Western Sydney International Airport and the airport business park. It will be serviced by two Sydney Metro stations and rapid bus services. It will include commercial offices, hotel accommodation, and passenger and freight facilities. It will support jobs in the airport operations and service industry and provide services to national and international travellers.

**Figure 4-53:** Western Sydney Airport Precinct

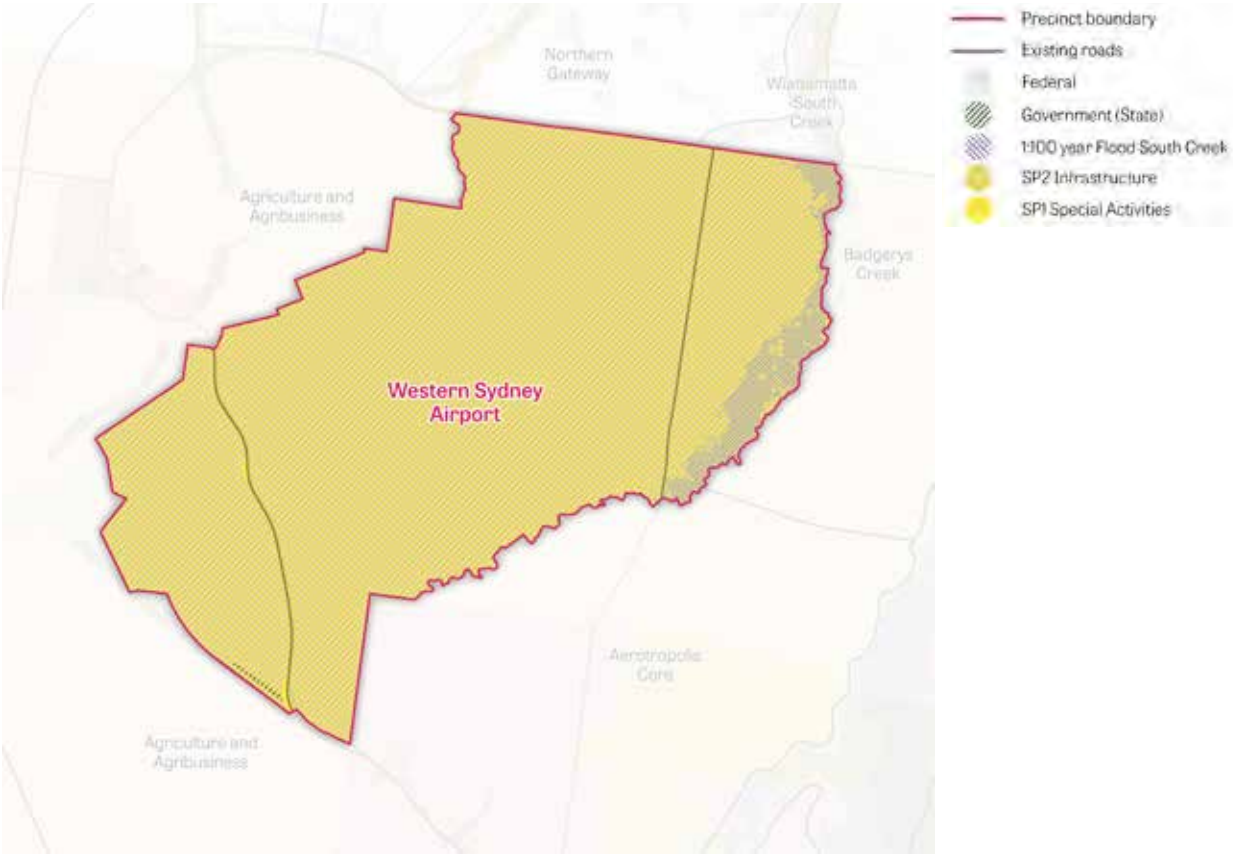


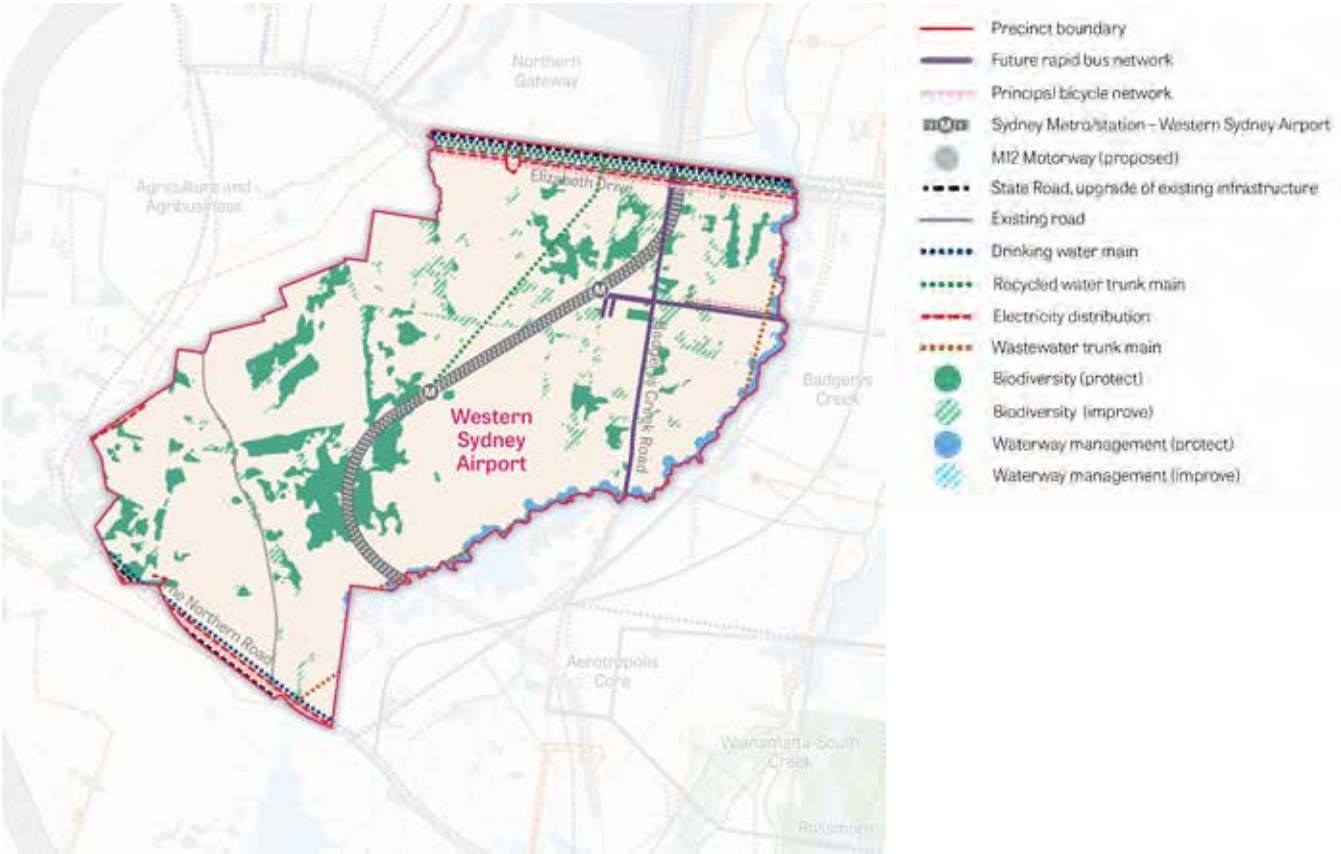

**Table 4-54:** Western Sydney Airport Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,690 | 1,676 | **2020** | 5% High, 95% Moderate |
| **Percentage of precinct** (%) | 100 | 99 | **2100** | 3% Acute, 2% High, 16% Moderate, 79% Low |

**Table 4-55:** Western Sydney Airport Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 53 | -48 | -49 | -48 | -49 | -47 | -48 |
| **Jobs** | 8 | +3,202 | +12,228 | +5,532 | +20,035 | +4,518 | +17,879 |
| **Homes** | 26 | -23 | -23 | -23 | -23 | -22 | -23 |

**Figure 4-54:** Western Sydney Airport Precinct infrastructure proposals identified in the PIC process




Additional precinct proposals

## Austral

Austral Precinct will transform from rural land to residential uses, offering a diversity of housing types, and an active interface with Bonds Creek, Kemps Creek and Western Sydney Parklands. There will be some employment in local centres and light industrial uses. Much of the land is in fragmented ownership, requiring government-led levers to allow development and enabling infrastructure.

People living in Austral Precinct will benefit from access to rapid bus services along the planned Fifteenth Avenue transit corridor identified in Liverpool City Council's Local Strategic Planning Statement, creating opportunity for higher density development at key points along the route with high frequency direct connections to Liverpool city centre the Aerotropolis Core, and services to other employment destinations within the Aerotropolis.

**Figure 4-55:** Austral Precinct

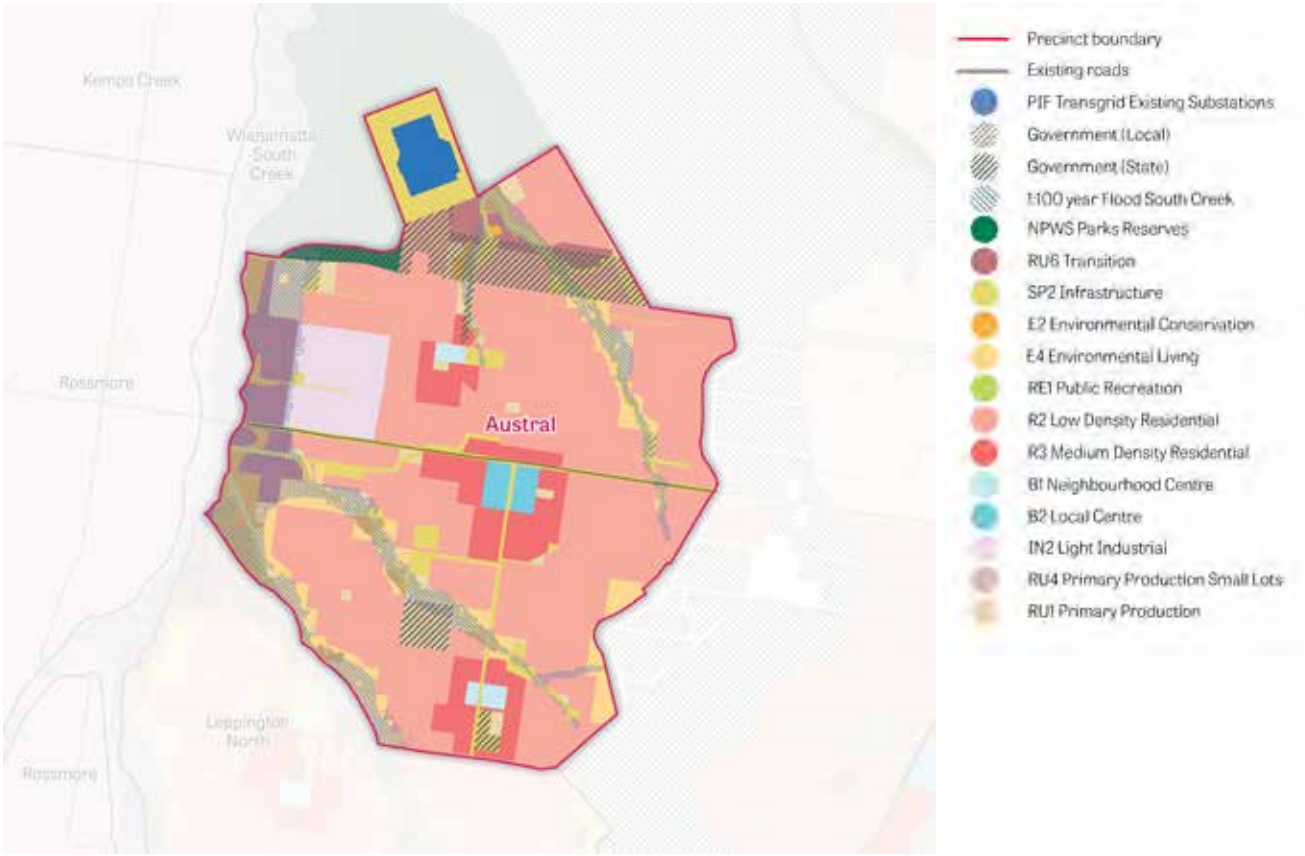


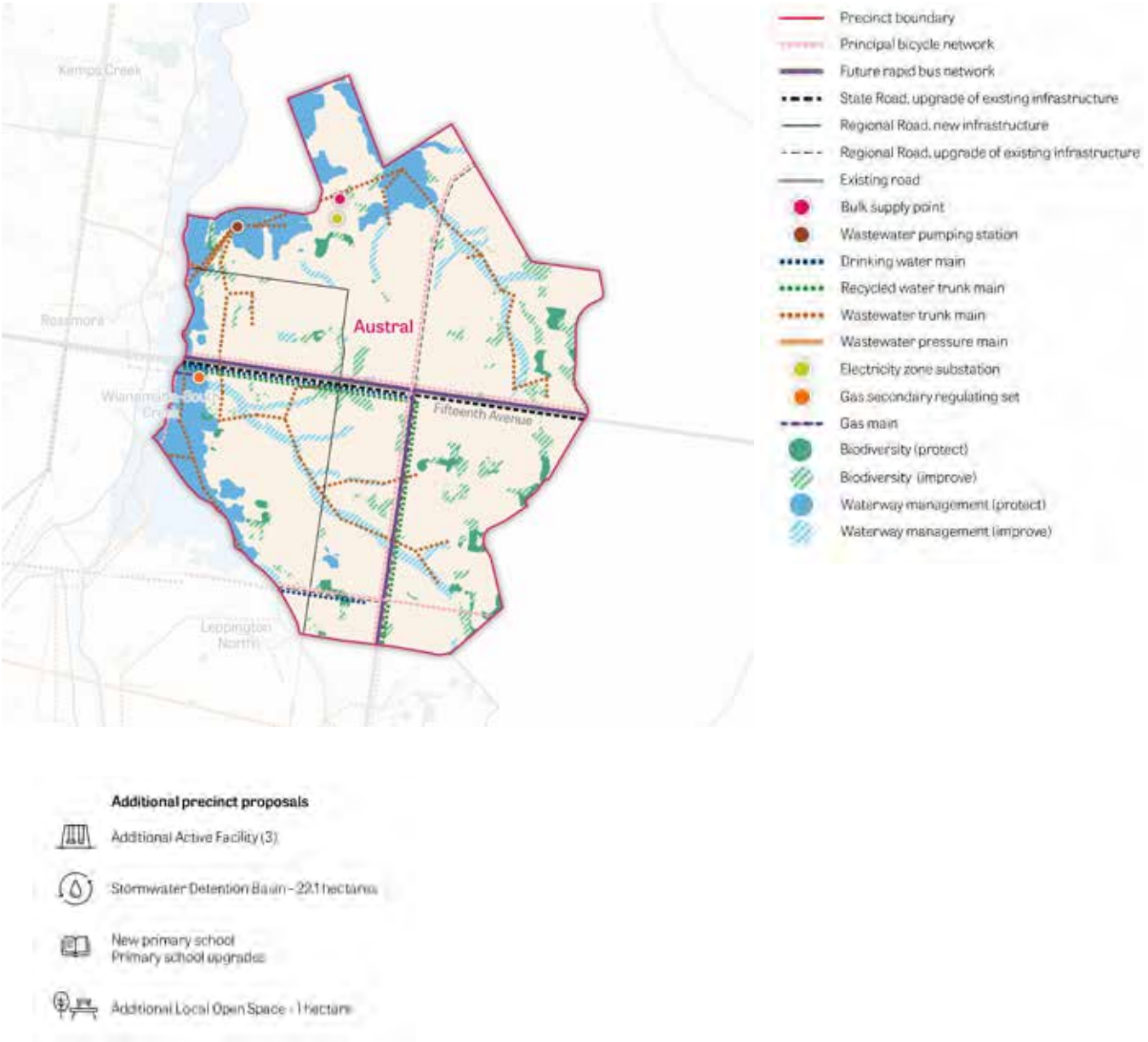

**Table 4-56:** Austral Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 933 | 123 | **2020** | 11% High, 89% Moderate |
| **Percentage of precinct** (%) | 100 | 13 | **2100** | 9% High, 91% Moderate |

**Table 4-57:** Austral Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 1,673 | +12,660 | +30,401 | +14,066 | +33,779 | +20,716 | +39,276 |
| **Jobs** | 425 | +2,290 | +6,851 | +3,117 | +11,178 | +3,746 | +9,718 |
| **Homes** | 628 | +4,436 | +10,313 | +4,929 | +11,459 | +7,284 | +13,374 |

**Figure 4-56:** Austral Precinct infrastructure proposals identified in the PIC process



## Leppington North

Leppington North is already transforming, with rural land rezoned for residential uses. Leppington Town Centre is a strategic centre at Leppington Station. Residents will benefit from a diversity of housing and the future South West Rail Link extension connecting to the Aerotropolis Core and the Airport.

Much of the land is in fragmented ownership, requiring government-led levers to allow development and enabling infrastructure ahead of rezoning for residential purposes. Camden Council is partway through a review of planning controls for Leppington North.

**Figure 4-57:** Leppington North Precinct

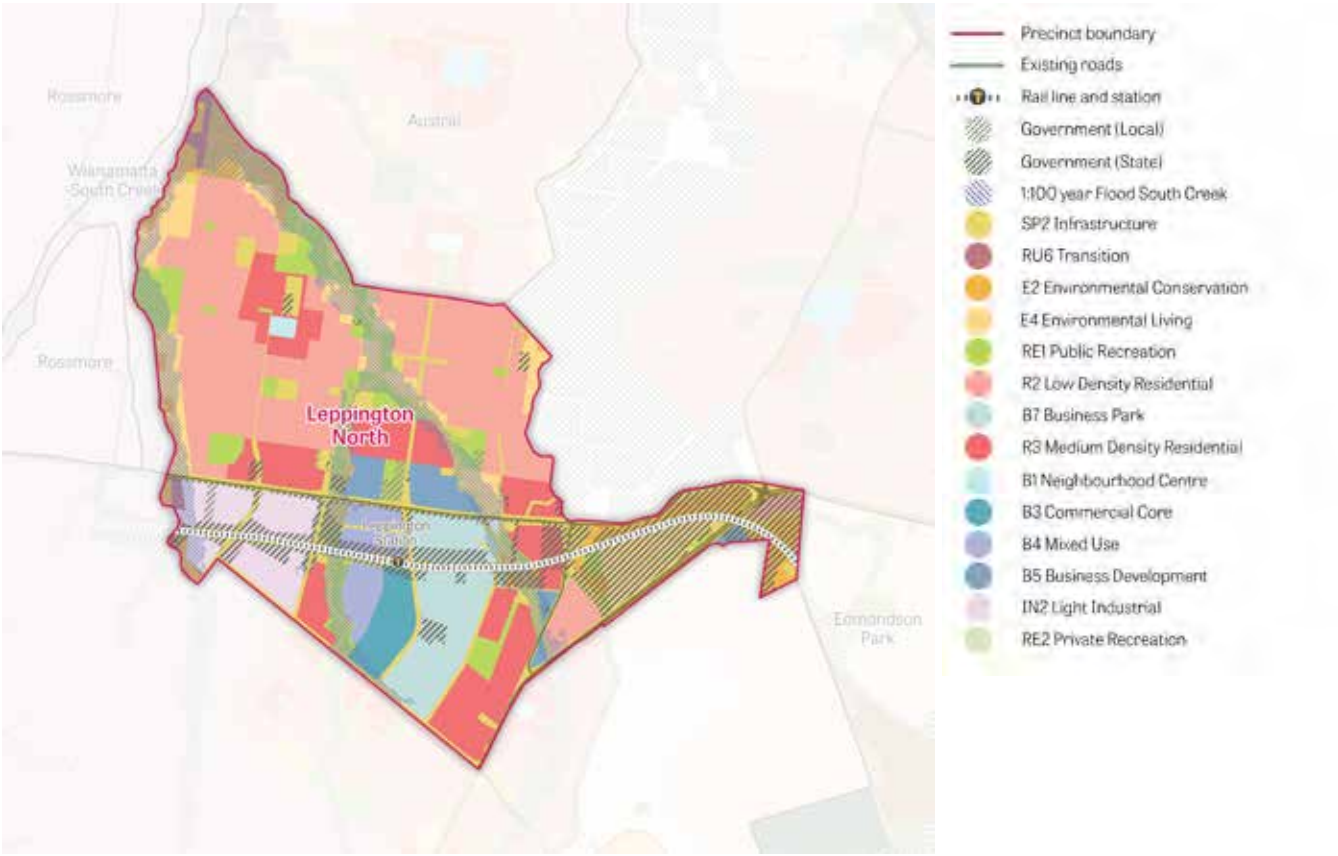



**Table 4-58:** Leppington North Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 1,095 | 197 | **2020** | 8% High, 92% Moderate |
| **Percentage of precinct** (%) | 100 | 18 | **2100** | 7% High, 93% Moderate |

**Table 4-59:** Leppington North Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 2,038 | +16,324 | +29,339 | +19,089 | +32,599 | +21,128 | +37,560 |
| **Homes** | 1,220 | +7,285 | +13,743 | +8,373 | +17,193 | +10,802 | +18,352 |
| **Jobs** | 744 | +5,978 | +10,731 | +7,094 | +11,923 | +7,623 | +13,743 |

**Figure 4-58:** Leppington North Precinct infrastructure proposals identified in the PIC process

## Edmondson Park

Edmondson Park Precinct has gradually transformed into a residential area, with medium and higher density housing and some jobs at the local centre around Edmondson Park Station. People will benefit from the future South West Rail Link extension, which will provide access to the Aerotropolis Core and the Airport.

**Figure 4-59:** Edmondson Park Precinct

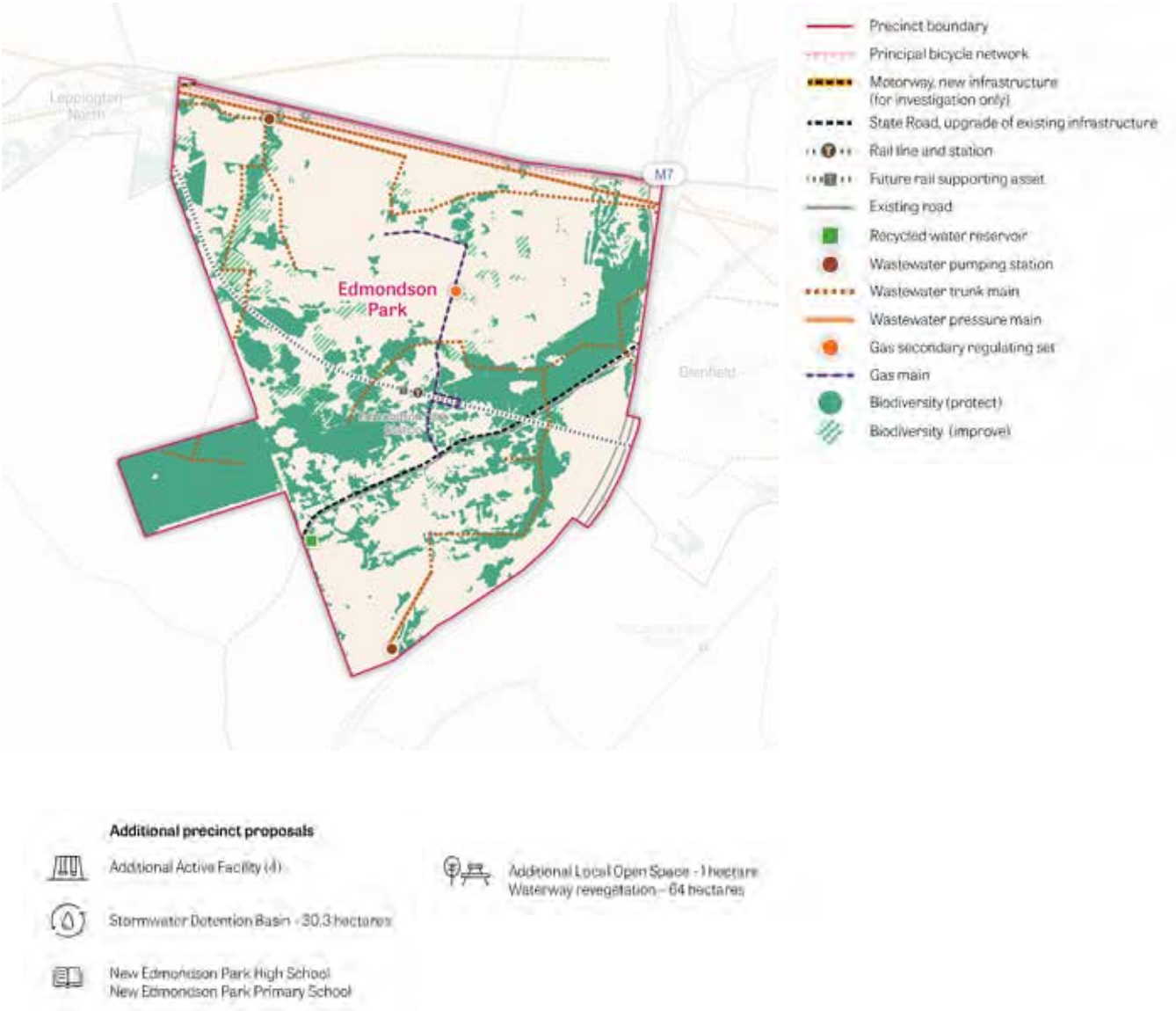

**Table 4-60:** Edmondson Park Precinct land breakdown

| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 857 | 300 | **2020** | Inaccurate results in precinct |
| **Percentage of precinct** (%) | 100 | 35 | **2100** | |

**Table 4-61:** Edmondson Park Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 4,010 | +14,316 | +30,520 | +16,019 | +37,722 | +22,867 | +37,203 |
| **Homes** | 373 | +2,870 | +4,728 | +3,448 | +6,451 | +3,219 | +5,510 |
| **Jobs** | 1,211 | +4,296 | +9,261 | +4,806 | +11,384 | +6,929 | +11,296 |

**Figure 4-60:** Edmondson Park Precinct infrastructure proposals identified in the PIC process



## Glenfield

Glenfield Precinct is an established residential area with Glenfield Town Centre at the rail station and transport interchange. It is subject to precinct planning that focuses on opportunities from land at the Hurlstone Agricultural High School site for educational uses and new housing.

Leveraging its strategic location on the rail network and the future South West Rail Link extension, this can be a place that will supply a diversity of housing types and local jobs through urban renewal of the town centre and established areas.

**Figure 4-61:** Glenfield Precinct


**Table 4-62:** Glenfield Precinct land breakdown

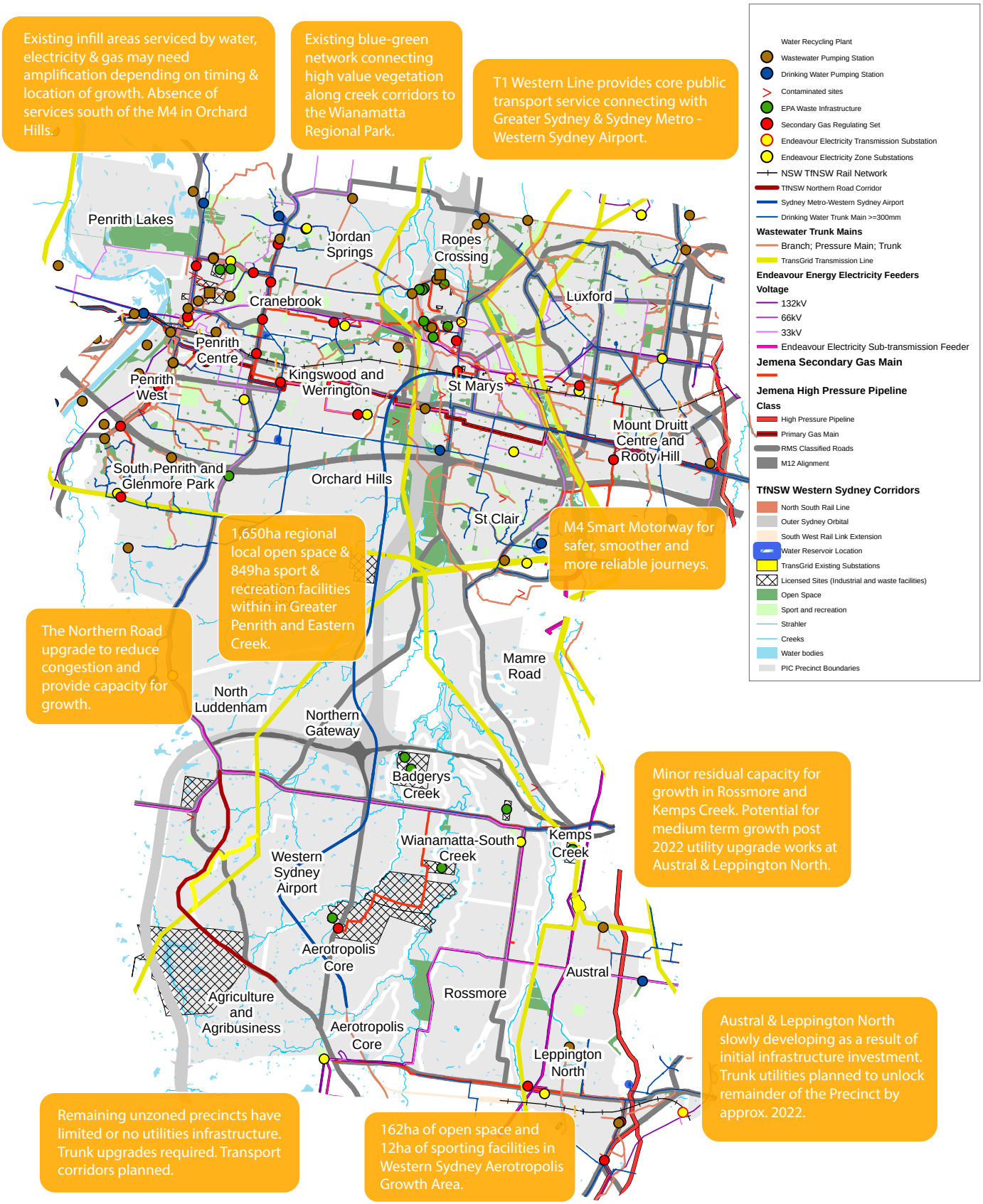
| | Total precinct area | Government owned | Climate risk rating (%) | |
|---|---|---|---|---|
| **Approximate area** (ha) | 758 | 348 | **2020** | Inaccurate results in precinct |
| **Percentage of precinct** (%) | 100 | 46 | **2100** | |

**Table 4-63:** Glenfield Precinct population, employment and housing by scenario

| | Existing | Growing Parkland City | | Thriving Aerotropolis | | Thriving Metropolitan Cluster | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 | 2016 -2036 | 2016 - 2056 |
| **People** | 9,926 | +5,279 | +9,089 | +6,598 | +11,608 | +9,269 | +12,793 |
| **Homes** | 2,387 | +522 | +1,478 | +581 | +1,870 | +1,014 | +2,259 |
| **Jobs** | 3,302 | +1,838 | +3,200 | +2,298 | +4,093 | +3,203 | +4,436 |

**Figure 4-62:** Glenfield Precinct infrastructure proposals identified in the PIC process

**Figure 5-1:** Greater Penrith to Eastern Creek and Western Sydney Aerotropolis Growth Area networks and systems – existing infrastructure and services (as at April 2019)



# 5 Step 2: Cross-sector infrastructure needs, costings and funding source

## 5.1 Infrastructure and service assessment – Baseline performance

An assessment of the initial PIC area established the current performance of the existing infrastructure and services and capacity to accommodate growth.

The *Baseline Infrastructure and Services Assessment* report in **Appendix 4** documents:

- current performance of infrastructure and services
- planned and committed investment in infrastructure and services and the projected change to capacity and performance
- opportunities for growth within existing programs and commitments
- relevant policy positions that would inform future planning.

There is a clear contrast in terms of the existing infrastructure and services in the initial PIC area, and the capacity to accommodate growth.

The already established area to the north incorporating Greater Penrith to Eastern Creek has a range of infrastructure with capacity to support growth in the short term. It is noteworthy that:

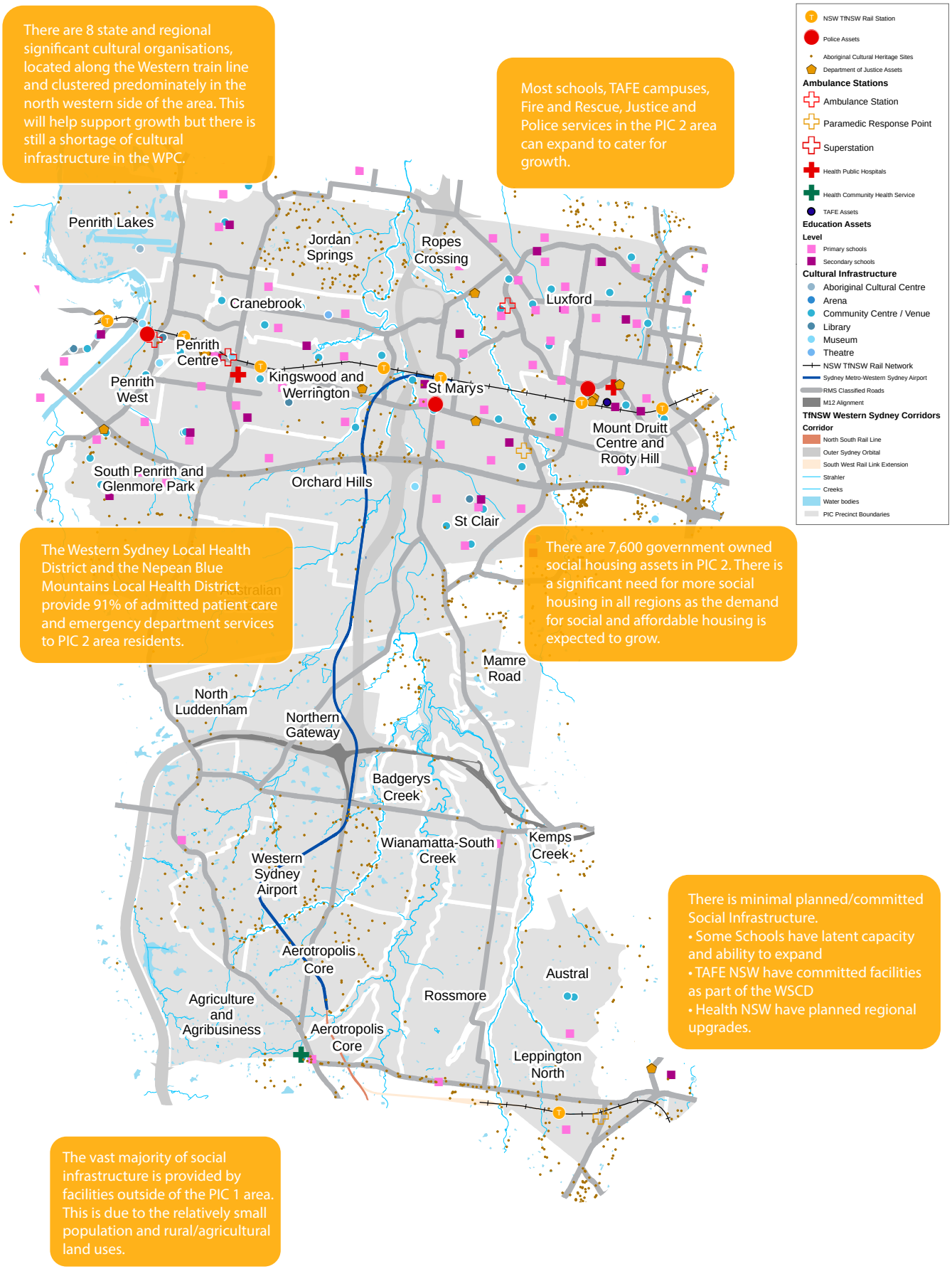
- Motorways and arterial roads, high voltage electricity networks, water, gas and regional open space generally have some short-term capacity.
- Kingswood TAFE NSW, justice and emergency services facilities have some short-term capacity.
- Additional infrastructure is needed to support growth in areas such as Orchard Hills and in the longer term.
- While most schools are nearing capacity (except for those in the Luxford Precinct), most have potential to expand on existing sites.
- There is a large amount of older social housing, particularly in the Luxford, St Marys, Mount Druitt Centre and Rooty Hill precincts.

By contrast, the Western Sydney Aerotropolis Growth Area and the Austral to Glenfield Corridor – as, generally, greenfield areas – contain few assets with the capacity to support growth; significant infrastructure investment is required.

As rezoned precincts, Austral and Leppington North benefit from recent investment in public transport and utilities. Some of this can support short-term growth in the adjoining precincts of Rossmore and Kemps Creek.

While Glenfield and Edmondson Park precincts are included in the initial PIC area, they were not subject to the services and infrastructure assessment as they were considered in the initial PIC area after this work concluded.

**Figure 5-2:** Greater Penrith to Eastern Creek and Western Sydney Aerotropolis Growth Area people and places – existing infrastructure and services (as at April 2019)



The *Climate Change Risk Assessment* report in **Appendix 5** considers climate change and risk over the next 80 years. To calculate the risk of damage and disruptive failure between 2020 and 2100, the analysis included:

- established datasets on riverine flooding
- forest cover
- soils and topology
- meteorological datasets from the Bureau of Meteorology (BoM)
- forward looking climate change models from UNSW (NARCliM)
- engineering design specifications of buildings and roads.

This found that the risks from climate change and extreme weather are likely to increase by 18 per cent to 20 per cent over time in the initial PIC area, with the southern area more exposed. Key findings include:

- Risks of damage or failure of infrastructure would increase by approximately 20 per cent due to climate change and extreme weather.
- The probability of disruptive heatwaves would increase threefold over the next 100 years, placing electricity supply under enormous pressure with increased reliance on air conditioning, power outages, failing infrastructure – putting vulnerable communities at risk.
- The risk of damage from flooding would increase by around 40 per cent in the south of the initial PIC area and 50 per cent in the north putting more people and property at risk.
- The amount of land considered at a high or acute risk of flooding would increase by about 200 hectares between 2020 and 2100 in Greater Penrith to Eastern Creek.

Planning and adapting places to address the risk of climate change and extreme weather will be key to the future resilience of the Western Parkland City. The climate risk assessment to establish can help to inform current and future planning and decision making through the implementation of the draft PIC.

## 5.2 Infrastructure and service assessment – Scenarios and precincts

Agencies and utility providers used land use forecasts for each scenario and precinct to assess and cost the infrastructure and services required over the next 10, 20 and 40 years to service growth.

Infrastructure and services requirements were provided for 20 years to 2036; transport, water and utilities provided infrastructure and services projects and costs for 40 years to 2056 to support the economic evaluation.

A standardised process allowed all agencies to provide details of:

- infrastructure proposals required to cater for estimated demand to meet desired service levels and targets, where known and established
- strategic capital costs estimates using publicly available information, such as benchmark costs
- estimated apportionment of costs to place and growth through modelling tools or population benchmarks
- approximate land requirements associated with the infrastructure
- potential primary funding sources, based on a consideration of the demand driver.

Each agency determined their own approach, based on their expert knowledge and ultimate accountability for delivery. This approach acknowledged that infrastructure and utilities often serve varying catchments and users outside an area being planned.

The Commission provided guidance to the methodology for cost apportionment, potential funding sources and a standardised methodology for estimating land costs.

Using a consistent process across all sectors, the Commission then integrated the expert advice to provide place-based insights that underpinned the findings and proposed actions detailed in the **draft PIC**.

### Co.LENS

The Commission's purpose-built a tool, Co.Lens, stores the data, information and advice generated through the collaborative PIC process. Data and information can be viewed, integrated and analysed to enable understanding of population, housing and job forecasts, and service and infrastructure costs over 10, 20 and 40 years across all precincts.

Co.Lens is essential to the PIC process, and to the ongoing monitoring and reporting required to ensure the PIC remains current and useful.

The Commission developed a process guide to assist agencies in providing infrastructure and servicing requirements. This provided examples of how to classify an infrastructure proposal, how to apportion costs by precinct and how to allocate project costs both inside and outside the initial PIC area.

This allowed agencies to nominate a preferred precinct for their project based on the rationale noted in the following tables. It also provided options to identify the location of infrastructure to a grid cell within a precinct, adding a further level of detail to inform co-location opportunities.

The Co.Lens tool was built in through a pilot project in 2017 and 2018 and is continuously being improved with wider application across Greater Sydney.

## 5.3 Methodology and assumptions

Infrastructure assessed in the PIC process primarily includes State and regional infrastructure, with local infrastructure only partially incorporated. More detailed planning for local infrastructure will form a major element of precinct and master planning processes.

### Transport

- Rail/metro
- Motorways
- State and regional roads
- Bus networks
- Principal bicycle network

### Water

- Drinking water
- Wastewater
- Recycled water
- Stormwater

### Open space and biodiversity

- Local and regional open space
- Sport and recreation facilities
- Waterway management and biodiversity
- Tree canopy

### Justice, Fire & Rescue and Police

- Court houses
- Correctional centres
- Youth justice facilities
- Fire stations
- Multi-functional police hub
- Police Stations

### Education, health and culture

- Primary, secondary schools
- Childcare centres
- School for specific purposes
- Education centres
- Hospitals
- Communality health facilities
- Ambulance stations
- Cultural infrastructure

### Energy, digital and waste

- Electricity distribution network
- High voltage transmission
- Gas
- Digital/smart infrastructure
- Circular economy and resource recovery facilities

The following methodology and costing assumptions for each sector details how agencies calculated infrastructure and service needs, capital costs and potential funding sources.

## Transport

### Introduction

Transport for NSW plans and delivers multimodal transport infrastructure and services to make NSW a better place to live, work and visit. *Future Transport 2056* sets the strategic direction for transport in NSW over the next 40 years. It aligns with vision for Greater Sydney as a metropolis of three cities and supports the objective of a 30-minnute city.

During the morning peak, 51 per cent of residents commute outside the Western City District for work; 75 per cent of commuting trips in Greater Penrith to Eastern Creek are by private vehicle. The public transport network requires better connections and services to encourage people towards more sustainable modes of transport to reduce congestion.

A safe and efficient reliable transport network will:

- increase the proportion of trips by active and public transport
- support access to new job opportunities within the Western Parkland City to reduce commuting times in the Central and Eastern cities
- improve freight connectivity for logistics movement to facilitate trade and distribution.

### System and service outcomes

Major city-shaping and city-serving infrastructure in the Western Parkland City includes:

- Sydney Metro-Western Sydney Airport
- M4 Smart Motoway, The Northern Road and Mulgoa Road upgrades to enable efficient and reliable road freight movements, and to support, in part, the operation of rapid and local bus services
- potential corridors for protection such as the Outer Sydney Orbital and North South Rail Link from St Marys to Schofields to plan for the long-term strategic needs of Greater Sydney
- targeted road improvements and new links to secure access to precincts expecting significant growth and support bus, freight and principal bicycle connections in Greater Penrith to Eastern Creek

Transport for NSW seeks to balance road space allocation at a network scale with:

- prioritising active and public transport on roads through areas with a higher place function
- assigning other roads for freight and regional through movements.

Data and forecasting from Transport for NSW relates to the Western City District and Greater Sydney.

### Context

Transport for NSW applied a 'vision and validate' approach to develop an integrated transport network and identify the infrastructure and servicing needs aligned with the scenarios, while also working to achieve the vision of *Future Transport 2056*.

The integrated network was developed concurrently for the Western Sydney Aerotropolis Plan and builds on committed infrastructure investment in The Northern Road/Bringelly Road upgrades, Sydney Metro - Western Sydney Airport, the M12 Motorway and rapid bus services under the City Deal.

The integrated network also assumed major transport corridors such as the Outer Sydney Orbital, The Castlereagh Connection, Western Sydney Freight Line, the north-south and east-west rail lines.

Strategic transport modelling was used to forecast network demand and based on high level assumption of infrastructure capacity and service level. This relied on the scenario land use forecasts per scenario provided by the Commission.

All projects unless committed for delivery are indicative only. The scope, cost and timing of all uncommitted projects are subject to further detailed transport modelling and analysis, engineering and design investigations, and final investment decision through business case processes. Additional projects may be required and costed when more detailed precinct level planning is undertaken including integration with the existing network across the initial PIC area and specific flooding evacuation route requirements to support the Penrith City Centre. This could include the need to redesign parts of the road-based transport network.

The rollout and prioritisation of infrastructure and services will depend on the location and actual uptake of growth as development proceeds.

### Assessing requirements

Transport for NSW adopted a conceptual a 5km x 5km grid for State roads and a 2.5km x 2.5km grid for regional roads when developing the road network – this is pertinent in greenfield areas and provides an appropriate density of these connections. This allowed different functional priorities to be applied to each corridor to support a movement and place approach. Generally, six lanes were assumed for higher order State roads, and four lanes for regional roads.

Bus priority and dedicated infrastructure along road corridors were assumed to be required to support rapid bus services. Pedestrian and bicycle facilities were also assumed.

Strategic transport (demand) modelling validated the need for and tested the capacity of the integrated network, which covers State and regional roads, rail (suburban, metro and freight), buses (rapid and local), and the Principal Bicycle Network. Some of these had already been in planning or under development.

The process used project capital cost estimates from business cases or construction contracts, or drew from an indicative high-level project scope developed for the PIC process.

Benchmarked capital cost rates used include:

- global rates of $6.125 million per lane kilometre for road projects (validated against several recent projects)
- standard vehicle cost of $400K per bus.

Indicative cost per kilometre of the Principal Bicycle Network uses the Cycling Investment Program - Strategic Business Case where cost is based on the distance of the facility from a metropolitan cluster/centre.

| Type | 0-5 kms | 5-10+ kms |
|---|---|---|
| **Bicycle lane ($)** | 800,000 | 500,000 |
| **Bicycle path ($)** | 3.3m | 1.1m |
| **Shared path ($)** | 1.8m | 800,000 |
| **Separated path ($)** | 2.5m | 1.1m |

Operational costs are also based on business cases. Where not available, service level assumptions were made then benchmark cost rates applied:

- average 1.5 per cent per annum for roads including on road rapid bus infrastructure (based on asset maintenance data)
- average 0.8 per cent per annum for rail projects from the Western Parkland City Integrated Transport Strategic Business Case
- B-line net operational costs as proxy for rapid bus services
- standard cost per bus kilometre for local buses ($1.65 excl labour) and cost per bus hour ($53.32 labour cost) from the Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives
- Western Sydney Bus Depot at 4 per cent per annum from the Western Parkland City Integrated Transport Strategic Business Case
- Principal Bicycle Network maintenance costs as per the Bicycle Facility Tool in the Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives.

Land requirements were taken either from project design investigations or indicative high-level project scopes developed for the PIC process, with the length of linear projects based on GIS-measured distances.

Road corridors were assumed to be 40 metres wide for four-lane corridors and 60 metres wide for six-lane corridors, including allowance for utilities, walking and cycle paths, and bus infrastructure. The assumed width of Principal Bicycle Network facilities were:

- bicycle lane: four metres
- bicycle path: three metres
- shared path: 3.5 metres
- separated path: 4.5 metres.

If the Principal Bicycle Network was planned for State and regional roads, it was assumed they will be located within the road corridor with no additional land requirements. Estimated land requirements did not include land already acquired or art of an existing corridor.

The benchmark cost rates applied are global estimates for strategic planning purposes and should not be relied on for making investment decisions.

### Apportioning costs

Apportioning costs to the initial PIC area and its precincts considered relative growth, project location, and trip origin and destination.

Growth and regional movement factors (as appropriate) were applied to each project for each scenario. The growth factor is based on the relative increase in the population and employment for a precinct, and the regional movement factor is calculated from strategic transport modelling outputs based on the trips made by customers travelling to and from the initial PIC area.

Projects were classified according to the expected network contribution and benefit to each precinct based on its physical location and forecast travel demand. This classification determined the suitable growth and regional movement factor to be applied for each project. The classifications were:

- **single precinct local** located within a single precinct with mainly local benefit
- **single precinct regional** located within a single precinct providing regional benefits inside and outside the initial PIC area
- **multi precinct local** located across a number of precincts and/or providing local benefits to more than one precinct, and mainly inside the initial PIC area
- where project boundaries extend outside the initial PIC area, length apportionment acts as a proxy for the project's regional impacts
- **multi precinct regional** located across several precincts providing regional benefits outside the initial PIC area.

A different method was applied to selected city-scale projects such as motorways, rail lines and The Northern Road. This method used select-link analysis from strategic modelling to provide a more accurate forecast of specific customer origins and destinations and a better understanding of the proportion of trips that can be attributable to the initial PIC area and each precinct.

The project cost apportioned to new growth was based on additional trips generated by the increase in population and jobs.

### Determining funding

Capital infrastructure is funded through various combinations of public funding or development contributions, depending on the location and type of infrastructure proposed. Private sector investment is possible for infrastructure such as motorways.

The choice of funding source and the share of costs to NSW Government for projects are based on similar projects funded for delivery and align with NSW Government policies.

Service and operating costs are funded primarily by the NSW Government, though councils are responsible for the part funding and carrying out maintenance on regional roads and the road reserve on State roads (except motorways).

Opportunities for limited operational cost recovery include user charges such as tolls, ticket box revenue, advertising or commercial lease of property for ancillary uses such as station retail.

## Water

### Introduction

The *Greater Sydney Region Plan* envisages the Western Parkland City centred around a healthy and biodiverse Wianamatta-South Creek and its tributaries. Water will bring the vision of a sustainable Western Parkland City to life.

Managing the total water cycle places greater value on this essential resource and can make the best use of it. This is a holistic approach to managing water within the landscape.

The transformation of the Western Parkland City presents a unique opportunity for landscape-led urban planning to rethink water management, strengthen climate independence, care for local ecology and create tree-lined streets, parks and green places. People will have easier access to safe, local waterways.

Sydney Water sees a city where:

- Traditional custodians, communities and businesses have a voice in shaping the right mix of sustainable water services.
- Water is available and delivered at the right time to support the city's growth.
- Treated recycled and harvested water is an affordable and reliable way to provide water for a variety of uses - within homes and businesses, irrigation of green spaces, and agricultural uses.
- Water recycling and harvesting both minimises excess wastewater and stormwater discharges to waterways and supports and protects natural landscape values.
- Water sensitive urban design consistently harnesses stormwater and retains water in the urban landscape, enabling a vibrant tree canopy cover, permeability and improved flood resilience.

The *Western City District Plan* reinforces more efficient use of water and energy to reduce impacts on the environment and greenhouse gas emissions and highlights the opportunity to change how water resources are managed towards a circular economy designed to avoid, minimise and reuse waste.

Total water cycle and resource recovery planning forms a strong foundation on which to build a thriving, liveable and sustainable Western Parkland City.

### System and service outcomes

Sydney Water's servicing plan for sustainable water management will help bring the Western Parkland City vision to life. Re-imagining water in Western Sydney aims to shape vibrant Western Sydney communities, where people enjoy affordable essential water services, healthy waterways and cool, green places.

The plan outlines an adaptive path towards a more sustainable, holistic and resilient future to:

- use and reuse of water wisely (including wastewater, stormwater, bioresources)
- retain water in the landscape
- diversify water supply options
- bring about whole-of-community benefits including urban greening, cooling, protection of waterways, and avoided infrastructure costs.

An integrated water future requires the production of more recycled water for use in new homes and businesses, irrigation, and for agricultural and industrial uses.

The Upper South Creek Advanced Water Recycling Centre is the largest investment in water resilience for a decade. It will collect wastewater from the Western Sydney Aerotropolis Growth Area, as well as a large proportion of the South West Growth Area and treat this water for reuse and to recover bio-resources.

The centre will support total water cycle management by retaining water within the landscape, protecting the health of waterways, improving the health and wellbeing of local communities, and ensuring water is valued and re-used wisely.

Sydney Water is also examining stormwater capture and harvesting approaches that will support a landscape-led, water sensitive designed city. Urban areas will capture and use as much stormwater as possible before it drains to the sensitive creeks and waterways. This water helps keep street trees and gardens green and shady, while protecting the local ecology.

Greater Sydney's dams will continue to supply most of the drinking water in the Western Parkland City. In the event of broader community acceptance, purified recycled water for drinking offers the potential for even greater water resilience during extended dry periods and generates greater economic benefits.

As the population grows, the advanced water recycling centre could achieve sufficient scale to cost effectively produce purified recycled water for drinking, and co-digest domestic food and agricultural waste to generate energy, potentially exporting electricity or gas to the grid.

Together with recycled water for irrigation, agriculture and environmental flows, purified recycled water also helps to achieve the long-term target of reusing 70 per cent of the drinking water consumed in the Western City by 2056.

Sydney Water will continue to partner with developers, businesses and local councils to facilitate tailored, sustainable water services for new communities.

### Context

Sydney Water's assessment in terms of drinking water considered the drinking water delivery systems at Orchard Hills, Prospect and Macarthur that service the initial PIC area. Greater Penrith to Eastern Creek is serviced by eight water supply zones at Penrith North, Cranebrook (elevated), Orchard Hills, Bringelly Road, Erskine Park, Erskine Park (elevated), Minchinbury and Minchinbury (elevated).

The southern precincts are serviced by five water supply zones:

- Cecil Park (part of the Prospect South delivery system)
- Leppington (part of the Macarthur delivery system)
- Raby (part of the Macarthur delivery system)
- Warragamba
- Carnes Hill.

The Warragamba pipeline bisects the initial PIC area. It is a critical asset for Greater Sydney's water supply as it transports raw water from Warragamba Dam to the Prospect water filtration plant for treatment and distribution. About 90 per cent of Greater Sydney's drinking water is supplied by the Prospect plant.

In terms of wastewater, Greater Penrith to Eastern Creek is serviced by recycling plant at St Marys, Penrith and Quakers Hill. The Western Sydney Aerotropolis Growth Area is largely unserviced. Austral and Leppington North have an interim connection to the Malabar Wastewater System via the Hoxton Park network. Glenfield and Edmondson Park are serviced by the Malabar wastewater system, and the Glenfield and Liverpool water recycling plants.

There is one residential recycled water scheme at Ropes Crossing, which is planned to be serviced in 2021--2022. Recycled water is also used to irrigate sports playing fields in Penrith. Highly treated water is produced at the St Marys water recycling facility and discharged to the Nepean River, downstream of Penrith CBD, for environmental purposes. This facility can produce up to 50 megalitres of water each day and save water stored in Warragamba Dam for the city's water supply.

The Hoxton Park Recycled Water Scheme will provide recycled water to parts of Sydney's south west including Edmondson Park and Glenfield and will be operational as development progresses and sufficient demand is reached. In the interim, recycled water from the plant will be used for constructing the new airport from early 2021.

Sydney Water does not provide stormwater services in the initial PIC area.

The infrastructure investments are strategic level estimates to inform the PIC process and do not necessarily represent capital expenditure being planned for or committed to by Sydney Water.

Sydney Water did not provide costs for smaller reticulation infrastructure as these costs are typically funded by developers and transferred to Sydney Water as assets free of charge (interest costs Sydney Water pays for assets received free of charge have not been included). As most of the southern precincts are undeveloped, there are only existing wastewater services available for the developing precincts in the South West Growth Area. Until major wastewater infrastructure is provided, developers wishing to develop in the short term (before 2025), would need to fund and build their own localised wastewater management facilities. The cost of these were excluded from Sydney Water's assessment, as they are the responsibility of developers.

### Assessing requirements

Sydney Water's assessment of the provision of drinking water and wastewater services for all scenarios aligned with its customer contract and guidelines. For each water product, levels of service were based on the relevant Sydney Water Guidelines:

- WSA 03-2011 Water Supply Code of Australia (Version 3.1, Sydney Water edition)
- Sydney Water - Water System Planning Guideline (Version 1, September 2014)
- WSA 02-2014 Gravity Sewerage Code of Australia (Version 3.1, Sydney Water edition)

- Sydney Water Wastewater System Planning Guideline (June 2017).

The Growing Parkland City scenario represents a business-as-usual servicing approach. Drinking water servicing is based on network upgrades and augmentations and expansion existing water filtration plants. Wastewater servicing would occur via augmentations of the existing Penrith, Quakers Hill, St Marys and Malabar wastewater systems and a new wastewater system flowing to the proposed Upper South Creek Advanced Water Recycling Centre.

Recycled water is limited to the Hoxton Park and Ropes Crossing recycled water schemes and committed upgrade with no further expansion to new areas.

Under the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios, drinking water servicing is based on network extensions and augmentations and expansion of water filtration plants. Drinking water demands are offset by recycled water to new homes and businesses.

Wastewater servicing is via augmentations of existing wastewater systems and new wastewater system flowing to the proposed Upper South Creek Advanced Water Recycling Centre. Recycled water would be provided to new homes and businesses. The Glenfield water recycling plan would be augmented to provide recycled water to the Edmondson Park and Glenfield precincts with the Advanced Water Recycling Centre providing recycled water to all precincts including Western Sydney Airport and the South West Growth Area. The Hoxton Park Recycled Water Scheme is already committed to certain precincts.

Although it is not the statutory manager of stormwater in the initial PIC area, Sydney Water assumed a servicing standard of mean annual runoff volume (MARV) 0.9 ML/ha/year for all new areas. For Austral, Leppington, Glenfield and Edmondson Park some additional infrastructure was costed to cater for improved stormwater management.

Different typology outcomes were identified for each scenario, in alignment with previous strategic planning work completed in the *South Creek Sector Review – Strategic Options Business Case*. The urban form and typology information from this business case informed irrigation demand and stormwater runoff estimates.

Common for all scenarios, Sydney Water identified projects such as gross pollutant traps, detention basins, stormwater pipes and storage for stormwater harvesting.

Under a Growing Parkland City scenario, Sydney Water assumed smaller rainwater tanks (to be supplied and funded by builders and home buyers) to meet BASIX requirements only. Larger rainwater tanks would be included under the other two scenarios. These tanks serve a retention purpose for better waterway health and can provide storage for recycled water to reduce the need for recycled water reservoirs.

The Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios include projects that green and cool, retain stormwater in the environment and feature open water bodies in greenfield development areas. This includes, for example, street trees that have a passive irrigation stormwater management function.

Population and employment forecasts were converted to an equivalent persons (EP) to determine water servicing requirements. 0.2 EP/job was adopted for each employment type and 1 EP/population which accounts for varying EP/dwellings for each precinct.

Drinking water trunk infrastructure was based on scaled comparison to subregional planning ultimate demand sizing (at a precinct level). Sizing of infrastructure for the drinking water network is based on the criteria in Sydney Water's planning guidelines:

Drinking water trunk infrastructure criteria

- surface reservoirs – 2/3 Maximum Day Demand (MDD)
- elevated reservoirs – 1/6 MDD
- pumping stations – MDD
- Surface to elevated reservoir pumping station – Maximum Hourly Demand (MHD)
- rising mains – MDD
- outlet mains – MHD

Recycled water trunk infrastructure criteria

- surface reservoirs – average day demand
- elevated reservoirs – 1/6 MDD
- recycled water pumping stations – MDD
- surface to elevated reservoir recycled water pumping station – MHD
- rising mains – MDD
- outlet mains – MHD

The following stormwater demand rates were assumed for each scenario.

| Assumption type | Scenario | Assumption | Comment/source |
|---|---|---|---|
| **Rainwater tanks** | Growing Parkland City | To new low and medium dwellings only | As per BASIX requirements. |
| **Harvesting** | Thriving Aerotropolis, Thriving Metropolitan Cluster | Precinct scale harvesting | To achieve the vision for the Western Parkland City, harvest stormwater at a precinct level. |
| **Stormwater target** | Thriving Aerotropolis, Thriving Metropolitan Cluster | 0.9 ML/Ha/Year | Maximum runoff allowed to achieve creek health outcomes. |
| **New growth** | All | Stormwater for recycled water demand | Total recycled water demand equals the sum of the demand for public open space irrigation and on-lot non-potable and irrigation demands. |
| **New growth** | All | Cumulative area | Area for each precinct equals the additional cumulative area in hectares from 2021. |
| **New growth** | All | Jobs conversion | Jobs were converted to the 'Centre' typology as this was identified as the most likely. |
| **New growth** | Growing Parkland City | Rainwater tank sizes | In the **Growing Parkland City** scenario rainwater tanks were assumed as 3kL for low and medium density only. |
| **New growth** | Thriving Aerotropolis, Thriving Metropolitan Cluster | Rainwater tank sizes | In the **Thriving Aerotropolis** and **Thriving Metropolitan Cluster** scenarios rainwater tanks were assumed as 6kL for low, 3kL for medium and 1.5L for high density as well as tanks for industrial typologies. |
| **New growth** | All | Stormwater harvesting | Stormwater harvesting applied to the greenfield percentage of the precinct only. |
| **New growth** | All | 2.5 ML/year public open space irrigation | Public open space irrigation demand calculated with a 2.5ML/year irrigation rate. |
| **New growth** | All | Stormwater for recycled water | Final recycled water demand assumed to be the public open space irrigation plus the 2017 'dry'. |

Costs for drinking water, wastewater and recycled water were calculated using Sydney Water's Cost Estimating Program using established benchmark costs. This tool provides unit rates based on cost curves of actual tender rates for Sydney Water projects. Standard allowances were adopted for scope contingencies and indirect cost within the Sydney Water corporate estimating system, applied for strategic level planning, for treatment and network assets.

The wastewater trunk network was sized using Sydney Water's Geospatial Water Planning Tool. This model provided strategic level wastewater trunk alignment.

In the southern precincts, the wastewater network was costed for a single stage, and constructed for ultimate demand (2056) by 2025, as all precincts need to be connected to a wastewater facility in Upper South Creek by 2026 under all land use forecasts.

Wastewater network trunk staging was not considered for the purpose of this analysis, as Sydney Water's Upper South Creek Options Assessment identified minimal staging opportunities. This involves significant infrastructure being built in a short delivery timeframe (2023-2025) required to service growth in all precincts. Sydney Water noted that the network costs and investment profile could be optimised by staging of precincts and alignment of investment with road investment.

Stormwater and waterway health investments were derived from recent integrated water cycle management strategies for the Western Sydney Aerotropolis Growth Area, South West Growth Area, Greater Penrith to Eastern Creek subregional plans and the Sydney Water's Western Sydney Regional Master Plan, and through a risk-based assessment of ways to protect and improve waterway health.

| Assumption type | Comment/source |
|---|---|
| **Residential rainwater tanks** | Cost based on industry supply rates for plumbing and reticulation. |
| **Stormwater bypass pipes** | Cost based on industry supply rates. |
| **End of pipe flood detention basins** | Cost bases on industry supply rates for earthworks, stabilisation and basin outlet structures. Includes 40% contingency due to variations in cost between different basin shapes and configurations necessary to suit local conditions. |
| **Street trees** | Costing based on land use type and industry supply rates for earthworks, structure cells, soil media, drainage works and materials. |
| **End of pipe gross pollutant traps (GPT)** | Itemised costing based on industry rates for GPTs, earthworks, filter media, planting, liners, outlet structures. Costs are based on industry rates. Includes 40% contingency. |
| **End of pipe open water bodies** | Itemised cost based on retaining walls, liners, vegetation, soil and wetland planting to manage algal blooms. Costs are based on industry rates. Includes 40% contingency which would cover the need for mechanical recirculation pumps if necessary.<br>OPEX costs have been based on published rates in MUSIC modelling manual by CRC for Freshwater. |
| **Local stormwater harvesting and irrigation** | Costs based on Rawlinsons (2010) heavy commercial water tanks + CPI and then rounded up. |

Costs for rainwater costs are noted below.

| Tanks size (kL) | Adopted cost ($) |
|---|---|
| **0.15 (per dwelling in a high-density typology)** | 350 |
| **3** | 7,000 |
| **5.25** | 8,000 |
| **6** | 9,000 |
| **8** | 10,000 |
| **12.** | 12,000 |
| **14** | 15,000 |
| **28** | 30,000 |

Onsite detention tanks have been assumed at a cost rate of $1,000/m$^3$. A rate of 350 m$^3$/ha was adopted which is typical for a 50 per cent and one per cent annual exceedance probability (AEP) detention volume with a relatively high early discharge outlet.

Street tree densities, rates and costs per hectare are shown below. The differences between business as usual (BAU) street trees and Parkland trees is the inclusion of passive irrigation with stormwater.

| Parkland | Low density | Medium density | High density | Strata | Large format | Business park | Centre |
|---|---|---|---|---|---|---|---|
| **Trees /Ha** | 30 | 20 | 20 | 11 | 9 | 9 | 9 |
| **Cost per tree ($)** | 4,574 | 4,574 | 13,724 | 4,574 | 4,574 | 4,574 | 13,724 |
| **Cost /Ha ($)** | 137,220 | 91,480 | 274,480 | 52,417 | 41,310 | 41,310 | 123,947 |
| **BAU** | **Low density** | **Medium density** | **High density** | **Strata** | **Large format** | **Business park** | **Centre** |
| **Trees /Ha** | 15 | 15 | 15 | 11 | 9 | 9 | 9 |
| **Cost per tree ($)** | 2,200 | 2,200 | 2,200 | 2,200 | 2,200 | 2,200 | 2,200 |
| **Cost /Ha ($)** | 33,000 | 33,000 | 33,000 | 25,210 | 19,870 | 19,870 | 19,870 |

- Costs associated with gross pollutant traps are based on continuous deflection separation proprietary units at a rate of $5,000 per hectare which is a cost based on a flexible arrangement for various catchment sizes between 10 and 30 hectares.
- End of pipe biofiltration costs are $550/m$^2$, which includes 40 per cent contingency. Costs are the equivalent to $53,204/ha of development treated.
- Open water body costs are $162/m$^2$ or $48,707/ha of residential catchment and $81,179/ha of industrial catchment.
- Detention basin costs are $90.5/m$^2$ of basin or $36,765/ha of catchment.
- Local harvesting costs are $315,000/ha of public open space including $15,000/ha of irrigation infrastructure.
- Precinct-wide stormwater harvesting costs are $210,000/ML of storage.

The annual operating and maintenance costs for network assets were estimated as a percentage of the capital cost of infrastructure (including contingencies and overheads) applied from the completion of the staged construction of assets over time. This was based on existing operating data. Operating costs for each infrastructure type are noted below.

| Infrastructure type | Operating | Maintenance | Total OPEX |
|---|---|---|---|
| **Reservoir (surface and elevated** | 0.60% | 0.50% | 1.10% |
| **Wastewater pumping station (< 50 kw)** | 2.00% | 1.80% | 3.80% |
| **Wastewater pumping station (≥ 50 kw)** | 0.70% | 1.80% | 2.50% |
| **Water pumping station (< 50 kw)** | 5.00% | 1.50% | 6.50% |
| **Water pumping station (≥ 50 kw)** | 1.00% | 1.50% | 2.50% |
| **Pipelines** | 0.20% | 0.40% | 0.60% |
| **Tunnels** | 0.15% | 0.10% | 0.25% |

OPEX cost estimates for wastewater treatment facilities were determined from Sydney Water's operational cost data at Rouse Hill, St Marys, Penrith and Brooklyn. Forecast operational costs for decentralised treatment systems were referenced from forecast costs for these types of facilities in Greater Parramatta to the Olympic Peninsula (GPOP). The costs of potential small-scale decentralised systems have not been included as part of the PIC.

In terms of land requirements, the largest project requiring land acquisition is the Advanced Water Recycling Centre which would require 40 to 50 hectares to include a wastewater treatment facility, wastewater pumping station, advanced treatment facility and recycled water pumping stations.

- Two to three hectares is typical for wastewater pumping stations with a land cost estimation of $2.5 million per hectare.
- Typically, three hectares are required for 60 megalitre reservoirs and these are scalable depending on the reservoir size.
- Easements would be required for all drinking water mains and wastewater pressure mains (at most nine metres for the largest mains), and wastewater gravity mains over 600mm in diameter. The width of gravity wastewater main easements is determined in each individual circumstance.

The size of stormwater basins for flood detention was determined at 350m³/ha. Gross pollutant traps and biofiltration basins would sit within stormwater detention basins. Detention basins would have a footprint outside the one per cent AEP flood extent and therefore their land take displaces development. The number of detention basins could be optimised and consolidated through modelling.

Rainwater tanks have a small footprint but were not included in the assessment. Street trees with a stormwater function referenced the Western Sydney Street Design Guidelines and have a footprint within the street verge but do not have a separate costed land take.

While Sydney Water noted that stormwater treatment and water sensitive urban design functions would need to be located outside of riparian corridors, co-location opportunities are proposed.

### Apportioning costs

For apportioning costs to the initial PIC area and precincts:

- All drinking water trunk infrastructure including reservoirs, pumping stations and rising main costs were apportioned based on relative growth/demand across the precincts.
- Water filtration plant treatment capital expenditure was apportioned to precincts on a population basis.
- Wastewater treatment and effluent management costs were apportioned to each contributing precinct based on the number of ultimate equivalent persons served. Total project cost per precinct for wastewater trunk infrastructure were apportioned costs based on the portion of equivalent persons serviced.

Stormwater investments were derived from recent integrated water cycle management strategies for rezoning new precincts in Western Sydney and through risk-based assessment of ways to protect and improve waterway health in South Creek. Costs were apportioned across the precincts and time (1-5 years, 6-10 years, 11-20 years and 21-40 years).

Growth outside the initial PIC area boundaries was assumed constant. The Department of Planning, Industry and Environment's forecasts provided in May 2019 were used to determine growth outside the initial PIC area.

Forecast population and employment growth data was interpreted as equivalent persons (EP) to determine water servicing requirements. 0.2 EP/job was adopted for each employment type.

The cost of projects for each precinct was apportioned based on each precinct's growth over time derived from the Commission's land use forecasts.

In apportioning costs to new growth, Sydney Water's subregional planning considers precincts not included within the initial PIC area, so the costs for known projects were adjusted to apportion costs to the precincts only. Where infrastructure crosses multiple precincts, costs were apportioned based on a pro rata distribution of affected precincts. This approach was also applied for infrastructure required to service areas within and outside the initial PIC area.

All projects and costs identified in the stormwater analysis were attributed to new growth and based on the land use forecasts. As much of the land is unserviced and rural by nature, new stormwater infrastructure will benefit the new population who will live in the southern precincts. Features like rainwater tanks and on-lot measures will service new homes and businesses rather than retrofitted to existing buildings.

### Determining funding

The primary funding source varies depending on the water service or product. Water and wastewater infrastructure that meets a test of prudent and efficient (least cost) investment is paid for by Sydney Water's broader customer base.

For recycled water, IPART's recycled water pricing framework distinguishes funding options between 'least cost' and 'higher-cost' schemes. A recycled water scheme which is the least cost way of providing water and wastewater services that can be paid for by the broader customer base. The residual cost of higher cost schemes must be recovered from external funding sources (government, third party, customers or developers). However, they can also be funded by customers if there are external benefits or a willingness to pay for the scheme from the broader customer base can be demonstrated.

New and upgraded water recycling plants have been classified as 'Customer' funded because the environmental protection licences for treatment plants in Western Sydney require a high level quality of effluent so that production of recycled water is assumed. Potential new recycled water networks including pumping stations and mains have been classified as 'General NSW Government' on the assumption that there is a funding gap and the funding mechanism would need to be determined in each case.

There are several funding sources for stormwater infrastructure. The cost of rainwater tanks and on-lot measures is typically borne by customers or home builders. Diversion pipes and pipes in the road verge would usually be funded by developers. Stormwater basins, harvesting and irrigation would be funded by local councils or NSW Government.

## Open space, bushland, waterways and tree planting

### Introduction

Open space, bushland and waterways are essential to health and wellbeing, air and water quality, cooling the urban environment, promoting walking and cycling and enhancing local habitat and ecological resilience. Sport and recreation facilities are essential to supporting health and socially connected cities.

### System and service outcomes

The proposals identified through the needs assessment will create an interconnected blue and green network, with Wianamatta-South Creek as the central spine of the Western Parkland City. There will be a focus on protecting and enhancing the biodiversity, improving the health of the waterways and creating network of accessible, multifunctional green spaces.

Land already in public ownership will be utilised to benefit people living and working in the Western Parkland City.

### Context

Wianamatta-South Creek and Hawkesbury Nepean are the key environmental catchments.

The assessment of open space and tree canopy align with the objectives of the *Greater Sydney Region Plan* and the principles in *Greener Places* to create green infrastructure that is accessible, integrated, connected and multifunctional. The assessment also aligns with the Premier's Priority Greening our City, which aims to increase tree canopy and green cover across Greater Sydney, and the *Cumberland Plain Conservation Plan*.

### Assessing requirements

Under the Growing Parkland City scenario, a benchmark of 2.83 ha of open space per 1,000 people for local open space was used. New tree canopy would be provided for in identified stormwater projects. Sport and recreation facilities were identified where a council verified that these would be provided under business as usual approaches. Channel stabilisation and floodway planting projects were identified to reduce erosion of waterways.

Under the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios, biodiversity and water management projects were identified to bring the waterways and parkland areas to a level to enable healthy functioning of the ecosystem.

Further prioritisation of open space, biodiversity and waterway management needs will occur in the implementation and delivery of the Western Parkland City. The program will also consider innovative delivery approaches and co-location opportunities that may reduce the overall need for land acquisition.

Targets for access to open space were based on:

- 200m access to local open space in high density areas
- 400m access to local open space
- 80 per cent of residents to be within 2km of district open space
- for most houses to have 5km access to regional open space
- workers to be within 800m of local open space.

The Department of Planning, Industry and Environment identified several targets for tree canopy:

- 15 per cent canopy cover in strategic CBD areas
- 25 per cent canopy cover in medium and high density areas
- 40 per cent canopy cover in suburban areas.

Targets were also identified for planting in open space, including:

- 60 per cent canopy cover in local open space
- 45 per cent in district open space (sport facilities)
- 65 per cent in regional open space
- 40 per cent planting in the 1:100 flood affected areas (in areas not identified for biodiversity and waterway management).

NSW Office of Sport identified sport and recreation infrastructure needs based on a sustainable number of participants per facility type using population benchmarks for other types of sporting facilities from across Greater Sydney.

Biodiversity and waterway revegetation costs were benchmarked, based on costs provided by Sydney Water, Local Land Services and councils.

Costs for open space were based on benchmarks provided from the Department, the Western Sydney Parklands Trust, Sydney Water and councils:

- local open space - $400 p/m$^2$
- regional open space - $200 p/m$^2$.

NSW Office of Sport provided indicative costs for each facility type based on projects completed in the last 18 months.

Tree canopy costs were based on costs provided by councils and the Western Sydney Parklands Trust. Costs were based on planting and one year of maintenance which is required to keep the tree alive and functioning.

- cost of a medium tree (road network planting) including one-year maintenance - $200 + $170 first year maintenance
- cost of a large tree (used for open space and other planting) - $300 + $170 first year maintenance
- cost of 5 litre tree (used for planting on arterial road) - $50
- costs of tube stock (used for planting in the 1:100 floodplain) - $15
- costs of planting along principal bicycle network - $200.

Annual operating costs as a percentage of total capital expenditure is estimated at 0.32 per cent for local open space. Estimated annual expenditure to maintain biodiversity and waterway management areas is 6 per cent of the total capital cost.

For land requirements, the Central Wianamatta Park (77 ha) and Gateway Park (174 ha) were identified essential to the Western Parkland City vision. The Central Wianamatta Park will provide regional open space, waterways and bushland areas for new residents and workers in the Aerotropolis Core.

Gateway Park at the confluence of South, Badgerys and Kemps creeks will provide regional open space and preserve key areas of biodiversity value for residents and workers in the north of the Western Sydney Aerotropolis Growth Area and Orchard Hills Precinct.

Local open space land requirements ranged from 0.3 to one hectare.

### Apportioning costs

Biodiversity and waterway management costs were apportioned to the precincts in which they occurred on the basis that the works were required to protect and enhance the values of Wianamatta-South Creek and to improve the functioning of the environmental assets, noting that these would be affected by current land uses.

- Local open spaces have a catchment of 400 metres and were apportioned to the precinct in which they were located.
- Cost apportionment of regional open space was based on a five-kilometre accessibility radius.
- Tree canopy costs were apportioned to the precinct in which they are located.
- Costs of sport and recreation facilities were apportioned by the NSW Office of Sport based on the sustainable use of the facility and its percentage of population participation within a catchment for each sporting facility type.

In apportioning costs to new growth, green infrastructure projects for open space, tree canopy and sport and active recreation facilities were apportioned to new growth when the existing facilities were already at capacity and unable to support the new population's requirements.

In developing precincts, biodiversity and waterway management project costs were apportioned to new growth with regard to the population change occurring in the precinct. While biodiversity projects weren't driven by land use change, projects in established areas were required to protect and enhance assets that had already been affected by growth.

Biodiversity and waterway management projects in growing areas were identified to protect and enhance values and prevent impacts that may occur as a result of land use change with the delivery of land use change and infrastructure development.

The PIC process identifies areas for conservation and planting that are additional to those identified in the *Cumberland Plain Conservation Plan*. These potential cost and land requirement are at a strategic level and will require further refinement as the Western Parkland City evolves.

### Determining funding

Primary funding sources are General NSW Government, developer contributions, regional and local, and private.

## Energy

### Introduction – electricity

The availability of reliable and safe electricity will be critical for connecting, lighting, heating and cooling homes and businesses in the Western Parkland City. As well as being an essential service for communities, it will power new public transport projects and, in time, private vehicle use too.

Both TransGrid and Endeavour Energy provided insights into demands and service needs. TransGrid is the operator and manager of the main high voltage electricity transmission network in NSW and the ACT. TransGrid's network carries bulk electricity from generators through 13,000 kilometres of high voltage transmission lines, underground cables and substations. The transmission network transports electricity from wind, solar, hydro, gas and coal power plants to large directly connected industrial customers and the distribution networks that deliver it to homes and businesses. TransGrid's *Transmission Annual Planning Report* (TAPR) involves joint planning with each of the distribution network service providers in NSW including Endeavour Energy.

Endeavour Energy then provides electricity through smaller poles and wires to homes and businesses across NSW. Endeavour Energy's Distribution *Annual Planning Report* (DAPR) outlines the details of the various investment programs and projects required to fulfil its obligation as a licensed distribution network service provider.

A new 132kV network is essential to the growing Western Parkland City. In addition, joint planning between TransGrid and Endeavour Energy will continue to identify preferred bulk supply points from where their networks can intersect and distribute electricity to new customers.

### System and service outcomes – electricity

Over the next decade, the power system is expected to transition steadily away traditional sources of electricity - coalfired generation - to low cost renewable generation including solar and wind.

A range of new technologies will transform the energy system: batteries, grid forming inverters, smart electric vehicle charging, vehicle to grid technology, intelligent grid, demand management, virtual power plants and low-emission hydrogen production.

Traditionally, utilities such as water, waste, gas and electricity are planned, designed and operated independently. Endeavour Energy is exploring opportunities to use an output of one process to feed into another to improve productivity of the overall system. For example, by-products of processing wastewater could be used as an input into agriculture or used to generate electricity. These initiatives are likely to be feasible in greenfield development areas.

Endeavour Energy believes energy consumption can be reduced through the evolution of electricity distribution into a two-way system, where customers can send power to the grid via their own mini generation systems, largely made up of roof top solar and increasingly battery systems.

Approximately 15 per cent of Endeavour Energy customers have rooftop solar systems and new systems are being installed. Solar and storage systems can work together as virtual power plants, reducing the need for investment in poles and wires infrastructure, and ultimately reducing power bills.

### Introduction – gas

The existing gas infrastructure network in the Western Parkland City can be extended over the next 20-40 years and beyond to cater for the initial PIC area.

Jemena Gas Networks (JGN) transports gas through the network on behalf of network users (such as retailers) to customers' premises. JGN is part of a broader energy supply chain that spans from gas production to retailing.

JGN plans to deliver gas through the Western Parkland City and will be installing three sections of secondary steel pipe to supply the Aerotropolis, Sydney Science Park, agricultural areas and the Western Sydney Airport itself in the short term.

JGN's *Draft 2020 Plan* sets out objectives to:

- deliver energy affordably and reliably
- strengthen the network to supply new estates and high-rise development
- play an active role in decarbonisation of the energy industry.

### System and service outcomes – gas

JGN will leverage transformative technologies to ensure its gas network remains viable in a low carbon future, as highlighted in the 2019 *Sustainability Report*. Initiatives include the Western Sydney Green Gas Project and empowering customers to use renewable energy through the installation of solar panels and microgrids on apartment buildings.

JGN is planning for its gas network to carry net zero carbon gas. From 2021, customers will have the option to choose renewable gas, reducing net carbon emissions of customers who opt in by 51.4 kg/GJ.

JGN is evaluating renewable gas projects in the Western Parkland City. This could be achieved through the injection and distribution of renewable gases such as hydrogen and biomethane from municipal waste and wastewater facilities.

The Western Sydney Green Gas Project aims to demonstrate how carbon-neutral hydrogen gas can be integrated into the existing gas distribution grid and provide customers with reliable and renewable gas. The project will convert solar and wind power into hydrogen gas, via electrolysis, which will then be stored for use across the gas network.

### Context

In the Western Sydney Aerotropolis Growth Area, Endeavour Energy takes 132kV supply from TransGrid's Sydney West 330kV substation bulk supply point to power its Western Sydney distribution network. Greater Penrith to Eastern Creek is serviced by 10 electricity zone substations that are supplied by three sub-transmission systems at Regentville, Penrith and Mount Druitt.

The Regentville Bulk Supply Point is owned by TransGrid and supplies the Penrith Transmission System and directly supplies the Penrith 11kV zone substation and Glenmore Park zone substation. The Penrith Transmission System services areas around Penrith CBD through zone substations at Emu Plains, Cranebrook, Cambridge Park, Jordan Springs and Kingswood.

TransGrid's Sydney West Bulk Supply Point supplies Endeavour Energy's Mount Druitt Transmission System which supplies zone substations at Claremont Meadows, St Marys and Werrington.

JGN infrastructure includes two primary regulating stations on the eastern boundary of the southern precincts, a limited secondary mains network, as well as secondary regulating sets and a medium pressure mains network in established precincts in the south east of Greater Penrith to Eastern Creek.

There are two primary regulating stations supplying gas to the Western Sydney Aerotropolis Growth Area at Horsley Park and West Hoxton. These step down the pressure from the existing high-pressure pipeline that runs north-south along the south-eastern boundary of the Growth Area. JGN does not foresee a requirement for a new primary regulating station in this area.

The three trunk regulating facilities supplying gas to Greater Penrith and Eastern Creek are:

- Plumpton Trunk Regulating Station – supplying trunk to secondary mains network
- Eastern Creek Trunk Regulating Station – supplying from trunk to primary mains network
- Penrith Primary Regulating Station facility – supplying from primary to secondary mains network.

There are approximately 20 secondary regulating sets in this northern area. Most of this system is supported through a primary gas main traversing east-west, generally following the Great Western Highway. Secondary and medium mains branch out from this primary main. There is good network coverage in existing residential communities, with more sparse coverage in industrial and commercial areas such as South Penrith. There is no existing gas infrastructure Orchard Hills south of the M4.

TransGrid operates under the NSW Electricity Transmission Reliability and Performance Standard 2017. The Standard specifies a level of redundancy, and minutes of expected unserved energy for each bulk supply point. TransGrid is also required to undertake network development to meet expected levels of demand. Levels of service must meet the reliability and performance standard and the technical standards outlined in the National Electricity Rules.

Any network development proposed by TransGrid is subject to approval by the Australian Energy Regulator (AER). TransGrid and Endeavour Energy are subject to five-yearly revenue determinations by the AER, which includes an assessment of prudent levels of capital and operating expenditure.

There are licence conditions Endeavour Energy must meet regarding reliability performance. The average System Average Interruption Duration Index (SAIDI) performance of their urban and rural feeders needs to be below 80 and 300 minutes respectively.

Endeavour Energy's supply security considers redundancy in the network and is expressed in terms of 'N' and N-1 scenarios. An 'N' level of security means there is no redundancy in the network and if a major element fails then supply is lost until the asset is repaired or replaced. For some network elements, such as zone substation power transformers, a catastrophic failure could mean a lengthy outage for several weeks. An 'N-1' level of security means the network can cope with the loss of a single major element, such as a power transformer, for example to achieve N-1 security, two transformers are required. The 'N-1 capacity is referred to as firm capacity and was used as the supply security standard in the assessment of projects for the Western Sydney Aerotropolis Growth Area assessment.

For all scenarios, the level of service required in terms of gas was considered the same. JGN operates under the *Gas Supply Act 1997* and is regulated by the AER in accordance with Natural Gas Rules and National Gas Law.

JGN's pipes have varying maximum allowable operating pressures (MAOP). This includes associated systems and services, such as cathodic protection equipment and valves.

- trunk pipelines (MAOP of 6,895 kPa)
- primary mains (MAOP of 3,500 kPa)
- secondary mains (MAOP of 1,050 kPa)
- medium and low-pressure mains (MAOP of 400kPa, 300kPa, 210kPa, 100kPa, 30kPa, 7kPa, 2kPa).
- service demand rates per population, dwelling and/or job.

### Assessment requirements

Endeavour Energy's demand assumptions included:

- 11kV feeders could accommodate approximately 1,000 dwellings.
- Zone substations could accommodate approximately 30,000 medium or high density dwellings.
- Demand would be 2.4kVA per medium or high density dwelling.
- Demand could be 3kVA/employee (industrial), 2kVA/employee (health and education) and 1kVA (knowledge and population serving).

Demand forecasts used Endeavour Energy's actual and forecast loads for the 2016 and 2020 periods, replacing the calculated 2016 and 2021 demands from the PIC process's employment and housing data. This provided a more accurate starting point.

Endeavour Energy converted the population, housing and jobs forecasts provided by the Commission into a unit of power demand and provided these calculations to TransGrid so that both utility providers were responding to the same data and assumptions.

TransGrid carried out a linear interpolation of the data to determine the demand for each year out to 2056. The purpose of this was to identify by which year any network amplification or new infrastructure item would be required. TransGrid also used Distribution Network Service Provider forecasts from the *2019 Transmission Annual Planning Report*.

JGN used the following demand rates and assumptions:

- The growth between the five-year interval data sets provided by the Commission is linear.
- One secondary regulator set can supply approximately 5,000 homes.
- Gas consumption in residential is 15 gigajoule/year and 295 gigajoule/year in commercial. There is 95 per cent penetration of gas services and customers receive a reliable gas supply.

The proposed electricity solutions were based on traditional network augmentation projects and costs mainly derived from typical historical project costs and Endeavour Energy's internal databases. Endeavour Energy's 11kV feeder augmentations for each zone substation was assumed to be $200,000/MVA.

TransGrid's project development team used a cost estimating tool that considers capital costs, discount rates and labour rates to calculate costs. Project costs were allocated to precincts according to geographic service areas based on existing distribution feeder locations and/or estimates for greenfield areas. Electricity and gas operating costs ranged from 2-2.5 per cent of each project based on general historical ratios of total operating cost versus total value of assets.

JGN used a historical unit rate approach where a cost per metre was multiplied to the new length of main to be laid.

For land requirements, the TransGrid's projects are already known: a 4.5-hectare site is required within the Western Sydney Aerotropolis Growth Area and another is required outside it.

Endeavour Energy requires new 132kV zone substations and distribution feeders. The zone substations require a land area of approximately a hectare each. In greenfield areas, electricity feeders can be laid underground if installed concurrently with road construction, allowing for smaller easement requirements. The width of easements for 132kV underground mains is six metres, while for overhead mains it is 25 metres.

Land requirements for gas infrastructure are minimal. Secondary regulating sets require 16m².

JGN has some requirements about the location and installation of their secondary regulating sets and mains. These include:

- Secondary mains are laid along the road reserve with a separation distance of at least 500mm.
- Secondary mains must be separated from trees and high voltage cables.
- Secondary regulating sets are installed in road reserves with separation distances of at least 500mm and where the speed limit is under 60km/hour.

### Apportioning costs

Endeavour Energy uses DIgSILENT's system modelling tool PowerFactory' for shorter term (up to 10 years) and their own calculations for projects beyond that period.

Project costs were allocated to precincts according to geographic service areas based on existing distribution feeder locations and/or estimates for greenfield areas. As the projects proposed were driven by demand exceeding the network asset capacities, demand growth was viewed from a zone or transmission substation perspective instead of at a precinct level. To determine the demand and growth forecast of a zone substation, the percentages of zone substation loads supplying each precinct were estimated.

This allowed for apportionment of precinct demand growth onto each zone substation based on the ratio of zone substation load supplied to the total precinct demand. The actual peak demand for each zone substation in summer 2019 was used as the starting point for demand projections with the calculated zone substation growth in demand added on to determine the zone substation forecast.

TransGrid apportioned the costs of their projects using the demand data converted by Endeavour Energy to distribute the costs of know projects amongst the precincts based on growth.

For existing bulk supply points, the demand growth attributed to new growth was combined with the latest 10-year demand forecasts. This provided an indication of when existing supply capacity at a bulk supply point is reached and the additional capacity is required.

The existing electricity network supplies only a rural load for most of the Western Sydney Aerotropolis Growth Area, besides the established precincts in the Austral to Glenfield Corridor. As there is only a minimal amount of existing infrastructure, extensive new assets are required, and Endeavour Energy's approach is to use existing assets until they reach their capacities. All projects identified by Endeavour Energy were deemed 100 per cent required for new growth.

All the projects identified by JGN were determined as being 100 per cent required for new growth. The methodology used by JGN for their assessment included analysis of current infrastructure, analysis of future projections, modelling and validation of current infrastructure and forecast of future projections augmented through modelling.

JGN used hydraulic simulation software called Synergi Gas to model, validate and simulate their natural gas transmission and local distribution systems. Inputs into the model included the forecasts provided by the Commission combined with real-time telemetry and performance data over the winter peak.

Projects were apportioned based on growth rates in the benefitting precincts. Where the Synergi model determined a new secondary regulating set or secondary main was required, JGN apportioned the cost of the project to the benefitting precincts by the growth proportion.

### Determining funding

Investment for growth by TransGrid and Endeavour Energy is ultimately paid for by customers. Similarly, the primary funding source identified by JGN is the customer. JGN's policy is to extend gas mains depending upon economic viability. Under the National Gas Rules, JGN is required to ensure that any extension of the natural gas distribution system is commercially viable so that existing customers are not cross subsidising new customers.

## Digital

### Introduction

The Smart Western City Program is a commitment of the Western Sydney City Deal to embed new digital technologies in infrastructure. The Program is a key component of the overall transformation vision for the Western Parkland City.

Driven in part by the transformative greenfield development plans and the generation of new jobs with a focus on knowledge-intensive jobs, there is a unique opportunity to utilise technology for improved service delivery, quality of life, environmental sustainability and economic prosperity.

The technology package adopted for the PIC model anticipates a networks of sensors and smart devices to collect real-time data; a communication layer to facilitate interaction between devices and solutions; and data analytics tools to process data and measure performance to make informed decisions, manage infrastructure proactively, maximise resource efficiency, and provide information to the community.

Smart technology can be integrated to help address urban issues and create an enabling environment for residents, businesses and government.

### System and service outcomes

The Smart Western City Program features eight focus areas that became the 'projects' for the PIC model:

- Internet Connectivity - accessibility to digital networks using new and existing infrastructure in a smart way
- Smart Monitoring - real-time monitoring of the city environment to effectively manage natural resources, moderate the impact of climate change, respond to critical events, and operate integrated systems
- Data Sharing - provide sharing of critical data across government agencies and partners in a safe and secure way to deliver better city services, whilst protecting privacy
- Smart Public Spaces - provide safe and enjoyable public spaces for our citizens via embedded smart technologies
- Smart Transport - provide smarter transport services to ensure efficient, safe and accessible movement for people and goods in our cities, centres and neighbourhoods
- Local Jobs/Work from Home - provide services that enable people access to work closer to home and provide incentive for business to grow in Western Sydney
- Smart Planning and Management - deliver better infrastructure and planning consultation, design and development
- Community Engagement - Use digital technologies to improve the way councils engage with their community and keep the community informed of council activities and decisions.

### Context

Smart Monitoring is being implemented within the Western Sydney Parklands Sensor Network Project under the *Smart Cities and Suburbs Program 2018*.

The Smart Western City Program Strategic Business Case assessed increasing levels of technology packages against the geographic extent (for example greenfield areas only, town centres only, and a combination of both) to which digital infrastructure would be incorporated into the planning of the Western Parkland City. The technology packages range from:

- 'Foundations' - provides the technologies with critical functionality, such as technologies under Internet Connectivity, Data Sharing, Smart Monitoring (all except water sensors), Smart Planning and Management (digital twin).
- 'Seamless City' - Full roll out of all identified smart technologies across eight focus areas.

The foundations case was assumed for the Growing Parkland City scenario. This maintains existing government commitments and core smart city initiatives, and strengthens regulation on personal data protection, data sharing, interoperability, and cyber security.

Under the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios, the aim is for a broader suite of digital technology initiatives such as Smart Transport, Smart Monitoring (water sensors) and Smart Planning and Management (smart energy initiatives). These initiatives were combined into the highest technology stack due to their complexity and cost.

### Assessing requirements

Capital expenditure costs determined for each project were expressed as a unit cost. The number of units required for each project was based on the geographic scale, population, dwellings and jobs. Each project consists of several components with varying costs and a varying number of

units required. The number of units is across the Western Parkland City and for interpretation should be scaled down to reflect a percentage of the initial PIC area.

Costs were determined using rates developed as part of the Smart Western City Program Business Case.

It was assumed there will be no additional land requirements for new digital infrastructure. Cables would be installed under pavements, existing road corridors and through private property spaces. There may be towers installed but they would not be additional to land required for other infrastructure and would be integrated with other utilities.

The deployment of devices would be attached to the side of buildings and street furniture. The installation of 'smart poles' is assumed to replace existing poles and would not require additional land.

### Apportioning costs

The Smart Western City Program Strategic Business Case assessed increasing levels of technology packages against the geographic extent (for example greenfield areas only, town centres only, and a combination of both) to which digital infrastructure would be incorporated into the planning of the Western Parkland City.

The costs included in the busines case refer to the population impacted from 2019 to 2036 – the growth in population, rather than the existing population. As with the Commission's land use forecasts, the projects costs are for the future population and was measured as the population of 2036 minus the population of 2019. All the costs are therefore attributed to new growth.

Costs for the Smart Western City Program represented the financial outlay required to deliver smart technologies and associated capabilities and services that would enhance the Western Parkland City. Cost planning was aligned with the *TPP17-03 NSW Government Guide to Cost-Benefit Analysis* and *ICT Business Case Guide* by the Department of Finance.

As part of cost planning, the cost analysis to develop a realistic cost model consisted of a top down and bottom up approach using a cost model built to provide the costs associated with implementation. The model reflected the known input costs of procurement, design, development, delivery, and project/program/change management of the investment at current rates for work.

The capital and operating cost estimates within the cost model were developed by Deloitte and validated by the Department of Planning, Industry and Environment. Assumptions regarding the impacted land area, population, dwellings and jobs were applied to the cost model.

The operating and maintenance (O&M) and cost for each project was set at 20 per cent of each project's capital cost. This is an industry standard for information and communication technologies. The 20 per cent reflects an average of 18 per cent typically applied for labour costs associated with O&M, and 22 per cent typically applied to hardware and software O&M costs. Operating costs are incurred annually from the first full year of operations.

The Commission worked with the Department of Planning, Industry and Environment to use the initial PIC area land use forecasts such that they aligned as closely as possible with the forecasts included in the Strategic Business Case. The percentage of population growth in initial PIC area was multiplied by the population growth of the Western Parkland City. Population growth in the Western Sydney Aerotropolis Growth Area and Austral to Glenfield Corridor was 21 per cent and Greater Penrith to Eastern Creek 42 per cent of the population growth in the Western Parkland City between 2016-2036.

Once the overall project costs were determined, the initial PIC area costs and total projects costs over the different time intervals were apportioned (0-5 years, 6-10 years, 11-20 years). Since all the projects identified begin in 2021-22, it was assumed that the costs for years 1-5 were nil. For years 6-10 and 11-20, the proportion of population growth for each scenario was used to apportion costs to the initial PIC area.

Once the initial PIC area cost was determined, the apportionment per precinct was based on the population growth percentage of each precinct over the various time intervals.

### Determining funding

For seven of the eight projects, the primary funding source was identified as 'General NSW Government'. The primary funding source for Smart Planning and Management was identified as 'Private'. Here, the key cost drivers around smart energy solutions including building energy efficiency solutions, advanced metering infrastructure, and electricity demand optimisation are assumed to be the responsibility of private utilities and developers.

## Waste

### Introduction

The circular economy is about changing the way people produce, assemble, sell and use products to minimise waste, and to reduce environmental impacts. A NSW Government 20-year waste strategy will explore a sustainable, reliable and affordable resource recovery and waste system in NSW. It will consider the broader waste needs of NSW and the waste network that operates across the State.

The waste infrastructure needs assessment for the PIC process was a preliminary assessment. Facilities in the initial PIC area could service Greater Sydney or other areas of NSW, and facilities across the State are likely to service the initial PIC area.

### System and service outcomes

The waste infrastructure identified through the PIC process supports strategic planning for waste and resource recovery by identifying shortfalls in the existing waste network and considering what waste infrastructure is needed to support growth in the initial PIC area and to support the transition to a circular economy.

Safeguarding industrial and urban services land is required to protect existing and develop new facilities. The early identification of infrastructure needs through the PIC process can help to prevent land use conflicts and provide opportunities for co-location of urban services land for utilities, state agencies and the private sector.

### Context

The assessment considered the needs of the initial PIC area and the network of waste facilities operating in Greater Sydney.

No services were considered under the Growing Parkland City scenario as the NSW Government does not have a role currently. The Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios assume a greater strategic role for NSW Government in waste and resource recovery infrastructure and greater support for the transition to a circular economy. This includes incentivising sustainable and circular businesses.

### Assessment requirements

Waste generation rates of 2.4 tonnes per capita per year (based on 2017-18 figures for the Metropolitan Levy Area) were applied to the population growth to determine the requirements for waste infrastructure. 2.4 tonnes per person annually.

Costs were benchmarked according to known costs of other similar facilities. Benchmarked costs used were:

- Materials recovery facility estimated between $10 – $100 million depending on size.
- Mixed waste processing facility estimated between $60 – $150 million depending on size.
- Organics processing facility - estimated between $10 – 30 million.
- Transfer station estimated between $10 – $20 million.

The annual average operating cost of the circular economy hub was estimated at approximately 10 per cent of the total capital cost.

Assumed land requirements for new facilities were based on 35 hectares for a circular economy hub.

### Apportioning costs

Costs were apportioned to the initial PIC areas based on the amount of the total capacity of the facilities that would be required. Costs were apportioned to precincts as a percentage of the initial PIC area population in each precinct.

Costs were apportioned to existing and future growth based on the population share of new growth.

### Determining funding

Funding is expected from the private sector.

## Education

### Introduction

The NSW Department of Education is responsible for providing quality public education to two-thirds of the NSW student population. NSW public schools enable all children and young people to have access to quality education.

As the NSW population grows, it is forecast that there will be a 21 per cent growth in student numbers by 2031. NSW schools will need to accommodate an extra 269,000 students, with about 164,000 of these students in the public system. About 80 per cent of this growth will occur in Greater Sydney, particularly in growth areas. This means more schools exceeding their capacity or facing overcrowding unless new ways of asset planning and operation are implemented.

TAFE NSW is the centre of the State's vocational education and training (VET) sector. TAFE NSW's operating environment is characterised by changing skills requirements, increasing competition from other education and training providers, advances in digital learning technologies and a stronger focus on higher level skills.

### System and service outcomes

The education facilities identified in the needs assessment will ensure sufficient teaching spaces to respond to population growth and increased demand in the area. Projects such as the Penrith Lakes Environmental Education Centre will also provide an opportunity for students in the Western Parkland City to learn about industrial and urban development and link them with programs that raise environmental awareness.

This will contribute to a quality of education provision in a Western Parkland City that supports optimal learning and student performance.

TAFE NSW's expansion of the Kingswood Campus and the introduction of the Western Sydney Construction Hub will provide skills-based training that leads to jobs, upskilling and reskilling. This will match education opportunities to emerging demand.

### Context

Assessment of school requirements are based on Greater Sydney and the initial PIC area.

The TAFE NSW assessment assumes the Kingswood campus catchment in Greater Penrith to Eastern Creek will service the Penrith LGA precincts and the Nirimba campus the Blacktown LGA precincts. The Mount Druitt Centre and Rooty Hill Precinct is split across the two campuses.

Land and property for required infrastructure were based on the School Assets Strategic Plan (2016) and Planning New Schools: School Safety and Urban Planning Advisory Guidelines. TAFE NSW's assessments are informed by its 20- year infrastructure strategy (in production).

### Assessing requirements

Existing urban areas were modelled using Schools Infrastructure NSW's Student by Area Population Projections model, which projects increases to current school intakes and can model changes to catchment boundaries, to better manage the distribution of intake areas, and the need for new catchments.

For greenfield areas, the following assumptions were made:

- Service age groups were defined (assuming an equal distribution of children in each year in each five-year cohort). Primary students are aged 5-11 and secondary students are aged 12-17.
- 70 per cent of primary school aged students will attend a government primary school (State-wide average).
- 60 per cent of high school aged students will attend a government secondary school (State-wide average).
- An average class size of 23 students in primary schools, 20 students for secondary schools and nine for schools for specific purposes.

In Greater Sydney, the ratio of childcare places to 0-4 year olds is 0.45:1. This ratio was applied to the projected growth of 0-4 year olds in the initial PIC area to establish the additional child care places required in the area to 2036.

TAFE NSW used the population forecasts provided by the Commission to underpin the demand forecast for infrastructure. The young age of TAFE NSW students increases the likelihood that they are still living at home and, depending on their TAFE course, they may not be in paid employment. In this way, jobs and dwelling growth are considered a less direct indicator of enrolment growth.

However, the strong job growth areas of the Aerotropolis and Parramatta are outside but well connected by planned and existing transport to the Greater Penrith to Eastern Creek area. In this area, 47 per cent of TAFE NSW students are aged between 15 and 24 and 88 per cent are aged between 15 and 49. TAFE NSW used the population growth age ranges at five-year increments from 15 to 49 to estimate growth in enrolments for Greater Penrith to Eastern Creek to 2036.

These ranges were weighted against the same age brackets for existing enrolments (as of 2018) in Greater Penrith to Eastern Creek and then applied as an average growth rate to TAFE NSW's existing infrastructure.

### Assessing requirements

The total project costs for schools are high level cost estimates, based on recent similar projects tendered costs as part of the current capital works program.

Operational expenditure for schools for was estimated at approximately 10 – 30 per cent as a percentage of total capital expenditure for primary, high and special schools.

The target school site size in greenfield and regional areas is a minimum site size of two hectares for primary and a minimum site size of four hectares for secondary. Based on functionality and recent new school designs, schools for specific purposes require a site size of at least one hectare.

The costs of new space for TAFE NSW is based on the average cost per square metre of 18 TAFE NSW new build projects completed or planned for completion between 2017 and 2021. The projects are from across NSW and range in total project cost from $2.5 million to $17 million.

The costs of refurbished space is based on the average cost per square metre of six TAFE NSW refurbishment projects completed or planned for completion between 2018 and 2020. The projects are from across NSW and range in total project cost from $3.3 million to $8.1 million.

Sites for TAFE NSW projects are already in public ownership.

### Apportioning costs

Due to the localised nature of education facilities, generally 100 per cent of the total project costs for schools were allocated to the initial PIC area. To apportion costs to individual precincts, the number of students that would attend a government school in each precinct in 2036 was determined, which was then converted to the number of additional teaching spaces needed to meet that demand.

To determine the proportion of costs allocated to new growth, the number of students residing in the precinct and attending existing schools not in the initial PIC area was determined. This proportion of students was allocated to existing growth with the residual proportion allocated to new growth.

The total project cost are high level cost estimates, based on recent similar projects tendered costs as part of the current capital works program.

Assumptions for expansion projects include:

- All existing buildings will be retained.
- The cost of providing new classrooms includes a component to expand core facilities to meet the demand from the extra students.
- There are no requirements for new furniture fittings and equipment to existing areas
- Existing lifts do not require upgrade/replacement.

Assumptions for new school projects include that the site is fully serviced with appropriate roads, footpaths, traffic intersections, water, electricity, sewage, gas and telecommunications.

Other general cost assumptions include:

- Construction work to be delivered on a design and construct basis.
- Projects would de designed and constructed to their maximum capacity in a single phase.
- Appointments and projects would be released to the market gradually so as not to swamp the market.
- No significant works required outside the boundary of the school site (e.g. road or intersection works).

Exclusions include:

- Land availability considerations
- The costs associated with the purchasing of the land
- GST
- The cost of refurbishing retained buildings to current educational standards
- Any planned maintenance provisions that may have been made for a facility, such as provision to replace a roof as it is past its useful life
- Escalation, all costs are based on current day estimations
- Local authority contributions
- Cost of remediation of contamination and / or enhanced / acoustic facades required by site characteristics
- The cost of providing a preschool on government school sites for private operates to run a pre-school service.

For TAFE NSW, an average growth rate was determined using the methodology applied above. This rate has been assigned to new growth. The following applies:

- The cost assumptions are general and do not distinguish between facility types
- All costs are in real terms (2019) dollars
- All costs are GST exclusive
- All costs assume existing utilities and services connections to TAFE NSW campuses an absorb the additional growth
- All costs assume the onsite utilities and services at TAFE NSW campuses can absorb the additional growth
- No costs for land acquisition are included
- The refurbishment costs do not allow for any structural improvements, asbestos, contamination, heritage or related constraints or significant changes of use
- No economies of scale or better utilisation from developing larger and/or more efficient campuses have been factored in
- The costs of renewing and refurbishing existing ageing infrastructure is not included other than existing mothballed facilities at the Kingswood Campus as identified.

### Determining funding

The primary funding source for education infrastructure projects has been identified as a combination of General NSW Government and development contribution funding.

The primary funding source for TAFE NSW is General NSW Government.

## Health

### Introduction

Healthcare in NSW is provided by a network of services ranging from large principal referral hospitals providing highly complex emergency and planned services, through to community health centres and care in people's homes.

The healthcare system includes ambulance services, population health and preventative services, mental health, primary care (including general practice), allied health services, pharmacy, dental and residential aged care.

Services are delivered by different levels of government, as well as the private and not-for-profit sectors. The *Greater Sydney Region Plan* identifies that 'integrated planning for health services will make it easier for people to access a comprehensive health system' and that 'strategic planning will continue to respond to the changing nature of health service delivery providing accessibility for patients, visitors and staff'.

### System and service outcomes

The health infrastructure identified will help to improve the physical and mental health of those in the Western Parkland City. New or upgraded infrastructure will also improve both the service levels in hospitals and improving outpatient and community care.

Additional ambulance stations will service growth and meet demand, ensuring high quality mobile health services and clinical care.

The increased provision of health infrastructure will increase preventative care for the community, improved health services and assist with overall levels of physical and mental health and wellbeing.

### Context

The initial PIC area is serviced by local health districts including the Nepean Blue Mountains Local Health District, South Western Sydney Local Health District and the Western Sydney Local Health District. Additionally, the Children's Hospital at Westmead provides services for residents in metropolitan Sydney and has a state-wide role in the delivery of specialist paediatric services that are networked with District and region facilities across the State

The *NSW State Health Plan: Towards 2021* provides a strategic framework that brings together NSW Health's existing plans, programs and policies and sets priorities across the system for the delivery of 'the right care, in the right place, at the right time'.

The *Sydney Ambulance Metropolitan Infrastructure Strategy* and *2019 Asset Strategy Plan* prepared by NSW Ambulance, also informed infrastructure requirements for the initial PIC area.

### Assessing requirements

NSW Health used its HealthApp to generate 12 models, assessing acute, sub-acute and emergency department services under each scenario. The following inputs were used to calculate the number of projected beds and emergency treatment spaces within hospitals:

- admitted length of stay = 2018 peer average was applied
- non-admitted length of stay = 2018 peer average was applied
- % patients admitted = HealthApp projected baseline proportion admitted was applied
- % patients not admitted = HealthApp projected baseline proportion admitted was applied
- % patients arriving between 6am to midnight = 90 per cent,

Previous modelling undertaken by NSW Ambulance identified that additional infrastructure that would be required to service the growth in the initial PIC area under each scenario.

Total project costs include the cost of the projects in their entirety including the costs associated with servicing residents outside the initial PIC area who also access these facilities. For hospital upgrades, the total project cost of projects are based on funds already committed. Annual operational expenditure, as a percentage of total capital expenditure, is estimated at 10 per cent for ambulance stations and 1 per cent for community health facilities.

Hospital redevelopment will occur on existing sites and no additional land will be required. Land size assumptions for ambulance stations range from 1,600m2 for a four-bay station to 4,000m2 for a 12 bay station.

15,000sqm of required land has been estimated for community health facilities under each scenario.

### Apportioning costs

As health facilities in the initial PIC area will also service people outside the initial PIC area, 'Inside costs' refers to the cost of servicing people living in the initial PIC area only.

Project costs were attributed to each precinct based on resident health need for the population of each precinct, as a percentage of the total resident health need within the initial PIC area. Each precinct's costs were then allocated to various facilities based on existing patient flows.

For apporting costs to new growth, existing demand costs were determined as costs related to servicing the existing population in each precinct, while new growth costs were the additional costs related to servicing the growth in population in each precinct under each scenario.

### Determining funding

The primary funding source for health infrastructure projects has been identified as General NSW Government funding.

## Cultural infrastructure

### Introduction

Culture is the essential ingredient in great places. It brings people together, gives shape and expression to the unique identities of communities and creates lively and dynamic places where people want to live, work, visit and do business. Cultural infrastructure – theatres, galleries, museums, libraries, archives, community halls, cinemas, public art and outdoor events spaces – provide the important spaces where arts and culture can be created, shared and enjoyed.

Create NSW developed its *Cultural Infrastructure Plan 2025+* to:

- ensure everyone can access the spaces and opportunities they need to make arts and culture part of their everyday lives
- support the creation of affordable, fit-for-purpose and sustainable space to support the growth of the cultural sector and creative industries
- allow for creativity and access to culture to thrive across NSW through a strategic and coordinated approach to cultural infrastructure planning.

### System and service outcomes

The infrastructure proposed in the needs assessment will help to rebalance the provision of cultural infrastructure across Greater Sydney. There will be a focus on both large-scale and smaller-scale community cultural infrastructure in Greater Penrith to Eastern Creek.

Large-scale cultural infrastructure such as the enhancement of a major cultural facility will benefit local communities as well the Western Parkland City's industry attraction and visitor economy.

Cultural infrastructure such as smaller-scale Aboriginal cultural facilities will provide greater accessibility to residents of the Western Parkland City, allowing them to better incorporate culture in their lives.

The proposed infrastructure will also contribute to an increased availability of spaces to support the cultural sector and creative industries.

### Context

The cultural infrastructure identified will service a range of areas across as well as beyond the Western Parkland City. Proposed cultural infrastructure servicing the entire Western Parkland City:

- Aboriginal cultural infrastructure facility (large scale)
- Western Sydney Screen Industry Production Hub
- Western Sydney Central Library (with event, cultural and maker spaces)
- Artist and creative industries precincts (studio spaces and office accommodation).

Proposed cultural infrastructure servicing the initial PIC area:

- Aboriginal cultural infrastructure facilities (community-based infrastructure)
- Major cultural facility (enhancement to existing facility) - Greater Penrith to Eastern Creek only.

The holistic collection storage project will service all of NSW by providing essential storage for some of the State's significant cultural collections. The original strategic business case for this project identified a potential site elsewhere in Greater Sydney. This proposal would require the demolition of an existing building to make way for construction of the new purpose-built storage facility. The capital costs from the business case associated with this facility have been applied to Western Sydney Aerotropolis Growth Area for a small facility. Therefore, the capital costs for the small facility in Western Sydney Aerotropolis Growth Area includes an allowance for demolition of an existing building that may not be required.

The *Cultural Infrastructure Plan 2025+* guided the requirements for cultural infrastructure provision in the initial PIC area.

### Assessing requirements

- **Aboriginal cultural infrastructure facilities:** Community-level infrastructure was calculated using benchmarks around the provision of community space which is 80 sqm of gross floor area (GFA) per 1,000 people. Comparator projects have been used to plan for the arger-scale facility in the Aerotropolis core.
- **Holistic collection storage facilities:** The development of a strategic business case in 2019 informed the requirements for this project.
- **Western Sydney Central Library** (with event, cultural and maker spaces): State Library of NSW benchmarks informed requirements. This includes one central library per 100,000+ people, with a GFA of 28 sqm per 1,000 people plus 20 per cent circulation space.
- **Artist and creative industries precincts** (studio spaces and office accommodation): Minimum provision level is based on estimates by Create NSW for other creative industries precincts and comparison to artist studio spaces in other LGAs.
- **Western Sydney Screen Industry Production Hub:** A potential provision level has been determined in consultation with Screen NSW. The site would be required to accommodate:
  - screen production offices (approx. 12,000m$^2$)
  - film stages complex (at least 45,000m$^2$)
  - sound mixing studio (1,000m$^2$)
  - water tank (at least 10,000m$^2$)
  - onsite parking for approx. 500 cars and trucks (included in sqm above)
  - backlot areas (this could also be located nearby if not on the actual site).
  - major cultural facility (enhancement to existing facility).

Infrastructure requirements are based on preliminary assessments and benchmarking against other capital infrastructure projects of a similar scale.

The following benchmark cost rates were used:

- **Aboriginal cultural infrastructure facilities:** Larger facility has been costed at a very high strategic level based on comparisons to other Create NSW projects.
- **Community-level infrastructure:** costed based on physical quantities calculated at $6,500 per sqm required (nominal value given to community infrastructure for the purposes of this project).
- **Holistic collection storage facilities:** The strategic business case included capital costs, transitional and implementation costs as well as foregone rent and opportunity costs.
- **Western Sydney Central Library** (with event, cultural and maker spaces): The benchmarked cost is based on physical quantities calculated at $6,500 per sqm (nominal value given to library infrastructure for the purposes of this project)
- **Artist and creative industries precincts** (studio spaces and office accommodation): The benchmarked cost is based on physical quantities calculated at $2,500 per sqm which is the nominal value given to adaptive re-use of existing buildings into creative industries precincts which based on previous work undertaken by Create NSW.
- **Western Sydney Screen Industry Production Hub:** The benchmarked cost is based on physical quantities calculated at $6,500 per sqm which is the nominal value given to screen infrastructure in consultation with Screen NSW and benchmarked across other Screen Production developments internationally.
- **Major cultural facility** (enhancement to existing facility): Costing for the project has been undertaken at a very high strategic level intended to determine a minimum expectation of cost. Costs are based on very preliminary assessments and benchmarking against other capital infrastructure projects of a similar scale.

Assumed land requirements for new facilities:

- **Aboriginal cultural infrastructure facilities:** Land requirements have been determined using benchmarks around the provision of community space, as identified above, and comparable projects.

- **Holistic collection storage facilities:** To meet the need outlined in the business case, Create NSW proposes that multiple sites will be located in the Western Parkland City, including two facilities in the Western Sydney Aerotropolis Growth Area and two facilities in Greater Penrith to Eastern Creek. No land acquisition is required in Greater Penrith to Eastern Creek as the potential site is owned by NSW Government.
- **Western Sydney Central Library:** State Library benchmarks have been used to determine requirements for this project, as identified above.
- **Artist and creative industries precincts:** Land requirements are based on estimates undertaken by Create NSW for other creative industries precincts and comparison to artist studio spaces in other LGAs.
- **Western Sydney Screen Industry Production Hub:** Land requirements for this project has been identified through consultations with Screen NSW and consideration given to the required inclusions in the production hub (see above).
- **Major cultural facility** (enhancement to existing facility): No land acquisition is required as this is an enhancement to an existing facility.

### Apportioning costs

Method to apportion costs to PIC area and precincts:

- **Aboriginal cultural infrastructure facilities:** For the larger facility, apportionment was calculated by adding the estimated population and employment figures for the initial PIC area as a percentage of estimated population for the entire Western Parkland City in 2036. For community-level infrastructure, apportionment was calculated by determining the Aboriginal population in the initial PIC area as a percentage of entire Western Parkland City Aboriginal population.
- **Holistic collection storage facilities:** Apportionment has been calculated by using the estimated populations for the PICs as percentages of the estimated NSW population in 2036.
- **Major cultural facility** (enhancement to existing facility): Apportionment has been calculated by utilising the estimated 2036 population figures for Greater Penrith to Eastern Creek as a percentage of the estimated 2036 population for the entire Western Parkland City.

The apportionment for projects such as the Western Sydney Central Library, the artist and creative industries precincts and the Western Sydney Screen Industry Production Hub were calculated by adding the estimated 2036 population and employment figures for the initial PIC area as a percentage of the estimated population for the entire Western Parkland City in 2036.

The cost of the cultural infrastructure projects have been apportioned equally across all precincts.

In terms of new growth, the majority of cultural infrastructure projects are calculated at 100 per cent as the infrastructure is being developed due to new population growth in the Western Parkland City.

- **Holistic collection storage facilities:** Calculated at 0 per cent as the infrastructure is being developed as the result of an already identified need, not new population growth in the Western Parkland City.
- **Western Sydney Central Library:** Calculated at 100 per cent as the infrastructure is being developed due to new population growth in the Western Parkland City.
- **Artist and creative industries precincts:** Calculated at 100 per cent as the infrastructure is being developed due to new population growth in the Western Parkland City.
- **Western Sydney Screen Industry Production Hub:** Calculated at 100 per cent as the infrastructure is being developed due to new population growth in the Western Parkland City.
- **Major cultural facility** (enhancement to existing facility): Calculated at 100 per cent as the infrastructure is being enhanced due to new population growth in the Western Parkland City.

### Determining funding

The primary funding source for cultural infrastructure projects would be a combination of General NSW Government and development contribution funding.

Cultural facilities of a significant scale such as the Western Sydney Screen Industry Production Hub may also require contribution from the Australian Government or through partnership with the private sector.

With proposed facilities that would normally be owned and operated by councils, Create NSW anticipates that a relevant council would make a contribution to the capital costs.

# Justice

## Introduction

The Stronger Communities Cluster is improving outcomes for the people of NSW, enabled by better, more strategic infrastructure.

From an infrastructure and assets perspective, the cluster's infrastructure can be arranged into seven distinct infrastructure groups:

- family, community, and disability services
- police
- courts, tribunals, legal and justice services
- corrective services
- child protection, permanency and youth justice services
- emergency services
- sport.

## System and service outcomes

The provision of enhanced justice infrastructure in the Western Parkland City will ensure sufficient space to accommodate expanded correctional centres and youth justice facilities.

The expansion of existing court facilities will contribute to a more efficient resolution of legal disputes, a shorter time between arrest and proceeding to trial, and a reduction in the backlog of court cases.

Expanded infrastructure will contribute to a safer community for people visiting, living and working in the Western Parkland City through maintained and reduced crime rates.

## Context

Courts and tribunal facilities operate on a hub and spoke service delivery model, where services radiate from regional centres across NSW, as well as metropolitan NSW. As such, hub and spoke facilities that service the initial PIC area yet may be located outside are considered.

Corrective services and youth justice facilities do not determine facility requirements based on geography and population. All correctional facilities are considered to service the whole of NSW, as allocation of detainees is based on numerous factors including sentence, remand, gender, health, rehabilitation and security level requirements.

The expansion of the youth justice centre does not reflect an increased need for youth justice services. The requirement for youth justice is decreasing and the project reflects the consolidation and decommissioning of existing facilities.

Despite recent investment in correctional infrastructure, projections show that demand will exceed network-wide capacity in 2025 and metropolitan capacity in 2023. A new correctional facility will be needed in Greater Sydney to address this shortfall. In addition, reliance on operationally obsolete infrastructure is still prevalent across the network and a major component of metropolitan capacity.

The *Greater Sydney Metropolitan Corrections Strategy* seeks to outline the actions and timeline to plan for the acquisition of appropriate sites, construction of facilities for existing and emerging offender cohorts and the potential rationalisation of existing infrastructure assets. A considered and strategic approach to correctional infrastructure will support NSW Government objectives for reducing reoffending and provide the community greater flexibility on the utilisation of correctional centres and the potential redevelopment of obsolete infrastructure.

### Assessing requirements

The approach used to determine future court infrastructure projects that will service the initial PIC area combined demand forecasting using population projections and demographic data provided by the Commission, with multi-criteria analysis of the current relevant asset base.

Once a demand forecast was determined, the number of courtrooms that would be required over time to service this demand was calculated. For each court, a five-year average for criminal-trial registrations, finalisations and pending trial caseloads (i.e. backlog of cases) were calculated and used as base year figures. Additionally, a 'finalisation capacity' number was determined by dividing the average number of case finalisations at a courthouse divided by the number of courtrooms.

Once an estimate of the number of courts required over time for each LGA was determined, a multi-criteria analysis was completed on each asset that falls in or services the initial PIC area. The analysis was split as follows:

- consideration of the contribution the asset has to the Western Parkland City vision
- asset service dependency
- consideration of the suitability of the location of the asset
- asset performance.

Assets were then recommended for divestment and reinvestment. The second stage of this process determined whether the existing asset should be future proofed and expanded.

The Outer Sydney Metropolitan Capacity Program Strategic Business Case found that the NSW correctional network is at capacity and has become increasingly reliant on inefficient and unsustainable operational practices to cater to ever-growing demand for custodial beds in the network. This situation is acutely experienced in Greater Sydney, where facilities provide the most specialised services.

An assumed cost of constructing each additional courtroom is estimated at $10 million. Where project costs have already been calculated for specific projects, those figures have been used. Annual operational expenditure is estimated at 20 per cent of total capital expenditure.

The split of the total project cost over 20 years where no detailed planning has taken place is split based on roughly when the demand forecasting suggests each additional courtroom will be required. This is not necessarily indicative of when each courtroom would be constructed.

If new sites were to be considered for courthouses, land requirements are expected to be approximately 10,000m² (and a minimum of 5,000m²).

Additionally, courthouses should be close to public transport and, preferably, co-located with other services such as Police and legal services. There are also restrictions for development based on certain types of adjacent properties (such as high rises), and land zoning.

### Apportioning costs

For courthouse infrastructure, precinct area cost percentages were based on the number of people residing in each relevant precinct as a percentage of the total population in the courthouse's catchment area.

The majority of projects are calculated at 100 per cent apportioned to new growth as the infrastructure is being developed due to population growth in the Western Parkland City.

### Determining funding

The primary funding source for justice infrastructure projects would be a combination of General NSW Government and development contribution funding.

## Fire and rescue

### Context

The number and general location of fire stations required to provide appropriate coverage to the initial PIC area was estimated under each scenario. Levels of service was determined as:

- service demand rates per population, dwelling and/or job
- a notional 'total' population of 25,000 as a trigger for when a Fire and Rescue NSW fire station, staffed by full-time firefighters 24/7, would be necessary and well justified.

### Assessing requirements

The cost for a new station was estimated to be approximately $6.15 million, which includes construction of the station and the provision of one fire truck. Costs are based on recent tenders for similar facilities. Annual operational expenditure is estimated at approximately one per cent of total capital expenditure.

Land required is 2,500m² which allows for a two-bay, 24-hour staffed station with ancillary facilities. A smaller site may be appropriate depending on location, orientation and whether it forms part of a co-located facility.

### Apportioning costs

In terms of apportioning costs to the initial PIC area and precincts, the area that a new fire station would likely cover and what would be covered by existing stations in the network was assessed. Potential service populations at the 20-year mark in each precinct were then considered and used that as the apportionment. The remainder would be serviced by stations within existing resources.

The method to apportion costs to existing and future beneficiaries (new growth) was calculated at 100 per cent.

### Determining funding

The primary funding source would be as a combination of General NSW Government funding and development contribution funding.

## Police

### Context

The initial PIC area is serviced by police area commands (PAC) including City PAC (South West Metro Region), Nepean PAC (North West Metro Region) and the Campbelltown City PAC (South West Metropolitan Region).

The methodology for determining levels of service is based on planning around infrastructure changes and the future needs of police. The focus for the proposed multipurpose police hub at Badgerys Creek is on access to critical infrastructure, transport networks and distance from other policing resources to enhance policing services. Multipurpose hubs will support mixed resources and allow for adaptation to future policing needs, including further expansion of building space.

The upgrade to Macquarie Fields Police Station will adapt to changes in the functionality of the station, improve police services and improve the condition of an existing asset that will remain within the property portfolio. Areas serviced include Glenfield Precinct as well as other growth areas extending south of the Western Sydney Aerotropolis Growth Area boundary.

### Assessing requirements

The construction costs for the multipurpose police hub were based on a cost of $8,000/m² and considers a range of pricing factors such as design, building construction, services, driveways and pavements.

Refurbishment construction and fit-out costs for the Macquarie Fields station upgrade were based on a cost of $5,500/m² for the entire station and considers a range of pricing factors such as design, building construction, services, amenity upgrades, locker replacement.

Annual operational expenditure, as a percentage of total capital expenditure, is estimated at approximately 1.3 per cent for the station upgrade and 2.5 per cent for the police hub.

The Multipurpose Police Hub requires 20,000m², which includes approximately 10,000m² of buildings. No additional land is required for the Macquarie Fields station upgrade.

### Apportioning costs

To determine the cost allocated to the initial PIC area for the multipurpose police hub, the costs are broken down to estimate the direct serviceability to the initial PIC area as follows:

- Police Station and AFP offices – 100 per cent
- Shared conference room/meeting room facilities – 100 per cent
- Mixed policing resources (traffic and highway, forensics, holding yard, etc) – 65 per cent
- State emergency management centre (noting airport proximity) – 50 per cent
- State Archives (not included in the cost estimate)

Apportionment was based on where providers they will spend their time providing services. Some of the services are 100 per cent inside the initial PIC area, others are only partially. This was not based on population levels but rather where they may base their time and provide services.

Apportionment to precincts was influenced by land uses and precinct purposes. The focus on Western Sydney International Airport means the bulk of costs were allocated to precincts surrounding the Airport.

Costs for the Macquarie Fields station upgrade are based on the concentration of policing resources allocated from Macquarie Fields that are dedicated to the initial PIC area.

From this, 65 per cent of the initial PIC area cost for the multipurpose police hub was attributed to new growth as the majority of hub is related to service the airport as critical infrastructure.

For the Macquarie Fields station upgrade, 100 per cent of the PIC inside cost was attributed to new growth and attributed to the Glenfield Precinct.

### Determining funding

Funding would be a combination of General NSW Government funding and development contribution funding.

## 5.4 Identifying land requirements

Partner agencies provided land requirements by location either by coordinates, grid, precinct or multiple precincts. Agencies were provided the area of land required in either square metres or hectares, as well as the assumed construction commencement date for the projects.

### Refinement of land requirements

The Commission then refined the raw land requirements through the steps as follows.

#### Step 1 – Set co-location principles

The Commission created a set of co-location principles to act as a guide for locating projects inside the initial PIC area. The principles covered overarching opportunities and constraints that drive project location decisions for each agency.

Additionally, to help identify opportunities for collaboration, compatible and non-compatible infrastructure from other agencies were also identified.

#### Step 2 – Gather spatial data and mapping proposed infrastructure

The Commission collected and mapped geospatial data for infrastructure proposals in two spatial formats:

- GIS data in the form of shapefiles and geodatabases where known
- grid cell locations, based on a map breaking down the initial PIC area into 500 m x 500m grid cells, each with a unique grid cell identifier.

Project locations were mapped to understand the spatial distribution of projects within each precinct.

#### Step 3 – Assess open space, bushland and waterways

Following the initial infrastructure assessment, some areas of overlap between open space, bushland and waterway infrastructure requirements were identified. Sydney Water and the Department of Planning, Industry and Environment assessed the infrastructure land requirements for natural infrastructure projects to categorise, refine and prioritise land areas, to avoid any overlap in the estimated land requirements.

#### Step 4 – Optimise land requirements for transport infrastructure

Land requirements for transport projects were optimised by using the latest available project information and their land take. Transport for NSW also sought to co-locate bus infrastructure and parts of the Principal Bicycle Network within road project corridors and maximise the use of land within existing road reserves.

#### Step 5 – Refine land take for open space and green infrastructure

Biodiversity projects were classified into three management zones - protect, improve and remnant vegetation. Protect and improve zones were considered as having higher biodiversity or ecological value or to be important to connectivity. Areas of remnant vegetation were not prioritised and were excluded from the land acquisition analysis.

Waterway management projects were classified into four categories: protect, improve, floodway and channel stabilisation. Improve areas were refined through the assessment and prioritised as the riparian corridors recommended by the Office of Water.

#### Step 6 – Exclude land under government or utility ownership or zoned for environmental and recreational uses

To avoid costing land areas that do not need to be acquired, analysis identified proposals already in publicly owned land. Land parcels under existing government or utility ownership along with land zoned for environment or recreation land uses under existing planning instruments, (E1 – E4, RE1, RE2, Regional Open Space) were excluded, as this land would not need to be acquired.

### Step 7 – Establish spatial locations for stormwater infrastructure

Based on advice from Sydney Water, a methodology was created to refine the location of stormwater detention basins. It was assumed that one-third of the total land area of stormwater infrastructure would lie in flood prone land, resulting in a lower acquisition cost. The remainder of the basins in each precinct was assumed to lie within the lowest rate land use zone adjacent to the flood prone land. Land zoned for environmental uses was excluded from this analysis.

### Step 8 – Apply a flood prone land rate in green infrastructure

After identifying spatial overlaps between green infrastructure and the 1:100-year flood catchment, a lower 'flood prone land' rate was applied to the percentage of land that lies within the flood catchment for each project.

## Applying costing rates to land requirements

Following the refinement of land requirements, a rate was applied using specialist advice from property consultants. A summary of maximum and minimal land values in dollars per square metre of land for acquisition was based on the existing underlying land use rates and considered:

- Valuer General's valuations by LGA
- sales transaction data
- unimproved and improved capital values
- any constraints that would affect land values such flood affectation.

In addition to rates for each land use zone, precinct-specific zones were provided based on weighted average values for the precinct. This allowed the Commission to cost land for infrastructure proposals that were nominated in a specific precinct only, or across multiple precincts.

## 5.5 Results – Growing Parkland City scenario

Summary of the infrastructure and service costs for the Growing Parkland City scenario:

- The total infrastructure cost is $55.7 billion over 20 years.
- Of this, $28.8 billion is apportioned to the initial PIC area.
- $24.6 billion is apportioned to new growth within the initial PIC area.
- 1,950 hectares of land is required for infrastructure over 20 years (including 746 hectares of land identified in multiple precincts or outside the initial PIC area).

The following tables show the magnitude of costs for each precinct as well as precinct costs apportioned to new growth by sector and land requirements.

**Table 5-1:** Growing Parkland City – 20-year sector costs for Greater Penrith precincts

| Sector | Penrith Lakes | | Penrith West | | South Penrith and Glenmore Park | | Penrith Centre | |
|---|---|---|---|---|---|---|---|---|
| **People** | +0 | | + 2,293 | | +8,630 | | +8,093 | |
| **Jobs** | +44 | | +840 | | +916 | | +2,153 | |
| **Homes** | +0 | | +843 | | +2,960 | | +4,203 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 0 | 0 | 122 | 52 | 369 | 169 | 341 | 153 |
| Water | 1 | 0 | 14 | 10 | 266 | 215 | 45 | 35 |
| Open space, bushland, waterways and tree planting | 4 | 4 | 13 | 9 | 43 | 41 | 8 | 0 |
| Education, health and culture | 11 | 4 | 21 | 10 | 125 | 46 | 78 | 69 |
| Justice, Fire & Rescue, and Police | 1 | 1 | 2 | 2 | 12 | 11 | 5 | 4 |
| Energy, digital and waste | 1 | 1 | 9 | 9 | 16 | 16 | 29 | 29 |
| **Total ($M)** | **18** | **10** | **181** | **92** | **831** | **498** | **506** | **290** |
| **Total land requirement (ha)** | **0** | | **1** | | **9** | | **2** | |

**Table 5-2:** Growing Parkland City 20-year sector costs for northern Greater Penrith to Eastern Creek precincts

| Sector | Cranebrook | | Jordan Springs | | Ropes Crossing | |
|---|---|---|---|---|---|---|
| **People** | +1,693 | | +9,023 | | +138 | |
| **Jobs** | +171 | | +325 | | +31 | |
| **Homes** | +617 | | +3,168 | | +30 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 55 | 24 | 76 | 38 | 4 | 1 |
| Water | 75 | 52 | 19 | 19 | 10 | 9 |
| Open space, bushland, waterways and tree planting | 104 | 103 | 94 | 94 | 25 | 25 |
| Education, health and culture | 52 | 40 | 71 | 40 | 26 | 6 |
| Justice, Fire & Rescue, and Police | 8 | 7 | 4 | 4 | 3 | 2 |
| Energy, digital and waste | 7 | 7 | 4 | 4 | 0 | 0 |
| **Total ($M)** | **302** | **233** | **268** | **199** | **68** | **45** |
| **Total land requirement (ha)** | **12** | | **18** | | **4** | |

**Table 5-3:** Growing Parkland City 20-year sector costs for central Greater Penrith to Eastern Creek precincts

| Sector | Kingswood and Werrington | | Orchard Hills | | St Marys | |
|---|---|---|---|---|---|---|
| **People** | +12,552 | | +12,324 | | +16,794 | |
| **Jobs** | +2,707 | | +915 | | +3,230 | |
| **Homes** | +4,387 | | +3,567 | | +7,006 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 686 | 330 | 1,382 | 717 | 1,059 | 526 |
| Water | 147 | 147 | 157 | 152 | 65 | 64 |
| Open space, bushland, waterways and tree planting | 315 | 312 | 268 | 268 | 418 | 417 |
| Education, health and culture | 57 | 46 | 166 | 149 | 60 | 46 |
| Justice, Fire & Rescue, and Police | 10 | 9 | 6 | 6 | 12 | 11 |
| Energy, digital and waste | 40 | 40 | 12 | 12 | 24 | 24 |
| **Total ($M)** | **1,255** | **884** | **1,991** | **1,303** | **1,638** | **1,089** |
| **Total land requirement (ha)** | **41** | | **98** | | **44** | |

**Table 5-4:** Growing Parkland City 20-year sector costs for eastern Greater Penrith to Eastern Creek precincts

| Sector | St Clair | | Luxford | | Mount Druitt Centre and Rooty Hill | |
|---|---|---|---|---|---|---|
| **People** | +1,104 | | +2,569 | | +10,284 | |
| **Jobs** | +163 | | +415 | | +2,200 | |
| **Homes** | +347 | | +643 | | +3,136 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 113 | 47 | 540 | 273 | 167 | 78 |
| Water | 33 | 33 | 95 | 69 | 92 | 66 |
| Open space, bushland, waterways and tree planting | 143 | 141 | 226 | 224 | 405 | 403 |
| Education, health and culture | 39 | 15 | 70 | 19 | 126 | 83 |
| Justice, Fire & Rescue, and Police | 8 | 7 | 19 | 17 | 18 | 17 |
| Energy, digital and waste | 6 | 6 | 4 | 4 | 24 | 24 |
| **Total ($M)** | **341** | **248** | **954** | **606** | **834** | **671** |
| **Total land requirement (ha)** | **15** | | **24** | | **43** | |

**Table 5-5:** Growing Parkland City 20-year sector costs for Aerotropolis initial precincts

| Sector | Agribusiness | | Northern Gateway | | Aerotropolis Core | |
|---|---|---|---|---|---|---|
| **People** | +147 | | + 7,167 | | +315 | |
| **Jobs** | +519 | | +5,768 | | +394 | |
| **Homes** | +63 | | +2,612 | | +126 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 99 | 87 | 994 | 947 | 774 | 698 |
| Water | 402 | 388 | 475 | 428 | 170 | 156 |
| Open space, bushland, waterways and tree planting | 138 | 134 | 159 | 149 | 78 | 52 |
| Education, health and culture | 18 | 11 | 115 | 81 | 28 | 19 |
| Justice, Fire & Rescue, and Police | 85 | 83 | 86 | 83 | 83 | 82 |
| Energy, digital and waste | 18 | 18 | 65 | 64 | 21 | 21 |
| **Total ($M)** | **760** | **721** | **1,893** | **1,752** | **1,153** | **1,029** |
| **Total land requirement (ha)** | **1** | | **9** | | **12** | |

| Sector | Badgerys Creek | | Mamre Road | |
|---|---|---|---|---|
| **People** | -153 | | +2 | |
| **Jobs** | +94 | | +291 | |
| **Homes** | -56 | | +1 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 8 | 7 | 76 | 41 |
| Water | 22 | 21 | 35 | 35 |
| Open space, bushland, waterways and tree planting | 18 | 14 | 116 | 20 |
| Education, health and culture | 12 | 11 | 12 | 10 |
| Justice, Fire & Rescue, and Police | 95 | 89 | 81 | 80 |
| Energy, digital and waste | 17 | 17 | 4 | 4 |
| **Total ($M)** | **172** | **159** | **324** | **190** |
| **Total land requirement (ha)** | **41** | | **0** | |

**Table 5-6:** Growing Parkland City 20-year sector costs for Aerotropolis non-initial precincts

| Sector | North Luddenham | | Kemps Creek | | Rossmore | |
|---|---|---|---|---|---|---|
| **People** | +31 | | -364 | | +426 | |
| **Jobs** | +292 | | +316 | | +71 | |
| **Homes** | +16 | | -128 | | +134 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 209 | 202 | 6 | 5 | 52 | 33 |
| Water | 22 | 21 | 104 | 95 | 312 | 290 |
| Open space, bushland, waterways and tree planting | 27 | 23 | 72 | 54 | 27 | 27 |
| Education, health and culture | 12 | 10 | 31 | 27 | 23 | 14 |
| Justice, Fire & Rescue, and Police | 80 | 79 | 85 | 83 | 84 | 83 |
| Energy, digital and waste | 1 | 1 | 0 | 0 | 0 | 0 |
| **Total ($M)** | **351** | **336** | **298** | **263** | **499** | **446** |
| **Total land requirement (ha)** | **0** | | **18** | | **44** | |

**Table 5-7:** Growing Parkland City 20-year sector costs for Austral to Glenfield – rezoned precincts

| Sector | Austral | | Leppington North | | Edmondson Park | | Glenfield | |
|---|---|---|---|---|---|---|---|---|
| **People** | +12,660 | | + 16,324 | | +14,316 | | +5,279 | |
| **Jobs** | +2,290 | | +7,285 | | +2,870 | | +522 | |
| **Homes** | +4,436 | | +5,978 | | +4,296 | | +1,838 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 111 | 101 | 467 | 439 | 257 | 240 | 56 | 53 |
| Water | 1,294 | 1,290 | 1,464 | 1,459 | 1,663 | 1,628 | 1,243 | 1,232 |
| Open space, bushland, waterways and tree planting | 191 | 190 | 143 | 142 | 539 | 538 | 1,266 | 1,266 |
| Education, health and culture | 120 | 66 | 169 | 115 | 283 | 177 | 132 | 78 |
| Justice, Fire & Rescue, and Police | 90 | 90 | 88 | 88 | 78 | 78 | 83 | 83 |
| Energy, digital and waste | 43 | 42 | 45 | 44 | 16 | 15 | 10 | 9 |
| **Total ($M)** | **1,850** | **1,779** | **2,377** | **2,288** | **2,835** | **2,677** | **2,790** | **2,720** |
| **Total land requirement (ha)** | **4** | | **15** | | **24** | | **44** | |

### Sector proposals for each precinct

The following tables summarise the sector proposals identified, costed and apportioned to each precinct under the Growing Parkland City scenario. These also identify potential funding source and relevant place outcome indicators that the proposal would contribute to.

**Table 5-8:** Penrith Centre Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater overflow source control (Penrith Centre) | Customer | P19, P21 |
| Wastewater upgrade (pump) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Penrith City Park | Regional and local | P21, P5, P18 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Penrith courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Penrith Centre electricity distribution works | Customer | P17, P18 |

**Table 5-9:** Penrith West Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Penrith water recycling plant upgrade | Customer | P20, P19 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Upgrades to existing open space and sports facilities | Regional and local | P5, P21 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Penrith West electricity distribution works | Customer | P17, P18 |
| South Penrith zone substation | Customer | P17, P18 |
| South Penrith zone substation | Customer | P17, P18 |

**Table 5-10:** Penrith Lakes Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Penrith Lakes electricity distribution works | Customer | P17, P18 |

**Table 5-11:** South Penrith and Glenmore Park infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Glenmore Park water pumping station upgrade | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| South Penrith and Glenmore Park electricity distribution works | Customer | P17, P18 |

**Table 5-12:** Cranebrook Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 21 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Cranebrook electricity distribution works | Customer | P17, P18 |

**Table 5-13:** Jordan Springs Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 33 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school (opened July 2020) | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Jordan Springs electricity distribution works | Customer | P17, P18 |

**Table 5-14:** Ropes Crossing Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 6 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Ropes Crossing electricity distribution works | Customer | P17, P18 |

**Table 5-15:** Kingswood and Werrington Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Kingswood and Werrington trunk mains | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P21, P5, P18 |
| Waterway management – 106 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Holistic storage facility | General NSW Government | P9 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| TAFE NSW Kingswood Campus refurbishment and new buildings | General NSW Government | P14, P15 |
| Western Sydney construction hub | General NSW Government | P14, P15 |
| **Energy, digital and waste** | | |
| Kingswood and Werrington electricity distribution works | Customer | P17, P18 |

**Table 5-16:** St Marys Precinct infrastructure proposal List – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Erskine Park water supply zone trunk mains | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| St Marys water recycling plant upgrade | Customer | P20, P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 93 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| St Marys electricity distribution works | Customer | P17, P18 |
| Werrington new electricity feeders | Customer | P17, P18 |

**Table 5-17:** St Clair Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Tree planting in open space, along the road network and across precinct | Private | P21, P18, P16 |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P5, P21 |
| Waterway management – 35 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Colyton ambulance station | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| St Clair electricity distribution works | Customer | P17, P18 |
| St Marys secondary regulating set. Install 1 x secondary regulating set along existing secondary gas main | Customer | P17 |

**Table 5-18:** Luxford Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P19, P20, P21 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 63 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | Combination General NSW Government and development contributions | P9, P6 |
| Tregear ambulance station | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| Luxford electricity distribution works | Customer | P17, P18 |

**Table 5-19:** Mount Druitt Centre and Rooty Hill Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 61 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Doonside ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Mount Druitt courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Mount Druitt Centre and Rooty Hill electricity distribution works | Customer | P17, P18 |

**Table 5-20:** Orchard Hills Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Orchard Hills sewer mains | Customer | P20 |
| Orchard Hills trunk mains | Customer | P20 |
| Orchard Hills wastewater pumping station 2 and rising main | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 154 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| New schools for specific purposes | Combination General NSW Government and development contributions | P15, P14 |
| **Energy, digital and waste** | | |
| Develop a new electricity bulk supply point at South Creek | Customer | P17 |
| Orchard Hills electricity distribution works | Customer | P17, P18 |

**Table 5-21:** Greater Penrith to Eastern Creek multiple precincts infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| Penrith to St Marys rail quadruplication | General NSW Government | P12, P10, P16 |
| Additional trains and services on the T1 Western Line | General NSW Government | P12, P10, P16 |
| M4 Smart Motorway - Penrith to Mays Hill (in delivery) | General NSW Government | P12 |
| M7 Motorway upgrade | General NSW Government | P12 |
| The Northern Road upgrade – Mersey Road to Glenmore Parkway; Glenmore Parkway to Jamison Road (in delivery) | Combination Australian/NSW Government | P12 |
| Mulgoa Road, Penrith – Union Road to Museum Drive including railway bridge upgrade (in delivery) | Combination Australian/NSW Government | P12 |
| Mamre Road upgrade - M4 to Erskine Park Road | Combination General NSW Government and development contributions | P12 |
| Rapid Bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |
| New local bus services | General NSW Government | P12, P10, P16 |
| **Water and stormwater** | | |
| Glenmore Park main upgrade | Customer | P20 |
| On lot stormwater measures | Customer | P20 |
| Orchard Hills wastewater pumping station 1 and rising main | Customer | P20 |
| Quakers Hill to St Marys advanced water treatment plant - transfer pipeline and pump | Customer | P20, P18 |
| Rainwater tanks | Customer | P20 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Tree planting projects | Private | P21, P18, P16 |
| **Education, health and culture** | | |
| Community health facilities | General NSW Government | P5, P6 |
| Nepean-Blue Mountains local health district (additional beds and emergency treatment spaces) | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| Smart Western City Program - Data Sharing - data sharing platform, city dashboards, integration platform, interface with third party organisation, data monetisation, data standards definition | General NSW Government | P13 |

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Smart Western City Program - Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P12 |
| Smart Western City Program - Smart Monitoring - environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT platform, AI platform, predictive model | General NSW Government | P13 |
| Smart Western City Program - Smart Planning and Management - digital twin infrastructure | General NSW Government | P13 |

**Table 5-22:** Infrastructure proposals required for Greater Penrith to Eastern Creek but located outside – 20 years (Growing Parkland City)

| Infrastructure proposal | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Brine management upgrade at Quakers Hill (transfer pipelines, storage tank and pump) | Customer | P20 |
| Quakers Hill water recycling plant upgrade | Customer | P20, P19 |
| **Education, health and culture** | | |
| Blacktown and Mount Druitt hospital redevelopment | General NSW Government | P5, P6 |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Major cultural facility enhancement | Combination General NSW Government and development contributions | P9 |
| Western Sydney Local Health District - (Additional beds and emergency treatment spaces) | General NSW Government | P5 |
| **Justice, Fire & Rescue, and Police** | | |
| Blacktown courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Erskine Park fire station | Combination General NSW Government and development contributions | P7 |
| Francis Greenway Correctional Centre expansion (former John Morony) | Combination General NSW Government and development contributions | P8, P7 |

**Table 5-23:** Agribusiness Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station agribusiness | Customer | P19 |
| Wastewater pump station agribusiness south | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 20 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Agribusiness electricity distribution works | Customer | P17, P18 |

**Table 5-24:** Northern Gateway Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station northern gateway | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Open space in Sydney Science Park | Combination General NSW Government and development contributions | P21, P5, P18 |
| Waterway management – 53 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney screen industry production hub | Combination General NSW Government and development contributions | P9 |
| **Energy, digital and waste** | | |
| Northern Gateway electricity distribution works | Customer | P17, P18 |
| Science Park zone substation | Customer | P17, P18 |
| Sydney Science Park (Northern Gateway) secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-25:** Aerotropolis Core Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 15 local open spaces | Regional and local | P21, P5, P18 |
| Waterway management – 9 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aerotropolis ambulance station | General NSW Government | P5 |
| Aerotropolis education centre | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney central library | Combination General NSW Government and development contributions | P9, P13 |
| **Energy, digital and waste** | | |
| Aerotropolis core electricity distribution works | Customer | P17, P18 |
| Aerotropolis core secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-26:** Badgerys Creek Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station Badgerys Creek | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 4 hectares | General NSW Government | P19, P16, P18 |
| **Justice, Fire & Rescue, and Police** | | |
| Badgerys Creek police hub | Combination General NSW Government and development contributions | P7, P8 |
| **Energy, digital and waste** | | |
| Badgerys Creek electricity distribution works | Customer | P17, P18 |

**Table 5-27:** Mamre Road Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Southern Link Road, Mamre Road to Wallgrove Road | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station Mamre Road | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Public open space | Regional and local | P21, P5, P18 |
| Waterway management – 10 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Mamre Road electricity distribution works | Customer | P17, P18 |

**Table 5-28:** Kemps Creek Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 24 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Kemps Creek electricity distribution works | Customer | P17, P18 |

**Table 5-29:** North Luddenham Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 10 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Holistic storage facility | General NSW Government | P9 |
| **Energy, digital and waste** | | |
| North Luddenham electricity distribution works | Customer | P17, P18 |

**Table 5-30:** Rossmore Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 4 hectares | General NSW Government | P19, P16, P18 |
| **Justice, Fire & Rescue, and Police** | | |
| North Rossmore fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Rossmore electricity distribution works | Customer | P17, P18 |

**Table 5-31:** Wianamatta South Creek infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 337 hectares | General NSW Government | P19, P16, P18 |

**Table 5-32:** Austral Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station austral | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 27 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Austral electricity distribution works | Customer | P17, P18 |
| Austral Fifteenth Avenue. secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Austral zone substation | Customer | P17, P18 |
| Develop an electricity bulk supply point at Kemps Creek | Customer | P17 |

**Table 5-33:** Leppington North Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Prospect South to Macarthur drinking water distribution system link - Carnes Hill to Raby | Customer | P19, P21 |
| **Open space, bushland, waterways and tree planting** | | |
| Open space on Camden Valley Way, Leppington | General NSW Government | P21, P5, P18 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 34 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Leppington ambulance station | General NSW Government | P5 |
| New school for specific purposes | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Leppington north electricity distribution works | Customer | P17, P18 |

**Table 5-34:** Edmondson Park Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station Edmondson Park North | Customer | P19 |
| Wastewater pump station Edmondson Park South | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 64 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Edmondson Park electricity distribution works | Customer | P17, P18 |
| Edmondson Park Soldiers Parade. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-35:** Glenfield Precinct infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins) | Regional and local | P18, P20 |
| Wastewater pump station Glenfield | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Waterway management – 119 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Glenfield electricity distribution works | Customer | P17, P18 |

**Table 5-36:** Western Sydney Aerotroplis Growth Area and Austral to Glenfield Corridor multiple precincts infrastructure proposal list – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| South West Rail Link extension | Combination Australian/NSW Government | P12, P10, P16 |
| M12 Motorway | Combination Australian/NSW Government | P12 |
| The Northern Road Upgrade – Peter Brock Drive to Mersey Road; Mersey Road to Glenmore Parkway (in delivery) | Combination Australian/NSW Government | P12 |
| Bringelly Road Upgrade (stage 2, in delivery) | Combination Australian/NSW Government | P12 |
| Eastern (Airport) Ring Road, The Northern Road to Elizabeth Drive | Combination General NSW Government and development contributions | P12 |
| Elizabeth Drive Upgrade (stage 1) - The Northern Road to Badgerys Creek Road | Combination General NSW Government and development contributions | P12 |
| Rapid Bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Campbelltown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Liverpool | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |
| New local bus services | General NSW Government | P12, P16 |
| **Water and stormwater** | | |
| Drinking water - outlet mains - Glenfield and Edmondson Park | Customer | P20 |
| Drinking water - outlet mains new - Aerotropolis | Customer | P20 |
| Drinking water - outlet mains upgrade - Aerotropolis | Customer | P20 |
| Drinking water - pumping stations - Glenfield and Edmondson Park | Customer | P20 |
| Drinking water - reservoirs - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Glenfield and Edmondson Park | Customer | P20 |
| Effluent management brine transfer | Customer | P19, P20 |
| Effluent management transfer to Nepean River | Customer | P20 |
| Effluent management transfer to South Creek | Customer | P20 |
| Hoxton Park recycled water scheme network | General NSW Government | P19 |
| On-lot stormwater measures | Customer | P20 |
| Prospect South to Macarthur drinking water distribution system link | Customer | P19 |
| Rainwater tanks | Customer | P20 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Stormwater pipes and pits in the street | Private | P20 |
| Upper South Creek advanced water recycling centre | Customer | P20 |
| Upper South Creek advanced water recycling centre treatment (reverse osmosis) | Customer | P20 |
| Wastewater network (trunk) | Customer | P19 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | Combination General NSW Government and development contributions | P9, P6 |
| Community health facilities | General NSW Government | P5, P6 |
| **Energy, digital and waste** | | |
| 132kV transmission backbone | Customer | P17, P18 |
| Smart Western City Program - Data Sharing - data sharing platform, city dashboards, integration platform, interface with third party organisation, data monetisation, data standards definition | General NSW Government | P13 |
| Smart Western City Program - Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P13 |
| Smart Western City Program - Smart Monitoring - environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT Platform, AI platform, predictive model | General NSW Government | P13 |
| Smart Western City Program - Smart Planning and Management - digital twin infrastructure | General NSW Government | P13 |

**Table 5-37:** Infrastructure proposals required for Western Sydney Aerotropolis and Austral to Glenfield Corridor but located outside – 20 years (Growing Parkland City)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Drinking water - pumping stations - Aerotropolis | Customer | P20 |
| Drinking water - reservoirs - Glenfield and Edmondson Park | Customer | P20 |
| Hoxton Park recycled water scheme treatment upgrades | Customer | P19 |
| Macarthur water filtration plant amplification | Customer | P20 |
| Malabar system - wastewater pump upgrade | Customer | P20 |
| Malabar wet weather overflow abatement program | Customer | P20 |
| Northern Georges River submain upgrade | Customer | P20 |
| Penrith Water recycling plant advanced treatment (reverse osmosis) | Customer | P19 |
| Prospect water filtration plant amplifications | Customer | P20 |
| Southern and western suburbs ocean outfall sewer augmentation | Customer | P20 |
| Treatment upgrades Glenfield water recycling plant | Customer | P19 |
| Treatment upgrades Liverpool water recycling plant | Customer | P19 |
| **Education, health and culture** | | |
| Campbelltown Hospital redevelopment | General NSW Government | P5, P6 |
| Cecil Hills high school upgrade | Combination General NSW Government and development contributions | P14, P15 |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Liverpool Innovation Precinct | General NSW Government | P5, P6 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Prestons ambulance station | General NSW Government | P5 |
| Secondary school expansion (South West Growth Area (north) secondary school community group) | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Catherine Fields fire station | Combination General NSW Government and development contributions | P7 |
| Liverpool courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Macquarie Fields police station upgrade | Combination General NSW Government and development contributions | P7 |
| South West Sydney courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Energy, digital and waste** | | |
| Additional capacity at existing Sydney West electricity bulk supply point | Customer | P17, P18 |

## 5.6 Results – Thriving Aerotropolis scenario

Summary of the infrastructure and service costs for the Thriving Aerotropolis scenario:

- Total infrastructure cost is $99.8 billion over 20 years.
- Of this, $61.7 billion is apportioned to the initial PIC area.
- $52.3 billion is apportioned to new growth within the initial PIC area.
- 7,100 hectares of land is required for infrastructure over 20 years (including 1,766 hectares of land identified in multiple precincts or outside the initial PIC area).

The following tables show the magnitude of costs for each precinct as well as precinct costs apportioned to new growth by sector and land requirements.

**Table 5-38:** Thriving Aerotropolis 20-year sector costs for Greater Penrith precincts

| Sector | Penrith Lakes | | Penrith West | | South Penrith and Glenmore Park | | Penrith Centre | |
|---|---|---|---|---|---|---|---|---|
| **People** | +0 | | +2,325 | | +13,416 | | +13,242 | |
| **Jobs** | +58 | | +1,442 | | +1,288 | | +2,842 | |
| **Homes** | +0 | | +859 | | +4,787 | | +6,748 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 0 | 0 | 181 | 115 | 674 | 448 | 476 | 287 |
| Water | 7 | 6 | 31 | 26 | 312 | 267 | 114 | 92 |
| Open space, bushland, waterways and tree planting | 151 | 37 | 254 | 110 | 411 | 166 | 100 | 41 |
| Education, health and culture | 16 | 7 | 32 | 21 | 177 | 113 | 184 | 171 |
| Justice, Fire & Rescue, and Police | 1 | 1 | 2 | 2 | 13 | 11 | 6 | 6 |
| Energy, digital and waste | 1 | 1 | 19 | 18 | 113 | 104 | 107 | 103 |
| **Total ($M)** | **175** | **53** | **519** | **291** | **1,698** | **1,109** | **988** | **700** |
| **Total land requirement (ha)** | **77** | | **24** | | **56** | | **9** | |

**Table 5-39:** Thriving Aerotropolis 20-year sector costs for Northern Greater Penrith to Eastern Creek precincts

| Sector | Cranebrook | | Jordan Springs | | Ropes Crossing | |
|---|---|---|---|---|---|---|
| **People** | +4,112 | | +9,023 | | +138 | |
| **Jobs** | +295 | | +346 | | +31 | |
| **Homes** | +1,478 | | +3,168 | | +30 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 305 | 240 | 73 | 57 | 28 | 21 |
| Water | 114 | 95 | 38 | 38 | 15 | 15 |
| Open space, bushland, waterways and tree planting | 471 | 328 | 648 | 394 | 267 | 214 |
| Education, health and culture | 189 | 172 | 68 | 44 | 27 | 7 |
| Justice, Fire & Rescue, and Police | 9 | 8 | 4 | 3 | 2 | 2 |
| Energy, digital and waste | 38 | 32 | 47 | 44 | 2 | 1 |
| **Total ($M)** | **1,125** | **875** | **877** | **581** | **342** | **260** |
| **Total land requirement (ha)** | **55** | | **121** | | **58** | |

**Table 5-40:** Thriving Aerotropolis 20-year sector costs for Central Greater Penrith to Eastern Creek precincts

| Sector | Kingswood and Werrington | | Orchard Hills | | St Marys | |
|---|---|---|---|---|---|---|
| **People** | +20,184 | | +37,522 | | +24,403 | |
| **Jobs** | +3,864 | | +2,459 | | +5,516 | |
| **Homes** | +7,340 | | +11,225 | | +10,237 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 1,103 | 852 | 3,504 | 2,826 | 1,364 | 1,029 |
| Water | 251 | 251 | 1,173 | 1,173 | 251 | 251 |
| Open space, bushland, waterways and tree planting | 977 | 712 | 1,320 | 1,139 | 966 | 722 |
| Education, health and culture | 149 | 132 | 313 | 286 | 143 | 123 |
| Justice, Fire & Rescue, and Police | 13 | 11 | 20 | 18 | 16 | 15 |
| Energy, digital and waste | 159 | 152 | 254 | 247 | 153 | 144 |
| **Total ($M)** | **2,651** | **2,109** | **6,585** | **5,689** | **2,893** | **2,284** |
| **Total land requirement (ha)** | **114** | | **594** | | **110** | |

**Table 5-41:** Thriving Aerotropolis 20-year sector costs for East Greater Penrith to Eastern Creek precincts

| Sector | St Clair | | Luxford | | Mount Druitt Centre and Rooty Hill | |
|---|---|---|---|---|---|---|
| **People** | +5,473 | | +18,256 | | +23,678 | |
| **Jobs** | +526 | | +1,370 | | +4,579 | |
| **Homes** | +1,753 | | +6,019 | | +7,306 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 284 | 202 | 1,048 | 801 | 374 | 279 |
| Water | 97 | 97 | 537 | 495 | 350 | 298 |
| Open space, bushland, waterways and tree planting | 350 | 295 | 405 | 357 | 778 | 612 |
| Education, health and culture | 72 | 43 | 88 | 27 | 186 | 134 |
| Justice, Fire & Rescue, and Police | 9 | 8 | 29 | 28 | 23 | 22 |
| Energy, digital and waste | 41 | 36 | 121 | 107 | 159 | 148 |
| **Total ($M)** | **853** | **681** | **2,229** | **1,815** | **1,870** | **1,493** |
| **Total land requirement (ha)** | **38** | | **91** | | **100** | |

**Table 5-42:** Thriving Aerotropolis 20-year sector costs for Aerotropolis initial precincts

| Sector | Agribusiness | | Northern Gateway | | Aerotropolis Core | |
|---|---|---|---|---|---|---|
| **People** | +1,597 | | + 10,017 | | +8,852 | |
| **Jobs** | +5,075 | | +13,908 | | +11,827 | |
| **Homes** | +681 | | +3,760 | | +3,374 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 471 | 446 | 1,107 | 1,070 | 1,875 | 1,817 |
| Water | 1,012 | 1,001 | 1,705 | 1,678 | 1,142 | 1,103 |
| Open space, bushland, waterways and tree planting | 1,376 | 1,296 | 792 | 625 | 630 | 606 |
| Education, health and culture | 22 | 16 | 152 | 96 | 183 | 149 |
| Justice, Fire & Rescue, and Police | 87 | 86 | 90 | 87 | 90 | 89 |
| Energy, digital and waste | 93 | 92 | 160 | 158 | 170 | 168 |
| **Total ($M)** | **3,061** | **2,937** | **4,005** | **3,713** | **4,090** | **3,931** |
| **Total land requirement (ha)** | **589** | | **354** | | **436** | |

| Sector | Badgerys Creek | | Mamre Road | |
|---|---|---|---|---|
| **People** | -147 | | +24 | |
| **Jobs** | +1,844 | | +3,954 | |
| **Homes** | -54 | | +12 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 646 | 618 | 289 | 273 |
| Water | 160 | 158 | 205 | 205 |
| Open space, bushland, waterways and tree planting | 224 | 205 | 227 | 200 |
| Education, health and culture | 16 | 15 | 14 | 12 |
| Justice, Fire & Rescue, and Police | 95 | 89 | 82 | 81 |
| Energy, digital and waste | 38 | 37 | 40 | 40 |
| **Total ($M)** | **1,178** | **1,122** | **858** | **811** |
| **Total land requirement (ha)** | **299** | | **113** | |

**Table 5-43:** Thriving Aerotropolis 20-year sector costs for Aerotropolis non-initial precincts

| Sector | North Luddenham | | Kemps Creek | | Rossmore | |
|---|---|---|---|---|---|---|
| **People** | +94 | | -333 | | +10,146 | |
| **Jobs** | +724 | | +1,546 | | +800 | |
| **Homes** | +46 | | -118 | | +3,217 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 171 | 166 | 662 | 525 | 1,067 | 986 |
| Water | 79 | 78 | 232 | 228 | 1,283 | 1,239 |
| Open space, bushland, waterways and tree planting | 150 | 124 | 623 | 554 | 648 | 603 |
| Education, health and culture | 14 | 13 | 17 | 13 | 111 | 74 |
| Justice, Fire & Rescue, and Police | 80 | 79 | 85 | 83 | 88 | 87 |
| Energy, digital and waste | 2 | 2 | 5 | 5 | 90 | 87 |
| **Total ($M)** | **496** | **461** | **1,624** | **1,407** | **3,287** | **3,078** |
| **Total land requirement (ha)** | **73** | | **237** | | **254** | |

**Table 5-44:** Thriving Aerotropolis 20-year sector costs for Leppington to Glenfield - Rezoned precincts

| Sector | Austral | | Leppington North | | Edmondson Park | | Glenfield | |
|---|---|---|---|---|---|---|---|---|
| **People** | +14,066 | | +19,089 | | +16,019 people | | +6,598 | |
| **Jobs** | +3,117 | | +8,373 | | +3,448 | | +581 | |
| **Homes** | +4,929 | | +7,094 | | +4,806 | | +2,298 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 384 | 364 | 736 | 703 | 532 | 496 | 210 | 153 |
| Water | 1,292 | 1,292 | 1,549 | 1,548 | 1,737 | 1,708 | 1,259 | 1,252 |
| Open space, bushland, waterways and tree planting | 1,775 | 963 | 1,560 | 858 | 1,469 | 705 | 1,903 | 1,435 |
| Education, health and culture | 136 | 85 | 160 | 107 | 284 | 181 | 144 | 88 |
| Justice, Fire & Rescue, and Police | 93 | 93 | 92 | 92 | 78 | 78 | 83 | 83 |
| Energy, digital and waste | 121 | 117 | 164 | 160 | 115 | 112 | 56 | 53 |
| **Total ($M)** | **3,801** | **2,913** | **4,261** | **3,469** | **4,216** | **3,278** | **3,653** | **3,063** |
| **Total land requirement (ha)** | **175** | | **176** | | **176** | | **182** | |

## Sector proposals for each precinct

The following tables summarise the sector proposals identified, costed and apportioned to each precinct under the Thriving Aerotropolis scenario. These also identify potential funding source and relevant place outcome indicators that the proposal would contribute to.

**Table 5-45:** Penrith Centre infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Penrith trunk mains 3 | General NSW Government | P20, P18 |
| Penrith water recycling plant upgrade | Customer | P20, P19 |
| Wastewater overflow source control (Penrith Centre) | Customer | P19, P21 |
| Wastewater upgrade (pump) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - one hectare | Combination General NSW Government and development contributions | P19, P16, P18 |
| Penrith city park | Regional and local | P21, P5, P18 |
| Tree planting in open space and along the road network | Private | P21, P18, P16 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Penrith courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Penrith Centre electricity distribution works | Customer | P17, P18 |

**Table 5-46:** Penrith West infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Castlereagh Road upgrade - Museum Drive to Coreen Avenue | Combination General NSW Government and development contributions | P12 |
| M4 Smart Motorway - Penrith to Emu Plains | General NSW Government | P12 |
| **Water and stormwater** | | |
| Penrith Lakes pump | General NSW Government | P20, P18 |
| Penrith pump 1 | General NSW Government | P20, P18 |
| Penrith reservoir | General NSW Government | P19, P21 |
| Penrith trunk mains 4 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 42 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and along the road network | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sports facilities | Regional and local | P5, P21 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Penrith West electricity distribution works | Customer | P17, P18 |
| South Penrith zone substation | Customer | P17, P18 |

**Table 5-47:** Penrith Lakes Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation – 83 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Waterway management – channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Penrith Lakes environmental education centre | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Penrith Lakes electricity distribution works | Customer | P17, P18 |

**Table 5-48:** South Penrith and Glenmore Park Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Mulgoa Road upgrade – Glenmore Parkway to Jeanette Street | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| Glenmore Park water pumping station upgrade | Customer | P20 |
| Penrith pump 2 | General NSW Government | P20, P18 |
| Penrith trunk mains 5 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater Pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 5 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation – 250 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and along the road network | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Mulgoa zone substation | Customer | P17, P18 |
| South Penrith and Glenmore Park electricity distribution works | Customer | P17, P18 |

**Table 5-49:** Cranebrook Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 74 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and along the road network | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 86 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Cranebrook ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Cranebrook electricity distribution works | Customer | P17, P18 |
| Cranebrook new electricity feeders | Customer | P17, P18 |
| Penrith Centre secondary gas main extension. Lay 500m of 150mm secondary regulating set | Customer | P17 |

**Table 5-50:** Jordan Springs Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 6 new tennis courts | Regional and local | P5, P21 |
| Biodiversity conservation - 120 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 546 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school (opened July 2020) | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Jordan Springs electricity distribution works | Customer | P17, P18 |

**Table 5-51:** Ropes Crossing Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 18 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 385 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Ropes Crossing electricity distribution works | Customer | P17, P18 |

**Table 5-52:** Kingswood and Werrington Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Kingswood and Werrington trunk mains | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 87 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in local open space and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P21, P5, P18 |
| Waterway management – 234 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Holistic storage facility | General NSW Government | P9 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| TAFE NSW Kingswood Campus refurbishment and new buildings | General NSW Government | P14, P15 |
| Western Sydney construction hub | General NSW Government | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Cobham Youth Justice Centre upgrade* | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Kingswood and Werrington electricity distribution works | Customer | P17, P18 |
| Kingswood and Werrington part 1 of 2. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |

*project reflects the consolidation and decommissioning of existing youth justice facilities.

**Table 5-53:** St Marys Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| St Marys trunk mains 2 | General NSW Government | P20, P18 |
| St Marys trunk mains 6 | General NSW Government | P20, P18 |
| St Marys trunk mains 9 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| St Marys pump 1 | General NSW Government | P20, P18 |
| St Marys pump 2 | General NSW Government | P20, P18 |
| St Marys reservoir | General NSW Government | P20, P18 |
| St Marys water recycling plant upgrade | Customer | P20, P19 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 80 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 401 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| St Marys - Part 1 of 3. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |
| St Marys - Part 2 of 3. Install 2x secondary regulating set along existing secondary gas main | Customer | P17 |
| St Marys electricity distribution works | Customer | P17, P18 |
| Werrington new electricity feeders | Customer | P17, P18 |

**Table 5-54:** St Clair Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Erskine Park water supply zone trunk mains | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 3 local open spaces | Regional and local | P21, P5, P18 |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 47 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P5, P21 |
| Waterway management – 99 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Colyton ambulance station | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| St Clair electricity distribution works | Customer | P17, P18 |

**Table 5-55:** Luxford Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P19, P20, P21 |
| St Marys trunk mains 3 | General NSW Government | P20, P18 |
| St Marys trunk mains 4 | General NSW Government | P20, P18 |
| **Open space, bushland, waterways and tree planting** | | |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 44 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 128 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | Combination General NSW Government and development contributions | P9, P6 |
| Tregear ambulance station | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| Luxford - Part 1 of 2. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |
| Luxford electricity distribution works | Customer | P17, P18 |

**Table 5-56:** Mount Druitt Centre and Rooty Hill Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Quakers Hill pump 2 | General NSW Government | P20, P18 |
| Quakers Hill trunk mains 2 | General NSW Government | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| 3 netball courts | Regional and local | P5, P21 |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 52 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 116 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Doonside ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Mount Druitt courthouse expansion /upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Mount Druitt Centre and Rooty Hill - Part 1 of 2. Install 2x secondary regulating sets along existing secondary gas main | Customer | P17 |
| Mount Druitt Centre and Rooty Hill electricity distribution works | Customer | P17, P18 |

**Table 5-57:** Orchard Hills Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Erskine Park Road extension | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| Orchard Hills effluent transfer main and pump | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Orchard Hills pump 1 | General NSW Government | P20, P18 |
| Orchard Hills pump 2 | General NSW Government | P20, P18 |
| Orchard Hills reservoir | General NSW Government | P20 |
| Orchard Hills sewer mains | Customer | P20 |
| Orchard Hills trunk mains | Customer | P20 |
| Orchard Hills trunk mains 1 | General NSW Government | P20, P18 |
| Orchard Hills trunk mains 2 | General NSW Government | P20, P18 |
| Orchard Hills wastewater pumping station 1 and rising main | Customer | P20 |
| Orchard Hills wastewater pumping station 2 and rising main | Customer | P20 |
| Orchard Hills water recycling plant | Customer | P20, P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 10 local open spaces | Regional and local | P21, P5, P18 |
| 2 sports fields | Regional and local | P5, P21 |
| 8 netball courts | Regional and local | P5, P21 |
| Biodiversity conservation - 90 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor sports centre | Combination General NSW Government and development contributions | P5, P21 |
| Tree planting in local open space and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 669 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| New schools for specific purposes | Combination General NSW Government and development contributions | P15, P14 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Energy, digital and waste** | | |
| Develop a new electricity bulk supply point at South Creek | Customer | P17 |
| Orchard Hills electricity distribution works | Customer | P17, P18 |
| Orchard Hills secondary extension - part 1 - 4km of 150mm gas main and a secondary regulating set | Customer | P17 |
| Orchard Hills Secondary Extension - part 2 - option 1 - 2km of 150mm gas main and a secondary regulating set | Customer | P17 |
| Orchard Hills zone substation | Customer | P17, P18 |

**Table 5-58:** Greater Penrith to Eastern Creek multiple precincts infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| Penrith to St Marys rail quadruplication | General NSW Government | P12, P10, P16 |
| Additional trains and services on the T1 Western Line | General NSW Government | P12, P10, P16 |
| M4 Smart Motorway - Penrith to Mays Hill (in delivery) | General NSW Government | P12 |
| M4 West facing ramps at roper road | General NSW Government | P12 |
| M7 Motorway upgrade | General NSW Government | P12 |
| Outer Sydney Orbital (Stage 1) – Great Western Highway to The Northern Road | Combination Australian/NSW Government | P12 |
| The Northern Road Upgrade – Mersey Road to Glenmore Parkway; Glenmore Parkway to Jamison Road (in delivery) | Combination Australian/NSW Government | P12 |
| Mulgoa Road, Penrith – Union Road to Museum Drive including railway bridge upgrade (in delivery) | Combination Australian/NSW Government | P12 |
| Mulgoa Road Upgrade – Jeanette Street to Blaikie Road; Blaikie Road to Union Road | Combination General NSW Government and development contributions | P12 |
| Mamre Road upgrade - M4 to Erskine Park Road | Combination General NSW Government and development contributions | P12 |
| Werrington Road upgrade | Combination General NSW Government and development contributions | P12 |
| Cycling infrastructure for the principal bicycle network | Combination General NSW Government and development contributions | P12, P21, P16 |
| Rapid Bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Mount Druitt | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Penrith to Rouse Hill via Marsden Park | Combination General NSW Government and development contributions | P12, P10, P16 |
| New local bus services | General NSW Government | P12, P10, P16 |
| **Water and stormwater** | | |
| Creek bank stabilisation | Regional and local | P19, P20, P21 |
| Glenmore Park main upgrade | Customer | P20 |
| Local stormwater harvesting | Regional and local | P19, P21, P20 |
| Penrith Lakes main | General NSW Government | P20, P18 |
| Penrith trunk mains 1 | General NSW Government | P20, P18 |
| Penrith trunk mains 2 | General NSW Government | P20, P18 |
| Quakers Hill to St Marys advanced water treatment plant - transfer pipeline and pump | Customer | P20, P18 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Quakers Hill trunk mains 1 | General NSW Government | P20, P18 |
| Rainwater tanks | Customer | P19, P21 |
| St Marys trunk mains 1 | General NSW Government | P20, P18 |
| St Marys trunk mains 10 | General NSW Government | P20, P18 |
| St Marys trunk mains 5 | General NSW Government | P20, P18 |
| St Marys trunk mains 7 | General NSW Government | P20, P18 |
| St Marys trunk mains 8 | General NSW Government | P20, P18 |
| Stormwater bypass pipes | Regional and local | P20 |
| Street tree planting with passive irrigation stormwater management function | Regional and local | P20, P19, P18 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space and biodiversity** | | |
| Tree planting projects | Private | P21, P18, P16 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Community health facilities | General NSW Government | P5, P6 |
| Nepean Blue Mountains Local Health District (Additional beds and emergency treatment spaces) | General NSW Government | P5 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Smart Western City Program - Community Engagement - community feedback platform, 3D das/digital twin public access, council app, community feedback AI processing engine | General NSW Government | P13 |
| Smart Western City Program - Data Sharing - data sharing platform, city dashboards, integration platform, interface with third part organisation, data monetisation, data standards definition | General NSW Government | P13 |
| Smart Western City Program - Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P13 |
| Smart Western City Program - Local Jobs/Working from Home - digital literacy eLearning platform, smart work hub, start-up hub | General NSW Government | P13 |
| Smart Western City Program - Smart Monitoring - water sensors, environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT platform, AI platform, predictive model, urban control centre | General NSW Government | P13 |
| Smart Western City Program - Smart Planning and Management - predictive maintenance platform/model, digital asset register, digital twin infrastructure, VR consultation platform, building energy efficiency solution, advanced metering infrastructure, electricity demand optimisation | Private | P13 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Smart Western City Program - Smart Public Space - smart poles, CCTV, video analytics platform, video analytics model, movement enabled lights/smart lighting, screen for public information, smart benches, smart citizen lab | General NSW Government | P13 |
| Smart Western City Program - Smart Transport - sensors/cameras/adaptive signalling in pedestrian zones, parking sensors, on-demand public transport app, road markings for connected and automated vehicles (CAVs), multi-mode real-time traffic updates and dynamic routing, mobility as a service | General NSW Government | P13 |

**Table 5-59:** Infrastructure proposals required for Greater Penrith to Eastern Creek but located outside – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| M7 Motorway upgrade | General NSW Government | P12 |
| **Water and stormwater** | | |
| Brine management upgrade at Quakers Hill (transfer pipelines, storage tank and pump) | Customer | P20, P20 |
| Quakers Hill pump 1 | General NSW Government | P20, P18 |
| Quakers Hill reservoir | General NSW Government | P20, P18 |
| Quakers Hill trunk mains outside initial PIC area | General NSW Government | P20, P18 |
| Quakers Hill Water recycling plant upgrade | Customer | P20, P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Gateway regional park | Combination General NSW Government and development contributions | P21, P5, P18 |
| **Education, health and culture** | | |
| Blacktown and Mount Druitt hospital redevelopment | General NSW Government | P5, P6 |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Major cultural facility enhancement | Combination General NSW Government and development contributions | P9 |
| TAFE NSW Nirimba Campus expansion | General NSW Government | P14, P15 |
| Western Sydney Local Health District - (Additional beds and emergency treatment spaces) | General NSW Government | P5 |
| **Justice, Fire & Rescue, and Police** | | |
| Blacktown courthouse expansion /upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Erskine Park fire station | Combination General NSW Government and development contributions | P7 |
| Francis Greenway Correctional Centre expansion (former John Morony) | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Circular economy hub | Private | P16, P18 |

**Table 5-60:** Agribusiness Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Adams Road upgrade (early stage) | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station agribusiness | Customer | P19 |
| Wastewater pump station agribusiness south | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 3 netball courts | Regional and local | P5, P21 |
| 9 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 240 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 306 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Agribusiness zone substation | Customer | P17, P18 |
| Agribusiness (Greendale Road) secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Agribusiness electricity distribution works | Customer | P17, P18 |
| D4 zone substation | Customer | P17, P18 |

**Table 5-61:** Northern Gateway Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Luddenham Road upgrade, Elizabeth Drive to pipeline | Combination General NSW Government and development contributions | P12 |
| Western Sydney bus depot | Combination General NSW Government and development contributions | P12, P16 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station northern gateway | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 4 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 76 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Open space in Sydney Science Park | Combination General NSW Government and development contributions | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 228 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney screen industry production hub | Combination General NSW Government and development contributions | P9 |
| **Justice, Fire & Rescue, and Police** | | |
| Badgerys Creek fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Northern Gateway electricity distribution works | Customer | P17, P18 |
| Science Park zone substation | Customer | P17, P18 |

**Table 5-62:** Aerotropolis Core Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Badgerys Creek Road upgrade | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 7 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 53 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Central Wianamatta regional park | Combination General NSW Government and development contributions | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 227 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aerotropolis ambulance station | General NSW Government | P5 |
| Aerotropolis education centre | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| New secondary school (South West Growth Area (north) secondary school community group) | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney central library | Combination General NSW Government and development contributions | P9, P13 |
| **Justice, Fire & Rescue, and Police** | | |
| Bringelly fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Aerotropolis core electricity distribution works | Customer | P17, P18 |
| Aerotropolis core secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Aerotropolis zone substation | Customer | P17, P18 |

**Table 5-63:** Badgerys Creek Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Badgerys Creek | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 17 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 79 hectares | General NSW Government | P19, P16, P18 |
| **Justice, Fire & Rescue, and Police** | | |
| Badgerys Creek police hub | Combination General NSW Government and development contributions | P7, P8 |
| **Energy, digital and waste** | | |
| Badgerys Creek electricity distribution works | Customer | P17, P18 |
| C4 zone substation | Customer | P17, P18 |
| Circular economy hub | Private | P16, P18 |

**Table 5-64:** Mamre Road Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Southern Link Road, Mamre Road to Wallgrove Road | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Mamre Road | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 29 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor sporting facility | Combination General NSW Government and development contributions | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 55 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Mamre Road electricity distribution works | Customer | P17, P18 |
| Mamre Road secondary extension. secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-65:** Kemps Creek Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 115 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Multifunctional linear park along creek corridors | Combination General NSW Government and development contributions | P21, P5, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 134 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Kemps Creek electricity distribution works | Customer | P17, P18 |

**Table 5-66:** North Luddenham Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P19, P21 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 21 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 50 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Holistic storage facility | General NSW Government | P9 |
| **Energy, digital and waste** | | |
| North Luddenham electricity distribution works | Customer | P17, P18 |

**Table 5-67:** Rossmore Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 6 tennis courts | Regional and local | P5, P21 |
| Biodiversity conservation - 86 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Multifunctional linear park along creek corridors | Combination General NSW Government and development contributions | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 98 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| North Rossmore fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Rossmore electricity distribution works | Customer | P17, P18 |
| Rossmore secondary regulating set | Customer | P17 |
| Rossmore zone substation | Customer | P17, P18 |

**Table 5-68:** Wianamatta South Creek Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| 10 netball courts | Regional and local | P5, P21 |
| Biodiversity conservation - 53 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 1,084 hectares | General NSW Government | P19, P16, P18 |

**Table 5-69:** Western Sydney Airport infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Energy, digital and waste** | | |
| Western Sydney Airport Terminal secondary gas mains extension | Customer | P17 |

**Table 5-70:** Austral Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Austral | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | Regional and local | P21, P5, P18 |
| 2 sports fields | Regional and local | P5, P21 |
| Biodiversity conservation - 70 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 176 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Austral electricity distribution works | Customer | P17, P18 |
| Austral Fifteenth Avenue. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Austral zone substation | Customer | P17, P18 |
| Develop an electricity bulk supply point at Kemps Creek | Customer | P17 |

**Table 5-71:** Leppington North Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Commuter car park - Leppington Station | General NSW Government | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Prospect South to Macarthur drinking water distribution system link - Carnes Hill to Raby | Customer | P19, P21 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Open space on Camden Valley Way, Leppington | General NSW Government | P21, P5, P18 |
| Aquatic facility | Combination General NSW Government and development contributions | P5, P21 |
| Biodiversity conservation - 113 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Netball courts | Regional and local | P5, P21 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in regional open space and along principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 171 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Leppington ambulance station | General NSW Government | P5 |
| New school for specific purposes | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Leppington North electricity distribution works | Customer | P17, P18 |

**Table 5-72:** Edmondson Park Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Commuter car park - Edmondson Park Station | General NSW Government | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Edmondson Park North | Customer | P19 |
| Wastewater pump station Edmondson Park South | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | | |
| 3 sports fields | Regional and local | P5, P21 |
| Biodiversity conservation - 286 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Lawn bowls green | Regional and local | P5, P21 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 64 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Edmondson Park electricity distribution works | Customer | P17, P18 |
| Edmondson Park Soldiers Parade. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-73:** Glenfield Precinct infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Cambridge Avenue upgrade and extension to Campbelltown Road | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Glenfield | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Aquatic facility | Combination General NSW Government and development contributions | P5, P21 |
| Biodiversity conservation - 105 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor facility | Combination General NSW Government and development contributions | P5, P21 |
| Skate facility in Glenfield | Regional and local | P5, P21 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Tree planting along principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 119 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Glenfield electricity distribution works | Customer | P17, P18 |

**Table 5-74:** Western Sydney Aerotropolis Growth Area and Austral to Glenfield Corridor infrastructure proposal list – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| South West Rail Link extension | Combination Australian/NSW Government | P12, P10, P16 |
| Western Sydney freight line | Combination Australian/NSW Government | P12, P16 |
| M12 Motorway | Combination Australian/NSW Government | P12 |
| Outer Sydney Orbital (stage 1) – Great Western Highway to The Northern Road | Combination General NSW Government and development contributions | P12 |
| The Northern Road upgrade – Peter Brock Drive to Mersey Road; Mersey Road to Glenmore Parkway (in delivery) | Combination Australian/NSW Government | P12 |
| Bringelly Road upgrade (stage 2, in delivery) | Combination Australian/NSW Government | P12 |
| Devonshire Road upgrade and extension to Mamre Road with new M12 interchange | Combination General NSW Government and development contributions | P12 |
| Eastern (Airport) Ring Road, The Northern Road to Elizabeth Drive | Combination General NSW Government and development contributions | P12 |
| Elizabeth Drive upgrade (stage 1, 2 and 3) - The Northern Road to Badgerys Creek Road; Badgerys Creek Road to Western Road; Western Road to Mamre Road | Combination General NSW Government and development contributions | P12 |
| Fifteenth Avenue upgrade and extension to Aerotropolis Core | Combination General NSW Government and development contributions | P12 |
| Pitt Street upgrade and extension to Devonshire Road | Combination General NSW Government and development contributions | P12 |
| New east-west road link – Littlefields Road to Luddenham Road (early stage) | Combination General NSW Government and development contributions | P12 |
| New east-west road link along Whitaker/New Road/Tenth Ave, Edmondson Ave to Aerotropolis Core | Combination General NSW Government and development contributions | P12 |
| Other new State and regional roads – Aerotropolis | Combination General NSW Government and development contributions | P12 |
| Cycling infrastructure for the Principal Bicycle Network | Combination General NSW Government and development contributions | P12, P21, P16 |
| Rapid bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid bus - Aerotropolis to Campbelltown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid bus - Aerotropolis to Liverpool | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid bus - Aerotropolis to Mount Druitt | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Rapid bus - Liverpool to Camden | General NSW Government | P12, P16 |
| New local bus services | General NSW Government | P12, P16 |
| **Water and stormwater** | | |
| Drinking water - outlet mains - Glenfield and Edmondson Park | Customer | P20, P19, P18 |
| Drinking water - outlet mains new - Aerotropolis | Customer | P20 |
| Drinking water - outlet mains upgrade - Aerotropolis | Customer | P20 |
| Drinking water - pumping stations - Glenfield and Edmondson Park | Customer | P20, P19 |
| Drinking water - reservoirs - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Glenfield and Edmondson Park | Customer | P20, P19, P18 |
| Effluent management brine transfer | Customer | P19, P20 |
| Effluent management transfer to Nepean River | Customer | P20 |
| Effluent management transfer to South Creek | Customer | P20 |
| High quality recycled water – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Hoxton Park recycled water scheme network | General NSW Government | P19 |
| Local stormwater harvesting and irrigation | Regional and local | P19, P21 |
| On-lot stormwater measures | Customer | P19, P21 |
| Prospect South to Macarthur drinking water distribution system link | Customer | P19 |
| Rainwater tanks | Customer | P19, P21 |
| Recycled water outlet - Glenfield System | General NSW Government | P20 |
| Recycled water pumping station – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Recycled water reservoirs – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Recycled water rising mains - Glenfield System | General NSW Government | P20 |
| Stormwater diversion pipes | Private | P19, P21 |
| Stormwater harvesting storage | Regional and local | P19 |
| Stormwater pipes and pits in the street | Private | P19, P21 |
| Street tree planting for passive irrigation stormwater management | Regional and local | P20, P19, P18 |
| Upper South Creek advanced water recycling centre | Customer | P20, P19, P18 |
| Upper South Creek advanced water recycling centre (reverse osmosis) | Customer | P19, P20, P18 |
| **Open space, bushland, waterways and tree planting** | | |
| Gateway regional park | Combination General NSW Government and development contributions | P21, P5, P18 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Planting along Metro line | Combination General NSW Government and development contributions | P21, P18, P16 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | Combination General NSW Government and development contributions | P9, P6 |
| Community health facilities | General NSW Government | P5, P6 |
| **Energy, digital and waste** | | |
| 132KkV transmission backbone | Customer | P17, P18 |
| Smart Western City Program: Community Engagement - community feedback platform,3D DAs/digital twin public access, council app, community feedback AI processing engine | General NSW Government | P13 |
| Smart Western City Program: Data Sharing - data sharing platform, city dashboards, integration platform, interface with third parties, data monetisation, data standards definition | General NSW Government | P13 |
| Smart Western City Program: Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P13 |
| Smart Western City Program: Local Jobs/Working from Home - digital literacy eLearning platform, smart work hub, start-up hub | General NSW Government | P13 |
| Smart Western City Program: Smart Monitoring - water sensors, environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT platform, AI platform, predictive model, urban control centre | General NSW Government | P13 |
| Smart Western City Program: Smart Planning and Management - predictive maintenance platform/model, digital asset register, digital twin infrastructure, VR consultation platform, building energy efficiency solution, advanced metering infrastructure, electricity demand optimisation | Private | P13 |
| Smart Western City Program: Smart Public Space - smart poles, CCTV, video analytics platform, video analytics model, movement enabled lights/smart lighting, screen for public information, smart benches, smart citizen lab | General NSW Government | P13 |
| Smart Western City Program: Smart Transport - sensors/cameras/adaptive signalling in pedestrian zones, parking sensors, on-demand public transport app, road markings for CAVs, multi-mode real-time traffic updates and dynamic routing, mobility as a service | General NSW Government | P13 |

**Table 5-75:** Infrastructure proposals required for Western Sydney Aerotropolis Growth Area and Austral to Glenfield Corridor but located outside – 20 years (Thriving Aerotropolis)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Drinking water - pumping stations - Aerotropolis | Customer | P20 |
| Drinking water - reservoirs - Glenfield and Edmondson Park | Customer | P19 |
| Glenfield water recycling plant upgrades for recycled water supply | Customer | P20, P21, P18 |
| Hoxton Park recycled water scheme treatment upgrades | Customer | P19 |
| Macarthur water filtration plant amplification | Customer | P20, P21, P18 |
| Malabar system - wastewater pump upgrade | Customer | P20 |
| Malabar wet weather overflow abatement program | Customer | P20, P21, P18 |
| Northern Georges River submain upgrade | Customer | P20 |
| Penrith water recycling plant advanced treatment (reverse osmosis) | Customer | P19 |
| Prospect water filtration plant amplifications | Customer | P20, P21, P18 |
| Recycled water pumping stations - Glenfield system | General NSW Government | P20 |
| Recycled water reservoirs - Glenfield system | General NSW Government | P20 |
| Southern and western suburbs ocean outfall sewer augmentation | Customer | P20 |
| Treatment upgrades Glenfield water recycling plant | Customer | P19 |
| Treatment upgrades Liverpool water recycling plant | Customer | P19 |
| **Education, health and culture** | | |
| Campbelltown Hospital redevelopment | General NSW Government | P5, P6 |
| Cecil Hills High School upgrade | Combination General NSW Government and development contributions | |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Liverpool Innovation Precinct | General NSW Government | P5, P6 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| Prestons ambulance station | General NSW Government | P5 |
| Secondary school expansion (South West Growth Area (North) secondary school community group) | Combination General NSW Government and development contributions | P14, P15 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Justice, Fire & Rescue, and Police** | | |
| Catherine Fields fire station | Combination General NSW Government and development contributions | P7 |
| Erskine Park fire station | Combination General NSW Government and development contributions | P7 |
| Liverpool courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Macquarie Fields police station upgrade | Combination General NSW Government and development contributions | P7 |
| South West Sydney courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Additional capacity at Sydney West electricity bulk supply point | Customer | P17, P18 |
| Bringelly Zone substation upgrade | Customer | P17, P18 |
| South Erskine Park zone substation | | |
| **Water and stormwater** | | |
| Recycled water rising mains – Upper South Creek System | General NSW Government | P20, P18 |
| Upper South Creek recycled water outlet – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Wastewater network (trunk) | Customer | P19 |

## 5.7 Results – Thriving Metropolitan Cluster scenario

Summary of the infrastructure and service costs for the Thriving Metropolitan Cluster scenario:

- Total infrastructure cost is $98.6 billion over 20 years.
- Of this, $60.3 billion is apportioned to the initial PIC area.
- $51.2 billion is apportioned to new growth within the initial PIC area.
- 6,800 hectares of land is required for infrastructure over 20 years (including 1,679 hectares of land identified in multiple precincts or outside the initial PIC area).

The following tables show the magnitude of costs for each precinct as well as precinct costs apportioned to new growth by sector and land requirements.

**Table 5-76:** Thriving Metropolitan Cluster 20-year sector costs for Greater Penrith precincts

| Sector | Penrith Lakes | | Penrith West | | South Penrith and Glenmore Park | | Penrith Centre | |
|---|---|---|---|---|---|---|---|---|
| **People** | +0 | | +2,347 | | +14,747 | | +15,451 | |
| **Jobs** | +45 | | +2,706 | | +2,034 | | +3,945 | |
| **Homes** | +0 | | +868 | | +5,287 | | +7,813 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 0 | 0 | 200 | 137 | 668 | 471 | 525 | 351 |
| Water | 7 | 6 | 42 | 37 | 356 | 310 | 162 | 135 |
| Open space, bushland, waterways and tree planting | 151 | 2 | 280 | 154 | 449 | 203 | 117 | 47 |
| Education, health and culture | 17 | 8 | 34 | 23 | 206 | 142 | 159 | 146 |
| Justice, Fire & Rescue, and Police | 1 | 1 | 2 | 2 | 13 | 12 | 7 | 6 |
| Energy, digital and waste | 1 | 1 | 21 | 20 | 137 | 128 | 134 | 130 |
| **Total ($M)** | **176** | **18** | **579** | **374** | **1,829** | **1,265** | **1,105** | **814** |
| **Total land requirement (ha)** | **77** | | **25** | | **63** | | **20** | |

**Table 5-77:** Thriving Metropolitan Cluster 20-year sector costs for Northern Greater Penrith to Eastern Creek precincts

| Sector | Cranebrook | | Jordan Springs | | Ropes Crossing | |
|---|---|---|---|---|---|---|
| **People** | +3,069 | | +9,023 | | +138 | |
| **Jobs** | +393 | | +401 | | +56 | |
| **Homes** | +1,107 | | +3,168 | | +30 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 246 | 203 | 69 | 56 | 26 | 21 |
| Water | 80 | 66 | 33 | 32 | 8 | 8 |
| Open space, bushland, waterways and tree planting | 424 | 272 | 638 | 421 | 231 | 212 |
| Education, health and culture | 210 | 194 | 70 | 46 | 27 | 6 |
| Justice, Fire & Rescue, and Police | 7 | 7 | 3 | 3 | 2 | 2 |
| Energy, digital and waste | 40 | 34 | 55 | 53 | 2 | 1 |
| **Total ($M)** | **1,007** | **776** | **868** | **611** | **297** | **250** |
| **Total land requirement (ha)** | **46** | | **121** | | **52** | |

**Table 5-78:** Thriving Metropolitan Cluster 20-year sector costs for Central Greater Penrith To Eastern Creek precincts

| Sector | Kingswood and Werrington | | Orchard Hills | | St Marys | |
|---|---|---|---|---|---|---|
| **People** | +25,212 | | +51,065 | | +21,612 | |
| **Jobs** | +5,773 | | +3,601 | | +7,821 | |
| **Homes** | +9,174 | | +15,310 | | +9,063 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 1,275 | 1,051 | 4,353 | 3,666 | 1,193 | 952 |
| Water | 315 | 315 | 945 | 945 | 226 | 226 |
| Open space, bushland, waterways and tree planting | 982 | 762 | 1,362 | 1,205 | 987 | 793 |
| Education, health and culture | 150 | 133 | 446 | 421 | 152 | 133 |
| Justice, Fire & Rescue, and Police | 14 | 13 | 26 | 23 | 14 | 12 |
| Energy, digital and waste | 216 | 208 | 396 | 386 | 176 | 168 |
| **Total ($M)** | **2,953** | **2,483** | **7,529** | **6,647** | **2,748** | **2,283** |
| **Total land requirement (ha)** | **126** | | **532** | | **109** | |

**Table 5-79:** Thriving Metropolitan Cluster 20-year sector costs for East Greater Penrith to Eastern Creek precincts

| Sector | St Clair | | Luxford | | Mount Druitt Centre and Rooty Hill | |
|---|---|---|---|---|---|---|
| **People** | +3,418 | | +9,318 | | +16,763 | |
| **Jobs** | +531 | | +1,187 | | +5,775 | |
| **Homes** | +1,091 | | +2,971 | | +5,165 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 217 | 158 | 777 | 614 | 309 | 232 |
| Water | 63 | 63 | 355 | 329 | 253 | 220 |
| Open space, bushland, waterways and tree planting | 400 | 336 | 400 | 351 | 777 | 643 |
| Education, health and culture | 78 | 51 | 78 | 22 | 160 | 113 |
| Justice, Fire & Rescue, and Police | 7 | 7 | 26 | 24 | 20 | 18 |
| Energy, digital and waste | 36 | 31 | 76 | 63 | 140 | 131 |
| **Total ($M)** | **801** | **645** | **1,711** | **1,404** | **1,658** | **1,358** |
| **Total land requirement (ha)** | **39** | | **73** | | **94** | |

**Table 5-80:** Thriving Metropolitan Cluster 20-year sector costs for Aerotropolis initial precincts

| Sector | Agribusiness | | Northern Gateway | | Aerotropolis Core | |
|---|---|---|---|---|---|---|
| **People** | +1,713 | | + 9,236 | | +3,607 | |
| **Jobs** | +4,984 | | +6,107 | | +4,926 | |
| **Homes** | +720 | | +3,362 | | +1,450 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 502 | 465 | 752 | 714 | 1,029 | 982 |
| Water | 954 | 939 | 1,082 | 1,054 | 580 | 556 |
| Open space, bushland, waterways and tree planting | 1,374 | 1,306 | 764 | 511 | 615 | 593 |
| Education, health and culture | 30 | 19 | 140 | 90 | 73 | 54 |
| Justice, Fire & Rescue, and Police | 88 | 86 | 90 | 86 | 87 | 86 |
| Energy, digital and waste | 54 | 53 | 126 | 124 | 82 | 81 |
| **Total ($M)** | **3,002** | **2,868** | **2,954** | **2,579** | **2,467** | **2,352** |
| **Total land requirement (ha)** | **580** | | **318** | | **364** | |

| Sector | Badgerys Creek | | Mamre Road | |
|---|---|---|---|---|
| **People** | -152 | | +22 | |
| **Jobs** | +935 | | +3,129 | |
| **Homes** | -57 | | +11 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 485 | 435 | 273 | 250 |
| Water | 68 | 66 | 154 | 154 |
| Open space, bushland, waterways and tree planting | 222 | 213 | 225 | 219 |
| Education, health and culture | 16 | 14 | 14 | 12 |
| Justice, Fire & Rescue, and Police | 95 | 89 | 82 | 80 |
| Energy, digital and waste | 24 | 24 | 40 | 40 |
| **Total ($M)** | **909** | **841** | **788** | **755** |
| **Total land requirement (ha)** | **287** | | **97** | |

**Table 5-81:** Thriving Metropolitan Cluster 20-year sector costs for Aerotropolis non-initial precincts

| Sector | North Luddenham | | Kemps Creek | | Rossmore | |
|---|---|---|---|---|---|---|
| **People** | +39 | | -356 | | +7,620 | |
| **Jobs** | +318 | | +1,068 | | +725 | |
| **Homes** | +20 | | -125 | | +2,394 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 115 | 111 | 607 | 401 | 1,093 | 973 |
| Water | 50 | 49 | 186 | 181 | 988 | 942 |
| Open space, bushland, waterways and tree planting | 145 | 109 | 595 | 521 | 610 | 570 |
| Education, health and culture | 14 | 12 | 17 | 12 | 93 | 61 |
| Justice, Fire & Rescue, and Police | 80 | 79 | 85 | 83 | 87 | 86 |
| Energy, digital and waste | 1 | 1 | 1 | 1 | 53 | 52 |
| **Total ($M)** | **405** | **361** | **1,491** | **1,199** | **2,925** | **2,684** |
| **Total land requirement (ha)** | **70** | | **231** | | **236** | |

**Table 5-82:** Thriving Metropolitan Cluster 20-year sector costs for Leppington to Glenfield - Rezoned precincts

| Sector | Austral | | Leppington North | | Edmondson Park | | Glenfield | |
|---|---|---|---|---|---|---|---|---|
| **People** | +20,716 | | + 21,128 | | +22,867 | | +9,269 | |
| **Jobs** | +3,746 | | +10,802 | | +3,219 | | +1,014 | |
| **Homes** | +7,284 | | +7,623 | | + 6,929 | | +3,203 | |
| | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) | Total precinct cost ($M) | Apportioned to precinct growth ($M) |
| Transport | 692 | 646 | 871 | 819 | 503 | 462 | 201 | 146 |
| Water | 1,611 | 1,610 | 1,781 | 1,781 | 2,017 | 1,987 | 1,462 | 1,455 |
| Open space, bushland, waterways and tree planting | 1,784 | 948 | 1,541 | 837 | 1,454 | 675 | 1,876 | 1,445 |
| Education, health and culture | 245 | 178 | 203 | 148 | 307 | 187 | 165 | 102 |
| Justice, Fire & Rescue, and Police | 95 | 94 | 93 | 93 | 78 | 78 | 83 | 83 |
| Energy, digital and waste | 175 | 171 | 173 | 169 | 162 | 158 | 76 | 73 |
| **Total ($M)** | **4,600** | **3,647** | **4,663** | **3,846** | **4,520** | **3,546** | **3,863** | **3,303** |
| **Total land requirement (ha)** | **182** | | **179** | | **166** | | **178** | |

## Sector proposals for each precinct

The following tables summarise the sector proposals identified, costed and apportioned to each precinct under the Thriving Metropolitan Cluster scenario. These also identify potential funding source and relevant place outcome indicators that the proposal would contribute to.

**Table 5-83:** Penrith Centre Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Penrith trunk mains 3 | General NSW Government | P20, P18 |
| Penrith water recycling plant upgrade | Customer | P20, P19 |
| Wastewater overflow source control (Penrith Centre) | Customer | P19, P21 |
| Wastewater pump upgrade (pump) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 1 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Penrith city park | Regional and local | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space, along the road network and principal bicycle network | Private | P21, P18, P16 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Penrith courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Penrith Centre electricity distribution works | Customer | P17, P18 |

**Table 5-84:** Penrith West Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Castlereagh Road upgrade – Museum Drive to Coreen Avenue | Combination General NSW Government and development contributions | P12 |
| M4 Smart Motorway - Penrith To Emu Plains | General NSW Government | P12 |
| **Water and stormwater** | | |
| Penrith Lakes pump | General NSW Government | P20, P18 |
| Penrith pump 1 | General NSW Government | P20, P18 |
| Penrith reservoir | General NSW Government | P19, P21 |
| Penrith trunk mains 4 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 42 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and along the road network | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sports facilities | Regional and local | P5, P21 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Penrith west electricity distribution works | Customer | P17, P18 |
| South Penrith zone substation | Customer | P17, P18 |

**Table 5-85:** Penrith Lakes Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 83 hectares | Combination General NSW Government and development contributionst | P19, P16, P18 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Penrith Lakes electricity distribution works | Customer | P17, P18 |

**Table 5-86:** South Penrith and Glenmore Park Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Mulgoa Road upgrade – Glenmore Parkway to Jeanette Street | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| Glenmore Park water pumping station upgrade | Customer | P20 |
| Penrith pump 2 | General NSW Government | P20, P18 |
| Penrith trunk mains 5 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 5 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 250 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space and along the road network | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management - channel stabilisation | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Mulgoa zone substation | Customer | P17, P18 |
| South Penrith and Glenmore Park electricity distribution works | Customer | P17, P18 |

**Table 5-87:** Cranebrook Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 6 tennis courts | Regional and local | P5, P21 |
| Biodiversity conservation - 74 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 86 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Cranebrook ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Cranebrook electricity distribution works | Customer | P17, P18 |
| Cranebrook new electricity feeders | Customer | P17, P18 |

**Table 5-88:** Jordan Springs Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 6 tennis courts | Regional and local | P5, P21 |
| Biodiversity conservation - 120 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in local open space along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 546 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school (opened July 2020) | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Jordan Springs electricity distribution works | Customer | P17, P18 |

**Table 5-89:** Ropes Crossing Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 18 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 385 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Ropes Crossing electricity distribution works | Customer | P17, P18 |

**Table 5-90:** Kingswood and Werrington Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Kingswood and Werrington trunk mains | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 87 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P21, P5, P18 |
| Waterway management – 234 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Holistic storage facility | General NSW Government | P9 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| TAFE NSW Kingswood Campus refurbishment and new buildings | General NSW Government | P14, P15 |
| Western Sydney construction hub | General NSW Government | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Cobham Youth Justice Centre upgrade* | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Kingswood and Werrington electricity distribution works | Customer | P17, P18 |
| Kingswood and Werrington Part 1 Of 2. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |

*project reflects the consolidation and decommissioning of existing youth justice facilities.

**Table 5-91:** St Marys Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| St Marys trunk mains 2 | General NSW Government | P20, P18 |
| St Marys trunk mains 6 | General NSW Government | P20, P18 |
| St Marys trunk mains 9 | General NSW Government | P20, P18 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| St Marys pump 1 | General NSW Government | P20, P18 |
| St Marys pump 2 | General NSW Government | P20, P18 |
| St Marys reservoir | General NSW Government | P20, P18 |
| St Marys water recycling plant upgrade | Customer | P20, P19 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 80 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 401 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| St Marys - Part 1 of 3. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |
| St Marys - Part 2 of 3. Install 2x secondary regulating set along existing secondary gas main | Customer | P17 |
| St Marys electricity distribution works | Customer | P17, P18 |
| Werrington new electricity feeders | Customer | P17, P18 |

**Table 5-92:** St Clair Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Erskine Park water supply zone trunk mains | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 3 local open spaces | Regional and local | P21, P5, P18 |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 47 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing open space and sport and recreation facilities | Regional and local | P5, P21 |
| Waterway management – 99 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Colyton ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| St Clair electricity distribution works | Customer | P17, P18 |

**Table 5-93:** Luxford Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P19, P20, P21 |
| St Marys trunk mains 3 | General NSW Government | P20, P18 |
| St Marys trunk mains 4 | General NSW Government | P20, P18 |
| **Open space, bushland, waterways and tree planting** | | |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 44 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 128 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | | |
| Tregear ambulance station | General NSW Government | P5 |
| **Energy, digital and waste** | | |
| Luxford - Part 1 of 2. Install 1x secondary regulating set along existing secondary gas main | Customer | P17 |
| Luxford electricity distribution works | Customer | P17, P18 |

**Table 5-94:** Mount Druitt Centre and Rooty Hill Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Quakers Hill pump 2 | General NSW Government | P20, P18 |
| Quakers Hill trunk mains 2 | General NSW Government | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| 3 netball courts | Regional and local | P5, P21 |
| 4 bowling greens | Regional and local | P5, P21 |
| Biodiversity conservation - 52 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 116 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Doonside ambulance station | General NSW Government | P5 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Mount Druitt courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Mount Druitt Centre and Rooty Hill - Part 1 of 2. Install 1 x secondary regulating sets along existing secondary gas main | Customer | P17 |
| Mount Druitt Centre and Rooty Hill electricity distribution works | Customer | P17, P18 |

**Table 5-95:** Orchard Hills Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Erskine Park Road extension | Combination General NSW Government and development contributions | P12 |
| Luddenham Road deviation to Erskine Park Road | Combination General NSW Government and development contributions | P12 |
| Wentworth Road upgrade | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| Orchard Hills effluent transfer main and pump | Customer | P20 |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Orchard Hills pump 1 | General NSW Government | P20, P18 |
| Orchard Hills pump 2 | General NSW Government | P20, P18 |
| Orchard Hills reservoir | General NSW Government | P20 |
| Orchard Hills sewer mains | Customer | P20 |
| Orchard Hills trunk mains | Customer | P20 |
| Orchard Hills trunk mains 1 | General NSW Government | P20, P18 |
| Orchard Hills trunk mains 2 | General NSW Government | P20, P18 |
| Orchard Hills wastewater pumping station 1 and rising main | Customer | P20 |
| Orchard Hills wastewater pumping station 2 and rising main | Customer | P20 |
| Orchard Hills water recycling plant | Customer | P20, P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 10 local open spaces | Regional and local | P21, P5, P18 |
| 12 netball courts | Regional and local | P5, P21 |
| 2 sports fields | Regional and local | P5, P21 |
| 6 new tennis courts | Regional and local | P5, P21 |
| Athletic track | Regional and local | P5, P21 |
| Biodiversity conservation - 90 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor sports centre | Combination General NSW Government and development contributions | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space, along the road network and across the precinct | Private | P21, P18, P16 |
| Tree planting in regional open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 669 hectares | General NSW Government | P19, P16, P18 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| New schools for specific purposes | Combination General NSW Government and development contributions | P15, P14 |
| **Energy, digital and waste** | | |
| Develop a new electricity bulk supply point at South Creek | Customer | P17 |
| East Orchard Hills zone substation | Customer | P17, P18 |
| Orchard Hills electricity distribution works | Customer | P17, P18 |
| Orchard Hills secondary extension - Part 1 - 4km of 150mm gas main and a secondary regulating set | Customer | P17 |
| Orchard Hills Secondary Extension - Part 2 - Option 2 - Lay 4km of 150mm gas main and two secondary regulating sets | Customer | P17 |
| Orchard Hills zone substation | Customer | P17, P18 |

**Table 5-96:** Greater Penrith to Eastern Creek multiple precincts infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| Penrith to St Marys rail quadruplication | General NSW Government | P12, P10, P16 |
| Additional trains and services on the T1 Western Line | General NSW Government | P12, P10, P16 |
| M4 Smart Motorway - Penrith To Mays Hill (in delivery) | General NSW Government | P12 |
| M4 west facing ramps at Roper Road | General NSW Government | P12 |
| M7 Motorway upgrade | General NSW Government | P12 |
| Outer Sydney Orbital (Stage 1) – Great Western Highway to The Northern Road | Combination Australian/NSW Government | P12 |
| The Northern Road upgrade – Mersey Road to Glenmore Parkway; Glenmore Parkway to Jamison Road (in delivery) | Combination Australian/NSW Government | P12 |
| Mulgoa Road upgrade – Jeanette Street to Blaikie Road; Blaikie Road to Union Road | Combination General NSW Government and development contributions | P12 |
| Mulgoa Road, Penrith – Union Road to Museum Drive including railway bridge upgrade (in delivery) | Combination Australian/NSW Government | P12 |
| Mamre Road upgrade - M4 To Erskine Park Road | Combination General NSW Government and development contributions | P12 |
| Werrington Road extension – M4 To Erskine Park Road extension | Combination General NSW Government and development contributions | P12 |
| Cycling infrastructure for the principal bicycle network | Combination General NSW Government and development contributions | P12, P21, P16 |
| Rapid Bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Mount Druitt | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Penrith to Rouse Hill via Marsden Park | Combination General NSW Government and development contributions | P12, P10, P16 |
| New local bus services | General NSW Government | P12, P10, P16 |
| **Water and stormwater** | | |
| Creek bank stabilisation | Regional and local | P19, P20, P21 |
| Glenmore Park main upgrade | Customer | P20 |
| Local stormwater harvesting | Regional and local | P19, P21, P20 |
| Penrith Lakes main | General NSW Government | P20, P18 |
| Penrith trunk mains 1 | General NSW Government | P20, P18 |
| Penrith trunk mains 2 | General NSW Government | P20, P18 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Quakers Hill to St Marys advanced water treatment plant - transfer pipeline and pump | Customer | P20, P18 |
| Quakers Hill trunk mains 1 | General NSW Government | P20, P18 |
| Rainwater tanks | Customer | P19, P21 |
| St Marys trunk mains 1 | General NSW Government | P20, P18 |
| St Marys trunk mains 10 | General NSW Government | P20, P18 |
| St Marys trunk mains 5 | General NSW Government | P20, P18 |
| St Marys trunk mains 7 | General NSW Government | P20, P18 |
| St Marys trunk mains 8 | General NSW Government | P20, P18 |
| Stormwater bypass pipes | Regional and local | P20 |
| Street tree planting with passive irrigation stormwater management function | Regional and local | P20, P19, P18 |
| Wastewater pump upgrade (pump and rising main) | Customer | P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Tree planting projects | Private | P21, P18, P16 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Community health facilities | General NSW Government | P5, P6 |
| Nepean Blue Mountains Local Health District (Additional beds and emergency treatment spaces) | General NSW Government | P5 |
| Secondary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Smart Western City Program - Community Engagement - community feedback platform,3D DAs/digital twin public access, council app, community feedback AI processing engine | General NSW Government | P13 |
| Smart Western City Program - Data Sharing - data sharing platform, city dashboards, integration platform, interface with third part organisation, data monetisation, data standards definition | General NSW Government | P13 |
| Smart Western City Program - Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P13 |
| Smart Western City Program - Local Jobs/Working from Home - digital literacy eLearning platform, smart work hub, start-up hub | General NSW Government | P13 |
| Smart Western City Program - Smart Monitoring - water sensors, environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT platform, AI platform, predictive model, urban control centre | General NSW Government | P13 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Smart Western City Program - Smart Planning and Management - predictive maintenance platform/model, digital asset register, digital twin infrastructure, VR consultation platform, building energy efficiency solution, advanced metering infrastructure, electricity demand optimisation | Private | P13 |
| Smart Western City Program - Smart Public Space - smart poles, CCTV, video analytics platform, video analytics model, movement enabled lights/smart lighting, screen for public information, smart benches, smart citizen lab | General NSW Government | P13 |
| Smart Western City Program - Smart Transport - sensors/cameras/adaptive signalling in pedestrian zones, parking sensors, on-demand public transport app, road markings for CAVs, multi-mode real-time traffic updates and dynamic routing, mobility as a service | General NSW Government | P13 |

**Table 5-97:** Infrastructure proposals required for Greater Penrith to Eastern Creek but located outside – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Brine management upgrade at Quakers Hill (transfer pipelines, storage tank and pump) | Customer | P20 |
| Quakers Hill pump 1 | General NSW Government | P20, P18 |
| Quakers Hill reservoir | General NSW Government | P20, P18 |
| Quakers Hill trunk mains outside initial PIC area | General NSW Government | P20, P18 |
| Quakers Hill water recycling plant upgrade | Customer | P20, P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Gateway regional park | Combination General NSW Government and development contributions | P21, P5, P18 |
| **Education, health and culture** | | |
| Blacktown and Mount Druitt Hospital redevelopment | General NSW Government | P5, P6 |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Major cultural facility enhancement | Combination General NSW Government and development contributions | P9 |
| Western Sydney Local Health District - (Additional beds and emergency treatment spaces) | General NSW Government | P5 |
| **Justice, Fire & Rescue, and Police** | | |
| Blacktown Courthouse expansion/upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Erskine Park fire station | Combination General NSW Government and development contributions | P7 |
| Francis Greenway Correctional Centre expansion (former John Morony) | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Circular economy hub | Private | P16, P18 |

**Table 5-98:** Agribusiness Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station agribusiness | Customer | P19 |
| Wastewater pump station agribusiness south | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 3 netball courts | Regional and local | P5, P21 |
| 9 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 240 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 306 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Agribusiness (Greendale Road) secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Agribusiness electricity distribution works | Customer | P17, P18 |

**Table 5-99:** Northern Gateway Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Western Sydney bus depot | Combination General NSW Government and development contributions | P12, P16 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Northern Gateway | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 76 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Open space in Sydney Science Park | Combination General NSW Government and development contributions | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 228 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney screen industry production hub | Combination General NSW Government and development contributions | P9 |
| **Justice, Fire & Rescue, and Police** | | |
| Badgerys Creek fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Northern Gateway electricity distribution works | Customer | P17, P18 |
| Science Park zone substation | Customer | P17, P18 |
| Sydney Science Park (Northern Gateway). Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-100:** Aerotropolis Core Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 7 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 53 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Central Wianamatta regional park | Combination General NSW Government and development contributions | P21, P5, P18 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 227 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Aerotropolis ambulance station | General NSW Government | P5 |
| Aerotropolis education centre | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| New secondary school (South West Growth Area (north) secondary school community group) | Combination General NSW Government and development contributions | P14, P15 |
| Western Sydney central library | Combination General NSW Government and development contributions | P9, P13 |
| **Justice, Fire & Rescue, and Police** | | |
| Bringelly fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Aerotropolis core electricity distribution works | Customer | P17, P18 |
| Aerotropolis core secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Aerotropolis zone substation | Customer | P17, P18 |
| Aerotropolis core secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Aerotropolis zone substation | Customer | P17, P18 |

**Table 5-101:** Badgerys Creek Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Badgerys Creek | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 17 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting across the precinct | Private | P21, P18, P16 |
| Tree planting along arterial roads and the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 79 hectares | General NSW Government | P19, P16, P18 |
| **Justice, Fire & Rescue, and Police** | | |
| Badgerys Creek police hub | Combination General NSW Government and development contributions | P7, P8 |
| **Energy, digital and waste** | | |
| Badgerys Creek electricity distribution works | Customer | P17, P18 |
| Circular economy hub | Private | P16, P18 |

Table 5-102: Mamre Road Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Southern Link Road, Mamre Road to Wallgrove Road | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Mamre Road | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 29 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor sporting facility | Combination General NSW Government and development contributions | P5, P21 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 55 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Mamre Road electricity distribution works | Customer | P17, P18 |
| Mamre Road secondary extension. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-103:** Kemps Creek Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 115 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Multifunctional linear park along creek corridors | Combination General NSW Government and development contributions | P21, P5, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the arterial road network and principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 134 hectares | General NSW Government | P19, P16, P18 |
| **Energy, digital and waste** | | |
| Kemps Creek electricity distribution works | Customer | P17, P18 |

**Table 5-104:** North Luddenham Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P19, P21 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 21 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the arterial road network and principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 50 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Artist and creative industries precinct | Combination General NSW Government and development contributions | P9 |
| Holistic storage facility | General NSW Government | P9 |
| **Energy, digital and waste** | | |
| North Luddenham electricity distribution works | Customer | P17, P18 |

**Table 5-105:** Rossmore Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| Biodiversity conservation - 86 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Multifunctional linear parks along creek corridors | Combination General NSW Government and development contributions | P21, P5, P18 |
| Tree planting in open space | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 98 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| North Rossmore fire station | Combination General NSW Government and development contributions | P7 |
| **Energy, digital and waste** | | |
| Rossmore electricity distribution works | Customer | P17, P18 |

**Table 5-106:** Wianamatta South Creek Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Open space, bushland, waterways and tree planting** | | |
| 10 netball courts | Regional and local | P5, P21 |
| Biodiversity conservation - 53 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Tree planting in open space and across the precinct | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 1,084 hectares | General NSW Government | P19, P16, P18 |

**Table 5-107:** Austral Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Austral | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | Regional and local | P21, P5, P18 |
| Biodiversity conservation - 70 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in open space | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 176 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Austral electricity distribution works | Customer | P17, P18 |
| Austral Fifteenth Avenue. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |
| Austral zone substation | Customer | P17, P18 |
| Develop an electricity bulk supply point at Kemps Creek | Customer | P17 |

**Table 5-108:** Leppington North Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Commuter car park - Leppington Station | General NSW Government | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Open space on Camden Valley Way, Leppington | General NSW Government | P21, P5, P18 |
| Aquatic facility | Combination General NSW Government and development contributions | P5, P21 |
| Biodiversity conservation - 113 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Netball courts | Regional and local | P5, P21 |
| Skate facility | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Tree planting in regional open space along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrades to existing sport facilities | Regional and local | P5, P21 |
| Waterway management – 171 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| Leppington ambulance station | General NSW Government | P5 |
| New school for specific purposes | Combination General NSW Government and development contributions | P14, P15 |
| Primary school upgrades | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Leppington North electricity distribution works | Customer | P17, P18 |

**Table 5-109:** Edmondson Park Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Commuter car park - Edmondson Park Station | General NSW Government | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Prospect South to Macarthur drinking water distribution system link - Carnes Hill To Raby | Customer | P19, P21 |
| Wastewater pump station Edmondson Park North | Customer | P19 |
| Wastewater pump station Edmondson Park South | Customer | P19, P20 |
| **Open space, bushland, waterways and tree planting** | | |
| 1 local open space | Regional and local | P21, P5, P18 |
| 3 sports fields | Regional and local | P5, P21 |
| Biodiversity conservation - 286 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Lawn bowls green | Regional and local | P5, P21 |
| Sports field | Regional and local | P5, P21 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Tree planting in regional open space and along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Waterway management – 64 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New high school | Combination General NSW Government and development contributions | P14, P15 |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Edmondson Park electricity distribution works | Customer | P17, P18 |
| Edmondson Park Soldiers Parade. Secondary gas mains extension and 1 x secondary regulating set | Customer | P17 |

**Table 5-110:** Glenfield Precinct infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Cambridge Avenue upgrade and extension to Campbelltown Road | Combination General NSW Government and development contributions | P12 |
| **Water and stormwater** | | |
| End of pipe stormwater basins (gross pollutant traps, biofiltration, detention basins, open water) | Regional and local | P18, P20 |
| Wastewater pump station Glenfield | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| 2 local open spaces | Regional and local | P21, P5, P18 |
| Aquatic facility in Glenfield | Combination General NSW Government and development contributions | P5, P21 |
| Biodiversity conservation - 105 hectares | Combination General NSW Government and development contributions | P19, P16, P18 |
| Indoor facility | Combination General NSW Government and development contributions | P5, P21 |
| Skate facility | Regional and local | P5, P21 |
| Tree planting in local open space | Private | P21, P18, P16 |
| Tree planting along the principal bicycle network | Combination General NSW Government and development contributions | P21, P18, P16 |
| Upgrade to existing sport facility | Regional and local | P5, P21 |
| Waterway management – 119 hectares | General NSW Government | P19, P16, P18 |
| **Education, health and culture** | | |
| New primary school | Combination General NSW Government and development contributions | P14, P15 |
| **Energy, digital and waste** | | |
| Glenfield electricity distribution works | Customer | P17, P18 |

**Table 5-111:** Western Sydney Aerotropolis Growth Area and Austral to Glenfield Corridor multiple precincts infrastructure proposal list – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Transport** | | |
| Sydney Metro – Western Sydney Airport | Combination Australian/NSW Government | P12, P10, P16 |
| South West Rail Link extension | Combination Australian/NSW Government | P12, P10, P16 |
| Western Sydney freight line | Combination Australian/NSW Government | P12, P16 |
| M12 Motorway | Combination Australian/NSW Government | P12 |
| Outer Sydney Orbital (stage 1) – Great Western Highway to The Northern Road | Combination Australian/NSW Government | P12 |
| The Northern Road upgrade – Peter Brock Drive to Mersey Road; Mersey Road to Glenmore Parkway (in delivery) | Combination Australian/NSW Government | P12 |
| Bringelly Road upgrade (stage 2, in delivery) | Combination Australian/NSW Government | P12 |
| Devonshire Road upgrade and extension to Mamre Road with New M12 Interchange | Combination General NSW Government and development contributions | P12 |
| Eastern (Airport) Ring Road, The Northern Road to Elizabeth Drive | Combination General NSW Government and development contributions | P12 |
| Edmondson Avenue, Gurner Avenue and Fourth Avenue upgrades | Combination General NSW Government and development contributions | P12 |
| Elizabeth Drive upgrade (stage 1, 2 and 3) - The Northern Road to Badgerys Creek Road; Badgerys Creek Road to Western Road; Western Road to Mamre Road | Combination General NSW Government and development contributions | P12 |
| Fifteenth Avenue upgrade and extension to Aerotropolis Core | Combination General NSW Government and development contributions | P12 |
| Pitt Street upgrade and extension to Devonshire Road | Combination General NSW Government and development contributions | P12 |
| Other new State and regional roads – Aerotropolis | Combination General NSW Government and development contributions | P12 |
| Rapid Bus - Aerotropolis to Blacktown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Campbelltown | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Liverpool | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Mount Druitt | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Aerotropolis to Penrith | Combination General NSW Government and development contributions | P12, P10, P16 |
| Rapid Bus - Liverpool to Camden | General NSW Government | P12, P16 |
| New local bus services | General NSW Government | P12, P16 |
| **Water and stormwater** | | |
| Drinking water - outlet mains - Glenfield and Edmondson Park | Customer | P20, P19, P18 |

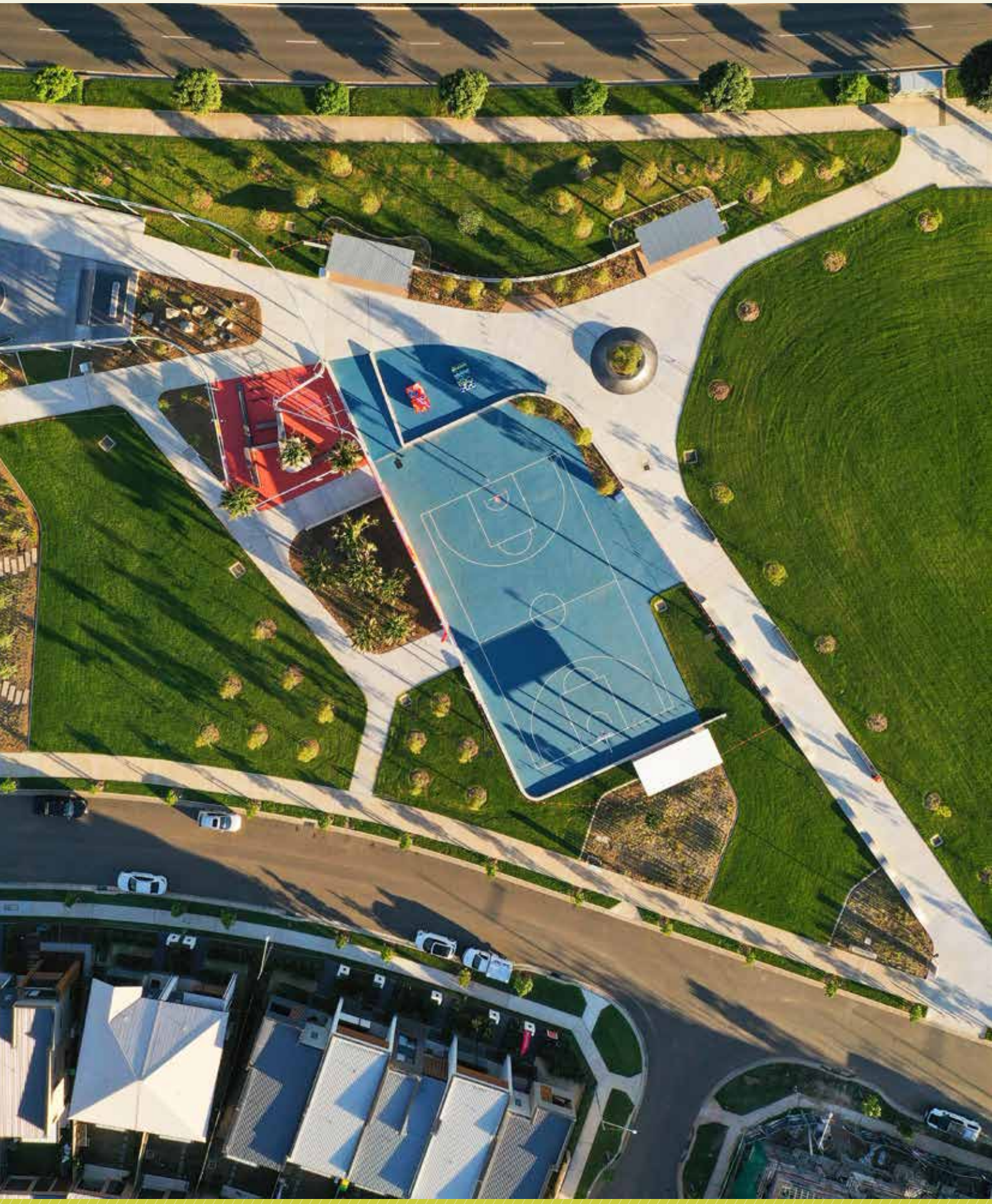
| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Drinking water - outlet mains new - Aerotropolis | Customer | P20 |
| Drinking water - outlet mains upgrade - Aerotropolis | Customer | P20 |
| Drinking water - reservoirs - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Aerotropolis | Customer | P20 |
| Drinking water - rising mains - Glenfield and Edmondson Park | Customer | P20, P19, P18 |
| Effluent management brine transfer | Customer | P19, P20 |
| Effluent management transfer to Nepean River | Customer | P20 |
| Effluent management transfer to South Creek | Customer | P20 |
| High quality recycled water – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Hoxton Park recycled water scheme network | General NSW Government | P19 |
| Local stormwater harvesting and irrigation | Regional and local | P19, P21 |
| On-lot stormwater measures | Customer | P19, P21 |
| Prospect South to Macarthur drinking water distribution system link | Customer | P19 |
| Rainwater tanks | Customer | P19, P21 |
| Recycled water outlet - Glenfield System | General NSW Government | P20 |
| Recycled water pumping station – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Recycled water reservoirs – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Recycled water rising mains - Glenfield System | General NSW Government | P20 |
| Recycled water rising mains – Upper South Creek System | General NSW Government | P20, P18 |
| Stormwater diversion pipes | Private | P19, P21 |
| Stormwater harvesting storage | Regional and local | P19 |
| Stormwater pipes and pits in the street | Private | P19, P21 |
| Street tree planting with passive irrigation stormwater management function | Regional and local | P20, P19, P18 |
| Upper South Creek recycled water outlet – Upper South Creek System | General NSW Government | P20, P21, P18 |
| Upper South Creek advanced water recycling centre | Customer | P20, P19, P18 |
| Upper South Creek advanced water recycling centre (reverse osmosis) | Customer | P19, P20, P18 |
| Wastewater network (trunk) | Customer | P19 |
| **Open space, bushland, waterways and tree planting** | | |
| Gateway regional park | Combination General NSW Government and development contributions | P21, P5, P18 |
| **Education, health and culture** | | |
| Aboriginal cultural infrastructure | Combination General NSW Government and development contributions | P9, P6 |
| Community health facilities | General NSW Government | P5, P6 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Energy, digital and waste** | | |
| 132kV transmission backbone | Customer | P17, P18 |
| Smart Western City Program - Community Engagement - community feedback platform,3D DAs/digital twin public access, council app, community feedback AI processing engine | General NSW Government | P13 |
| Smart Western City Program - Data Sharing - data sharing platform, city dashboards, integration platform, interface with third part organisation, data monetisation, data standards definition | General NSW Government | P13 |
| Smart Western City Program - Internet Connectivity - 4G, 5G, LPWAN, Wi-Fi, fibre optic fixed, 10GB fibre network | General NSW Government | P13 |
| Smart Western City Program - Local Jobs/Working from Home - digital literacy eLearning platform, smart work hub, start-up hub | General NSW Government | P13 |
| Smart Western City Program - Smart Monitoring - water sensors, environmental sensors, weather station, soil sensor, traffic flow sensor, bin sensor, IoT platform, AI platform, predictive model, urban control centre | General NSW Government | P13 |
| Smart Western City Program - Smart Planning and Management - predictive maintenance platform/model, digital asset register, digital twin infrastructure, VR consultation platform, building energy efficiency solution, advanced metering infrastructure, electricity demand optimisation | Private | P13 |
| Smart Western City Program - Smart Public Space - smart poles, CCTV, video analytics platform, video analytics model, movement enabled lights/smart lighting, screen for public information, smart benches, smart citizen lab | General NSW Government | P13 |
| Smart Western City Program - Smart Transport - sensors/cameras/adaptive signalling in pedestrian zones, parking sensors, on-demand public transport app, road markings for CAVs, multi-mode real-time traffic updates and dynamic routing, mobility as a service | General NSW Government | P13 |

**Table 5-112:** Infrastructure proposal required for Western Sydney Aerotropolis Growth Area and Austral to Glenfield Corridor but located outside – 20 years (Thriving Metropolitan Cluster)

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| **Water and stormwater** | | |
| Drinking water - pumping stations - Aerotropolis | Customer | P20 |
| Drinking water - pumping stations - Glenfield and Edmondson Park | Customer | P20, P19 |
| Drinking water - reservoirs - Glenfield and Edmondson Park | Customer | P19 |
| Glenfield water recycling plant upgrades for recycled water supply | Customer | P20, P21, P18 |
| Hoxton Park recycled water scheme treatment upgrades | Customer | P19 |
| Macarthur water filtration plant amplification | Customer | P20, P21, P18 |
| Malabar system - wastewater pump upgrade | Customer | P20 |
| Malabar wet weather overflow abatement program | Customer | P20, P21, P18 |
| Northern Georges River submain upgrade | Customer | P20 |
| Penrith water recycling plant advanced treatment (reverse osmosis) | Customer | P19 |
| Prospect water filtration plant amplifications | Customer | P20, P21, P18 |
| Recycled water pumping stations - Glenfield System | General NSW Government | P20 |
| Recycled water reservoirs - Glenfield System | General NSW Government | P20 |
| Southern and western suburbs ocean outfall sewer augmentation | Customer | P20 |
| Treatment upgrades Glenfield water recycling plant | Customer | P19 |
| Treatment upgrades Liverpool water recycling plant | Customer | P19 |
| **Education, health and culture** | | |
| Campbelltown Hospital redevelopment | General NSW Government | P5, P6 |
| Cecil Hills High School upgrade | Combination General NSW Government and development contributions | P14, P15 |
| Children's Hospital Westmead redevelopment | General NSW Government | P5, P6 |
| Liverpool Innovation Precinct | General NSW Government | P5, P6 |
| Nepean Hospital and integrated services | General NSW Government | P5, P6 |
| Prestons ambulance station | General NSW Government | P5 |

| Infrastructure proposals | Potential funding source | Place outcome indicator(s) |
|---|---|---|
| Secondary School expansion (South West Growth Area (north) secondary school community group) | Combination General NSW Government and development contributions | P14, P15 |
| **Justice, Fire & Rescue, and Police** | | |
| Catherine Fields fire station | Combination General NSW Government and development contributions | P7 |
| Erskine Park fire station | Combination General NSW Government and development contributions | P7 |
| Liverpool courthouse expansion and upgrade | Combination General NSW Government and development contributions | P8, P7 |
| Macquarie Fields police station upgrade | Combination General NSW Government and development contributions | P7 |
| South West Sydney courthouse expansion and upgrade | Combination General NSW Government and development contributions | P8, P7 |
| **Energy, digital and waste** | | |
| Additional capacity at existing Sydney West electricity bulk supply point | Customer | P17, P18 |
| South Erskine Park zone substation | Customer | P17, P18 |



# 6 Step 3: Analysis of scenarios and precincts to identify preferred sequencing

## The draft PIC presents a proposed sequencing plan for the initial PIC area.

This proposed plan was directed informed by an economic and cost-effectiveness analysis that acknowledges the long-term horizon of the PIC process over 40 years.

The *Economic Evaluation* at **Appendix 6** details the liveability, productivity and sustainability criteria that allowed the place-based benefits of each scenario to be measured in monetary terms (relative to costs over a 40 year horizon).

This analysis (see *Table 6-1*) informed the preferred sequencing within precincts. It found that the Thriving Aerotropolis and Thriving Metropolitan Cluster scenarios will bring about the greatest benefits over 40 years.

The net benefits for the community under these scenarios is $3.5 to $4 billion, compared to $-1.1 billion for the Growing Parkland City scenario, where growth is constrained to that permitted under existing planning controls, with no further rezoning of land around major new infrastructure.

*Table 6-2* shows the results of the economic evaluation at the precinct level under the Thriving Aerotropolis scenario. While a Thriving Aerotropolis achieves a slightly lower net benefit than the Thriving Metropolitan Cluster scenario, it is more likely to facilitate a greater number of jobs – and knowledge-intensive jobs – for the people and industries of the Western Parkland City, thus improving equity outcomes for the growing number of local workers.

Essential to this analysis is the potential that other scenarios could mean these jobs are to other parts of Greater Sydney, limiting the ability to achieve the metropolis of three city vision.

Further, cost-effectiveness analysis determined the cost of accommodating a new resident or job in each of the 28 precincts, which provides similar insight to the relative performance of precincts as the cost-benefit analysis.

**Table 6-1:** The net benefits of each scenario relative to the Base Case, present value, $billion*

| | Growing Parkland City | Thriving Aerotropolis | Thriving Metropolitan Cluster |
|---|---|---|---|
| Total capital cost | -5.9 | -15.6 | -15.4 |
| Total benefit (incl spill overs) | 3.9 | 15.5 | 15.9 |
| Total benchmark | 0.8 | 3.6 | 3.6 |
| **Net benefit (with benchmarking)** | **-1.1** | **3.5** | **4.0** |

* Note: Using a 7 per cent discount rate.

**Table 6-2:** The net benefits per person and job for each precinct relative to the Base Case, present value, $'000 per person and job - Thriving Aerotropolis

| Precinct | Thriving Aerotropolis – net benefits per person and job ($'000/person and job) |
|---|---|
| **Residential precincts** | |
| South Penrith and Glenmore Park | 57 |
| Cranebrook | -163 |
| Orchard Hills | 68 |
| St Clair | 26 |
| Luxford | 2 |
| Rossmore | -32 |
| Austral | 104 |
| Edmondson Park | 58 |
| **Mixed use precincts** | |
| Penrith Centre | 7 |
| Kingswood and Werrington | 8 |
| St Marys | 76 |
| Mount Druitt Centre and Rooty Hill | 55 |
| Leppington North | 103 |
| Glenfield | -24 |
| Glenfield (sensitivity) | 5 |
| **Employment precincts** | |
| Penrith West | -43 |
| Agribusiness | -90 |
| Northern Gateway | 8 |
| Mamre Road | -61 |
| Aerotropolis Core | 18 |
| Badgerys Creek | -195 |
| North Luddenham | -76 |
| Kemps Creek | -361 |

The economic evaluation analysis was combined with a structured process to develop and assess sequencing options. This work guided the proposed sequencing of precincts, and initial places within them. The proposed sequencing of precincts will achieve more orderly development – this means a development sequence that makes best use of public investment, while making a city hat offers more opportunities for more people.

A range of inputs, collaboration and engagement supported the process, including:

- the economic evaluation, including net benefits by precinct and cost-effectiveness analysis
- strategic investigations by the Planning Partnership, the Western City Parkland Authority and through local strategic planning statements
- the locations of new Sydney Metro stations and the spatial impacts of existing and proposed major transport corridors
- current and known rezonings, planning proposals and State significant development applications
- collaboration with partners including the Planning Partnership, Western City Parkland Authority, the Department of Planning Industry and Environment, and Penrith, Blacktown, Campbelltown, Camden and Liverpool councils
- stakeholder engagement over July to October 2020 as outlined in the Consultation Outcomes Report.

The proposed sequencing plan reflects the outcomes of the technical process and continuous refinement through collaboration and engagement.

# 7 Where to from here?

The draft PIC marks the start of a place-based approach to developing the initial PIC area, under the auspices of the City Deal signed by three levels of government.

Community and stakeholder feedback will inform the Commission's recommendations to the NSW Government.

In the interests of transparency and to provide the full analysis that is the foundation of the PIC process, this Technical Report is an essential companion document to the draft PIC.

Before making recommendations to the NSW Government and proceeding through all the steps in the PIC model the Commission is seeking feedback on the collaborative work to date.

## 7.1 Consultation

People in the Western Parkland City must be informed and can provide feedback on the draft PIC. The Commission will actively engage with representative groups, industry, councils and the community to listen and understand people's thoughts on the outcomes of the PIC process to date.

This will include round-table discussions, briefings and information drop-in sessions, as well as online and via focus groups and deliberative forums.

Details of key drop-in sessions and forums will be available on the Commission's website.

## 7.2 Providing feedback

The Commission values and encourages the input of the community, business and the development industry. Everyone now has the opportunity to provide feedback between **9 November to 18 December**.

Visit the Commission's website **www.greater.sydney** to find out more about the Commission and the PIC Program, and to provide feedback or register for a feedback session.

## 7.3 Contact details

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Appendix 1: Western Parkland City analysis

Appendix 2: Place Outcomes Framework - baseline performance

Appendix 3: Western Sydney PIC Land Use Scenario Forecasts

Appendix 4: Baseline Infrastructure and Services Assessment

Appendix 5: Climate Change Risk Assessment

Appendix 6: Economic Evaluation

**To view all appendices (other than Appendix 2, which follows), visit:**

www.greater.sydney/project/western-sydney-pic-program

## Appendix 2: Place Outcomes Framework - baseline performance

| | Indicator | Measure | Purpose |
|---|---|---|---|
| Liveability | **Physical population health** | Overweight and obesity rates | This indicator monitors one aspect of the physical health of the population. It is an important aspect to help understand community health and resilience. |
| | **Population health and wellbeing** | Outpatient and community care | This indicator monitors preventable health visits which is important to help understand population health and wellbeing. |
| | | Improving service levels in hospitals | This indicator examines the level of service provided to the community by hospital facilities and is fundamental in understanding community health and resilience. |
| | **A safer community** | Crime rates | This indicator examines crime rates, which is a fundamental aspect to help understand an area's safety. |
| | **Efficient justice services to meet the needs of people** | Efficient resolution of legal disputes | This indicator examines the ability of the court system to efficiently address legal disputes and is related to understanding community safety. |
| | | Time to justice | This indicator examines the ability of the court system to efficiently process arrests and is related to understanding community safety. |
| | | Court backlog | This indicator measures the ability of the court system to efficiently process court cases and is related to understanding community safety. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| Reduce the percentage of the population that are overweight and obese. | Proportion of overweight or obese people as a proportion of the population. | N/A – Statistics are by local health district | 56.6 % SWSLHD<br>64.1% NBMLHD<br>53.5% WSLHD | Health |
| Improve outpatient and community care. | Reduce preventable visits to hospital by 5% by caring for people in the community by 2023. | NBMLHD 21.9%<br>NSLHD 17.5%<br>SESLHD 19.9%<br>SWSLHD 18.8%<br>SVHN 16%<br>SLHD 16.1%<br>SCHN 30.7%<br>WSLHD 16.5% | NBMLHD 21.9%<br>SWSLHD 18.8%<br>WSLHD 16.5% | Health |
| Improve service levels in hospitals. | 100% of all triage category 1, 95% of triage category 2 and 85% of triage category 3 patients commencing treatment on time by 2023. | NBMLHD: T1 100%; T2 69%; T3 64%<br>NSLHD: T1 100%; T2 81%; T3 79%<br>SESLHD: T1 100%; T2 81%; T3 78%<br>SWSLHD: T1 100%; T2 75%; T3 78%<br>SVHN: T1 100%; T2 85%; T3 69%<br>SLHD: T1 100%; T2 84%; T3 78%<br>SCHN: T1 100%; T2 71%; T3 82%<br>WSLHD: T1 100%; T2 80%; T3 71% | NBMLHD: T1 100%; T2 69%; T3 64%<br>SWSLHD: T1 100%; T2 75%; T3 78%<br>WSLHD: T1 100%; T2 80%; T3 71% | Health |
| A safer community with maintained and reduced crime rates. | Rate per 100,000 of adult population of recorded crimes. | 7,260 per 100,000 adult population | Average of 4,544 per 100,000 adult population | Justice, Fire & Rescue, and Police |
| A safer community through efficient resolution of legal disputes. | Clearance rate of legal disputes in local and district courts across both criminal and civil legal disputes. | 1,511 per 100,000 adult population of finalisations in the local and higher courts | Local court - 127,227 (Criminal)<br>District Court - 4,302 (Criminal)<br>Supreme Court - 103 (Criminal) | Justice, Fire & Rescue, and Police |
| A safer community through shorter times between arrest and proceeding to trial. | Median number of days – arrest to finalisation (proceeded to trial). | N/A - Statistics are by court type (jurisdiction), not geographical locations | Local Court - 187 days<br>District Court - 713 days<br>Supreme Court - 8<br>47 days | Justice, Fire & Rescue, and Police |
| A safer community through reduction of the number of pending civil and criminal cases. | Number of pending cases (civil and criminal). | N/A - Statistics are by individual courthouses not geographical locations | **Criminal**<br>Local Court – 1,670<br>District Court – 2,039<br>Supreme Court - 112<br>**Civil**<br>Local Court – 1,506<br>District Court – 5,943<br>Supreme Court – 3,301 | Justice, Fire & Rescue, and Police |

## Appendix 2: Place Outcomes Framework - baseline performance

| Indicator | Measure | Purpose |
|---|---|---|
| **Prevalence of cultural infrastructure** | Cultural infrastructure near transport nodes | This indicator examines the percentage of total cultural infrastructure located close to transport nodes. This is important to understand the accessibility of cultural infrastructure. |
| **Accessible affordable and social housing** | Social and affordable housing that is well located | This indicator examines the accessibility of social and affordable housing and how well the provision of social and affordable housing is linked to community needs. It is fundamental in understanding social connectivity and resilience of the community. |
| **Aboriginal participation** | Value of contracting by Aboriginal business in construction projects | This indicator is fundamental in ensuring equitable participation of Aboriginal businesses in construction projects. |
| | Value of contracting by Aboriginal business in goods and services contracts | This indicator is fundamental in ensuring equitable participation of Aboriginal businesses in goods and service contracts. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| Increase the percentage of cultural infrastructure located close to transport hubs. | Percentage of cultural infrastructure located within 2km of transport hubs. | 78.5% (2017) | 58.8% (2017) | Create NSW |
| Accessible affordable and social housing. | Measure 1: Number of social and affordable housing dwellings. | 80,360 | 21,574 | Land and Housing Corporation (LAHC) |
| | | 42,266 | 14,586 | LAHC |
| Increased value of contracting for Aboriginal business in construction projects. | Percentage of construction project value over $1 million project value with Aboriginal Participation. | 0% (FY19/20) | 0% (FY19/20) | NSW Treasury |
| Increased value of contracting for Aboriginal business in goods and service contracts. | Percentage of goods and service contracts awarded to Aboriginal businesses. | 0.5% (FY19/20) | | NSW Treasury |

| | Indicator | Measure | Purpose |
|---|---|---|---|
| Productivity | **Reliable, efficient and safe movement of people and goods** | Fatal and serious crashes on the transport network | Reduced trauma incidents on the roads of the Western Parkland City will show effective road design, successful implementation of the road safety plan as well as availability of other safer transport options for customers. |
| | | Public transport and active transport use | Improvements to the share of travel by public transport represent an improvement in public transport service offering and positive change in behaviour of customers. More journeys on public transport also imply an improvement to the competitiveness of public transport as an alternative to cars. |
| | | Journey time reliability | This indicator monitors the reliability and overall level of customer satisfaction with the transport network which is important to monitor the effectiveness of the transport network. |
| | **Reliable digital connectivity and inclusion** | Australian Digital Inclusion Index (ADII) | The ADII measures access to information and communications technology and the resulting social and economic benefit, affordability and digital ability (skills, online activities, and attitudes towards digital technology). Access to information and communication technologies is essential to living, working and education today. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| Reduce the total number of fatal and serious injury crashes to ensure reliable, efficient and safe movement of people and goods. | Total number of fatal and serious injury crashes over a 5-year average. | 5-year average (2014-18):<br>Fatal = 101.8<br>Serious injury = 2,761<br>Total = 2,862.8 FSI crashes | 5 year average (2014-18):<br>Fatal = 33.4<br>Serious injury = 671<br>Total = 704.4 FSI crashes | Transport for NSW (TfNSW) |
| Increase the share of journeys on public transport and active transport to promote reliable, efficient and safe movement of people and goods. | Measure 1: Mode share of public and active transport (as part of commuting trips) from the annual Household Travel Survey. | Public transport = 26%<br>Active transport = 11% | Public transport = 11%<br>Active transport = 3% | TfNSW |
| | Measure 2: Passenger activity (total boardings and alightings) on the public transport network using Opal ticketing data. | Total = 755,661,381 | Total = 55,734,818 | TfNSW |
| Reliable, efficient and safe movement of people and goods. | Measure 1: Bus journey travel time reliability. | | 95%<br>Note: data is for the initial PIC area | TfNSW |
| | Measure 2: Road journey travel time reliability. | 92.3% | 94.9% | TfNSW |
| | Measure 3: Level of customer satisfaction for public transport modes. | Train – 88%<br>Bus – 91% | Train – 82%<br>Bus – 92% | TfNSW |
| Increase the Western Parkland City ADII score to be similar to those of the Central River City and Eastern Harbour City. | ADII and following sub-indices:<br>• Access sub-index<br>• Affordability sub-index<br>• Digital ability sub-index. | Access: 76.6<br>Affordability: 61.8<br>Digital ability: 53.8 | Access: 77.2<br>Affordability: 62.0<br>Digital ability: 51.0 | Department of Planning, Industry and Environment (DPIE) |

| | Indicator | Measure | Purpose |
|---|---|---|---|
| Productivity | **Provision of quality education to meet emerging demand** | Education space standards for emerging demand | This indicator examines the level of service currently provided by primary, secondary and vocational education and how it aligns with community needs, which is fundamental to understanding the quality of education provision. |
| | | Skills-based training that leads to jobs upskilling and reskilling | The indicator examines the proportion of students completing apprenticeships and traineeships and how education opportunities are matched to emerging demand which is fundamental to understanding the quality skills-based training provision. |
| | **Supporting optimal learning and student performance** | Maintenance of government schools | This indicator examines the percentage of schools that meet facility condition requirements which is important to help understand the quality of education provision. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| Increase the percentage of permanent teaching space (PTS) and provision of quality primary, secondary and vocational education to meet emerging demand, and schools are designed to the latest education standards. | Percentage of permanent teaching spaces at schools and TAFE. | As at May 2019<br>86% PTS<br>14% demountable teaching spaces (DTS) | As at May 2019<br>87% PTS<br>13% DTS | Department of Education (DoE) and TAFE NSW |
| Increase in proportion of students completing primary, secondary and vocational education. | Proportion of students completing apprenticeships and traineeships. | 54% (2013) | 54% (2013) | DoE, TAFE NSW |
| Reduce the maintenance backlog for government schools to ensure a city which supports optimal learning and student performance. | Percentage of schools that meet Facility Condition Index targets of <3%. | 62% (2018) | 64% (2018) | DoE |

| | Indicator | Measure | Purpose |
|---|---|---|---|
| Sustainability | **An environmentally efficient and healthy city** | Air Quality | This indicator examines the community exposure to ambient air quality, which is key to help understand the state of the environment. |
| | | Emissions profiles of greenfield and urban renewal areas | This is important to measure to understand key environmental outcomes, including air pollution and the contribution to emissions over time. |
| | | Waste generation | This indicator examines the overall generation of waste which is important to understanding the transition to a circular economy. |
| | **Clean, affordable and reliable energy** | Energy consumption and renewable energy generation | This indicator examines overall energy consumption and total renewable energy consumption which is key to understanding the level of environmental sustainability. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| 100% of the population enjoys ambient air quality meeting National ambient air quality standards, and NSW clean air measures below 100 to enable an environmentally efficient and healthy city. | NSW Clean Air Measure. | 100 | 107 | NSW Environment Protection Agency (EPA) |
| Urban renewal areas are low carbon (reduced carbon emissions compared to baseline per capita) and greenfield areas are carbon neutral during construction and throughout operations (associated net carbon emissions are equal to zero due emission reductions and offsets). | Measure 1: Total Greenhouse gas emissions by Scope: (Scope 1, 2 and 3). | 23,484,488 tonnes CO2-e (2016-17) | 1,648,143 Tonnes CO2-e (2016-17) | EPA and DPIE |
| | Measure 2: Greenhouse gas emissions by sector. | Residential: 1,078,358 tonnes CO2-e<br>Non-Residential: 569,785 tonnes CO2-e (2016-17) | Residential: 57,503 tonnes CO2-e (2016-17)<br>Non-residential 29,655 tonnes CO2-e (2016-17) | EPA and DPIE |
| | Measure 3: Emissions of CO2-e per dwelling. | 10.81 tonnes Co2-e per dwelling (2016-17) | 12.32 tonnes CO2-e per dwelling (2016-17) | EPA and DPIE |
| | Measure 4: Percentage of new dwellings that have an 'Annual Carbon Offset'. | 0% (2019) | 0% (2019) | EPA and DPIE |
| Reduce the rate of waste generation. | Rate of waste generation per capita. | 2.8 tonnes per capita (2016) | 2.4 tonnes per capita (2016) | DPIE |
| Clean, affordable and reliable energy, reduced energy consumption and increased renewable energy generation. | Measure 1: Total Energy Consumption (MWh and GWh). | 29,179 Giga Watt Hour (2019) | 8,484,905 Mega Watt Hour (2018-19) | Utilities |
| | Measure 2: Total Residential and Commercial Gas Consumption (GJ). | Residential: 20,388,627 GJ<br>Commercial: 10,013,537 GJ | Residential: 1,757,556 GJ<br>Commercial: 3,645,719 GJ | Utilities |

| | Indicator | Measure | Purpose |
|---|---|---|---|
| | | | |
| Environment | **A city that is resilient** | Exposure to climate risk | This indicator examines the number of people that may be exposed to climate related hazards including extreme weather events.<br><br>By measuring and monitoring the number of people exposed to different natural hazards and climate change impacts, informed decisions can be made to manage these risks to reduce adverse effects of exposure. |
| | **A city with healthy waterways and enhanced biodiversity** | Protection of ecosystems and biodiversity | This indicator examines the existence, area and diversity of native vegetation and areas that are currently being actively managed to improve condition. This is important for protecting and enhancing ecosystems and biodiversity that are the backbone of the Parkland City. |
| | | Waterways and water dependent ecosystems | This indicator examines whether water dependant ecosystems are being protected, maintained or restored. This is important to measure as healthy waterways are an essential component in achieving a cool and green Parkland City. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western Sydney District | |
| Improve consideration of natural hazards and potential climate change impacts in new and established areas to inform strategies to reduce community exposure to climate related risks.<br><br>Manage residual risk of climate related hazards within the context of place through planning controls and infrastructure, where relevant or possible. | Number of people (using population per mesh block data) living in areas of climate risk hazards determined from an appropriate climate risk assessment.<br><br>Baseline data is at a point in time and the methodology to determine climate risk and exposure may be refined over time. | | Low risk: 27,388<br>Medium risk: 237,421<br>High risk: 24,242<br>Acute risk: 2,004<br>Note: data is for the initial PIC area | DPIE |
| Terrestrial ecosystems are protected, restored and maintained to enhance biodiversity to create a city with healthy waterways and enhanced biodiversity. | Extent, area and diversity of native vegetation and areas that are under active management. | 6,110ha of native vegetation with around 5% under active management<br>Note: data is for the initial PIC area | | SWC/DPIE |
| Waterways and water dependent ecosystems are protected, maintained or restored to achieve the community environmental values and uses to enable a city with healthy waterways and enhanced biodiversity. | Length, area and/or sentinel sites (monitored) within waterways and water dependent ecosystems in poor, fair, good and very good condition. | Water quality monitoring sites classed as being in Excellent (0.9%), Good (0%), Fair (1.4%), Poor (97.8%) Condition<br>Mapped and/or monitored waterways classed as having Good (13.3%), Moderate (74.6%) or Poor (12.2%) Geomorphic Condition<br>Water dependent vegetation monitoring sites classed as being in Excellent (18.4%), Good (11.3%), Fair (21. 5%), Poor (31.3%), and Very poor (17.8%) Condition<br>Note: data is for the initial PIC area | | SWC/DPIE |

| | Indicator | Measure | Purpose |
|---|---|---|---|
| Sustainability | **A city with sustainable water** | Water resource recovery | This indicator examines water resource recovery which is fundamental in ensuring a city with sustainable water use into the future. |
| | **A cool and green city** | Access to high quality public open space and recreation facilities | This indicator examines the number of dwellings/people that have district parks and large regional parks close to them. This is important as access to high quality is key to creating liveable places and contributes to the vision for the Western Parkland City. |
| | | Green grid connections | This indicator examines the continuity of green corridors in the PIC area. This is important to measure as contiguous vegetation corridors contribute to the vision for the Western Parkland City, creating cool and green places and supporting wildlife movement. |

| Goal | Metric | Baseline findings | | Responsible agency |
|---|---|---|---|---|
| | | Greater Sydney | Western City District | |
| Increase water resource recovery to ensure that 70% of potable water consumed is reused (40 year target). | Annual total of recycled water supplied. | 16 billion litres | | SWC |
| Increase accessibility to high quality public open space and recreation facilities to achieve a cool and green city with high quality and accessible open space. | Measure 1:<br>80% of people and dwellings have access to a 2-5 ha district park within 2km walking distance of their home, which includes at least two of the following within 2km: field sports, outdoor court sports, indoor sports, aquatic sports. | 50-80% of people and dwellings in the initial PIC area | | Western Sydney Planning Partnership (PP) |
| | Measure 2:<br>100% of people and dwellings have access to a major destination/ regional park of more than five hectares within 30-minute travel time from their home on public transport or by vehicle. | 100% of the initial PIC area | | |
| Increased percentage of green grid connections that are contiguous to create a cool and green city and support biodiversity and enable corridors for walking and cycling. | Percent of green corridors and green grid links that have continuous vegetation cover. | 30-37% of green corridors and green grid links in the initial PIC area | | DPIE/PP |

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