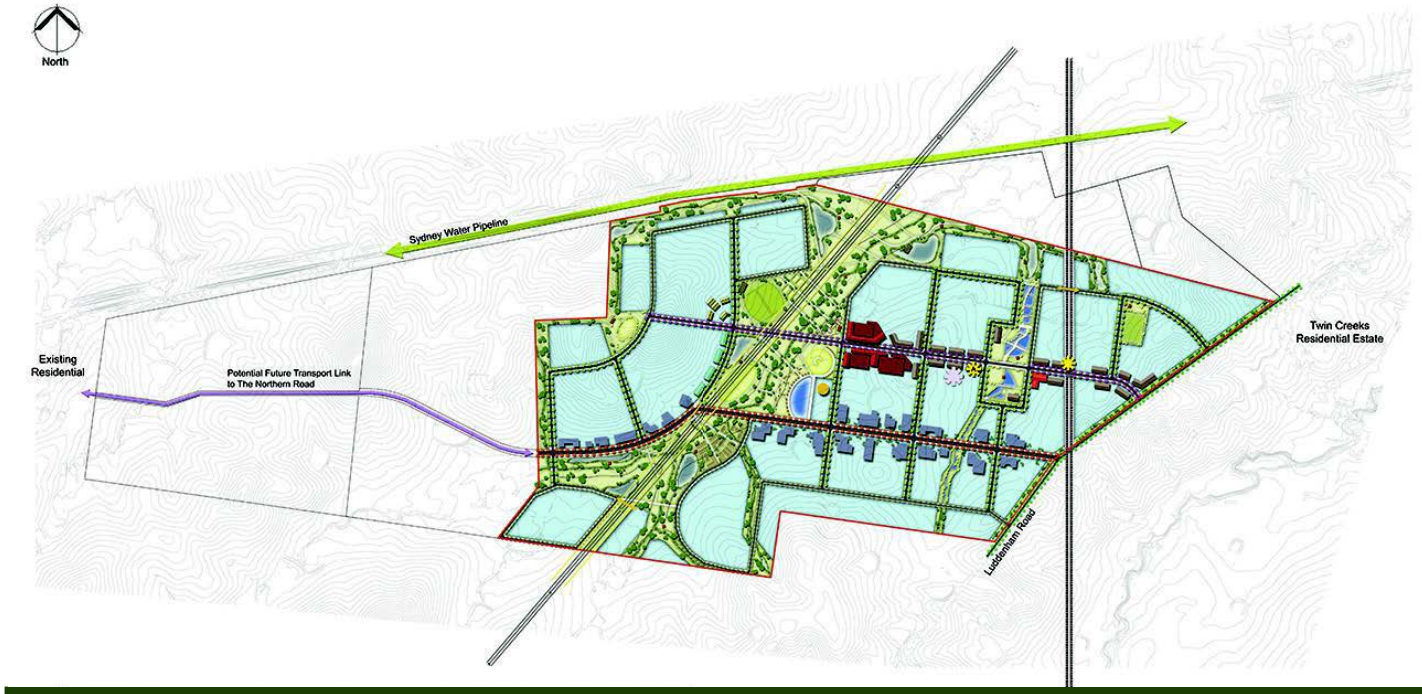
Planning Proposal
Sydney Science Park
Volume 1



March 2014

PENRITH CITY COUNCIL

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Executive Summary

This planning proposal seeks to enable the development of Sydney Science Park, a centre specialising in clustering leading science based businesses, tertiary institutions, research and development providers in an epicentre environment to advance innovation around the important principles of food, energy and health. It is a proposal by E.J Cooper and Son Pty Limited (EJC), a wholly owned company of Baiada.

It is EJC's vision to develop the Sydney Science Park and attract the world's leading scientific professionals and organisations to Western Sydney through the creation of a place built on the fundamental principles of quality architectural and urban design, social cohesion, high connectivity and transport accessibility and environmental excellence. It is a Vision that exceeds the expectations of Government planning policy for job creation in Western Sydney, namely the Broader Western Sydney Employment Area Draft Structure Plan. The development will achieve this not just through the number of jobs but through the tertiary nature of these jobs, their relationship to a strong educational presence and the supporting offering of a quality residential environment where workers can live near their place of employ. A fundamental feature at the centre of Sydney Science Park is a town centre that will be vibrant, safe and unique in comparison to other work places in Australia. It will be a place of activity.

Through master plan design, Sydney Science Park will develop 440,000m2 of employment and educational floor spaces, offer appropriate dwellings for workers, students and new residents, significant tracts of embellished open spaces and integrate the site's environmental features into parklands, water bodies and view lines to the nearby Blue Mountains. The environmental impacts are positive, improving riparian qualities of water courses, responding to the topographic nature of the landscape, constructing the necessary road network system to enable traffic to flow efficiently throughout the region and providing essential community infrastructure.

Of significance, Baiada will commence the Sydney Science Park development with building its own food and research laboratories and headquarters committing to 200 jobs in the first stages from 2016.

To enable this to occur EJC are seeking to amend the Penrith Local Environmental Plan 2010 and rezone 287 hectares of land in Luddenham Road, Luddenham. The Master Plan for Sydney Science Park is shown in Figure 1.

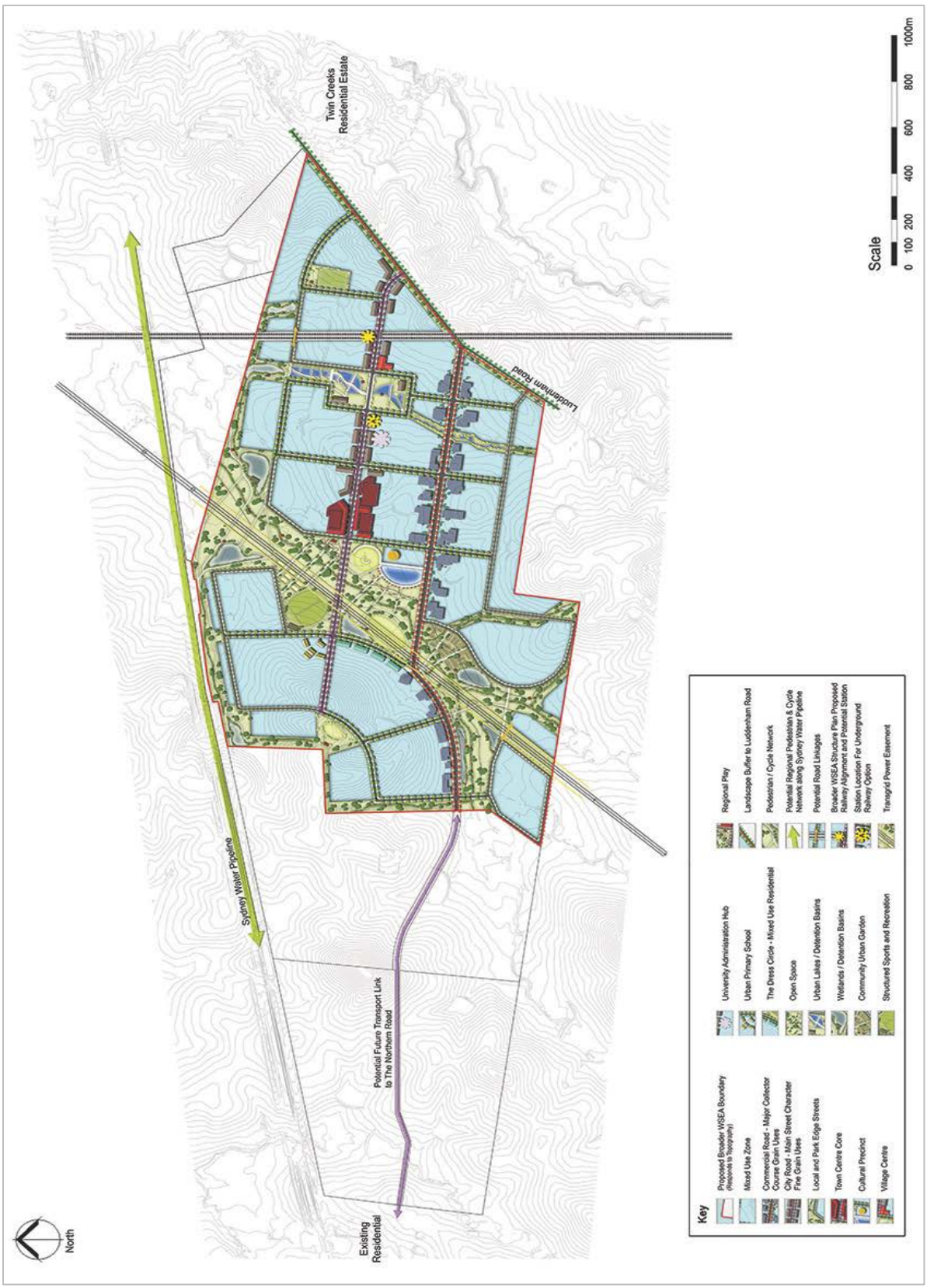


Figure 1 Master plan

1. Introduction

1.1. Purpose of the Planning Proposal

This Planning Proposal is submitted in support of an amendment to the Penrith Local Environmental Plan (LEP) 2010. The proposal is to rezone a 287 hectare parcel of land at 565-609 Luddenham Road, Luddenham to accommodate a new specialised centre comprising research and development, employment, education, retail and residential uses. This specialised centre is to be known as Sydney Science Park.

The site is located within the Broader Western Sydney Employment Area (Broader WSEA) which aims to provide some 6,300 hectares of additional employment lands, 57,000 new jobs over the next 30 years, with a total of 212,000 new jobs when the area is fully developed beyond 2046, including both office based jobs and those in the industrial sector.

The Planning Proposal has been prepared on behalf of the landowner and developer E.J. Cooper and Son Pty Ltd (EJC) who are wholly owned by the Baiada family group of companies. This single ownership provides a unique opportunity to develop the land in a streamlined way, which is rare given the fragmented land ownership patterns within the Broader WSEA.

The development of Sydney Science Park represents a new vision for Australia to cluster leading science based businesses, tertiary institutions, research and development providers in one location to advance innovation around the important principles of food, energy and health. Supporting residential uses, provision of a new Town Centre and an extensive network of open space are also key features of the proposal. The first stage of development will deliver 200 jobs in 2016 through the construction of Baiada's National Headquarters, Food Science Laboratories, Research and Tertiary Facilities.

The Planning Proposal is supported by a Master Plan, which represents the overall planning framework and preferred outcome for Sydney Science Park. The Master Plan includes:

- approximately 340,000m^2 of research and development floor area;
- approximately 100,000m^2 of education floor area and associated student accommodation;
- a Town Centre comprising up to 30,000 m^2 of retail space;
- 3,400 dwellings;
- a primary school site;
- new roads and infrastructure; and
- landscaped open space, sporting fields and parks.

The Planning Proposal includes a servicing and water strategy which demonstrates how the infrastructure is to be delivered to Sydney Science Park in a timely and efficient manner. It is also accompanied by an offer to enter into a Voluntary Planning Agreement with State Government and Council for the delivery of infrastructure and services that are required to meet the future demands of Sydney Science Park. This includes road network improvements, district and local open space and a community centre.

Sydney Science Park will have a number of positive social and economic benefits, namely:

- **Delivering high end jobs to Western Sydney**. The proposal will deliver 12,200 jobs in the fields of scientific research and development, education and support services.

- **Bringing international recognition in the fields of science, research and development to Sydney.** And attracting internationally recognised scientific professionals to live and work in Western Sydney.

- **Acting as a Catalyst for development in the Broader WSEA**. It would represent a vote of confidence in the future potential of this area and support a substantial number of new jobs, many of which will be high value.

- **Creating a Lifestyle Centre to live and work.** This will bring jobs and home closer together, creating a 24 hour vibrant employment area with life on weekends and evenings**.**

This report is based on plans and information provided by Design IQ and Rice Daubney and other supporting technical documents (refer to Table of Contents). It has been prepared in accordance with the Department of Planning and Infrastructure's *'A guide to preparing planning proposals' (October 2012)* and includes the following:

- a statement of the objectives;
- an explanation of the provisions proposed;
- the justification for those objectives, outcomes and provisions and the process for their implementation;
- a zoning map which reflects the proposed land use zones; and
- acknowledges the community consultation that will be undertaken.

The Planning Proposal also addresses the matters that must be addressed as set out in section 55(2) of the *Environmental Planning and Assessment Act 1979*.

1.2. Structure of this Report

Volume 1 of the Planning Proposal is structured as follows:

Section 2	Site Analysis
Section 3	The Vision
Section 4	Planning Proposal
Section 5	Structure Plan
Section 6	Proposed LEP Amendment
Section 7	Strategic Justification
Section 8	Environmental, Social and Economic Impact
Section 9	Conclusion

Volume 2 contains the Appendices which include the technical studies undertaken to inform the proposed land use change and Master Plan and its environmental assessment, including ecology, landscape, heritage, engineering (infrastructure, water cycle, flooding), transport, contamination and geotechnical assessments).

The expert project team formed to prepare the Planning Proposal includes the following consultants:

Table 1. Project Team

Report / Study	Consultant
Urban Design	Design IQ
Master Planning	Design IQ, Paterson Design Studio and HDR / Rice Daubney Architects
Feasibility and Statutory Planning	APP
Landscape Architect	Paterson Design Studio
Indigenous Heritage	Kelleher Nightingale
Social Planning	Elton Consulting
Infrastructure and Services	J Wyndham Prince
Water Quality and Flood Management	J Wyndham Prince
Transport	GTA Consultants and GHD
Economic and Retail Analysis	Hill PDA
Ecology	Cumberland Ecology and Travers
Environmental / Contamination	JBS

1.3. Background

1.3.1. EJC and Baiada

E.J. Cooper & Son Pty Limited (EJC) is a developer that undertakes mixed use, industrial and residential developments in key growth corridors along the east coast of Australia. EJC is a wholly owned subsidiary of Baiada Poultry Pty Ltd (Baiada Group). The Baiada Group is one of Australia's largest private companies and the poultry producer with recognised brands, notably Steggles and Lilydale. Employing over 6,000 staff and an annual turnover of $2 billion dollars, the Baiada Group provides EJC a strong business platform to support its development projects.

EJC is focused on developing landmark master planned communities incorporating elements of world's leading practice in urban and sustainable design. Sydney Science Park will be another flagship development for EJC. The Sydney Science Park's combination of size, location and proximity to services provides a unique and irreplaceable opportunity to make this vision a reality.

The Baiada Group specialises in providing premium quality poultry products. Their business operations include Broiler and Breeder Farms, Hatcheries, Processing Plants, Feedmilling and Protein Recovery throughout Australia. Birling Avian Laboratories, a laboratory and research centre owned and operated by the Baiada Group, carries out work within the poultry industry in the areas of microbiology, serology, virology, molecular biology, allergen testing and pathology. The laboratories are also active participants in research and development and frequently work with universities and state government research institutions.

Baiada's research and development facilities are committed to its expansion of modern and larger laboratory and research space so that it can continue its scientific work in the poultry sector.

The first stage of development on Sydney Science Park will include Baiada's new Food Science Laboratories and Research Facility. Housed within this facility will be:

- a commercial veterinary and food laboratory;
- an animal research facility;
- a training centre, including lecture theatre and meetings rooms;
- an analytical training centre, including high tech instrument centre for research and training;
- a commercial manufacturing facility, including manufacture of vaccines and related products; and
- a commercial human pathology centre.

1.3.2. Science Parks

Science parks are master planned precincts, primarily for private and public research and development facilities, high technology and science based companies and support services and may include a component of ancillary manufacturing, sales and other supporting uses. Science parks compete in an international market for highly skilled, qualified and specialised workers, who demand access to dwellings commensurate with their earnings. Science Parks compete with each other based on the attractiveness of their 'quality of life' offer in addition to the work opportunities they provide.

Science parks benefit from shared resources and ideas, have strong links to government, universities and industry end-users and seek to foster innovation and collaboration between all parties. In addition, they gather researchers, producers of high-technology products and knowledge-based businesses in one location; stimulate entrepreneurship, knowledge-transfer and support the development of skills; focus on a niche sector and source highly educated and skilled employees and promote economic competiveness and development through the creation of new businesses, new techniques which add value to companies and new knowledge-based jobs.

Science parks are marketed as self-contained lifestyle choices. The quality of the residential offer is particularly important to successful science parks. This is because:

- workers within them command high salaries and this in turn drives demand for a range of 'executive' housing indicative of their financial means and life-style expectations; and
- workers also demand a high quality of life offer, demonstrating the importance of attaining a positive work/ life balance by minimising the need to commute, and having all lifestyle facilities nearby.

Successful science parks comprise a genuine mix of employment, research and development, education, residential and retail uses. This is because a symbiotic relationship exists between each use. Research and development, employment and education uses attract leading scientists, lecturers and higher skilled people to the park. Residential uses provide homes for workers, students and visitors and contribute to the social sustainability of the overall development. Accommodation for workers, visitors and students help activate science parks in evenings and weekends, thereby making them safer places and helping to create a sense of vibrancy and liveliness in the area. Workers, students, visitors support and help make viable a range of retail, leisure and recreational facilities. A close association between a science park and university supports successful science park development, in part by attracting graduates from the university to employment on site and by providing a source of qualified employees.

Science parks are commonly loss leading undertakings. For a privately funded science park to be financially viable there is a secondary need for residential uses to be incorporated as part of an overall development mix to underpin financial viability. Residential uses would mitigate the loss leading role of research park uses in the absence of government funding and allow the project to be financially viable. Research by Hill PDA and international case studies has proven that the inclusion of residential uses is required within science parks to ensure the viability and liveability of such epicentres.

Case Studies

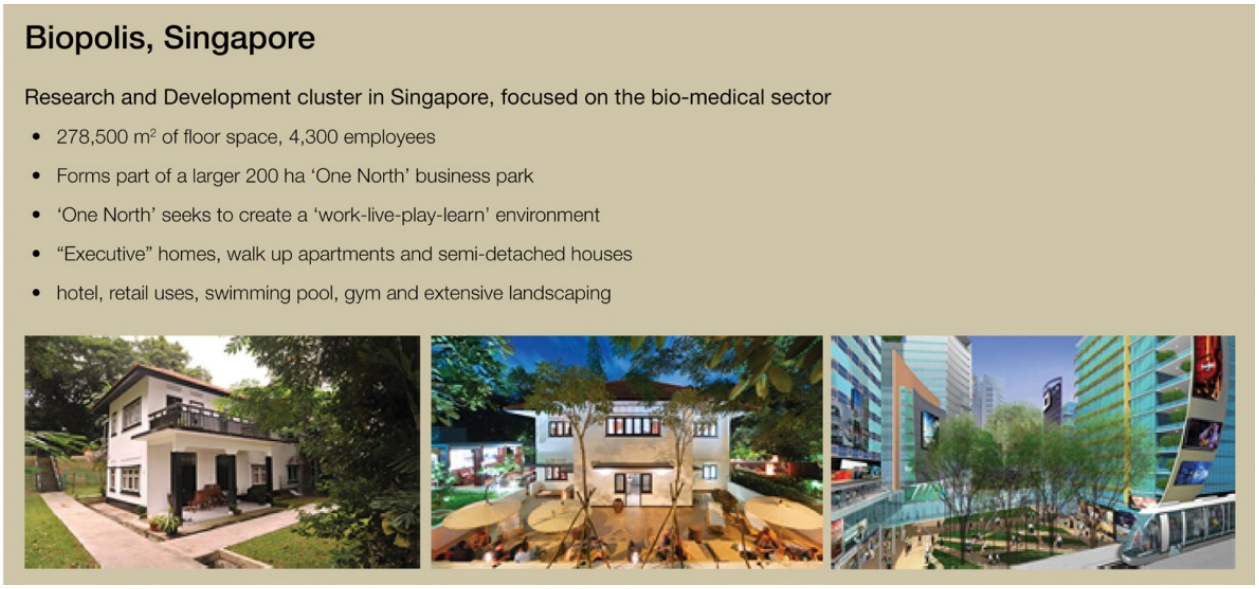


Figure 2 Case studies

1.4. Food Security, Health and Energy Concept

Agriculture accounts for a large share of Australia's exports, $30 billion or 12% of total merchandise exports[1] with potential to significantly expand production to meet a relatively strong growth in food demand in Asia. As changing environmental conditions impact on farming systems, innovation will be essential to maintaining growth in Australia's agricultural productivity and its export businesses. Because it competes with the rest of the world, Australian agriculture has long recognised that innovations commercialised from research are fundamental to long-term success. This research encompasses production improvements and, equally importantly, issues such as food security, supply chain logistics, infrastructure, telecommunications, water, climate change and energy. Agricultural research is becoming an important part of efforts that employ around 11,500 people and add over $1 billion value to the Australian economy each year. Sydney Science Park will attract agricultural science research facilities and companies that deal with food security, animal research and development and innovation. In addition, community supported agriculture, urban farm and community gardens, road side food production are also key elements of the science park.

An aim of Sydney Science Park will be to supply much of the development's energy needs from on-site renewable energy sources. Consideration will be given to the embodied energy contained in completed buildings and their designers actively encouraged to design for changing real estate values, changing usage and changing cultural currents. Water will be respected as a precious resource. As much as possible, stormwater and building water discharge will be managed locally to meet internal water demands or through surface flow, groundwater recharge, agricultural use and building needs. Active living and transport, quality open spaces, biodiversity and bushland regeneration, connection with nature, social places, access to local produce, access to public transport and recreational facilities, health research and development.

The most important ways to create robust, healthy spaces, and improve health and productivity will be recognised. These include access to fresh air and daylight, minimising volatile organic compounds (VOCs) but also elements and systems that maintain natural systems and processes, and enhance place and nature based relationships.

1.5. Consultation

In accordance with the Department of Planning and Infrastructure's Guideline '*A Guide to preparing local environmental plans'*, an indication of the proposal community consultation strategy is outlined below. The community consultation program includes:

- Letters to individual land owners, residents and tenants advising of the exhibition and how to make a submission.
- Advertising through local media to inform the community that the exhibition has started, how long it will run, how information can be obtained and how to make a submission.
- Media Releases providing the above information.
- Newspaper articles.
- Fact sheets available at exhibition points highlighting key features of the Planning Proposal, the closing date for the exhibition and how to make a submission.
- Targeted consultation with relevant public authorities.
- Staff available to answer enquiries.

[1] 2013 ABARE Research Report

A number of supporting documents will be exhibited with the Planning Proposal to assist in understanding the planning documents. The supporting documents will include:

- A full list of the relevant State Government policies, plans and directions, which have been taken into account when developing the Planning Proposal.
- Fact sheets, as described above.
- Technical studies and supporting documentation.

A proposed draft list of stakeholders is included below.

- Roads and Maritime Services
- Transport for NSW
- State Transit Authority
- Manager, Land Use Planning RailCorp Property Division
- Busways
- Department of Infrastructure and Regional Development
- Department of the Environment, Water, Heritage and the Arts
- Office of Environment and Heritage, NSW Heritage
- Office of Environment and Heritage, Heritage Branch
- Sydney Catchment Authority
- Office of the Hawkesbury Nepean
- Hawkesbury Nepean Catchment Management Authority
- Hawkesbury River County Council
- NSW Office of Water
- Department of Primary Industries Land Use Planning, Resource Planning & Development
- Waste Services NSW
- Western Sydney Parklands Trust
- SITA Environmental Solutions
- NSW Land and Property Information
- Government Property NSW
- NSW Soil Conservation Service
- NSW Crown Lands Division
- NSW Department of Health
- Minister of Health
- Nepean Blue Mountains Local Health District
- Department of Education and Communities
- Sydney Water
- Energy Australia
- Integral Energy
- Transgrid
- Land Services Department Jemena Asset Management Pty Ltd
- Strategic Forecasting Manager Telstra Operations
- Optus
- AGL
- Australia Post
- Planning Services, Assets Division Housing NSW
- Fairfield City Council
- Liverpool City Council

- Wollondilly Shire Council
- Growth Centres Manager
- Deerubbin Local Aboriginal Land Council
- Office of Strategic Lands
- Department of Premier and Cabinet
- Fire and Rescue NSW
- NSW Rural Fire Service
- NSW State Emergency Service
- Ms Fiona Scott MP
- Member for Lindsay
- Member for Greenway
- Member for Fowler
- Member for Prospect
- Member for Chifley
- Member for Macquarie
- Member for Mulgoa
- Member for Penrith
- Member for Londonderry
- Member for Camden
- Member for Smithfield
- Member for Riverstone

1.5.1. Council

On 1 August 2013, APP and EJC met with Council officers and the Department of Planning and Infrastructure (DoPI) to formally present the Sydney Science Park planning proposal. This planning proposal was subsequently refined following feedback from both Council and the Department of Planning and Infrastructure (DoPI) mainly in relation to the study boundary. On the 9 December 2013, Council officers prepared a report to Council's Policy Review Committee recommending that following receipt of the formal planning proposal and assessment by Council officers, that Council commence a 'Gateway' process for the ultimate consideration of a Planning Proposal for Sydney Science Park in accordance with the requirements of the EP&A Act, 1979. This recommendation was supported by the elected Council.

On 3 February 2014, Council officers prepared a report to Council's Ordinary Meeting recommending the following:

1. The information contained in the report on Sydney Science Park Planning Proposal be received.
2. Council endorse the enclosed Planning Proposal for Sydney Science Park to be forwarded to the Department of Planning and Infrastructure seeking a Gateway Determination under s56 of the Environmental Planning and Assessment Act 1979.
3. The General Manager be granted delegation to update and finalise the Planning Proposal, written instrument and associated maps before submitting it to the Department of Planning & Infrastructure seeking the Gateway Determination.
4. Council seek approval from the Gateway to publicly exhibit the Planning Proposal for the Sydney Science Park LEP in accordance with the community consultation requirements under s57 of the EP&A Act, and in a form consistent with any revisions of the Planning Proposal directed by the Department of Planning & Infrastructure as part of the s56 Gateway Determination.

This recommendation was submitted by the elected Council.

1.5.2. Timeframes

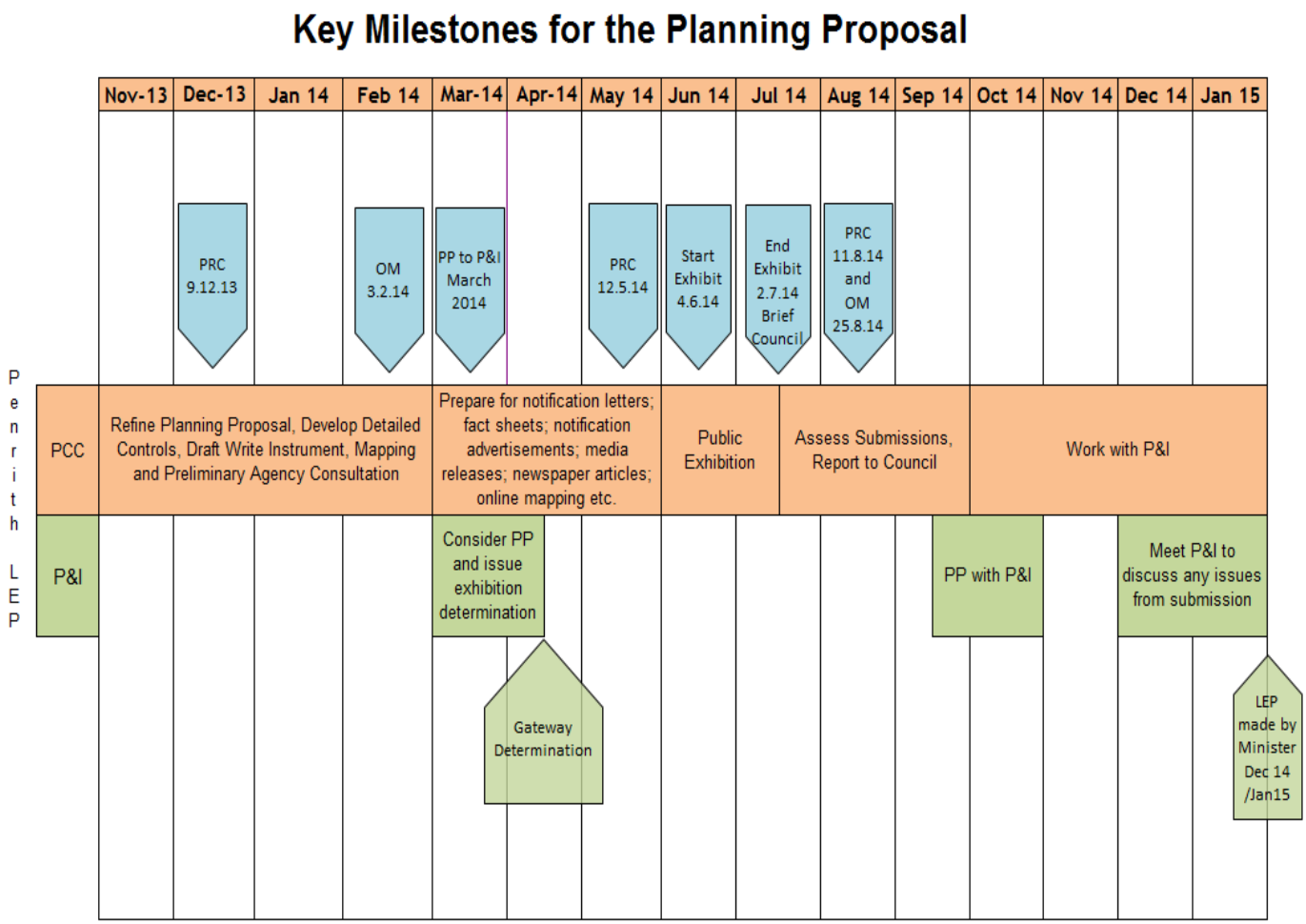


Figure 3 Key milestones for the Planning Proposal

2. Site Analysis

2.1. Site Location and Context

Sydney Science Park comprises an area of approximately 287 hectares. It is located on the western side of Luddenham Road, Luddenham, approximately 8 km south of Penrith, 21 km north-west of Liverpool and 43 km west of Sydney CBD (refer to Figure 4). The site is generally bound by the Warragamba Prospect Water Supply Pipelines to the north, Luddenham Road to the east and existing agricultural land to the south and west. The site is located within the Broader WSEA and Draft Structure Plan (refer to Figure 5).

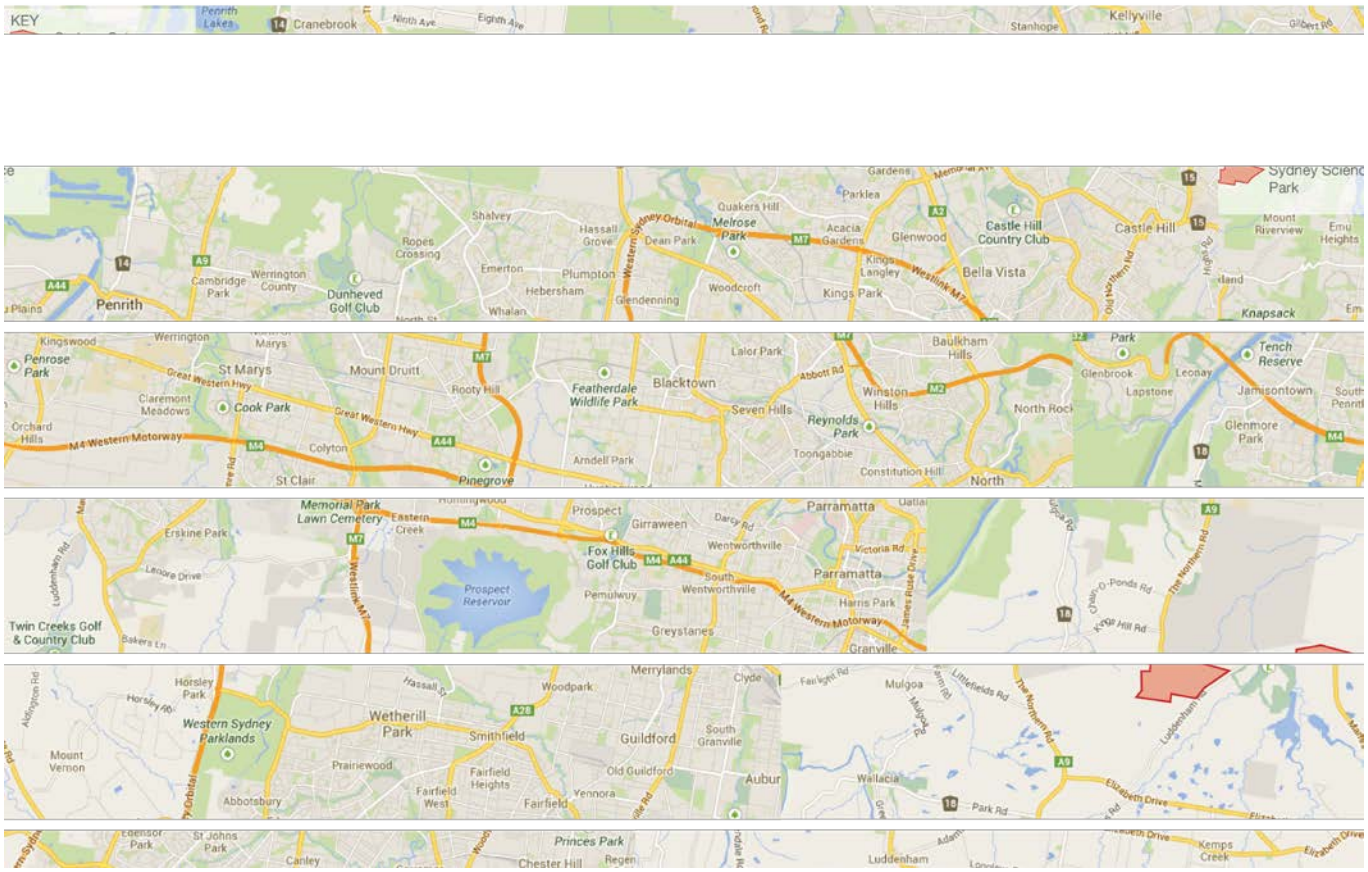


Figure 4 Context Plan

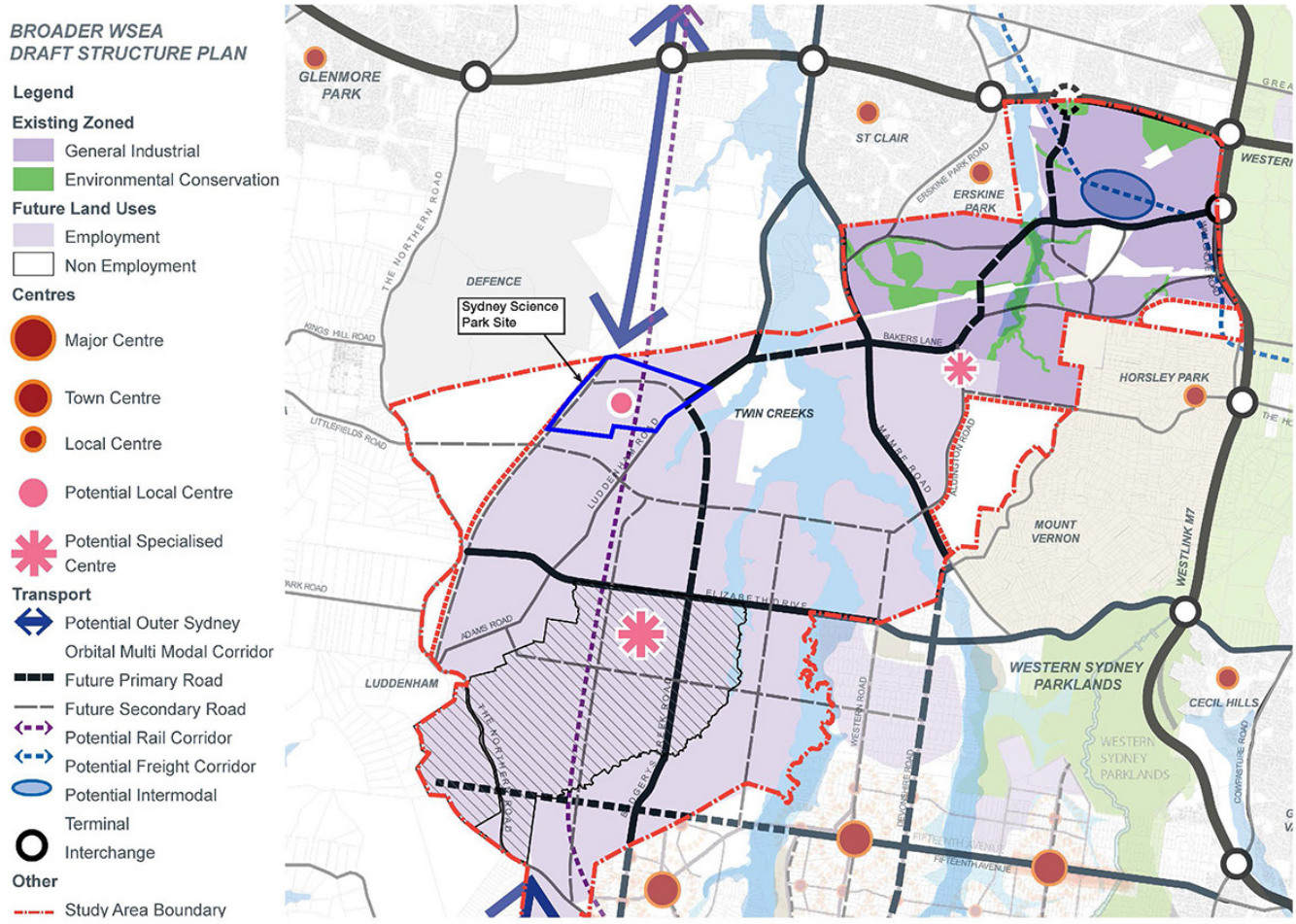


Figure 5 Site Location in relation to Broader WSEA

2.2. Land Ownership and Legal Description

The site is legally described as Lot 201 and part Lot 202 in DP 1152191 and is known as 565-609 Luddenham Road, Luddenham. The site is owned by E.J. Cooper and Son Pty Ltd.

2.3. Existing Zoning and Development Standards

The site is currently zoned RU2 Rural Landscape under the Penrith Local Environmental Plan 2010 (Penrith LEP). The objectives of the RU2 Rural Landscape zone are to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- maintain the rural landscape character of the land;
- provide for a range of compatible land uses, including extensive agriculture;
- minimise conflict between land uses within the zone and land uses within adjoining zones;
- preserve and improve natural resources through appropriate land management practices; and
- ensure development is compatible with the environmental capabilities of the land and does not unreasonably increase the demand for public services or public facilities.

2.4. Existing Land Use and Development

The site is currently used for low intensity farming, primarily grazing land for cattle. It also contains two rural residences, outbuildings and a number of dams. A 60 m wide electricity transmission corridor bisects the site north to south. An aerial photograph of the site is included at Figure 6. General views of the site are illustrated in Figures 7 - 11.

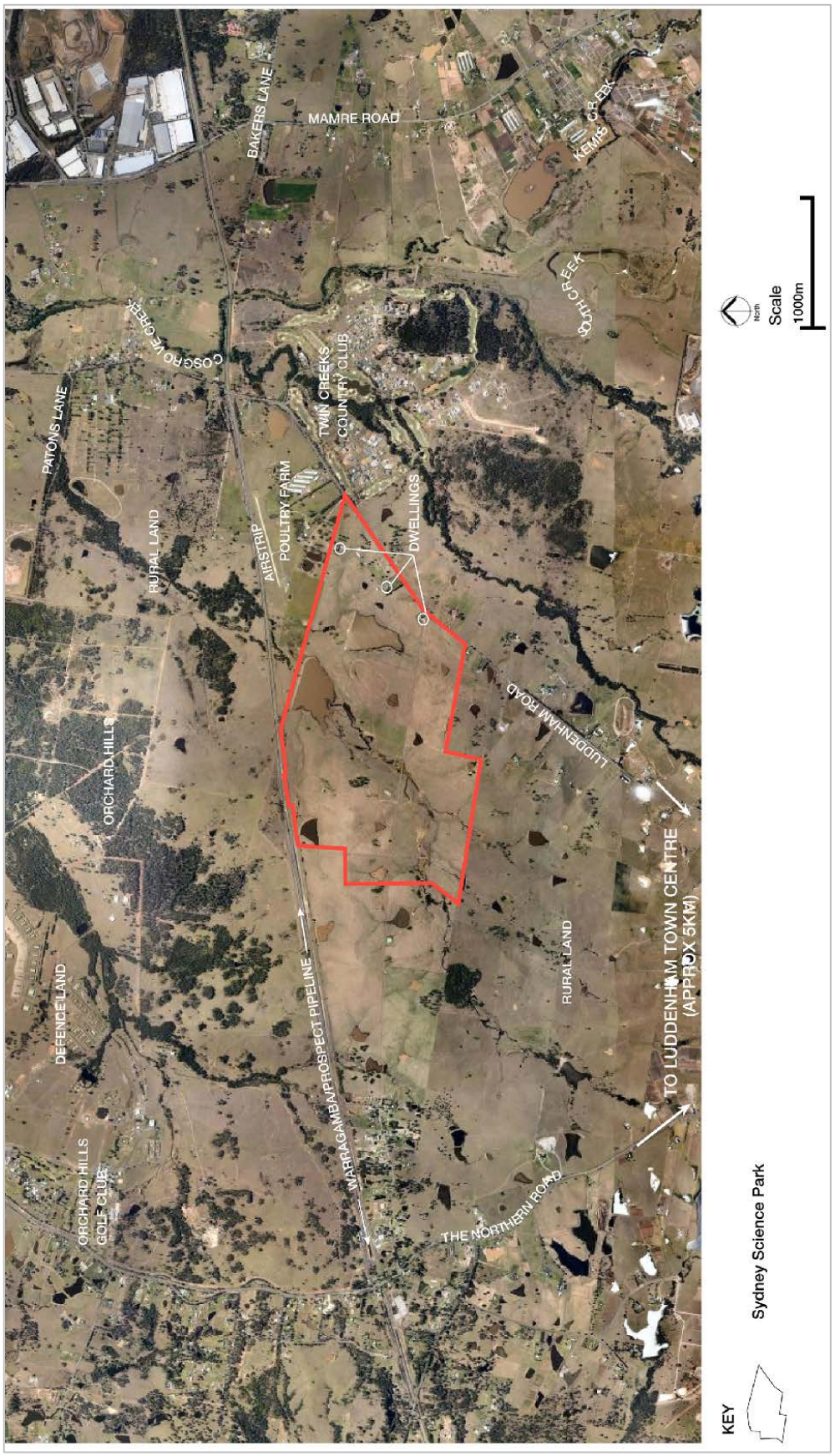


Figure 6 Aerial Photograph

Figure 7 Central Valley Looking West

Figure 8 Top of ridgeline looking north west towards Penrith

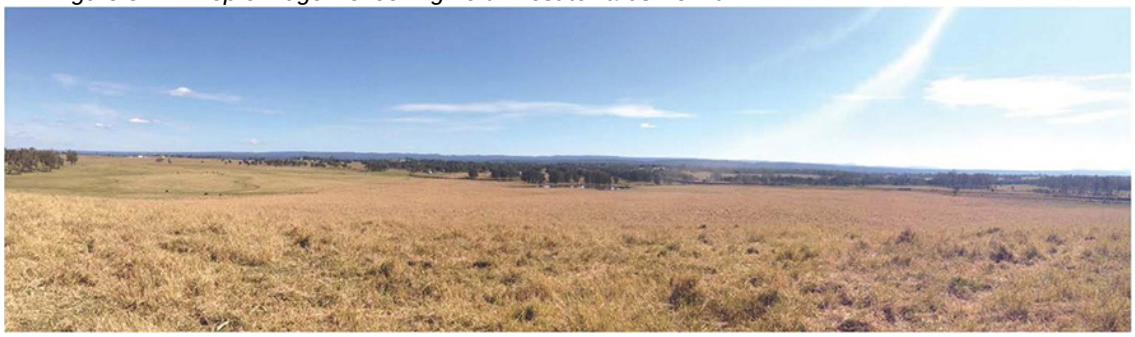


Figure 9 Top of ridgeline looking west towards Blue Mountains

Figure 10 Central Valley Looking South

Figure 11 Internal Valley Looking South

2.5. Surrounding Land Uses

To the north

The Warragamba Prospect Water Supply Pipeline is located to the north of the site. The area contains bunded soil against the south boundary of the pipeline corridor and had various creeks and gullies running underneath the pipeline and onto the site. Further north is rural/grazing land. An air strip is located on a property north east of the site.

To the south

To the south of the site is rural and / or agricultural land. This land also forms part of the Broader WSEA. Commonwealth lands to the south at Badgerys Creek that would potentially accommodate Sydney's second airport. The South West Growth Centre is also approximately 5 km to the south.

To the east

The Twin Creeks Golf, Country Club and Residential Estate is directly opposite on the eastern side of Luddenham Road. It contains 54 lots. A poultry farm is located east of the site opposite the Twin Creeks Country Club and south of the air strip. This land also forms part of the Broader WSEA.

To the west

Land to the west of the site is rural, also owned by EJC. This land does not form part of the site. Further west is a pocket of residential development fronting onto Gates Road and adjacent The Northern Road. The defence land accessible via The Northern Road to the west.

2.6. Topography

The site is undulating with many hills and low lying areas. The regional topographical data (NDE 1975) indicates that the site lies between 60 m and 90 m in Australian Height Datum (AHD). The majority of Lot 201 and part Lot 202 sloped in toward the creek running through Lot 202. The eastern portion of Lot 201 sloped to the east/southeast towards Luddenham Road.

2.7. Hydrology

A number of dams exist within the two water courses traversing through the site, the largest of which is within the eastern portion of the site. The water courses flow in a north-easterly direction forming an unnamed tributary to Blaxland Creek before flowing onto South Creek, approximately 4 km to the north.

2.7.1. Riparian corridors

As part of the NSW Office of Water guidelines, water course orders have been classified under the "Strahler" system using current 1:25,000 topographic maps. Water courses within the site have been classified as 1st to 4th order water courses (refer to Table 2).

A detailed stream classification and ground truthing study of the site by Worley Parsons in 2011, confirmed that all of the existing riparian corridors within the site have little ecological significance and as such the removal and / or reclassification of all riparian corridors was recommended. The central watercourse is the only flow path which was recommended to be reconstructed as a fully vegetated riparian corridor (refer to Figure 12). J Wyndham Prince has endorsed these recommendations.

Table 2. Strahler System of Stream Classification

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1st order	10 m	20 m + channel width
2nd order	20 m	40 m + channel width
3rd order	30 m	60 m + channel width
4th order and greater (includes estuaries, wetlands and any part of rivers influenced by tidal waters)	40 m	80 m + channel width

Stream order	Vegetated Riparian Zone (VRZ)	RC off-setting for non RC uses	Cycleways and paths	Detention basins		Stormwater outlet structures and essential services	Stream realignment	Road crossings		
				Only within 50% outer VRZ	Online			Any	Culvert	Bridge
1st	10m	•	•	•	•	•	•	•		
2nd	20m	•	•	•	•	•		•		
3rd	30m	•	•	•		•			•	•
4th +	40m	•	•	•		•			•	•

Figure 12 Riparian Corridor Matrix (NSW Office of Water)

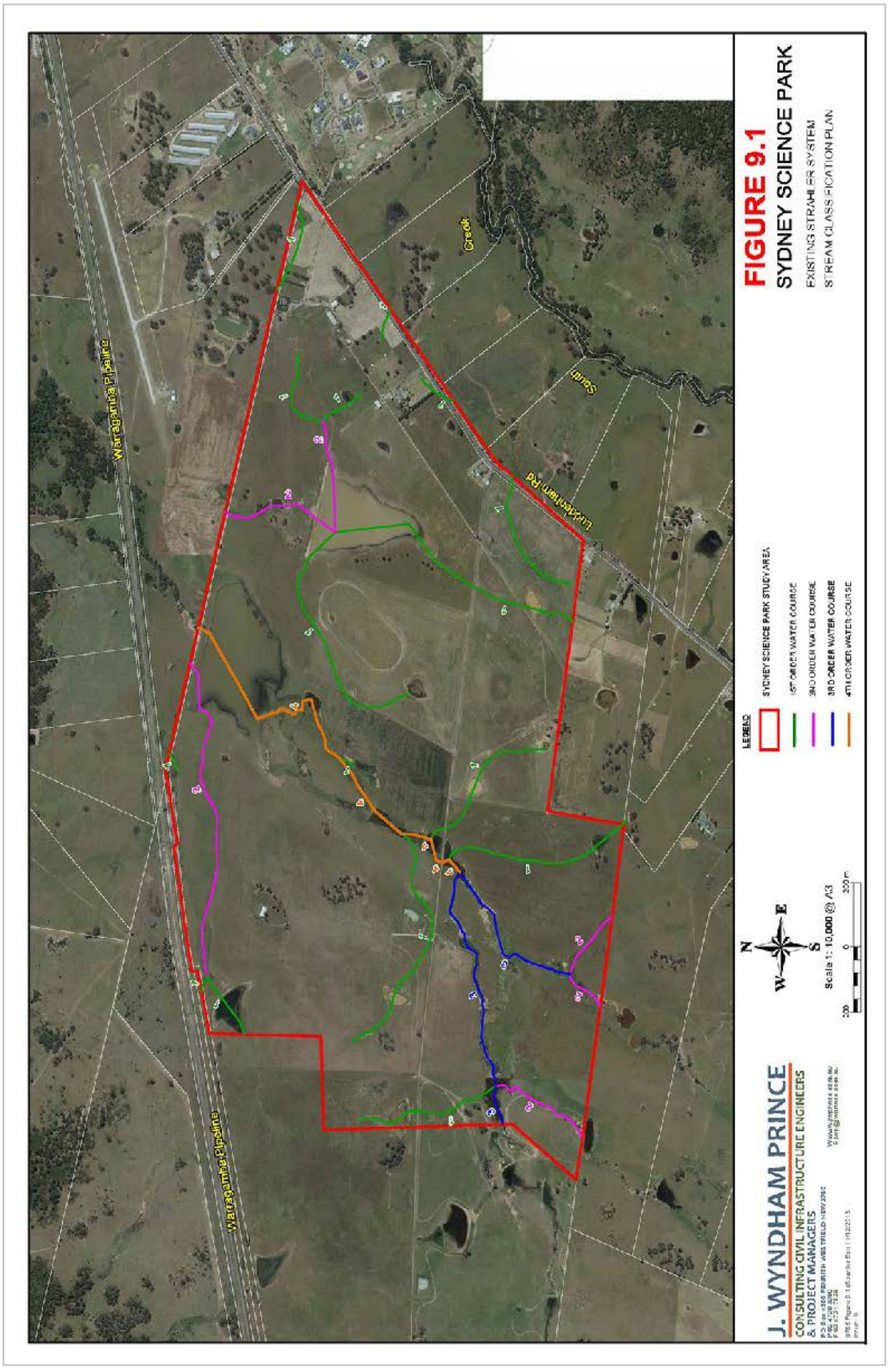


Figure 13 Strahler System of Stream Classification

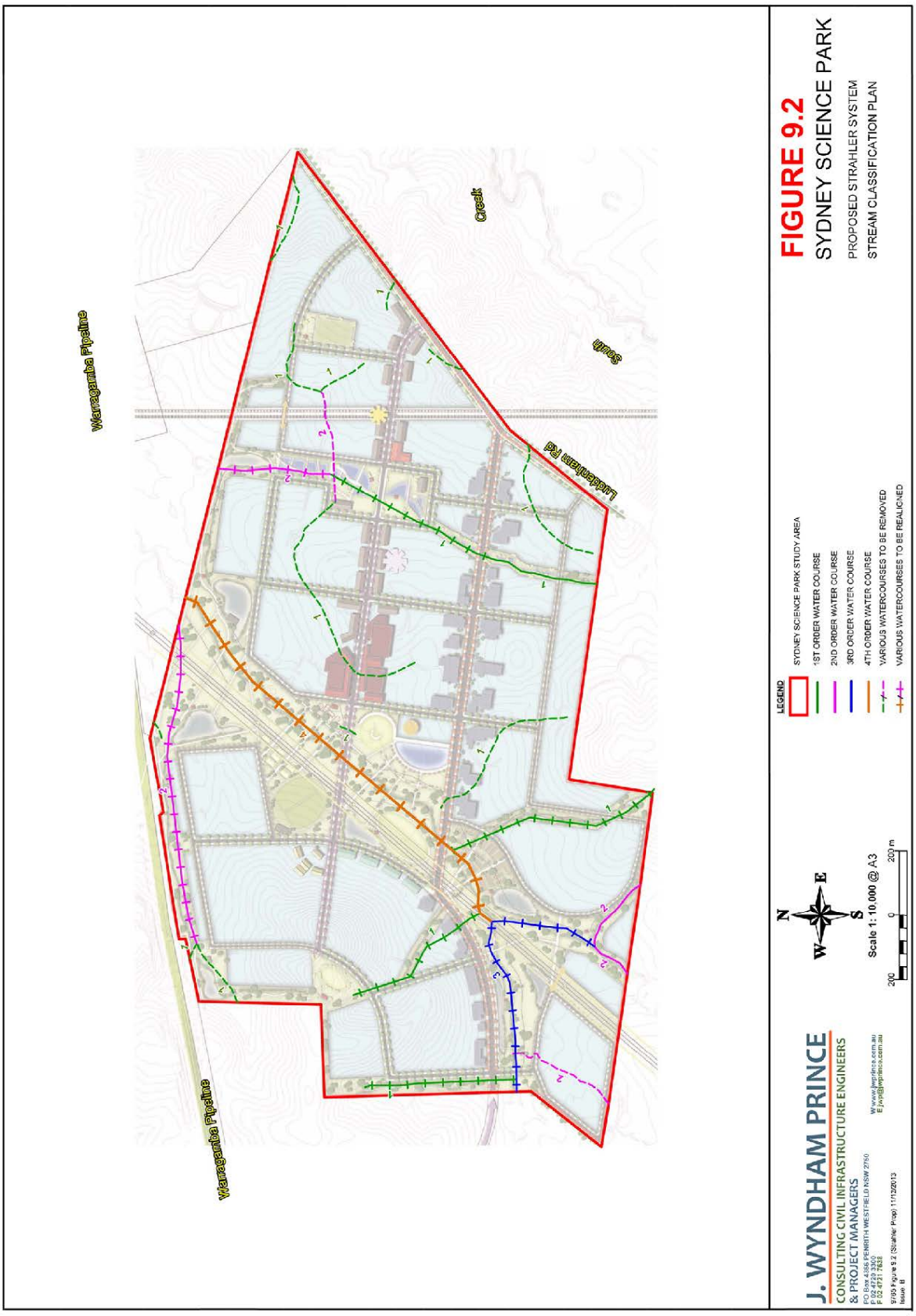


Figure 14 Proposed Strahler System of Stream Classification

2.7.2. Flooding

The site is affected by both the 50% AEP flood and 1% AEP flood events (refer to Figures 15 and 16).

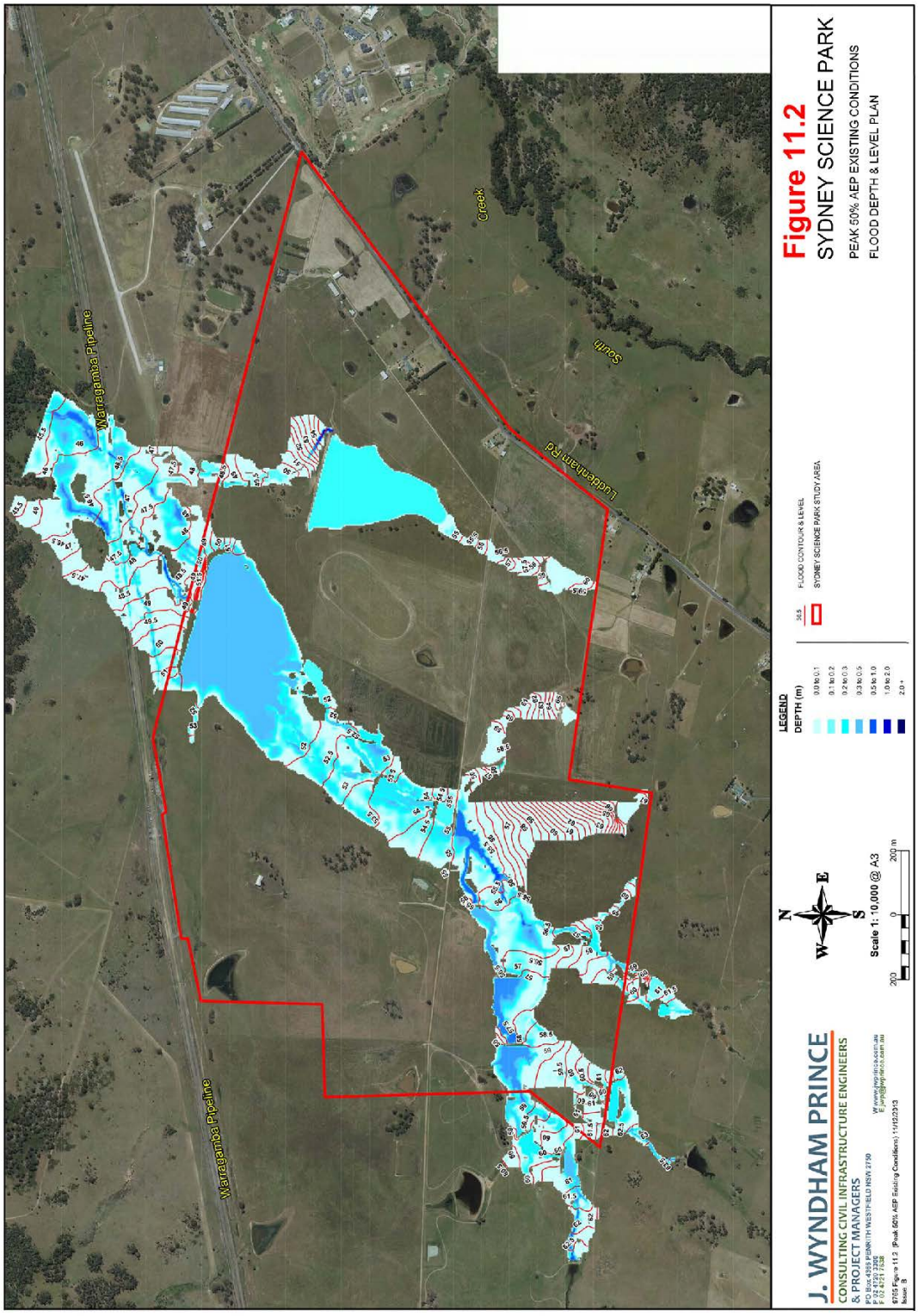


Figure 15 Existing Flood Depth and Level Plan (50% AEP flood)

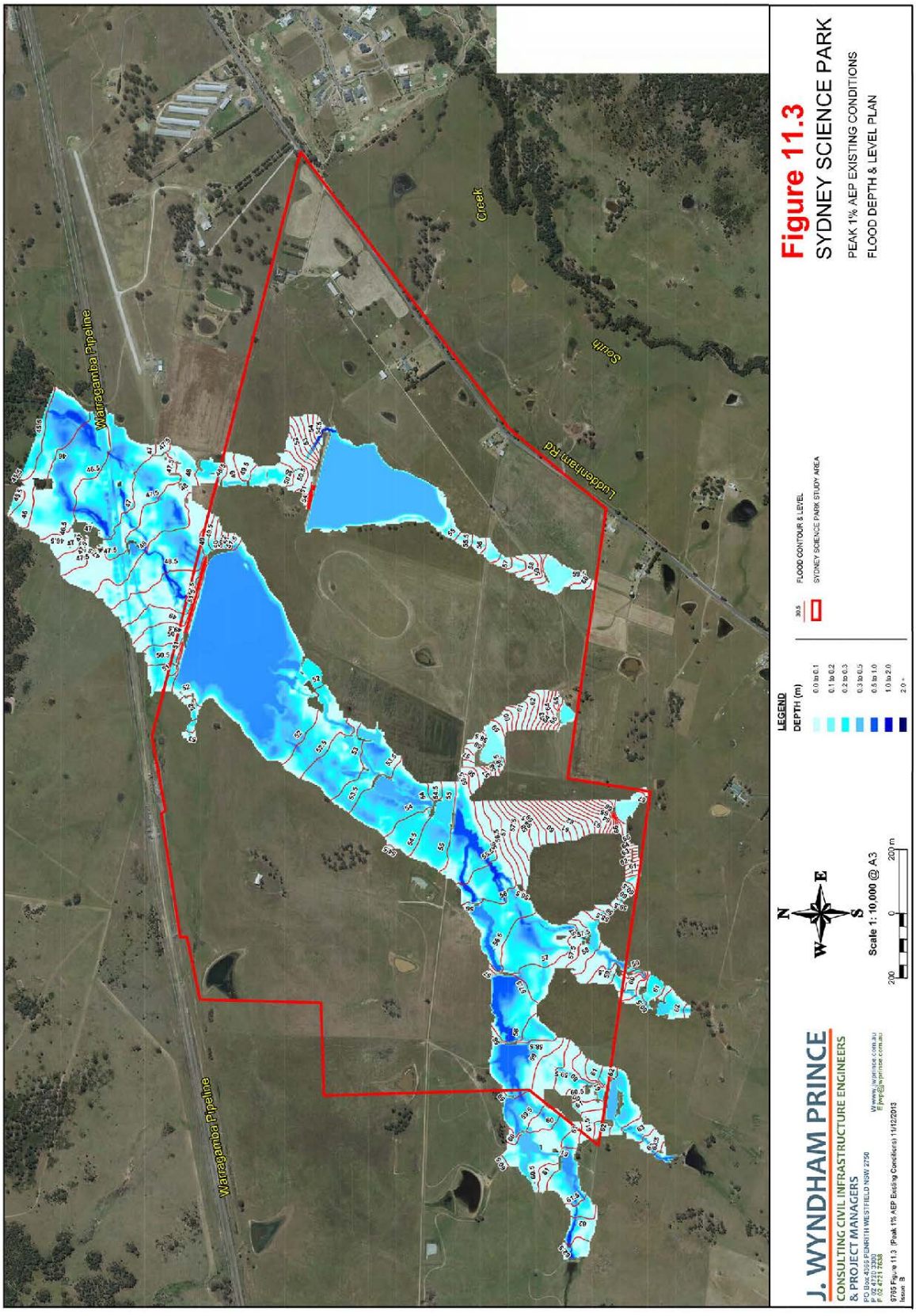


Figure 16 Existing Flood Depth and Level Plan (1% AEP flood)

2.8. Geology

The Penrith Geological Map (DME 1991) shows the site is underlain by Triassic Bringelly Shale which consists of shale, carbonaceous claystone, laminate, fine to medium grained lithic sandstone, and rare coal and tuff. Geology adjacent to tributaries running through the site are characterised by Quaternary fine grained sand, silt and clay.

The regional soils map (SCS 1989) shows that the site was characterised by two soil groups, the residual soils of the Blacktown Group and fluvial soil from the South Creek Group. The Blacktown Group soils are shallow to moderately deep (<100 cm) with a hard setting mottled texture. They contrast from red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines. These soils are moderately reactive, have highly plastic subsoil, low soil fertility and drain poorly.

The South Creek Group soils are found adjacent to tributaries running through the site and consist of very deep layered sediments over bedrock or relict soils. Where pedogenesis has occurred there are structured plastic clays or structured loams in and immediately adjacent to drainage lines, red and yellow podzolic soils on small terraces with small areas of minimal krasnozems, leached clays and yellow solodic soils. These soils flood frequently and are an erosion hazard.

2.9. Acid Sulphate Soils

Review of the NSW Natural Resource Atlas (NRA 2013) indicated that for the site, there are no known occurrences of acid sulphate soils.

2.10. Contamination

A Preliminary Site Investigation of the site was undertaken by JBS&G (NSW & WA) Pty Ltd (refer to report included at **Appendix A**). The preliminary site investigation has concluded that the potential for widespread contamination across the site is low and the potential areas of 'environmental concern' as identified below will not prevent planning and development of the land for the proposed uses.

2.10.1. Potential areas of environmental concern

Potential areas of environmental concern are identified in Figure 17 and Table 3.

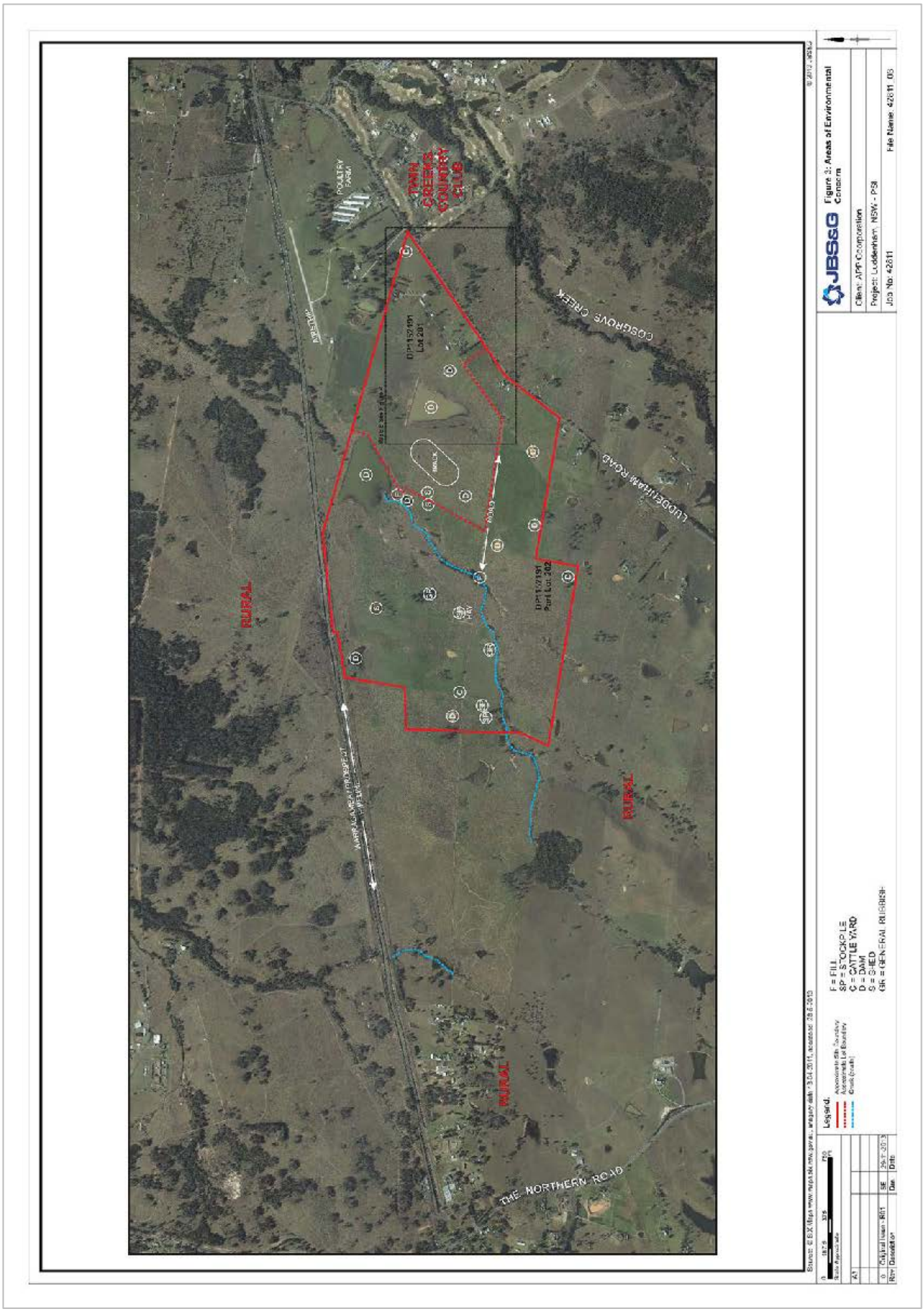


Figure 17 Potential areas of environmental concern

Table 3. Potential areas of environmental concern

Area of Environmental Concern	Contaminants of Potential Concern
Fill material at the site	Heavy metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs) and asbestos
Contamination associated with agricultural land use	Heavy metals, pesticides (OCPs), polychlorinated biphenyls (PCBs)
ASTs located around the site	Heavy metals, TPH/BTEX, PAHs and Volatile Organic Compounds (VOCs).
Hazardous material storage, within maintenance area/workshops with associated oil storage, staining, surface debris, stockpiles and burn pits.	Heavy metals, TPH/BTEX, PAHs, OCPs and asbestos.
Site Building Structures	Asbestos, lead paint
Pipeline corridor	Heavy metals, TPH/BTEX, PAHs, OCPs and asbestos.

2.10.2. Potentially contaminated media

Potentially contaminated media present at the site include:

- Fill material;
- Natural soils;
- Surface water; and
- Shallow groundwater.

The historical review and site inspection indicates the potential for fill material around anthropogenic structures such as sheds, workshops, houses etc. in or around dams, on or near access roads throughout the site and in stockpiles around the site. Based on the likelihood of the majority of the site consisting of natural soil there is potential for a contaminant of environmental concern to be present at the site migrating vertically or laterally onto natural soils nearby. Due to the large amount of surface water on site and the potential for contaminant of environmental concerns being in close proximity to dams and creeks, surface water is considered a potentially contaminated media. Shallow groundwater in low lying areas and areas nearby surface water bodies are also considered a potentially contaminated media.

2.10.3. Potential for migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of the nature of the contaminants (solid/liquid and mobility characteristics), the extent of the contaminants (isolated or widespread), the location of the contaminants (surface soils or at depth) and the site topography, geology, hydrology and hydrogeology.

Due to the isolated nature of areas of contaminant of environmental concerns and the inert nature of some contaminant of environmental concerns (asbestos) potential for migration of contaminants is low. There is however some potential for migration of contaminant of environmental concerns in or around surface water bodies through surface water runoff, through windblown migration of ground surface contamination such as stockpiles and asbestos containing material (ACM) and infiltration through the ground surface and into shallow groundwater. This is possible where liquid or otherwise leachable contaminant sources (e.g. ASTs) are located. In addition to the areas displaying potential for contamination, there is the potential aesthetic aspect relating to odours from possible poultry operations to the northeast.

Based on the site observations and agriculturally related site activities, it is considered the potential for widespread contamination across the site is low. The impact of contamination on the planning proposal is addressed in section 8.6.

2.11. Aboriginal Cultural Heritage

An Aboriginal Heritage Assessment Report, prepared by Kelleher Nightingale Consulting Pty Ltd is included in **Appendix B**. The assessment included background research and an archaeological field survey conducted in accordance with the Office of Environment and Heritage (OEH) requirements including:

- Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales; and
- Code of Practice for Archaeological Investigations of Aboriginal Objects in New South Wales.

Four Aboriginal archaeological sites were identified in the study area:

- RPS LTPAS01 (AHIMS Site ID 45-5-4189);
- Sydney Science Park 1 (SSP 1);
- Sydney Science Park 3 (SSP 3); and
- Sydney Science Park 4 (SSP 4).

These sites are identified on Figure 18. All four identified sites were located on the lower slopes, flats and terraces along the main drainage line within the site. Site locations within the drainage channel have been affected by various erosional and depositional processes. In the case of RPS LTPAS01 and SSP 1, artefacts observed at these sites may have derived from further up the drainage catchment and been transported to these locations by flood events or downslope movement of sediments. Sites SSP 3 and SSP 4 were located on more stable landforms. Artefacts observed at these locations are more likely to have derived from the immediate area, offering greater archaeological integrity.

Archaeological sites RPS LTPAS01 and SSP 3 were open artefact scatters. Archaeological sites SSP 1 and SSP 4 consisted of isolated finds. Three of the identified sites (RPS LTPAS01, SSP 1 and SSP 4) within the study area were isolated or low density artefact scatters, of low archaeological significance. One identified site (SSP 3) exhibited moderate significance based on the integrity of the soil deposit.

In accordance with the significance assessment criteria established in the Australia ICOMOS Burra Charter, 1999 (Australia ICOMOS 1999), the sites were considered to be of low to moderate archaeological value and none of the identified sites warrant conservation. Notwithstanding, conservation of heritage is a positive outcome if it can be achieved within the future development layout.

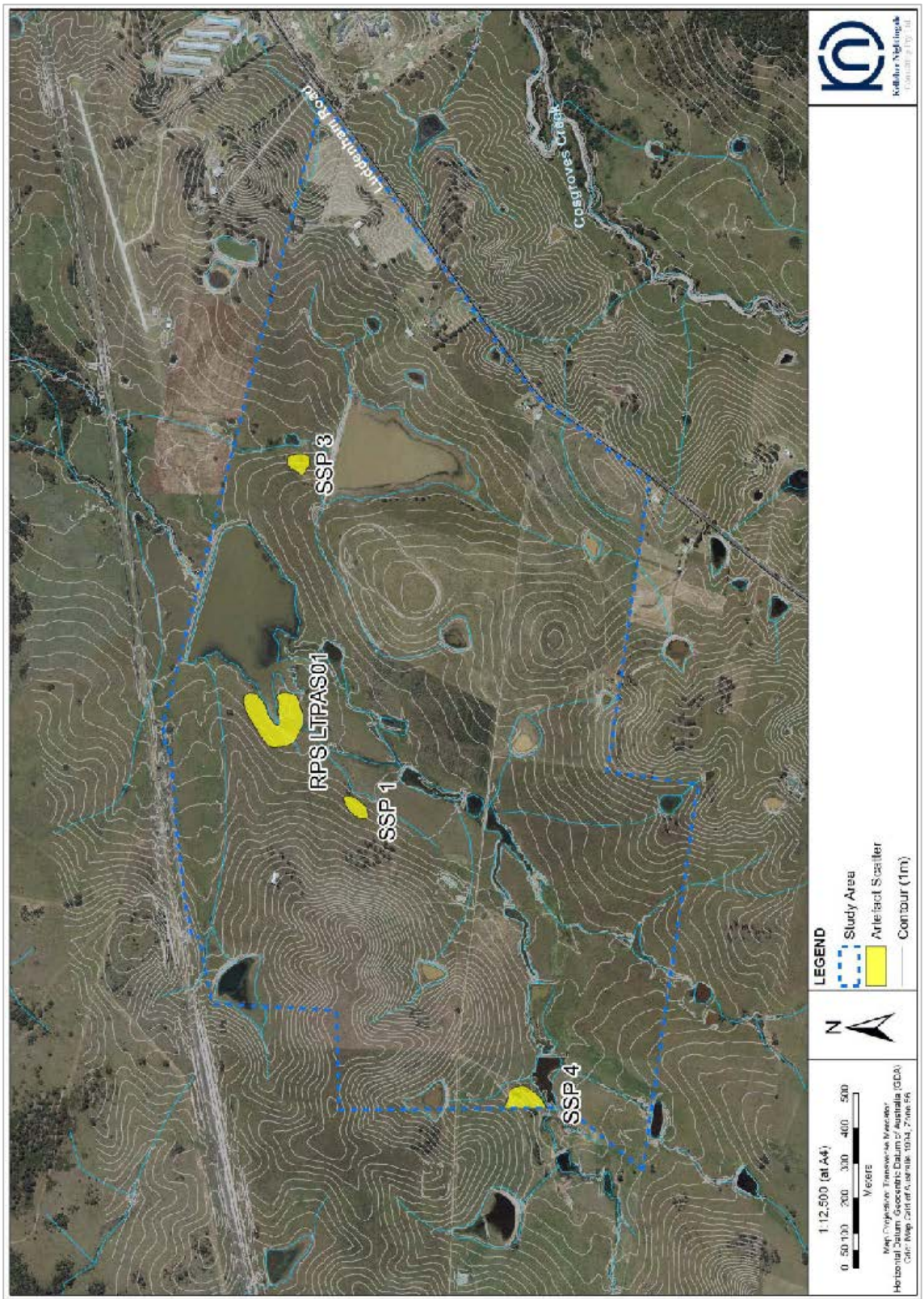


Figure 18 Aboriginal sites within the site

2.12. European Heritage

The site does not contain any items of local or State heritage significance.

2.13. Ecological Characteristics and Values

The site has a history of agricultural use and has been largely cleared as a result. The site consists of grazing land, a few scattered trees and farm dams. An Ecological Constraints Analysis for a larger study area, within which the subject site forms only part of, was prepared by Travers Ecology in 2010 (the Travers report) (refer to copy included at **Appendix C**). The 'study area' as defined in the Travers report includes additional land to the west and south of the subject site – areas which are outside of the land to which this planning proposal relates. The Travers Report has been reviewed by Cumberland Ecology in relation to its findings for the subject site. The key ecological characteristics and values of the site are identified below.

2.13.1. Vegetation Communities

There are four highly degraded vegetation communities on the site:

- cleared / pastoral;
- disturbed Grey Box / Forest Red Gum Open Woodland (Ecological Endangered Community – Cumberland Plain Woodland);
- disturbed Swamp Oak Woodland - Forest (Ecological Endangered Community – River-flat Eucalypt Forest on Coastal Floodplains); and
- dams and creeks with fringing vegetation.

Of these communities two are listed as threatened communities: Cumberland Plain Woodland (CPW) is listed as a Critically Endangered Ecological Community (CEEC) under both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The River-Flat Eucalypt Forest on Coastal Woodlands (RFEF), is listed as an Endangered Ecological Community (EEC) under the TSC Act only.

All patches of the threatened communities within the development footprint are degraded and fall into the category of Low Condition under a biometric assessment and consist of only a small number of trees (less than 0.25 hectares in size). The understorey of these areas comprises mostly exotic pastoral weeds, with no native mid-storey species.

The areas mapped as 'cleared / pastoral' do not qualify as the Derived Native Grasslands variant of CPW listed under the TSC Act as the ground cover in these areas consisted of predominately exotic weeds, as it does across the site.

Figure 19 illustrates the site boundary and the flora and fauna survey results from the Travers Report (2010).

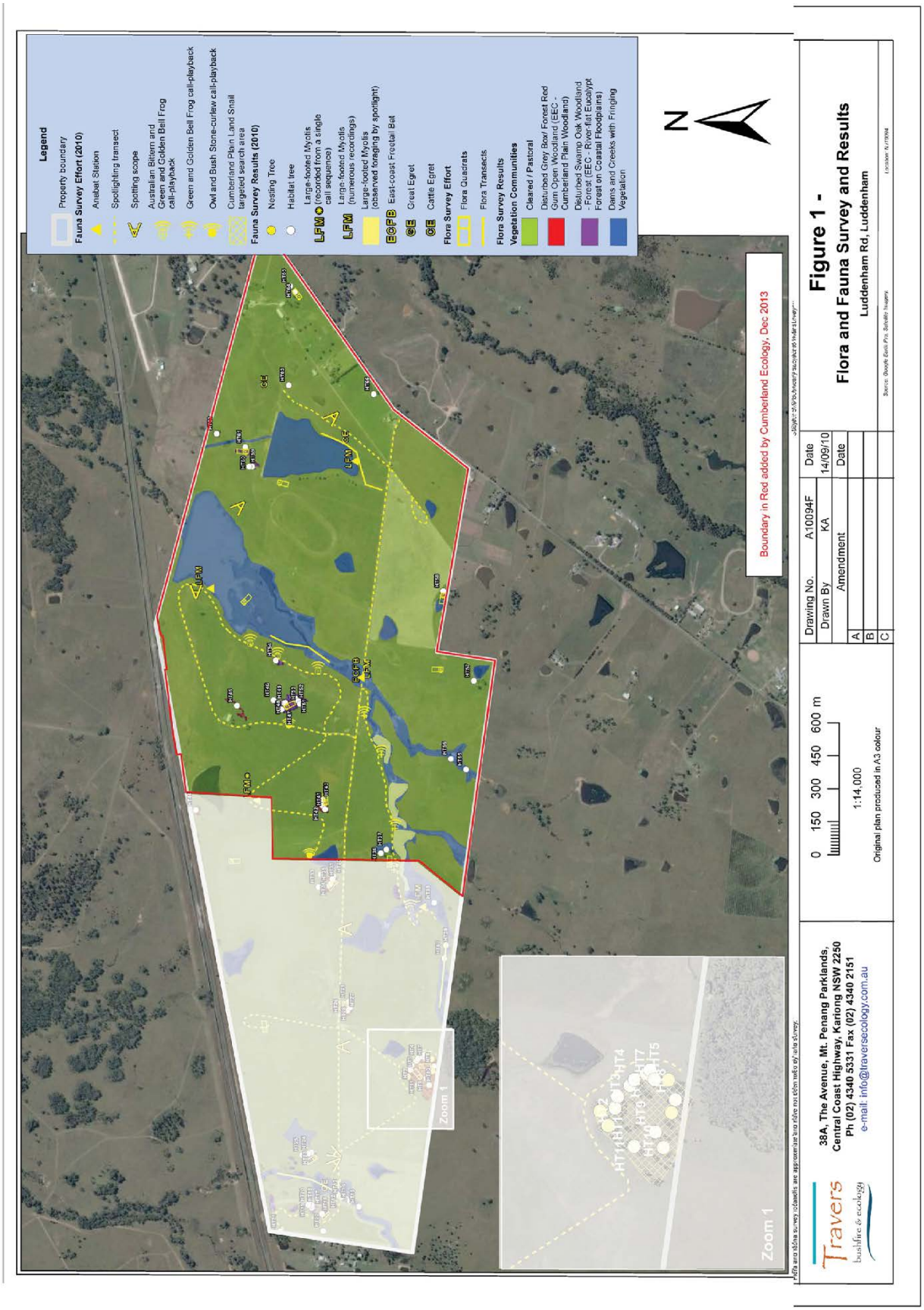


Figure 19 Results of Flora and Fauna Survey

2.13.2. Flora Survey

The flora surveys undertaken identified 111 flora species within the original study area (which includes the subject site) with only 50 of these comprising native species (refer Travers Report at **Appendix C**). The native species included several non-endemic planted species. There were no threatened flora species found during the flora surveys and it was concluded that no suitable habitat for threatened flora species is present. A site inspection undertaken by Cumberland Ecology, 2013 concluded that suitable habitat for most threatened flora species with potential to be found in the area does not exist on the site, especially under the current grazing regime.

2.13.3. Fauna Survey

Fauna surveys by Travers Bushfire and Ecology identified 63 fauna species within or near the original study area (which includes the subject site), with 12 of these being exotic species. Although suitable habitat in the form of dams exists for the threatened Green and Golden Bell Frog (*Litoria aurea*) on site, they did not find the species during their amphibian survey. During the fauna surveys they recorded two threatened fauna species on site. These were both bats, the East-Coast Freetail Bat (*Micronomus norfolkensis*), and the Large-Footed Myotis (*Myotis macropus*). Two migratory birds protected under the EPBC Act; the Cattle Egret (*Ardea ibis*) and the Great Egret (*Ardea alba*) were also recorded.

A large number of habitat trees were recorded on site, though few had hollows, and all hollows were less than 20cm in size and therefore not suitable for large fauna species.

2.14. Access and Transport

2.14.1. Existing road network

The road network surrounding the Sydney Science Park site is currently comprised of a number of arterial, sub-arterial and local roads, including:

- Luddenham Road, which provides direct access to the site;
- Mamre Road, functioning as a sub-arterial road linking Elizabeth Drive to the south with the Western Motorway (M4) and the Great Western Highway (A44) to the north; and
- Elizabeth Drive, running east-west approximately 3.6 kilometres to the south of the site and linking The Northern Road (A9) to the west with the Westlink M7 Motorway and further up to the Hume Highway (A28) in Liverpool to the east.

Other strategic road links in the surrounding areas include:

- Westlink M7 motorway;
- Western Motorway (M4);
- The Northern Road; and
- Erskine Park Link Road – Lenore Lane

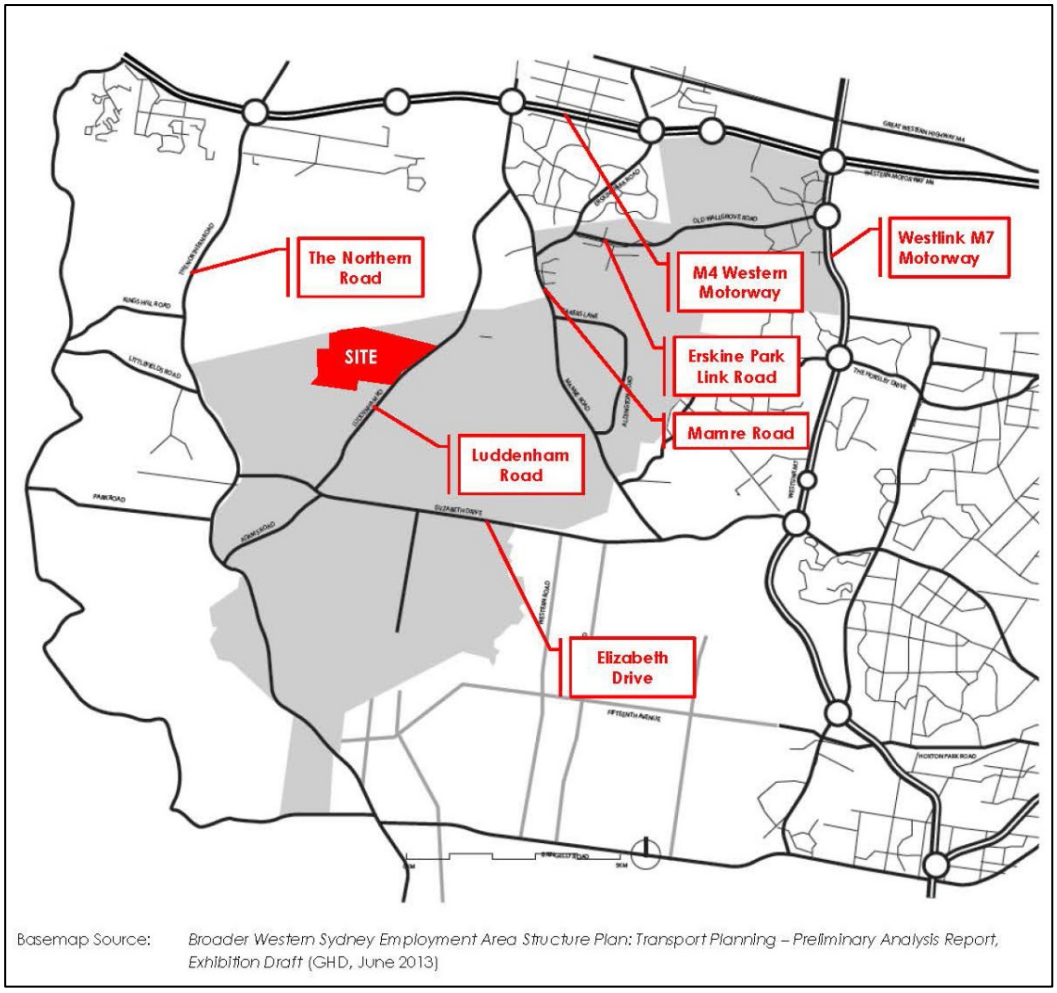


Figure 20 Surrounding Road Network

Key intersections comprise Luddenham Road/Mamre Road intersection, which enable access to the site via the north and east and Luddenham Road/Elizabeth Drive intersection which enable access from the south.

2.14.2. Public Transport

The site is within Metropolitan Bus Contract Region 1, currently being operated by Busways. Apart from Bus Route 779 between St Marys and the Erskine Park Industrial Area running along Mamre Road past the Luddenham Road Intersection, only a daily school bus service runs along Luddenham Road. This is reflective of the current low travel demands of the locality.

2.14.3. Pedestrian and Cycling infrastructure

There is currently limited pedestrian or cyclist infrastructure provided in the vicinity of the site, mainly due to the nature of land uses in the vicinity and the limited demand for such facilities at present.

2.14.4. Future Broader WSEA Transport Network

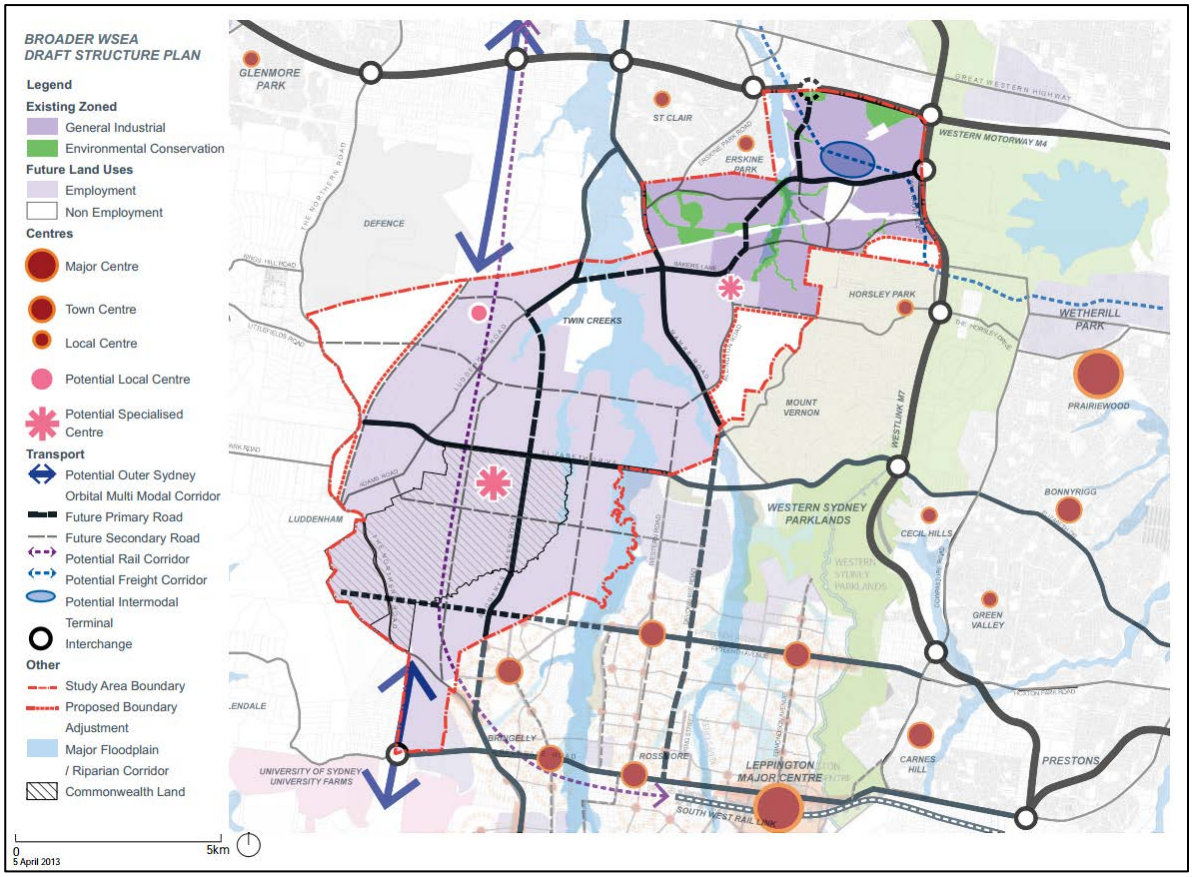
The Draft Broader WSEA Structure Plan identifies that:

- transport, movement and access are critical to the success of an employment area; and
- movement and access covers a broad range of considerations, which include road access and freight networks, rail access (passenger and freight) public transport and active transport.

The Draft Broader WSEA Structure Plan has been developed with key transport infrastructure elements including: Outer Sydney Orbital (OSO) corridor;

- Road network;
- Freight rail line;
- Passenger rail line; and
- Centres (major, town and local).

The Draft BWSEA Structure Plan is shown in Figure 21.



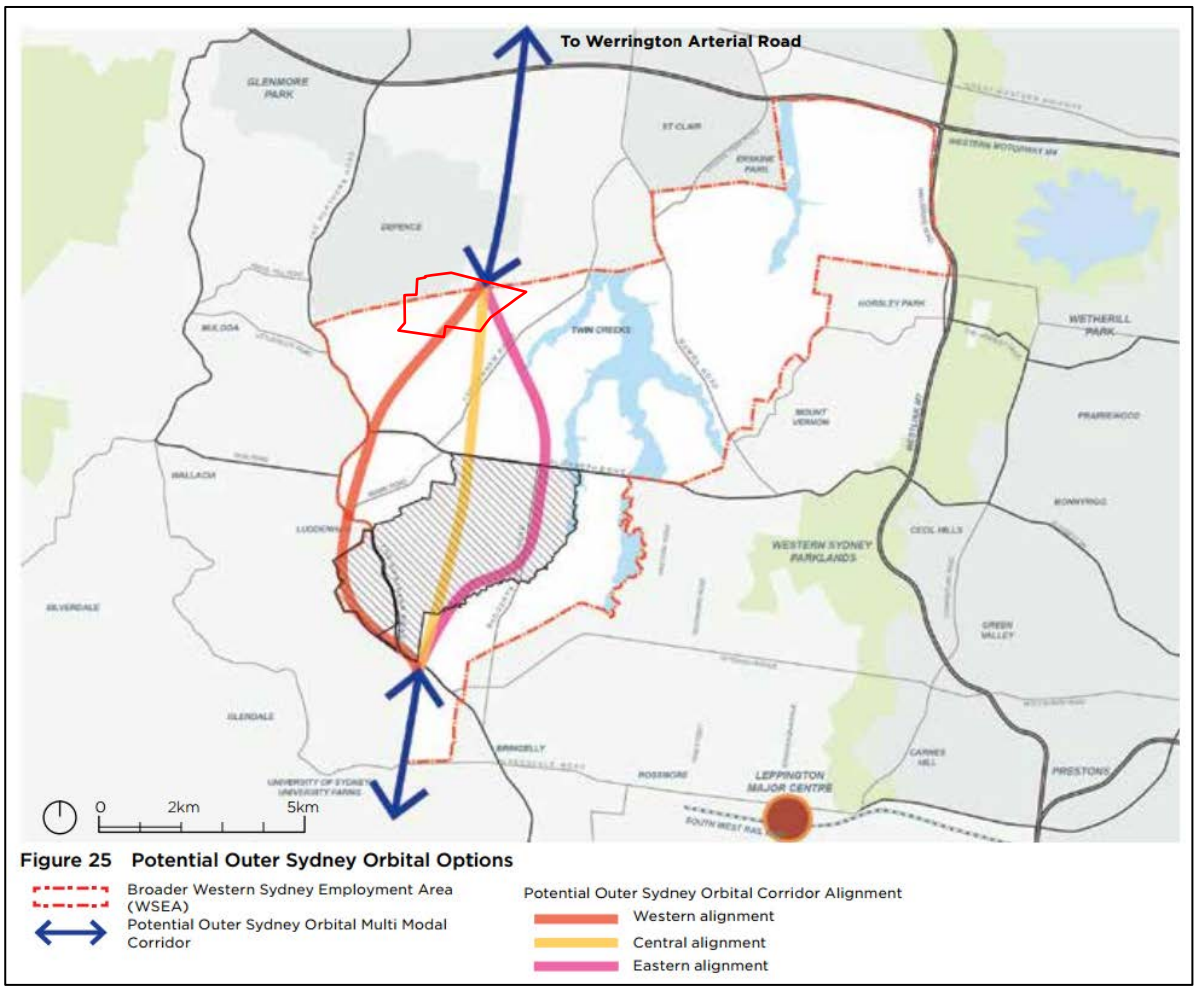
Source: Department of Planning and Infrastructure website

Figure 21 Draft Broader Western Sydney Employment Area Structure Plan

2.14.4.1. Road Network Improvements

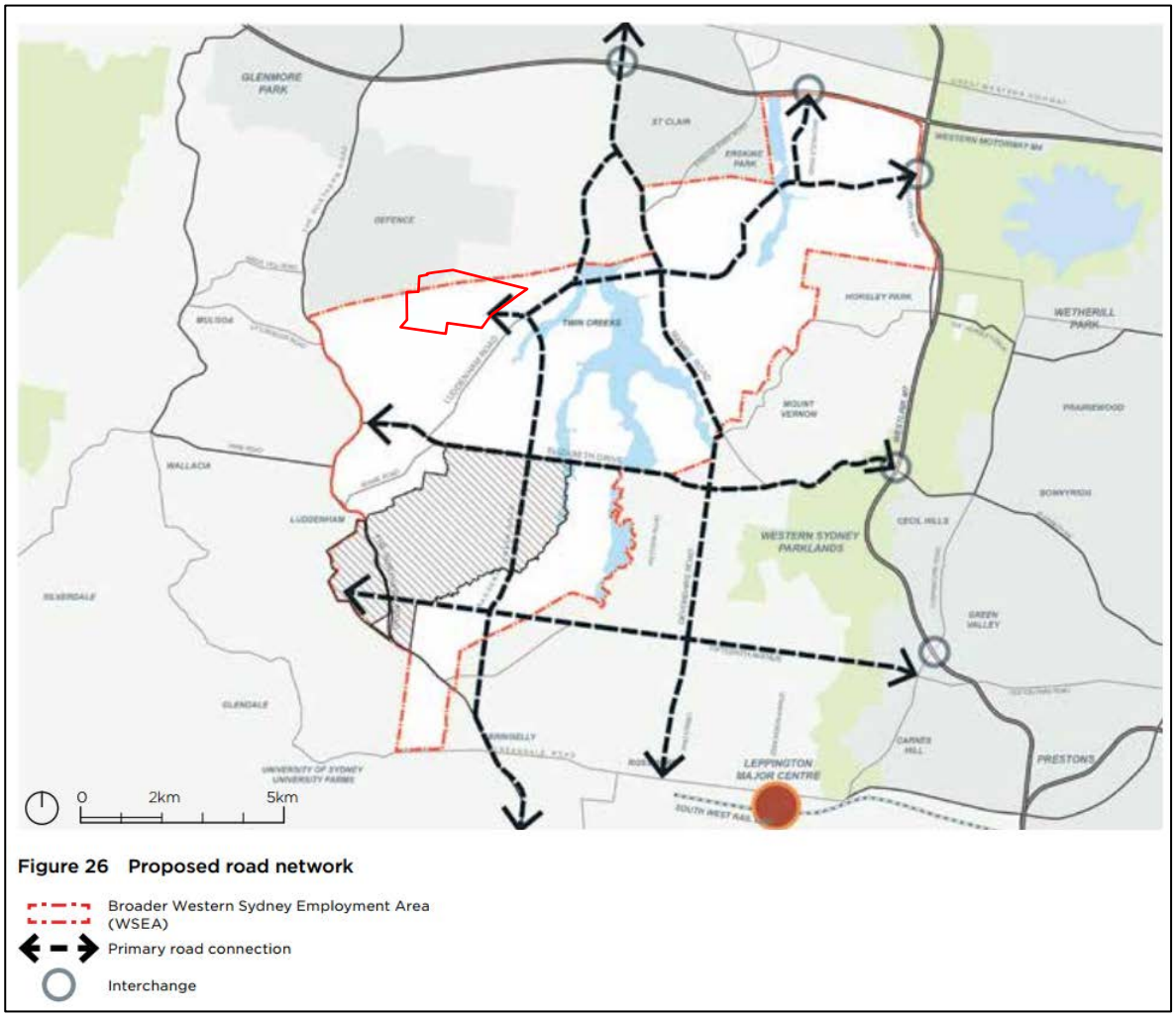
A key principle of the draft Structure Plan is the development of an efficient road network with strategic links into to the existing road network with direct access to local centres as well as direct heavy vehicle links to key freight corridors. A key component is the preservation of an Outer Sydney Orbital (OSO) corridor which was identified in the NSW Long Term Transport Master Plan and draft Metropolitan Strategy for Sydney to 2031. The precise location of the corridor is subject to further investigations, however potential OSO corridor options run through or adjacent to the site.

The OSO corridor would be supported with an interconnected road network as shown in Figure 22. Key elements include east-west connections between the OSO and the M7 Motorway and north south connections between the M4 Motorway and Elizabeth Drive.



Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 22 Potential Alignment Options for the Outer Sydney Orbital

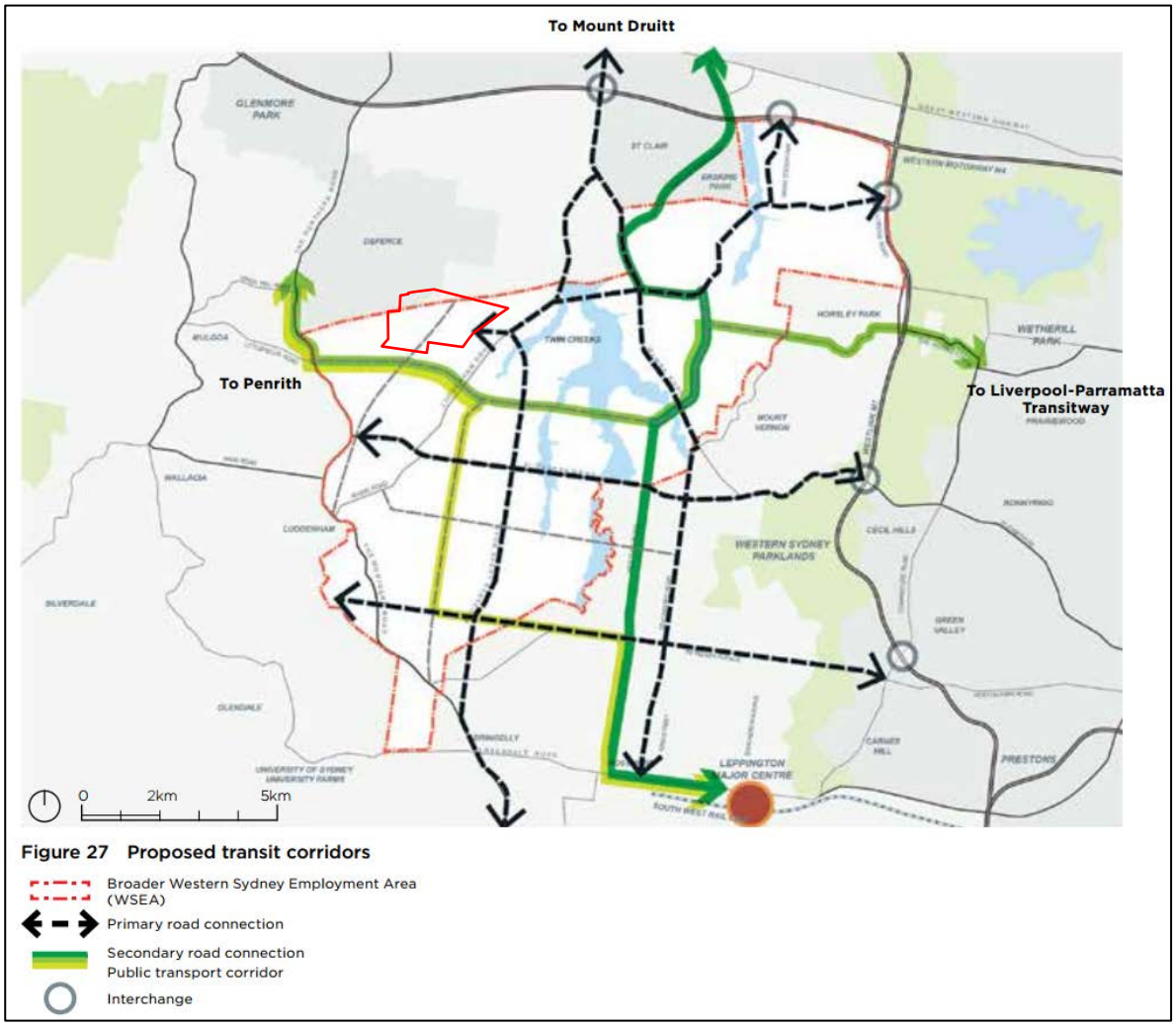


Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 23 Broader WSEA Proposed Road Network

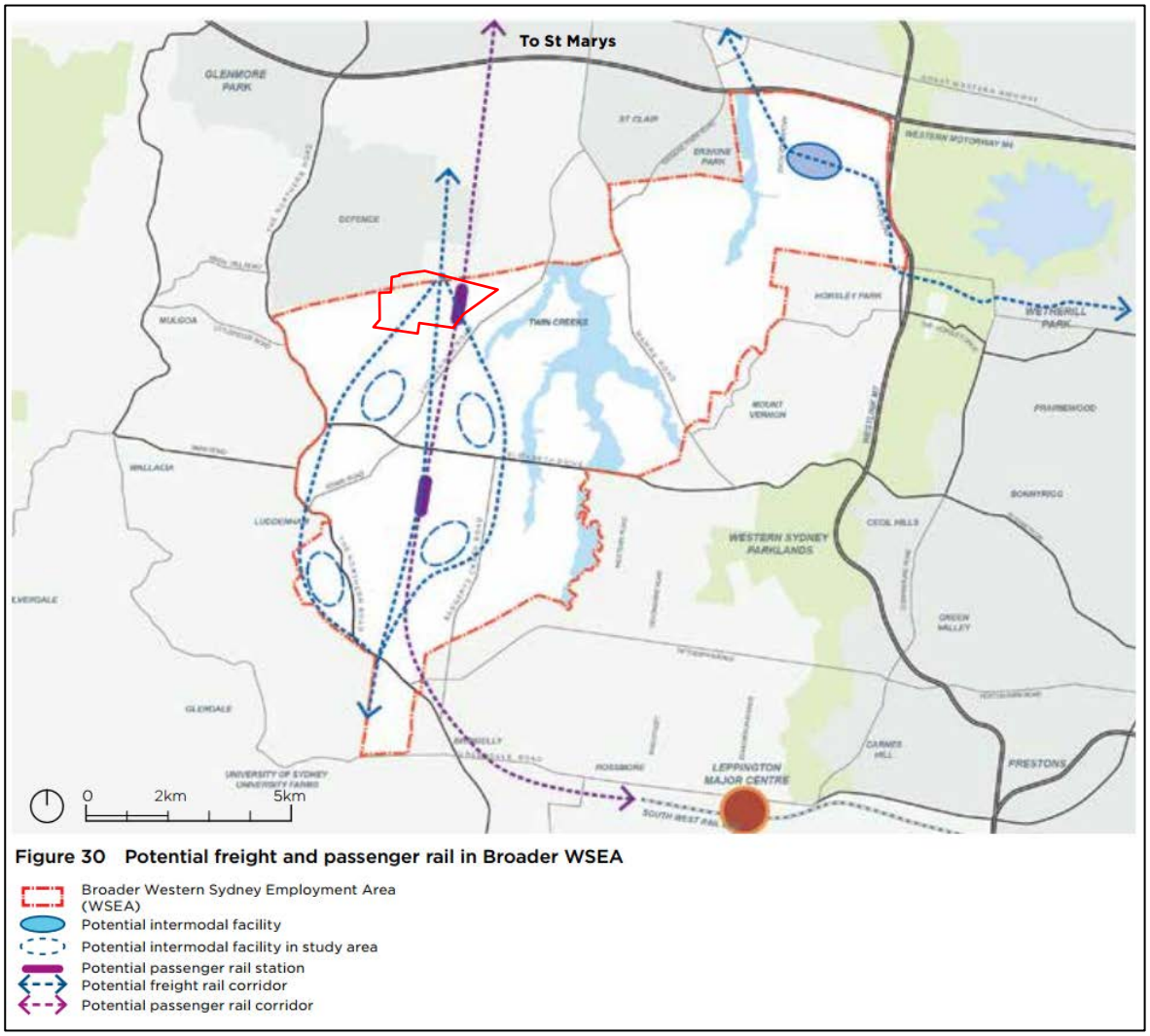
2.14.4.2. Rail and Public Transport Corridors

The draft Broader WSEA Structure Plan has identified passenger rail, freight rail and public transport corridors within Broader WSEA. These lines and corridors seek to connect centres within the Broader WSEA and beyond. As shown, a potential rail station and connecting public transport corridor is proposed at Luddenham within the Sydney Science Park Science. Accordingly, the draft Broader WSEA Structure Plan has identified a local centre to be located within the Sydney Science Park site around this potential transport hub.



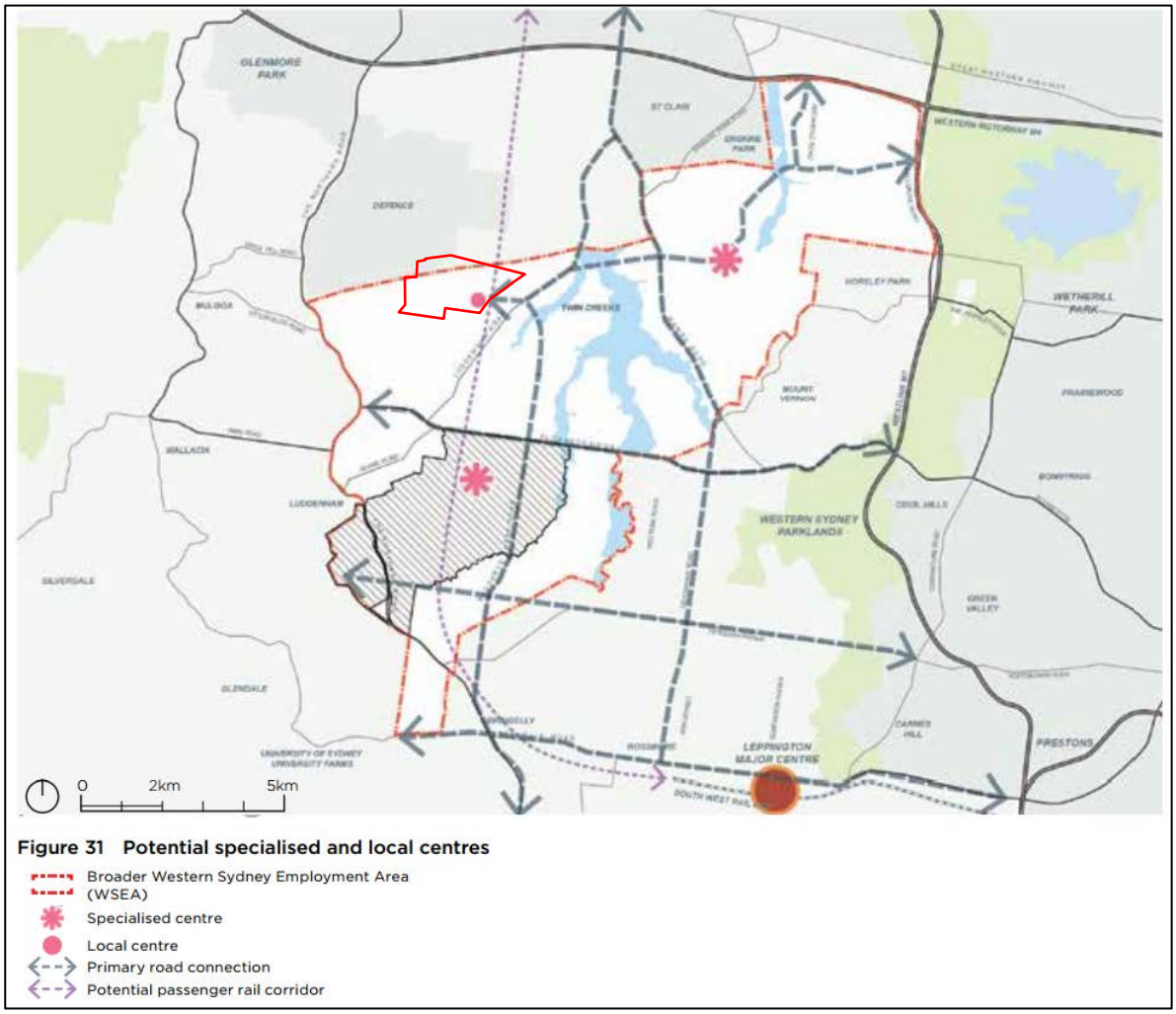
Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 24 Broader WSEA Proposed Transit Corridors



Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 25 Potential Broader WSEA Freight and Passenger Rail Links



Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 26 Potential BWSEA Specialised and Localised Centres

2.15. Badgerys Creek Airport

In 1986, following an extensive site selection process, the Australian Government announced that a location at Badgerys Creek, approximately 50 km west of Sydney's CBD and approximately 2.5 km to the south of the site, had been chosen as the site for a second major airport for Sydney. In 2012, the findings of a joint study undertaken by both the State and Federal government into Sydney's aviation capacity needs were released. The study concluded that the site's location adjacent to the residential growth areas of South West Sydney, and to the key transport corridors of the M7 motorway and the future Outer Sydney Orbital corridor, as well as its proximity to the WSEA, means it remains the location best placed to meet Sydney's spatial demand growth for aviation services at a relatively unconstrained site.

2.16. Community and Social Infrastructure

Consistent with its current rural use, there is no existing social infrastructure on the site. There is also little in the way of existing social infrastructure in the surrounding area at present.

Shopping and neighbourhood centres

Mulgoa Village is the closest shopping centre, catering for a wide variety of daily needs. There are also local shopping centres in Glenmore Park, St Clair and Erskine Park. For requirements that cannot be met in these centres, major shopping facilities are available within Penrith City Centre and St Marys Town Centre.

Schools

There are more than a dozen schools located in suburbs surrounding the site. The closest government primary school to the site is Luddenham Primary School to the south, although there are others in nearby Erskine Park, St Clair, Orchard Hills, Glenmore Park and Mulgoa. The primary schools at Luddenham, Mulgoa and Orchard Hills are all small schools, each with less than 100 students. The nearest government high school is in Glenmore Park, 10kms to the north east. However, seven non-government high schools are located throughout the surrounding suburbs, with the closest being Penrith Anglican College, Orchard Hills approximately 8kms to the north of the site. The majority of the primary schools identified above have increased enrolments between 2008 and 2012, reflecting recent population growth across the area.

Childcare

Several local schools also operate pre-school facilities. In addition, Mulgoa contains a stand-alone pre-school. Long day care services are offered at centres at Kemps Creek, Luddenham, Glenmore Park, St Clair and Erskine Park. Many appear from websites to have some vacancies on some days for some age groups.

Community Facilities

Community facilities provided by Council within proximity to the site include:

- Mulgoa Hall (simple hall with capacity for 110 people);
- Floribunda Community Centre (medium-sized hall, meeting room and activity room);
- Glenmore Park Youth and Community Centre (large function hall with terrace and meeting rooms); and
- Surveyors Creek Community Centre –providing a good sized hall as well as three meeting rooms.

The nearest library to the site is the St Clair branch library, within the St Clair Shopping Centre. The site is also served by the central library within Penrith City Centre.

Medical services

Nepean Hospital, located in Kingswood approximately 12km north of the project site. This hospital is a public facility and a teaching hospital of the University of Sydney. Blacktown Hospital and Liverpool Hospital provide secondary options should they be required, however these facilities are located approximately 25km north west and 25 km east of the site respectively. The closest medical centres are at Mulgoa and Luddenham. Further afield, a variety of general and specialist medical services and allied health services are available in Glenmore Park and Penrith City Centre.

Emergency services

The closest ambulance station to the site is in Penrith. There are a number of fire and rescue stations within a 5km radius of the site, namely Erskine Park, Mulgoa and Wallacia. The nearest police stations are in Penrith and St Marys.

Open space and recreation facilities

There are no areas of developed public open space on the site. The area's rural character also means there are limited open space facilities within close proximity to the site. There are a number of large areas of open space with sporting facilities in neighbouring suburbs, the closest being Mulgoa and Glenmore Park. Gow Park in Mulgoa provides two soccer fields and a cricket pitch, while Mulgoa Park contains some tennis courts. Glenmore Park offers Blue Hills Reserve (comprising a cricket pitch and mini soccer fields), Ched Towns Reserve (a variety of different sized rugby league fields, two soccer fields, two cricket pitches and a skate park) and Surveyors Creek Softball Fields (containing a number of softball diamonds).

Further south, three additional areas of open space also serve residents of the Luddenham area (Bill Anderson Park, Badgerys Creek Park and a baseball field south of Elizabeth Drive).

In addition to the provision of public open space, a range of private recreational facilities are provided within surrounding suburbs. The closest is the Twin Creeks Golf and Country Club, at Badgerys Creek, comprising a large scale leisure facility accessible to both paying members and guests. The Club offers a championship golf course set amongst 800 acres of bushland, together with tennis facilities, conference facilities, function spaces and dining and beverage facilities. Other facilities within proximity to the site include:

- Orchard Hills Golf Club;
- Wallacia Golf Course;
- Hubertus Country Club, Luddenham;
- Glenmore Heritage Valley Golf Club, Mulgoa Road, Mulgoa;
- Sydney School of Model Engineers Model Park;
- Equestrian centres at Mulgoa and Wallacia; and
- Bill Spilstead Complex for Canine Affairs (Dog Showground).

Places of worship

A number of places of worship are located within proximity to the site. These include:

- St Thomas Anglican Church, Mulgoa;
- Schoenstatt Fathers; and
- Schoenstatt Sisters of Mary.

Conference facilities

The area offers a number of conference centres and retreats such as Winbourne Edmond Rice Retreat and Conference Centre, the Mount Shoenstatt Retreat Centre, Greenvale Lodge and Luddenham Lodge, in addition to the Twin Creeks facility noted above.

New social infrastructure proposed for the area

A multi-purpose community centre is the only facility recommended from the assessment that would need to be provided to Council as Works in Kind through a Voluntary Planning Agreement. This facility would be owned and managed by Penrith City Council.

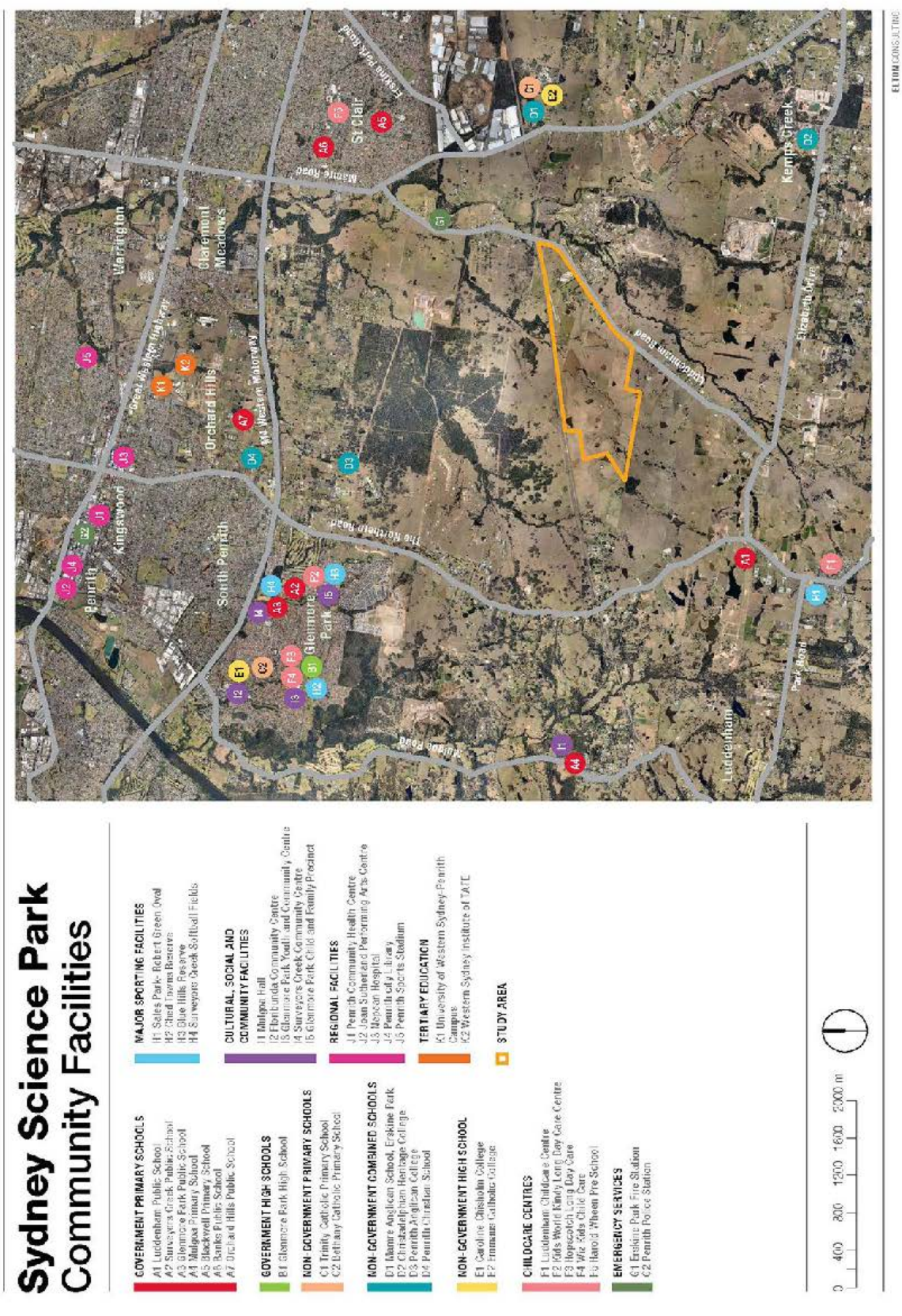


Figure 27 Social infrastructure within proximity to Sydney Science Park

2.17. Urban Capable Land Analysis

As demonstrated throughout this section, the site is relatively free of major physical and environmental constraints. Figure 28 provides an overall summary of the environmental constraints identified as part of the site analysis. The constraints that do exist on the site can be integrated and managed as part of the proposed development through the adoption of appropriate strategies.

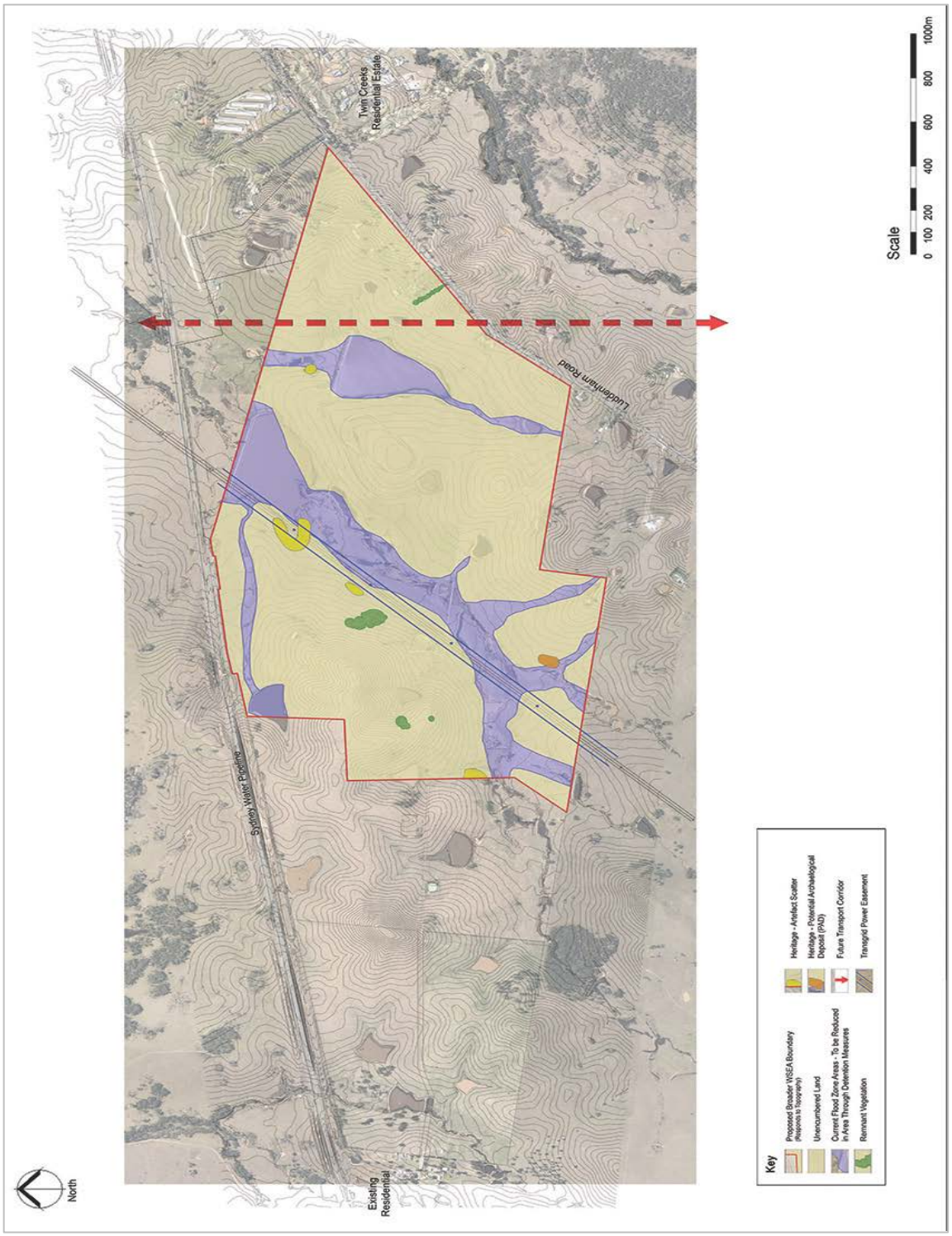


Figure 28 Constraints Plan

3. The Vision

Baiada, through its own business in research and development and through its own business partners internationally and nationally, including universities, derived the vision, concept and opportunity to create a science park, focused around food security, health and energy – sectors of international importance as the world's population increases and climate change influences agricultural productivity and the way people live.

3.1. Overview

Sydney Science Park will deliver to Western Sydney an urban structure providing greater choice, better value, leading edge environmental outcomes, higher design quality, improved social interaction and superior amenity. Employment in jobs of the future, high value research, technology and education facilities will be supported by business, retail and community services and housing for a diversity of incomes and lifestyles.

Entrepreneurial thinking, innovative design, sound marketing and consistent delivery will ensure Sydney Science Park quickly provides a compelling research, educational, business and housing environment.



Sydney Science Park will have the following characteristics:

- a memorable and valued urban concept that demonstrates consistency and clarity from the Master Plan to the scale of streets, landscaping, open spaces and built forms;
- clearly articulated and high quality open spaces that respect the site's character and create strong links with its topography, watercourses, trees and views, promote pedestrian movement, stimulate social contact, and feel familiar to the diverse mix of people and cultures for whom they are designed;
- a variety of employment and workplace opportunities and a diversity of housing types and tenure choices will be contained in a compact urban form that integrates multiple uses, encourages the creation of a walkable, pedestrian oriented community and facilitates communication between workers, researchers, academics, students, other residents and visitors;
- a sustainable street activity generated by a 'main street' style retail, commercial and housing mix that offers lifestyle, convenience and proximity to parks and squares rather than a traditional, fully enclosed 'shopping centre' experience remote from the outdoors;
- community facilities, education, shopping and employment opportunities will be within comfortable walking distances along a network of bicycle routes and enhanced transport services;
- a Town Centre will recall the character, dynamics and advantages of the world's most prestigious university towns, a life where town and gown are inseparable;

- a variety of policies and programs designed to effectively manage water, reduce energy consumption, improve resident and employee health, ensure physical and emotional accessibility, manage waste and materials toxicity, produce a highly valued environment; and
- a viable and soundly based planning and development process for employment land, community amenities and housing that ensures infrastructure, building and other development costs are not incurred 'out of synch' with market demand.

Sydney Science Park aims to respect the area's landscape setting and achieve a high level of scenic quality. The public domain will make a significant contribution to defining the place and making it special. Equally importantly, the community's built character will be modern and contemporary, not superficially evocative of other eras or places.

3.2. Six Broad Strategies

Exceptional communities do not just happen, they are built through the collective efforts of many people with a willingness to test new ideas. Sydney Science Park aims to dramatically improve on all past models.

Strategy 1: Strategic Master Planning

The site's Master Plan articulates the areas to be developed, protected, enhanced or restored, and how a community based on pedestrian and cycle movement rather than car will be encouraged. Each pedestrian catchment, planning block and development stage will contain a considered mix of employment, educational and residential uses.

A healthy, safe and complete sustainable community demands an appropriate mix of housing types and tenures. These will range from detached high-end homes to townhouses, residential flat buildings, studios, and live/work and student accommodation. All will offer residents the opportunity to occupy a home appropriate to their lifestyle, life stage, income and tenure choice. Every dwelling will contribute to reducing urban energy and water consumption through their siting, design, construction, inclusions and landscape.

The detailed consideration and design of the public domain – the parks and roads – and its seamless integration with the private domain – the places where people work or live – will respond to the natural features of the site. The combination of thoughtful and responsive public domain design and the holistic integration of public and private domain is what will make Sydney Science Park special.

Strategy 2: Water Re-use

Water will be respected as a precious resource. As much as possible, stormwater and building water discharge will be managed locally to meet internal water demands or through surface flow, groundwater recharge, agricultural use and building needs.

Strategy 3: Renewable Energy Generation

An aim of Sydney Science Park will be to supply much of the community's energy needs from on-site renewable energy sources. Consideration will also be given to the embodied energy contained in completed buildings and their designers actively encouraged to design for changing real estate values, changing usage and changing cultural currents.

Strategy 4: Leading Health Design

The most important ways to create robust, healthy spaces, and improve health and productivity will be recognised. These include building design with access to fresh air and daylight, minimising VOCs but also elements and systems that maintain natural systems and processes, and enhance place and nature based relationships. A transparent and socially equitable process to increase to use of non-toxic building and landscape materials will be encouraged if not mandated.

Strategy 5: Equity

The design and development of Sydney Science Park will foster a true sense of community, loyalty, trust and investment. As it will outlive the original development team there is an inherent and understood responsibility to ensure the project provides a public good and does not degrade the quality of life.

Strategy 6: Enhancement of Natural Terrain Beauty

An appreciation of beauty is a precursor to caring enough to preserve, conserve and serve the greater good. To this end, the community, its buildings and open spaces will contain design features and elements intended solely for human delight and the celebration of culture, spirit and place appropriate to its function. This will be carried through to families of buildings similar in style, texture and colour but expressing their individual typology, scale and nature.

This Vision is to be translated through the Master Plan, the Development Control Plan, future development applications and in EJC's benchmarks in making and developing Sydney Science Park.

4. Planning Proposal

4.1. Introduction

Penrith Local Environmental Plan 2010 (Penrith LEP 2010) is the principal environmental planning instrument applying to the site. Under Penrith LEP 2010, the site is zoned RU2 Rural Landscape. The objective of the RU2 Rural Landscape zone is to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- maintain the rural landscape character of the land;
- provide for a range of compatible land uses, including extensive agriculture;
- minimise conflict between land uses within the zone and land uses within adjoining zones;
- preserve and improve natural resources through appropriate land management practices; and
- ensure development is compatible with the environmental capabilities of the land and does not unreasonably increase the demand for public services or public facilities.

It is proposed to rezone the site from RU2 Rural Landscape to B7 Business Park, B4 Mixed Use and RE1 Public Recreation generally in accordance with Penrith LEP 2010. The Planning Proposal also seeks to establish a number of development controls to guide future development on the site including minimum lot sizes for residential development in the B4 Mixed Use zone and maximum height of buildings development standards.

4.2. Part 1 – Objectives and Intended Outcomes

The objectives of the Planning Proposal are:

- to nominate a new specialised centre within the north-west portion of the Broader WSEA area that will accommodate research and development, employment, education and supporting retail and residential uses.
- to facilitate development of Sydney Science Park in a coordinated fashion and in doing so achieve the site's highest and best use;
- to establish site specific objectives and development standards for Sydney Science Park that will allow the proposal to respond to market and demographic change and to allow the science park to continue to evolve and reinvent itself over time;
- to accommodate 440,000m^2 of employment and education floor space;
- to accommodate 3,000 dwellings integrated within the Town Centre and within the employment and education land;
- to provide accommodation for up to 400 students;
- to accommodate 30,000m^2 of retail floor space;
- to deliver a design that integrates community, transport, environmental and economic outcomes;
- to create a diverse worker, resident and student community that is demographically balanced, responds to changing life cycle, lifestyle and work requirements over time;
- to develop an open space network including active playing fields, and a connecting trail network of recreational spaces that capture riparian and amenity qualities; and
- to identify a new primary school site.

4.3. Part 2 – Explanation of Provisions

A detailed explanation of provisions is provided in section 6.3. The Planning Proposal will, as far as practical, incorporate the range of presently permissible land uses within the proposed land use zones together with the introduction of additional site specific land uses. The introduction of new site specific development standards and

controls for Sydney Science Park has been limited to where an existing standard and control is an impediment to achieving the desired outcomes for Sydney Science Park.

4.4. Part 3 – Justification

The justification of the Planning Proposal is set out under the following probe questions asked in the Department of Planning and Infrastructure's *Guide on Preparing Planning Proposals.*

4.5. Part 4 – Need for the Planning Proposal

Is the Planning Proposal the result of any strategic study or report?

Sydney Science Park is located within the Broader WSEA, the aim of which is to provide an appropriate supply of well-located serviced employment lands to secure the State's future productivity and growth. It seeks to generate approximately 21,000 office based and 36,000 industrial new jobs within the next 30 years. The proposal provides a critical opportunity to provide a source of highly skilled, quality jobs within Western Sydney. This stands in contrast to the types of jobs being created in other parts of the WSEA, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited. The proposal will deliver more than 12,200 jobs in the fields of scientific research and development, education and support services, the first 200 jobs expected to be delivered in 2016. Sydney Science Park will also provide a much needed catalyst for economic development through the provision of an innovative research and development cluster. Sydney Science Park will exceed the targets envisaged by the Draft Broader WSEA Structure Plan. The Sydney Science Park master plan incorporates a town centre, options for Outer Sydney Orbital, freight and passenger rail corridor and train station on the site, consistent with Draft Structure Plan. A more detailed discussion of the proposal's consistency with the Broader WSEA Draft Structure Plan is included in section 7.4.

Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Penrith LEP 2010 is the principal environmental planning instrument applying to the site. Penrith LEP 2010 was prepared in accordance with the (Standard Instrument) and which came into effect in September 2010. It is considered that a stand-alone planning proposal is the best means of achieving the objective and intended outcome for the site.

Is the planning proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

The planning proposal is consistent with the objectives and actions of applicable regional or sub-regional strategies including the Sydney Metropolitan Strategy. A detailed discussion of the planning proposal's relationship to the relevant strategies is included at section 7.

Is the planning proposal consistent with a Council's local strategy or other strategic plan?

The planning proposal is consistent with the majority of Council's policies including:

- Penrith Regional City Community Strategic Plan 2031;
- Penrith Community Plan;
- Penrith Sustainability Blueprint for urban release areas;
- Penrith Regional City – Major Developments and Investment Opportunities;

- Penrith City Centre & St Marys Town Centre Vitality & Viability Review Economic Analysis; and
- Penrith Rural Lands Strategy.

A detailed discussion of the planning proposal in relation to Council's strategies are included in section 7.

Is the planning proposal consistent with applicable State Environmental Planning Policies?
State Environmental Planning Policies (SEPP) relevant to the planning proposal are:

- State Environmental Planning Policy – Remediation of Land (SEPP 55);
- State Environmental Planning Policy - Design Quality of Residential Flat Development (SEPP 65); and
- Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No 2 - 1997) (SREP 20).

A detailed discussion of the planning proposal in relation to its consistency with SEPP 55, SEPP 65 and SREP 20 is provided in section 7.8. Given the site's current and previous usage (i.e. agriculture), the potential for widespread contamination across the site is considered low. JBS has concluded that contamination on the site would not prevent the planning and development of Sydney Science Park for the proposed uses, consistent with the objectives of State Environmental Planning Policy No. 55 – Remediation of Land (refer to section 8.6 and Preliminary Site Investigation, prepared by JBSG included at **Appendix A**).

Is the planning proposal consistent with applicable Ministerial Directions (s.117 directions)?
A detailed discussion of the planning proposal's consistency with the relevant s.117 directions is included at section 7.9. In summary, the planning proposal is consistent with relevant s.117 directions.

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

The majority of the site has been cleared due to a long history of agricultural land use and consists mainly of exotic pastures and farm dams. The subject site comprises small patches highly disturbed Grey Box / Forest Red Gum Open Woodland (EEC – Cumberland Plain Woodland) and highly disturbed Swamp Oak Woodland - Forest (EEC – River-flat Eucalypt Forest on Coastal Floodplains). Cumberland Plain Woodland (CPW) is listed as a Critically Endangered Ecological Community (CEEC) under both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and River-Flat Eucalypt Forest on Coastal Woodlands (RFEF), is listed as an Endangered Ecological Community (EEC) under the TSC Act only. Both Travers Ecology and Cumberland Ecology have included that all patches, on the subject site, are classified as being in 'Low Condition' under a biometric assessment and consist of a small number of trees than 0.25ha in size. The understorey of these areas consists of mostly exotic pastoral weeds, with no native mid-storey species. These degraded scattered trees form part of a central area of open space that is proposed to be zoned RE1 Public Recreation. It is not anticipated as a result of the current planning proposal that there will be any significant effects to threatened flora or fauna or Endangered Ecological Communities (refer to section 8.2 and flora and fauna assessments included at Appendix C).

Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

An environmental assessment of the Planning Proposal in relation to the following factors has been considered:

- Transport and Access assessment;
- Flora and fauna;
- Water cycle management including flooding, surface water, groundwater quality and riparian corridors;
- Services and Utilities;
- Geotechnical, soils and contamination assessment;
- Aboriginal heritage assessment;
- Social planning assessment;
- Economic Impact Assessment; and
- European heritage.

In summary, the planning proposal does not result in any significant adverse environmental impact.

Has the planning proposal adequately addressed any social and economic effects?

A discussion of the planning proposal's social and economic effects is provided in section 8 and the Economic and Retail Analysis, prepared by Hill PDA and included at **Appendix D**. In summary, the proposal has a number of positive social and economic impacts, namely:

- **Direct employment** (12,200 jobs in the fields of scientific research and development, education and support services with the first 200 jobs delivered by 2016). This is in addition to indirect jobs supported in support services (public transport, servicing and so on) and jobs sustained during the construction process itself. These will largely be high value jobs that are net additional to Australia and reflect the demographic shift towards a more knowledge-based economy. This direct employment will support economic value add for the wider economy. It will also diversify employment opportunities in the Broader WSEA. It would support significant numbers of indirect jobs off-site associated with economic multipliers;
- **Attract international investment to Penrith and Western Sydney** as a place to work, study, live and invest. Sydney Science Park would be an Australian first and would compete with science, research and technology parks worldwide. As such the investment, scientists and skilled workers that it will attract would not otherwise be attracted to Australia. It will thus be net additional investment to Australia and will not be at the expense of other local, regional or national destinations;
- **Acts as catalyst for the Broader WSEA**. Sydney Science Park would act as a catalyst for the wider development of the Broader WSEA, stimulating further development and supporting the economic viability of planned infrastructure. It would also assist in promoting and marketing the potential that the Broader WSEA offers. Indeed the Broader WSEA Economic Issues and Drivers Study states that the provision of an employment 'hub' such as "a food science and technology hub building upon the area's history of poultry farming and horticulture" could act as a catalyst to kick-start development in the area;
- **Educational Support**. The Sydney Science Park would underpin Sydney's reputation as a world-class destination for university education and learning by accommodated an estimated 10,000 students by 2041. This in turn will support the economy of Sydney, NSW and Australia particular as universities attract the greatest number of visitors per square metre of floor space than any other employment use. It will also provide greater support for the knowledge-based economy that Sydney needs to development to allow it be more competitive nationally and internationally.

- **Economic value add**. Science, technology and research parks are usually supported by Government and the development process itself is normally loss leading. However, because of the significant and wide ranging economic value add which knowledge-based industries support for national economies this initial loss can be justified in economic terms. This is because new technologies support a whole range of further employment and economic opportunities in manufacturing, production and knowledge industries that create significant economic multipliers for local, regional and national economies. Sydney Science Park would allow Sydney, NSW and Australia to benefit from these opportunities whilst being at no risk to Government. It should be noted that scientific research in Australia already employs around 11,500 people and provides just over $1 billion of added value to the Australian economy every year;
- **Support additional housing** and contribute to the housing targets for Penrith as set out in the Metropolitan Plan and North West Subregion Draft Subregional Strategy;
- **Trading Impact**. The proposed town centre would largely cater for demand emanating out of future workers, students and workers (i.e. it is demand which would not exist in the absence of Sydney Science Park). On this basis it would not be at the expense of trade which would otherwise be directed towards existing or planned centres in the Broader WSEA or beyond and is thus not expected to adversely impact upon any other centres to any significant extent;
- **Construction**. High level estimates of construction costs associated with Sydney Science Park is approximately $2.55 billion (constant 2012 dollars). In terms of economic multipliers associated it has been estimated that:
  - $2.55 billion in direct construction costs will generate a further $3.4 billion in production induced multiplier impacts and a further $2.5 billion in consumption induced multiplier impacts. Total economic activity would amount to $8.4 billion; and
  - $2.55 billion of construction will generate 7,270 job years directly in construction. A further 9,727 job years would be generated in production induced impacts and 9,727 job years in consumption induced impacts resulting from construction of Sydney Science Park. Total job years generated will be 26,724 spread over the construction period.
- **Creating a lifestyle centre to live and work**. The genuine mixture of employment, research and development, education, residential and retail uses will contribute to the social sustainability of the overall development and activate the science park in the evenings and on weekends, thereby making them safer places and helping to create a sense of vibrancy and liveliness in the area. The proposal brings jobs and homes closer together.

Is there adequate public infrastructure for the planning proposal?

The Planning Proposal is supported by a clear and viable infrastructure servicing strategy that leverages readily accessible existing infrastructure and demonstrates that the project can be implemented as a standalone proposal. The Project presents an opportunity to provide infrastructure and high quality new facilities in a timely manner based on leading practice sustainability principles and sustainable funding, management and maintenance arrangements. A detailed discussion in relation to public infrastructure is included at section 8.5 and the Infrastructure Services Assessment, prepared by J Wyndham Prince and included at **Appendix E**.

In summary, the site can be serviced with regard to electricity, sewer, water, gas and telecommunications:

- Electrical supply - stage 1 can be serviced by two local zone substations. A new zone substation to amplify the existing electrical infrastructure is required to adequately service the remaining stages of the development.
- Sewer - a new lead-in service is required to connect the site to Sydney Water's sewer network.

- Water - a new water trunk main needs to be constructed to connect the site to Sydney Waters water supply network. A new reservoir or booster pumping station is required to amplify the existing water supply network to provide adequate supply and pressure to the development.
- Gas – a gas main extension is required to connect the site to the gas network.
- Telecommunications - new lead-in services are required to connect the site to the NBN network.

What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway determination?

As discussed in section 1.5, consultation has been undertaken with Council and the Department of Planning and Infrastructure (DoPI). Relevant public authorities will be consulted during the post gateway determination process.

5. Master Plan

5.1. Introduction

The Master Plan for Sydney Science Park has been prepared by Design IQ, Paterson Design Studio Pty Ltd, J Wyndham Prince and HDR Rice Daubney Architects to demonstrate the capability of the site to accommodate the vision and to guide future planning (refer to Figure 29). It responds to the site analysis at section 2, identifies the parameters and outcomes for future development and describes key elements of the environmental strategies that are proposed.

Sydney Science Park is to be developed in stages over an approximate 25 year period. The urban structure of the master plan provides sufficient scope and flexibility to respond to future changes in planning and open space, transport infrastructure, market demand, lifestyle and demography.

The master plan has been designed for energy and resource efficiency, flexibility in the use of property, public spaces and service infrastructure. Detailed planning and design for urban development will be addressed as part of a series of future applications for subdivision, open space and infrastructure works that will be submitted as part of a staged process over time.

5.2. Urban Design Concept

Key features of the Master Plan are:

- a master plan framework that responds to the site topography of ridge lines and valleys to create a strong underlying connecting landscape structure;
- a master plan framework that can respond to and accommodate a future rail line extension and proposed station consistent with the Draft Broader WSEA Structure Plan;
- capitalisation on existing views and creation of new views and vistas;
- optimisation of solar orientation to maximise energy efficiency;
- delivery of a sustainable community in terms of employment, environmental outcomes, integrated land use and transport planning;
- provides a higher order road hierarchy that has been developed in a manner that provides for flexibility of development of various land uses including creation of a Commercial Road (southern road) and City Road (northern road connecting the train station to the proposed town centre) as key east/west connectors that represent key structural elements of the master plan and which delivers distinct characters and land use type and density;
- a grid street hierarchy that delivers engaging and active streets that promotes permeable connections and accessibility, trip containment, walking, cycling and use of public transport;
- a Main Street Town Centre located on the City Road adjacent to the major open space amenity, integrated via strong pedestrian and cycle linkages to the balance of the development. The Town Centre will be the key built identity and focal point for the whole of the Sydney Science Park community, both visually and physically central to employment and education uses;
- a second smaller centre in the form of a local village located in an early stage of the project to provide a ready supply of local retail and basic community needs;
- a range of densities and dwelling types providing housing choice to satisfy the needs of a wide spectrum of households, at different life stages and from varying socio-economic circumstances and lifestyle preferences;

- a cultural precinct adjacent to a formal recreational lake will provide for community, entertainment and function facilities;
- walking and cycling networks designed to provide for workers, students and residents linking key amenities within the site;
- provision of an extensive passive and active open space and landscape / vegetation network that shapes an identity and character responsive to the topography of the site and integrates a livable, robust network of parks, reserves, corridors and streetscapes; and
- use of water bodies, performing both an aesthetic and functional (water sensitive urban design) purpose, as a contributing element of the public domain.

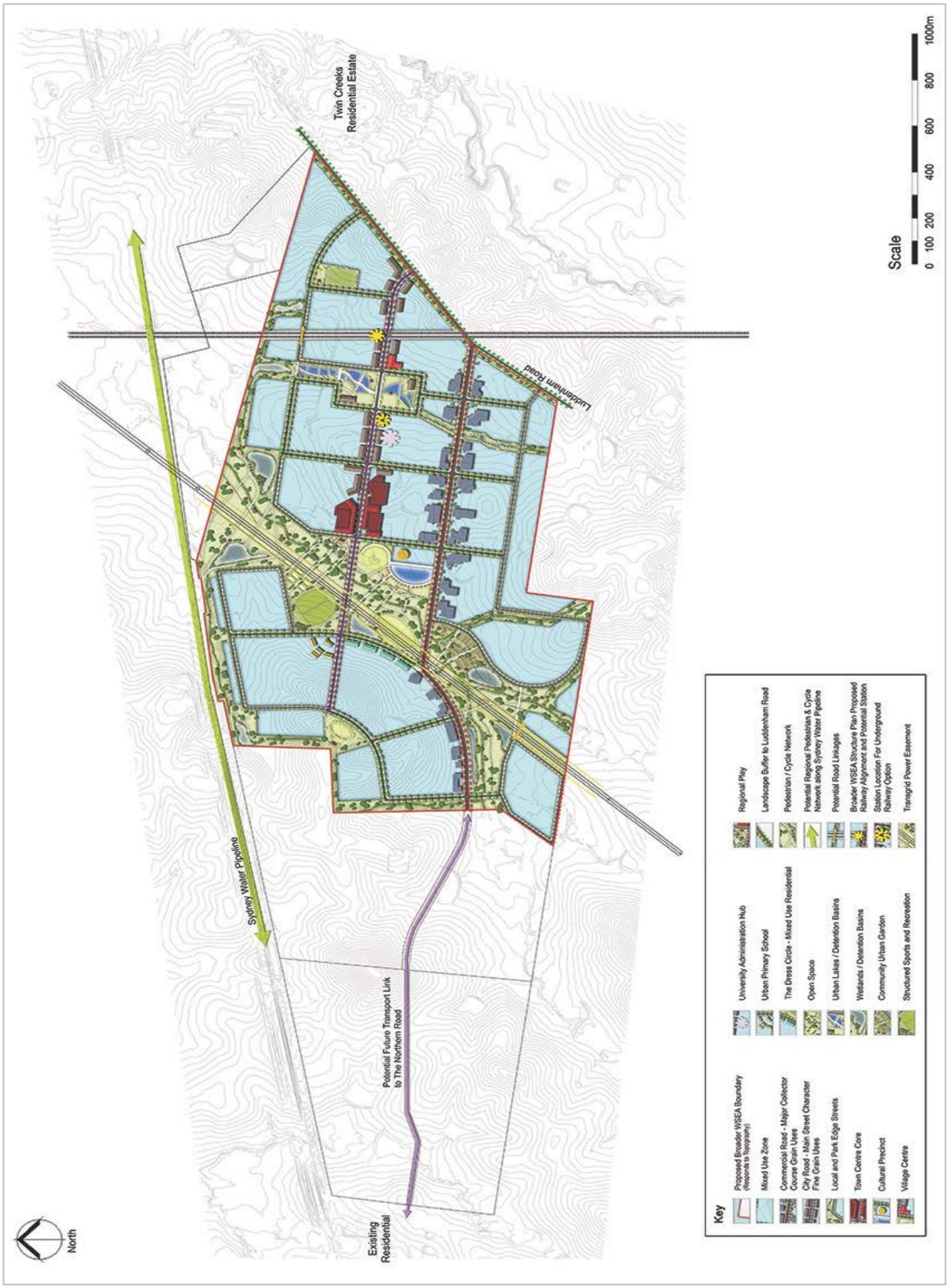


Figure 29 Master Plan

The Master Plan and associated drawings, prepared by Design IQ are included at Appendix F.

5.3. Land Uses and Distribution

A general distribution of land uses is shown in Figure 30 and described in detail below.

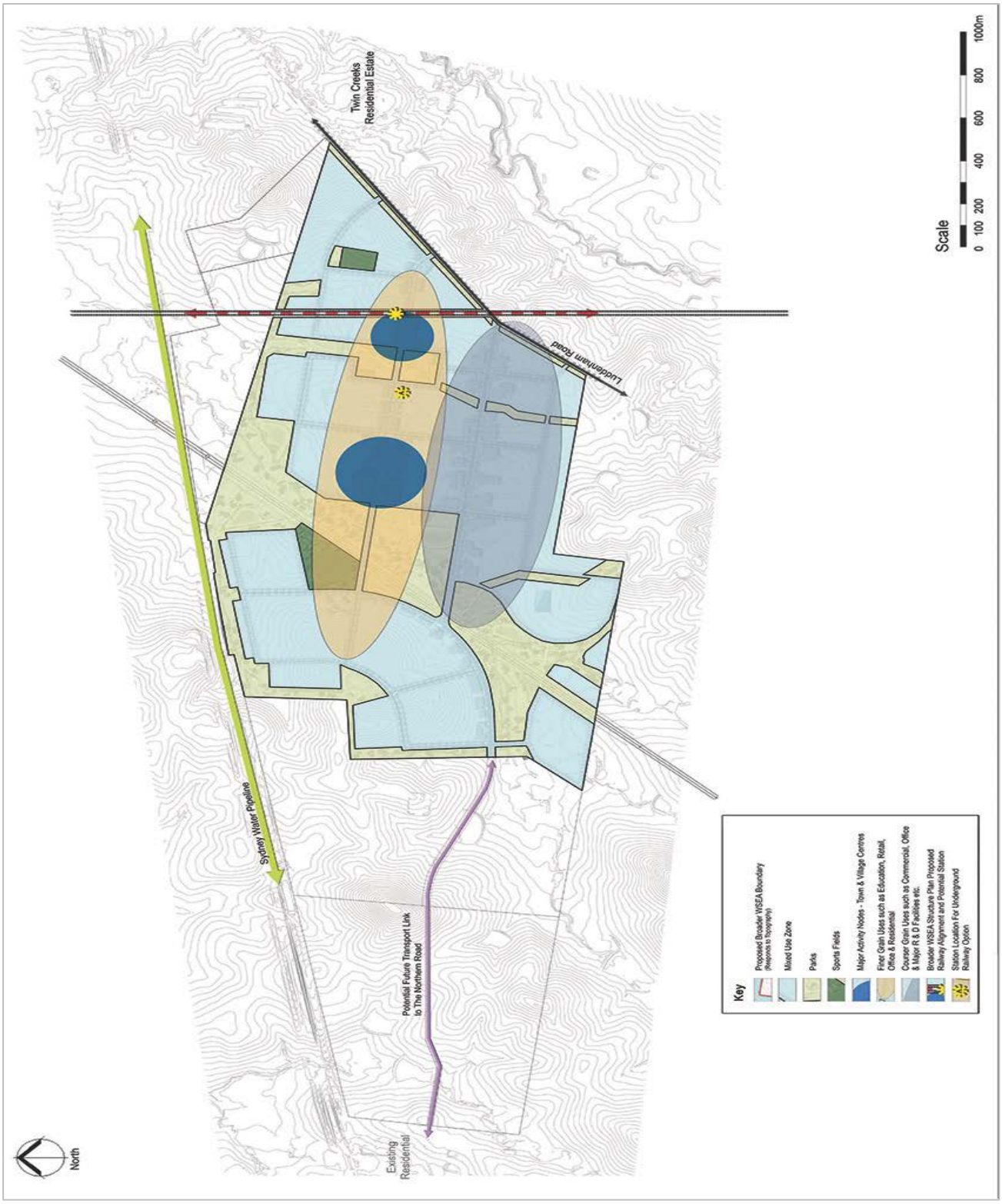


Figure 30 Distribution of Land Uses

5.3.1. Town Centre and Employment

The Town Centre is located to the east of the main area of the north-south riparian corridor with employment land to the north, south and east. The new Town Centre will comprise a wide range of retail, commercial, business education, entertainment, civic recreation, residential, tourist and visitor accommodation and employment land uses including approximately 30,000 m2 of retail floor area (supermarkets, speciality food stores, restaurants, hotels / clubs, personal and household retail) and a community facility. The higher density housing types (residential flat buildings, shop top housing and small lot multi-unit housing) will be concentrated in and around the Town Centre and in areas of high visual and landscape amenity, to maximise access to services and helps strengthen the customer base for local businesses, allows more trips to be made by public transport and combined with other factors including high quality civic spaces, will help to make the centre an attractive place to live, work and visit. It is expected that the proposed student accommodation will also be located in this area.

The genuine mixture of employment, research and development, education, residential and retail uses will contribute to the social sustainability of the overall development and activate the science park in the evenings and on weekends, thereby making them safer places and helping to create a sense of vibrancy and liveliness in the area.

In addition to the Town Centre, a new local village centre is proposed towards the eastern portion of the site, adjacent to the formal lake. The local village will be delivered as part of the initial stages of the development to assist in place creation and to provide for the local day to day convenience retail needs of future workers and residents. It is expected that once the Town Centre is established and 'anchor' tenants secured, retailers (including those in the local village) will be drawn naturally to the Town Centre, the 'heart' of Sydney Science Park. Although subject to future planning applications, it is likely that buildings within the interim village will need to be flexible in terms of design, so as to maximise opportunities for their adaptive reuse as the development evolves.

5.3.2. Education

Education uses are expected to be 'peppered' throughout Sydney Science Park with student life visible in the public domain and town centre spaces. A university administration 'hub' is identified along the new City Road. Approximately 100,000m2 of education floor space is expected to be developed by University and education institutions within Sydney Science Park. A close association between a science park and university supports successful science park development, in part by attracting graduates from the university to employment on site and by providing a source of qualified employees. It is expected that up to 10,000 students will be on the site and with the 400 student dwellings to be constructed, creating an attractive and lively university campus.

5.3.3. Residential uses

Sydney Science Park will provide a mix of housing types ranging from residential flat buildings, through traditional single lot residential dwellings, to provide housing diversity and choice to meet the needs of future workers, students and residents. Higher density housing types will be concentrated closer to the Town Centre and adjoining open space areas and will have a building height of 4-6 storeys. While the medium and lower density housing types will be located on the fringes and more topographical sensitive areas, and will have a maximum building height of 2-4 storeys.

An indicative mix of housing may include:

Dwelling Type	Number
Detached dwellings	300
Terrace/townhouse	1,200
Residential apartments	1,500
Student dwellings	400
	3,400

The actual dwelling mix and yield for each dwelling type will be determined as part of future detailed applications for each stage. The Master Plan specifically does not pre-determine the number of dwellings or mix within each future stage. Dwelling mix is subject to change over the significant time period for implementation of the development as market requirements change.

5.3.3.1. Open Space, Recreation and Public Domain

The scenic quality of the landscape is underpinned by its undulating topography and vistas to the Blue Mountains. These vistas have been used as key axes through the design of the master plan, grounding the sense of place, increasing the view corridors and enhancing way finding. This has provided a significant opportunity for parks to be created on the high ground with views to the Blue Mountains.

The Master Plan provides for approximately 83.2 hectares of public open space in the form of riparian corridors (18.99 hectares), sporting fields (5.15 hectares), corridors, district and local parks (59.06 hectares). The landscape and open space vision for Sydney Science Park is to:

- embrace the sites undulating topography and vistas to Blue Mountains;
- create a living and working environment that promotes health, well-being, active living and sociability;
- use open space as a way to establish connections between workers, students and residents and nature; and
- celebrate food production through community supported agriculture, community gardens and a policy to cultivate roadside land for food production where appropriate.

Landscape Concept Plans prepared by Paterson Design Studio Pty Ltd are included at **Appendix G**. Landscaped open space has been configured into five activity generators / focus areas, namely:

- District level / active sport – within the north-western portion of the site and comprising sporting fields, multi-purpose hard paved courts and ‘kick-a-bout’ spaces;
- Regional play focus – adjacent to the proposed town centre comprising skate / bike parks, ‘play’ facilities and passive open space;
- Cultural / community space – on the eastern side of the main area of open space comprising performance / amphitheatre space, pond and ‘kick-a-bout’ space;
- Food productive zone – within the southern portion of the site comprising community gardens; and
- Central core – within the eastern portion of the site with a focus on water and activity.

For local and district parks, the key landscape principles include the following:

- create a network of connected parks within walking distance of work places and dwellings which readily link in with other key urban places and services;
- provide parks which are flexible and can be used by a number of people for a range of purposes;
- provide parks that can be adapted to new opportunities and changes in future demand;
- plan the location, design and management of parks is based on the principles of sustainability; and
- provide wetlands, bio-retention gardens and detention basins to achieve storm water control and quality targets in accordance with water sensitive urban design best practice standards.

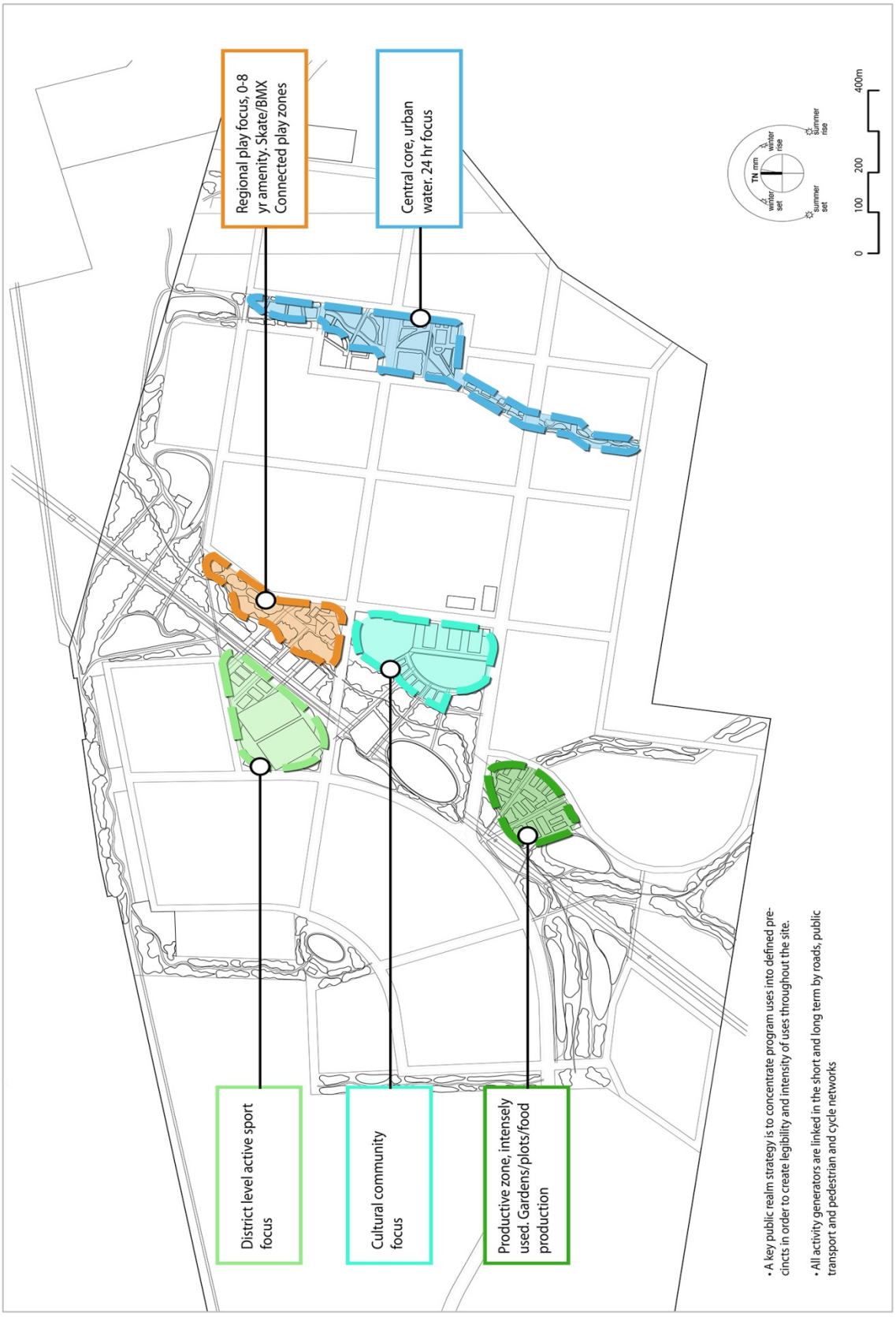


Figure 31 Activity Generators

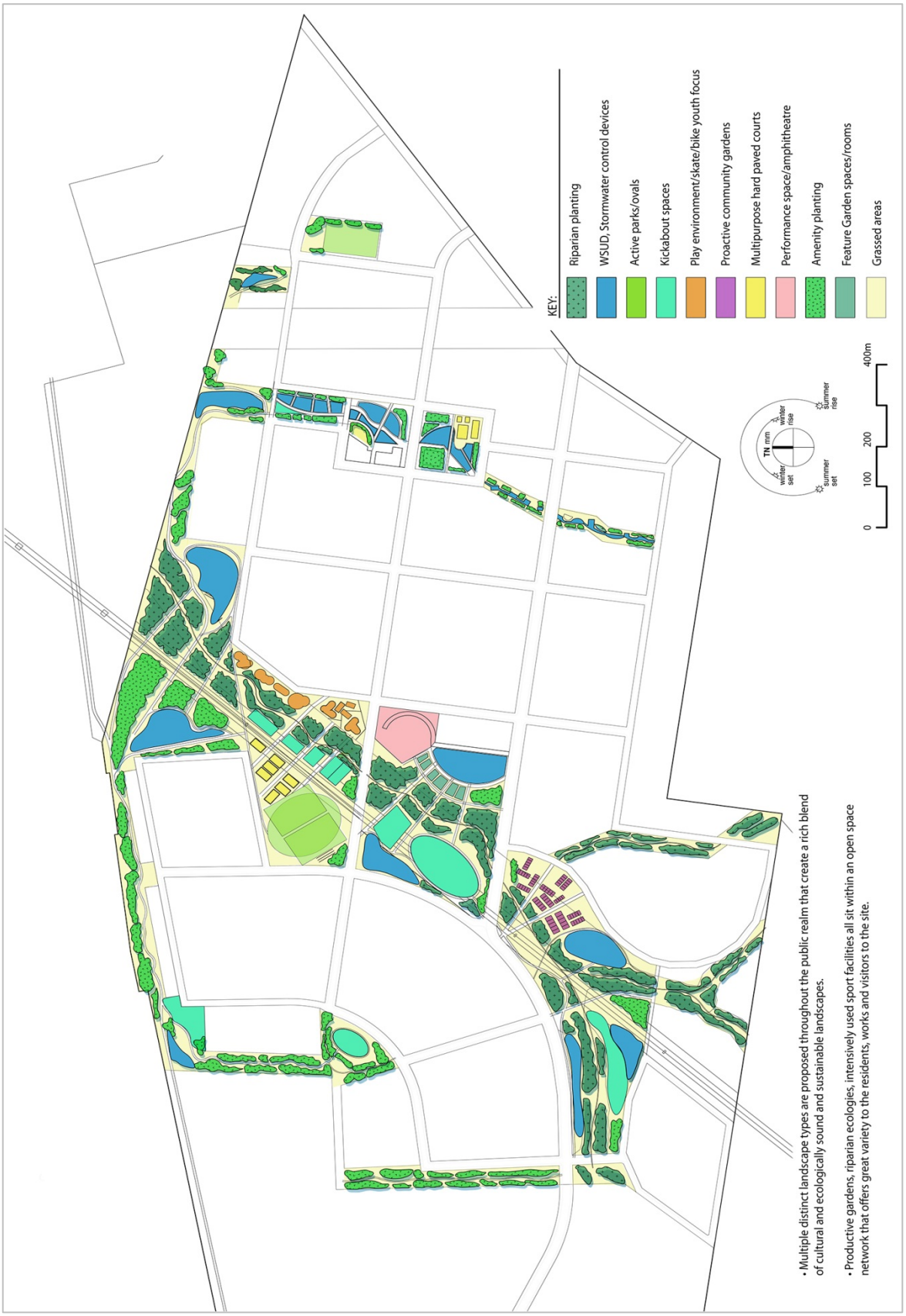


Figure 32 Open Space Typography

Public open space provision includes:

- Land and embellishment of local parks;
- Road and traffic facilities and upgrades;
- Drainage, pond and riparian works;
- Land and construction of footpaths and cycle ways; and
- Land and construction of bus shelters.

Streets are an important feature of the public domain and connect people and provide an opportunity to create a memorable landscape setting for new communities. They are a major component of the public domain and will influence the quality of life of future Sydney Science Park workers, students and residents.

For streets, the key landscape principles include the following:

- create a clear landscape hierarchy and character of major and local streets;
- provide a high quality landscape continuously along each street to reinforce the overall landscape vision;
- create a comfortable, safe, pedestrian friendly, shady avenue streets;
- create a strong visual avenue tree planting; and
- provide a sustainable ground plane of native grasses and groundcover planting where possible.

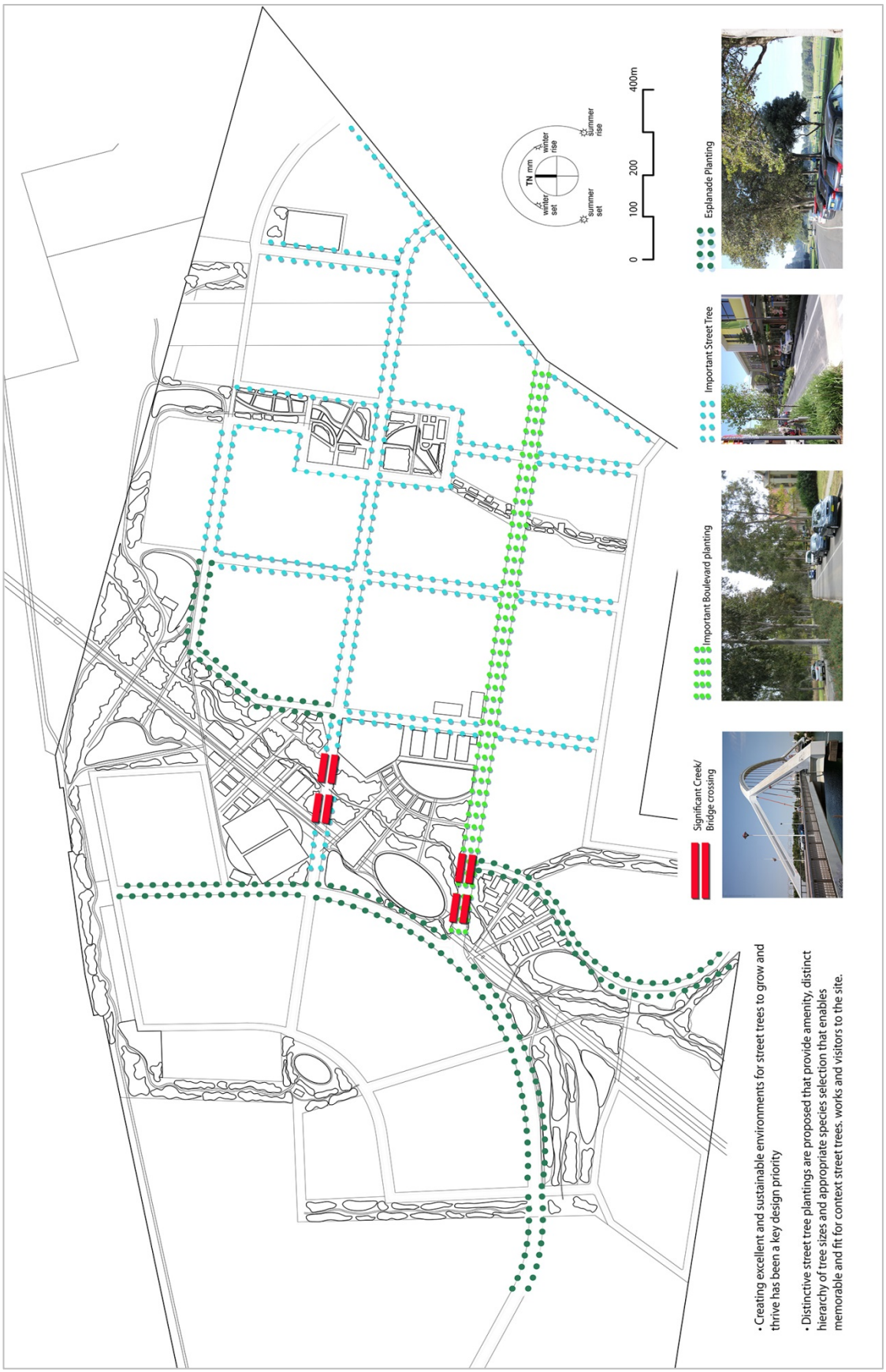


Figure 33 Green Streets

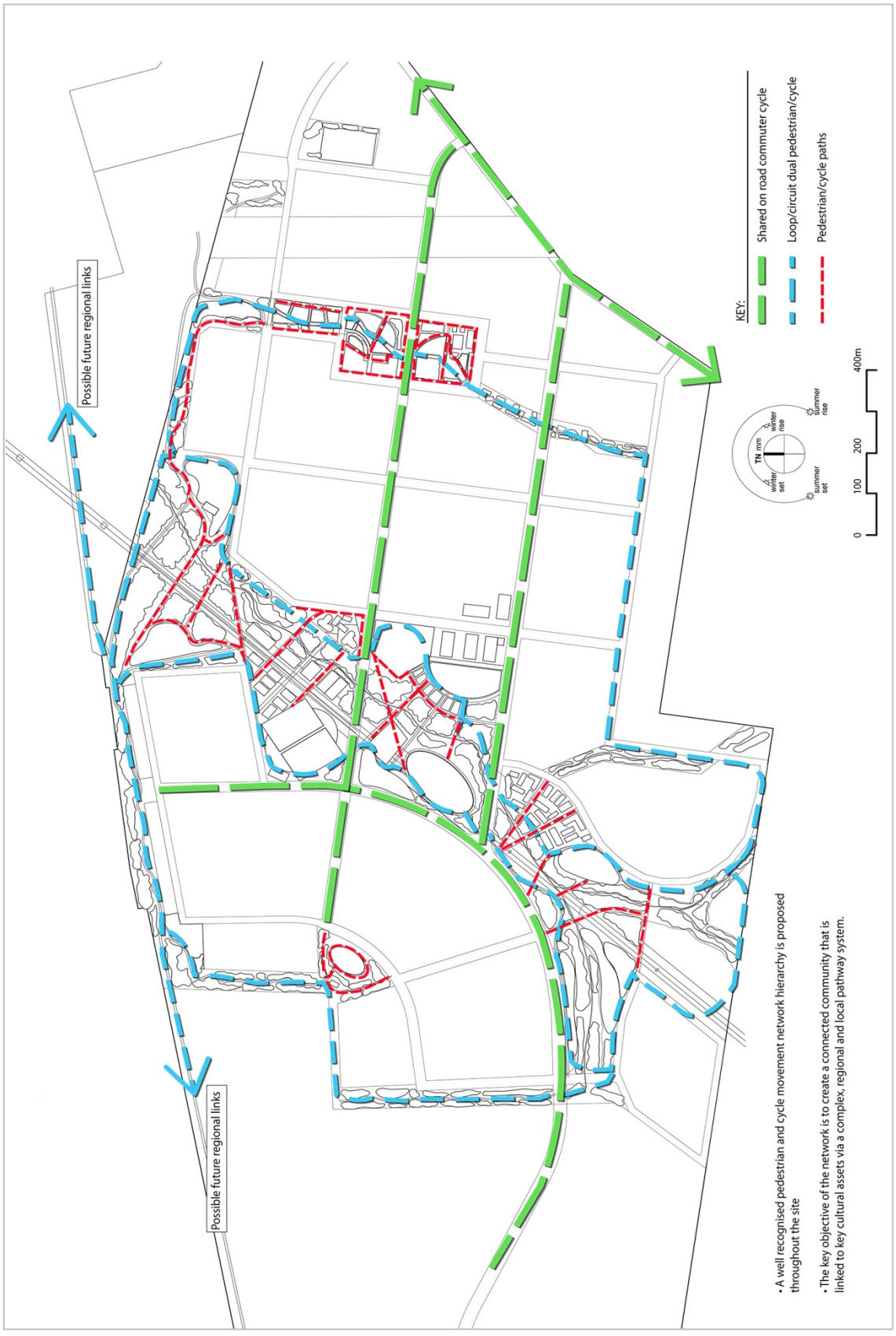


Figure 34 Pedestrian and Cycle Network

5.4. Road Network and Public Transport

5.4.1. Road Network

The Master Plan illustrates that vehicular access to Sydney Science Park will be provided from four points along Luddenham Road. The proposed street network and road hierarchy is described in Table 4.

The Master Plan is characterised by a legible street network that delivers a flexible grid to deliver multiple land use form in a mixed use environment. The streets will create a legible network of vehicular, pedestrian and bike linkages forming a hierarchy of streets that reinforce arrival and destination points, public realm and built form.

Streets are positioned to respond to the site's topography and gradients (refer to Figure 41). Significant roads follow subtle contours and take advantage of the sites natural assets such as riparian corridors and ridge tops, providing opportunities for frequent views down, over and across the site. Other roads generally run perpendicular to contours, providing for frequent views and delivering better site management. Collector Roads will be designed to cater for cycle ways, major pedestrian networks and potential future public transport. The two major east/west link roads will deliver two distinct functions and character, namely:

- City Road will have a main street character with activated frontages and a pedestrian focus. It will be the main link to the proposed rail station; and
- Commercial Road will function as the major transport road within the development, capturing the corporate science park.

Areas of open space are bordered by Park Edge Streets to maximise access and useability of these spaces.

Table 4. Proposed Road/Street Types

Road Type	Footpath/Verge	Parking	Road Width	Total Width
Commercial Road	5.5m – 6.5m	2.5m both sides	13m including 4m median	30m
City Road	6m	2.5m both sides	7m	24m
Connector Road	6m	2.5m both sides	7m	24m
Park Edge Street	1m park side and 6m building side	2.5m park side only	6.5m	16m
Access Street	3.75m	2.5m one side	8.5m including parking	16m
Lane ways	1m both sides	Nil	6m	8m

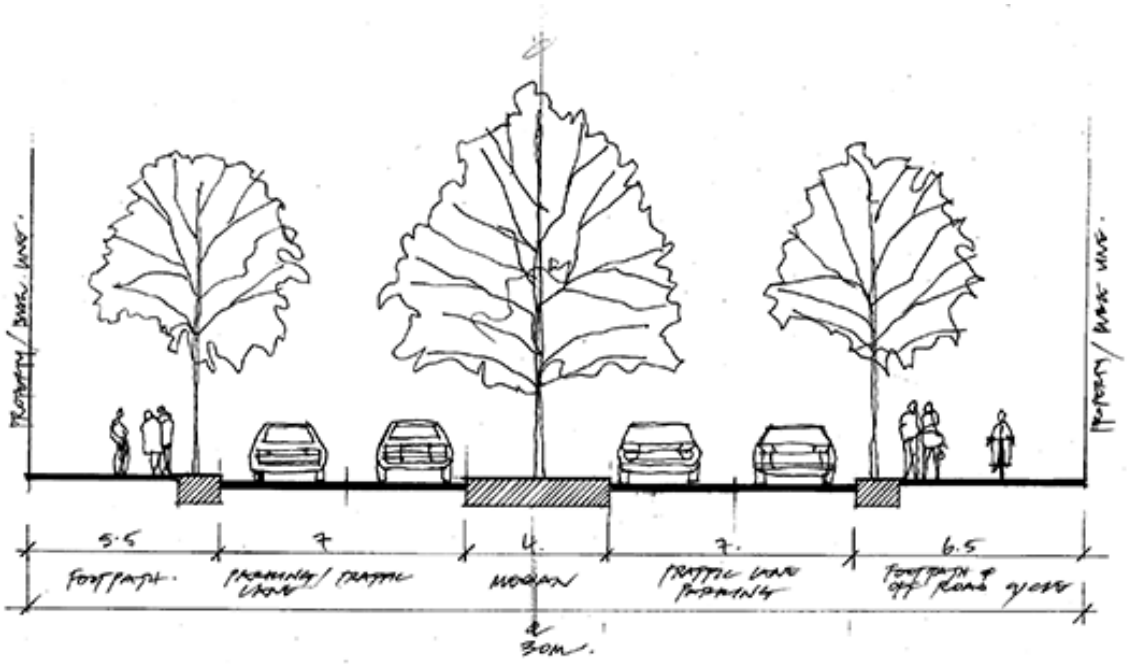


Figure 35 Cross Section – Commercial Road

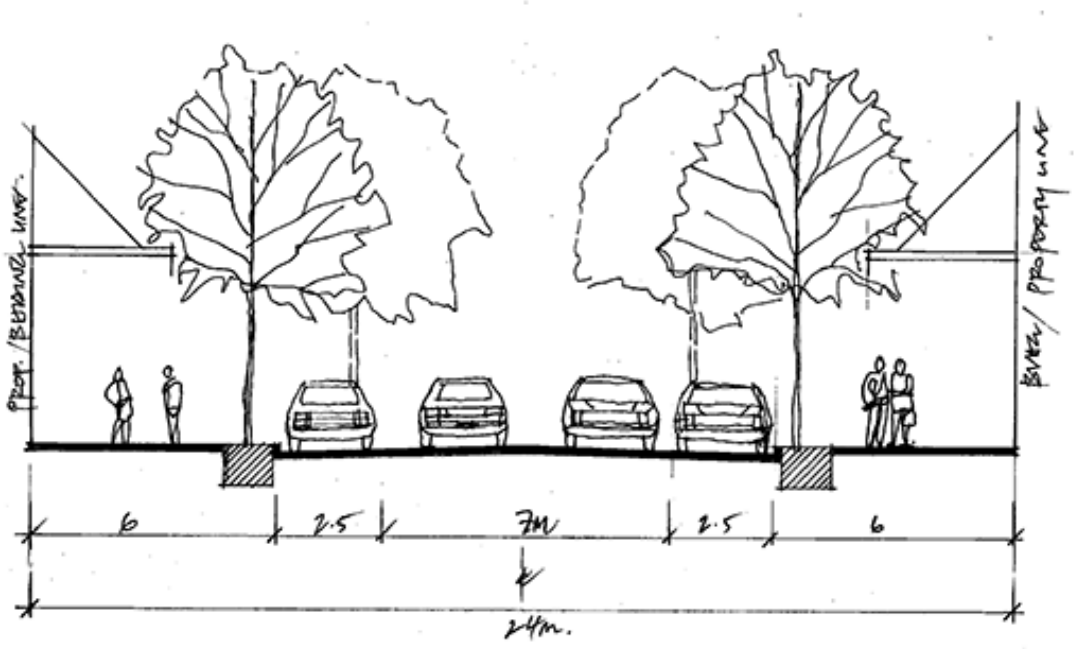


Figure 36 Cross Section – City Road

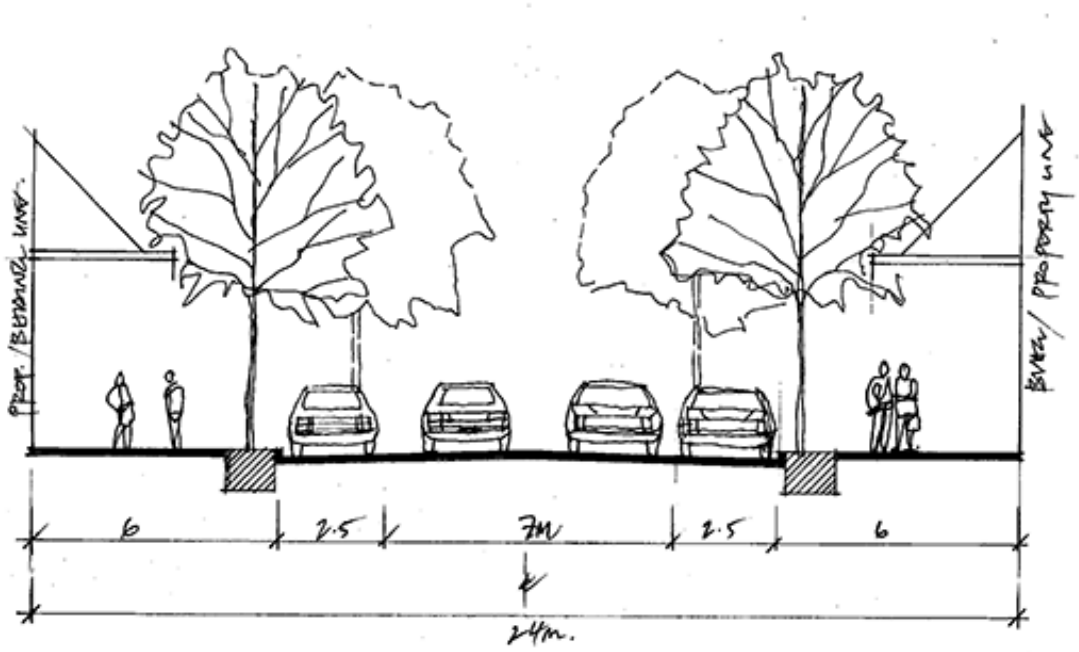


Figure 37 Cross Section – Connector Road

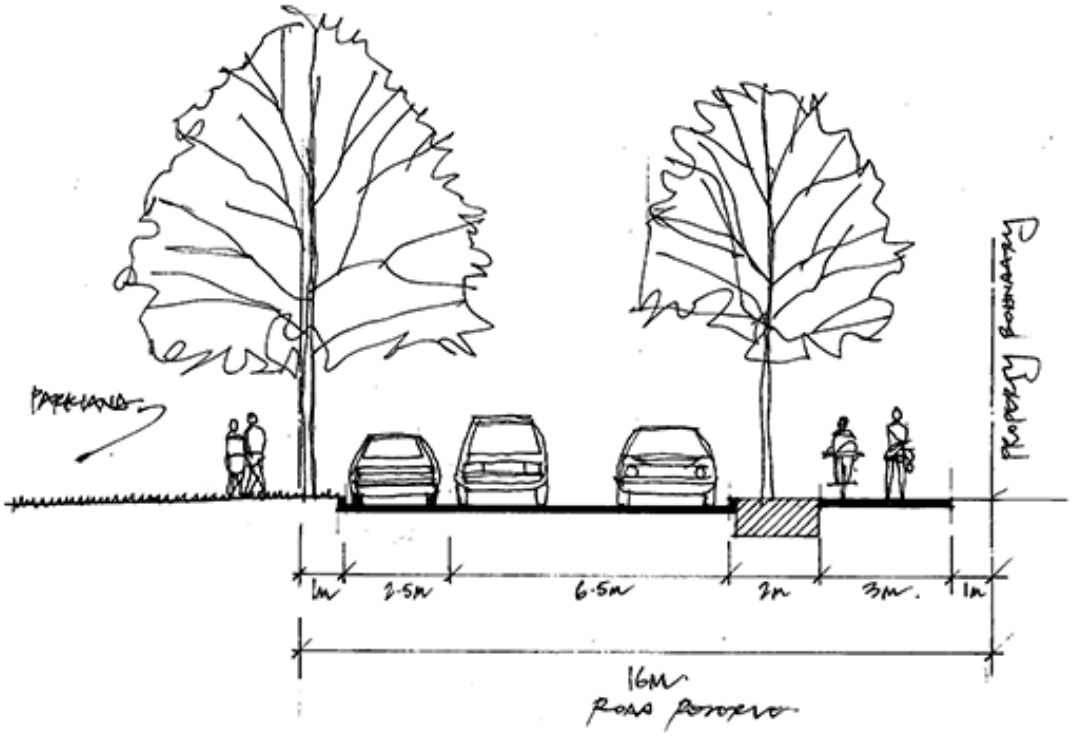


Figure 38 Cross Section – Park Edge Street

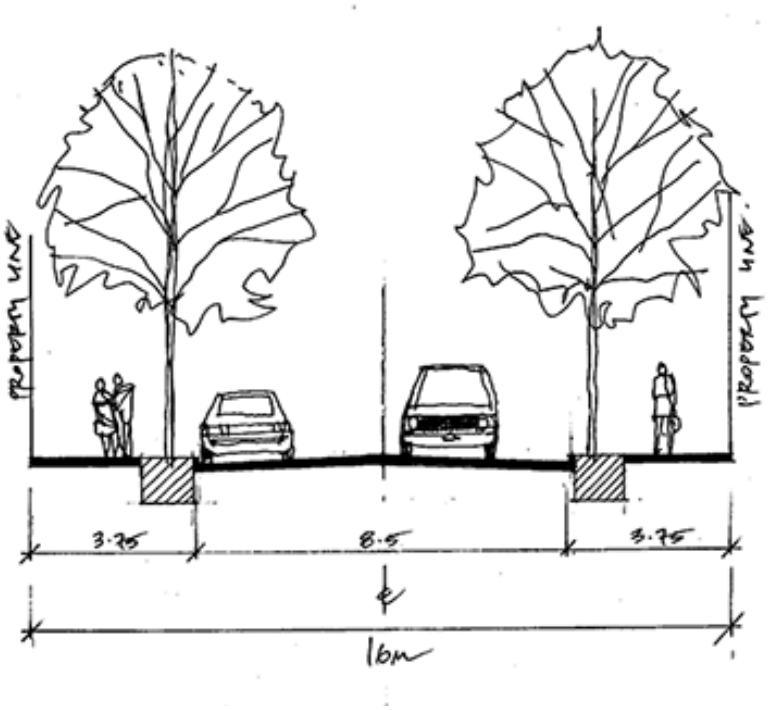


Figure 39 Cross Section – Access Street

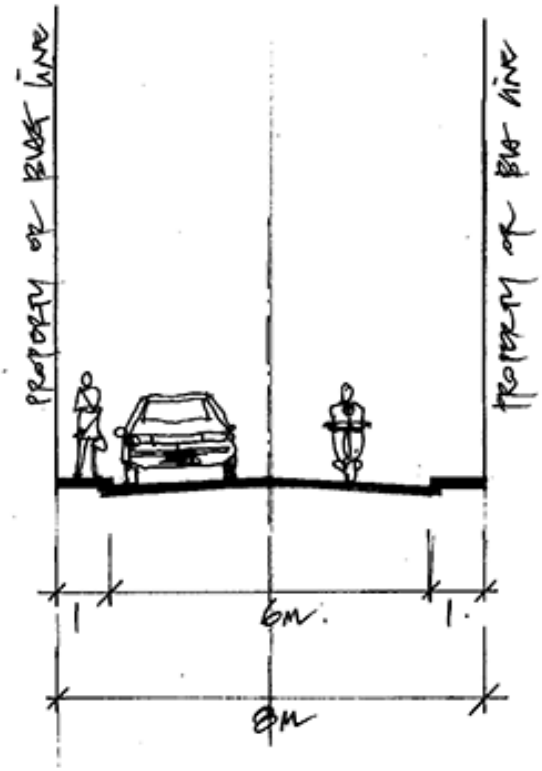


Figure 40 Cross Section – Lane Way

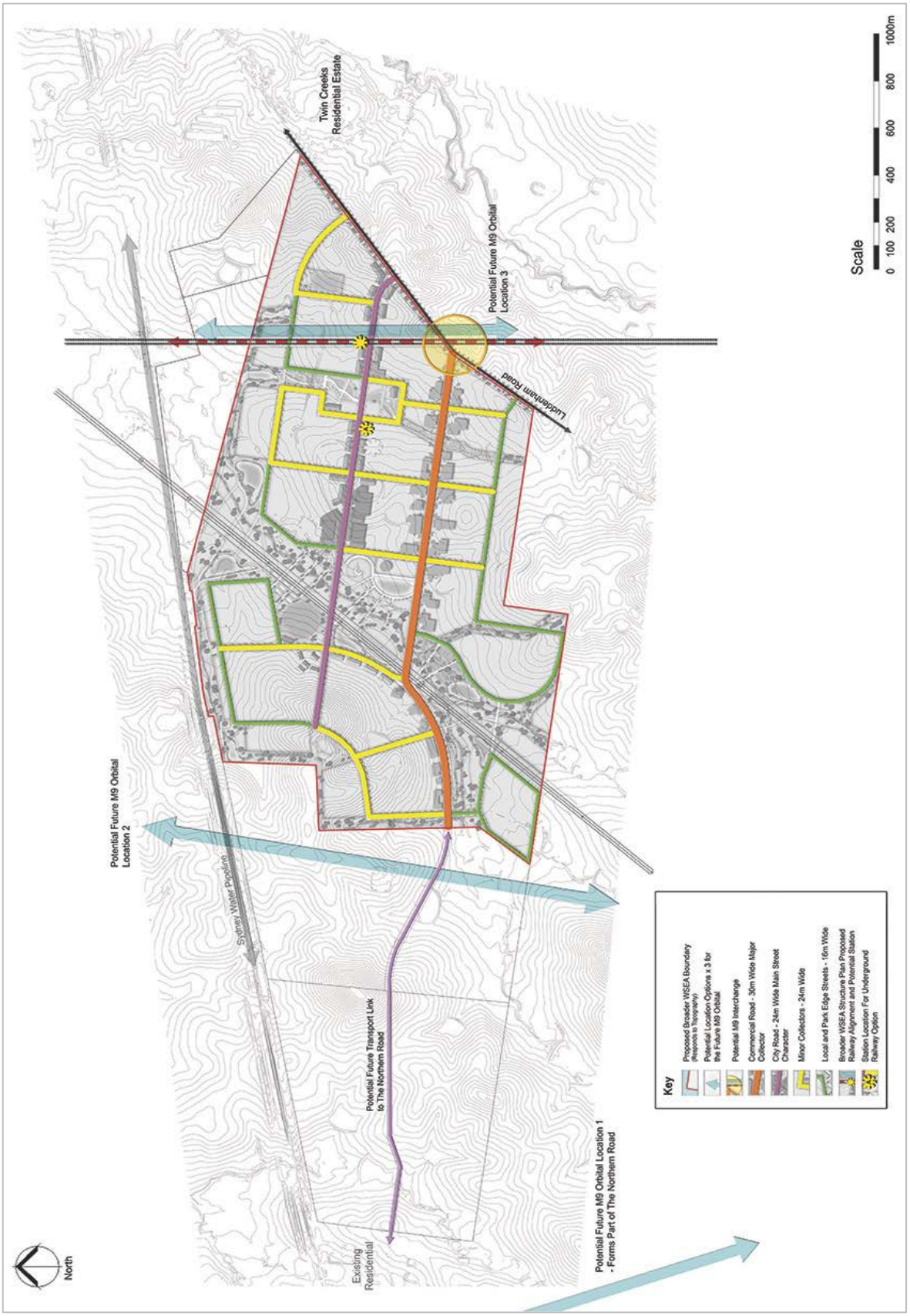


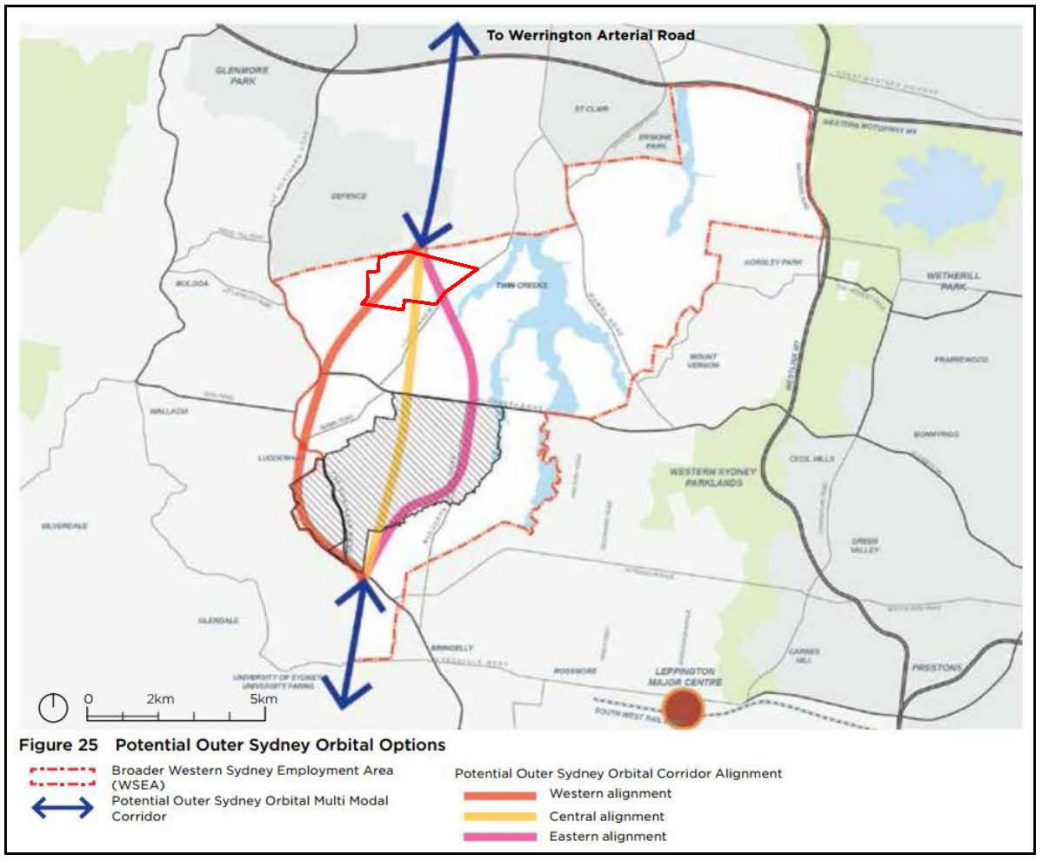
Figure 41 Proposed Road Network

5.4.2. Potential Outer Sydney Orbital Options

As discussed in section 2, the Draft Broader WSEA Structure Plan has identified the potential for the Outer Sydney Orbital (OSO) Transport Corridor running north south through the western portion of WSEA. It is assumed that the transport corridor would have the potential to accommodate the following:

- an arterial road;
- passenger rail line; and
- freight rail line.

Three provisional corridors for the potential OSO are shown in the Draft Broader WSEA Structure Plan. These locations are shown in Figure 42.



Source: *Draft Broader Western Sydney Employment Area Structure Plan* (Department of Planning and Infrastructure, 2013)

Figure 42 Potential Outer Sydney Orbital Options (Draft Broader WSEA Structure Plan)

GTA has undertaken a conceptual corridor option assessment to inform the site planning of Sydney Science Park and to demonstrate that provision for a transport corridor through Sydney Science Park can be accommodated if required by State Government for a future OSO. The various options identified as part of this assessment are shown in Figure 41 and the road corridor options include the duplication of The Northern Road.

These corridor options have been shown on the Master Plan. Figure 41 demonstrates the way in which the future corridor options can be accommodated. An OSO alignment is preferred outside of the study area to enable better urban design and a cohesive science park.

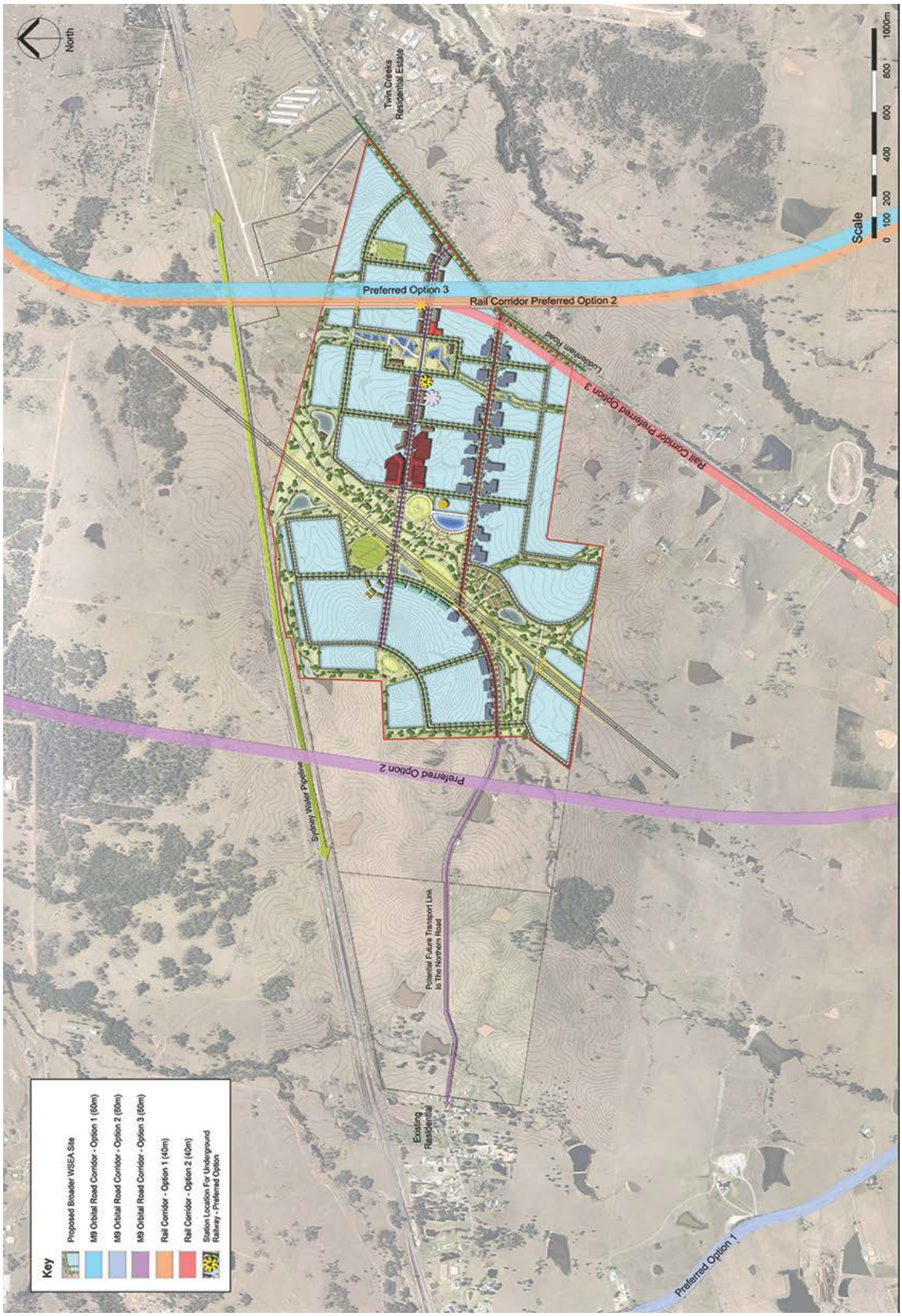


Figure 43 Transport Corridor Options

A future rail extension and station has been provided in the location that reflects the Draft Broader WSEA Structure Plan. The potential station has been proposed centrally to the site to maximise catchment and potential development. An ideal rail alignment resulting in the ability to maximise transit oriented development potential would be underground with a station surfacing between the Town Centre and interim local village as shown on the Master Plan.

5.4.3. Public Transport

The proposed road network allows for the provision of bus services through the site. The two key east-west link roads, City Road and Commercial Road, are the proposed primary bus routes. These routes will link major facilities and provide access to the future rail station. The Master Plan makes provision for a future potential link to The Northern Road. Bus routes are proposed within 400 metres (i.e. walking distance) of all areas and at key intersections. The proposed train station has been placed to maximise both the 400 m and 800 m catchment areas. City Road with its finer grain land uses is orientated to focus onto the rail station.

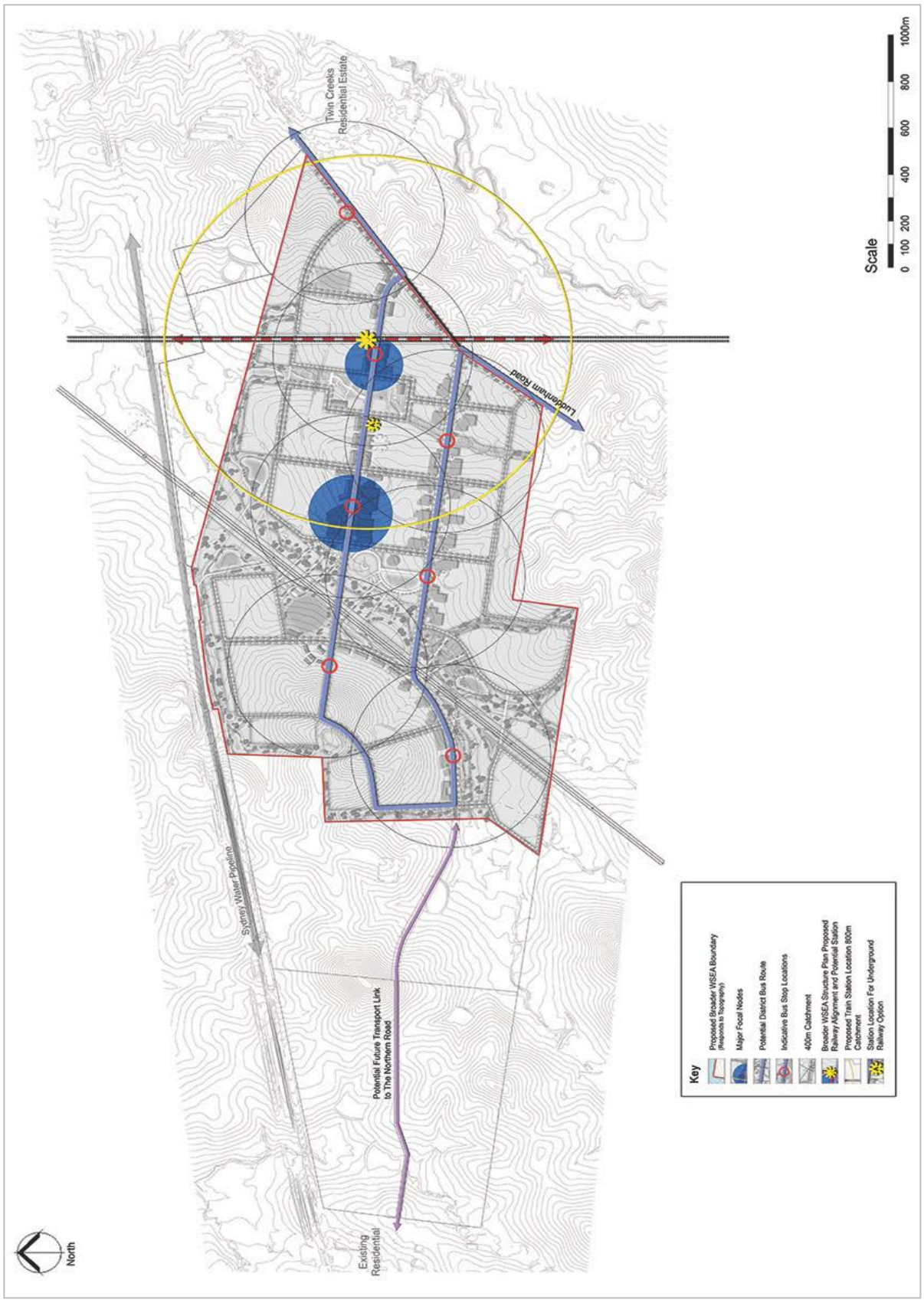


Figure 44 Proposed Public Transport

5.5. Pedestrian and Cycleway Network

Connectivity throughout the development and open space network is one of the key principles that underpin the urban structure of Sydney Science Park. A network of pedestrian and cycle paths is proposed within open space and riparian corridors and along the street network providing a high level of connectivity within and between precincts and linking the Town Centre. The proposed cycle and pedestrian network is shown in Figure 43.

The Master Plan envisages:

- safe and well-connected cycle and pedestrian networks will be established as a healthy option for the workers, students and residents, promoting walkability;
- a reduction in the focus of car travel and subsequent reduced travel times for workers and students;
- major cycle commuter routes along City Road and Commercial Road with on-street bike paths;
- identification of City Road as the major pedestrian connector to the proposed rail station with generous walkways and activated frontages; and
- the potential to explore land adjacent to the Sydney Water pipeline as a regional pedestrian and cycle network corridor.

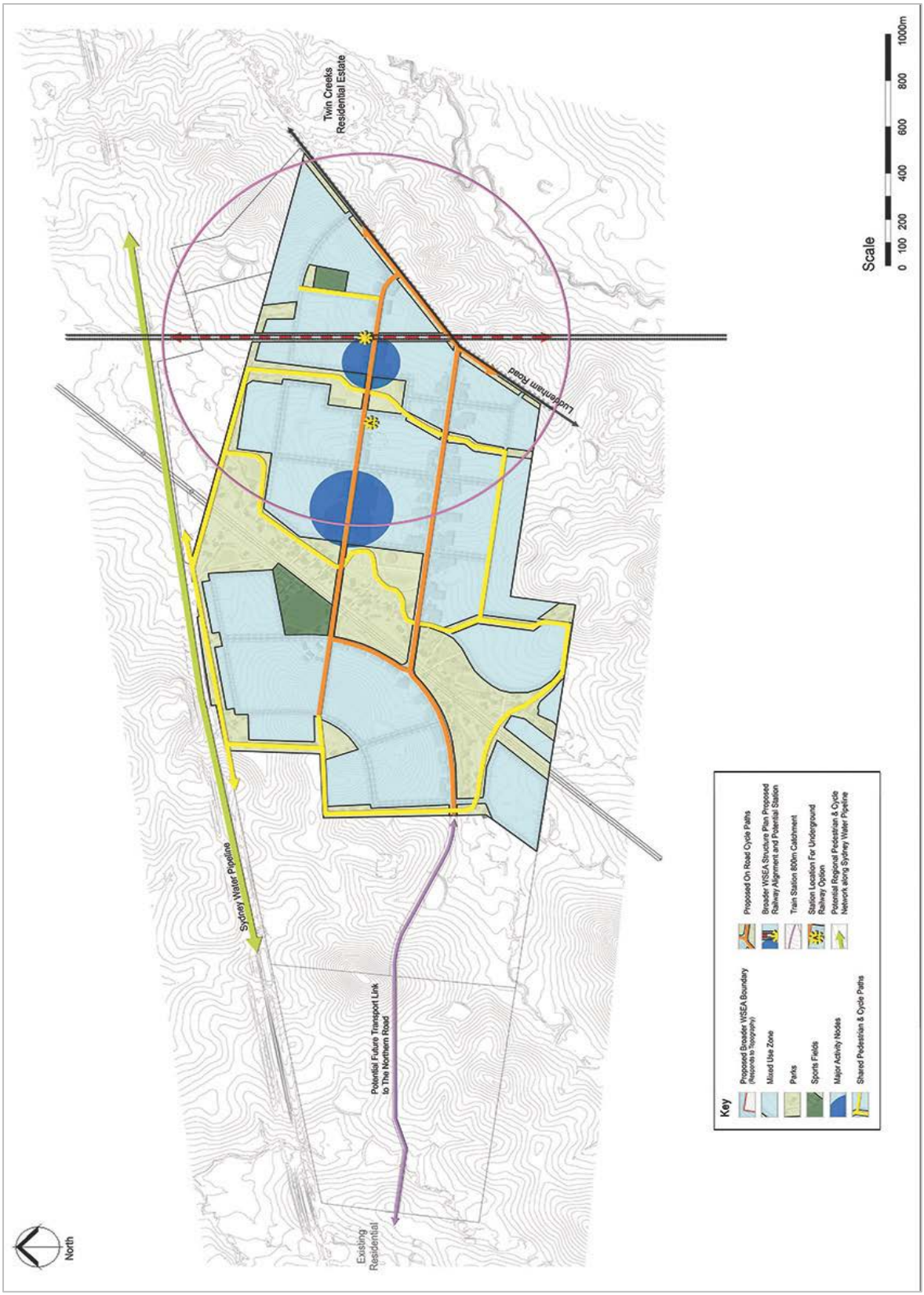


Figure 45 Proposed Pedestrian and Cycle Network

5.6. Water Cycle and Flood Management

The strategy focuses on mitigating the impacts of the development on the total water cycle and maximising the environmental, social and economic benefits achievable by utilising responsible and sustainable stormwater management practices. A range of stormwater management techniques and options considered for the management of nutrients and suspended solids discharging from the site include:

- Vegetated swales and buffers;
- Wetlands and ponds;
- Rain gardens and bio-retention systems; and
- detention basins.

Figure 46 illustrates the general location of water quality and water quantity treatments.

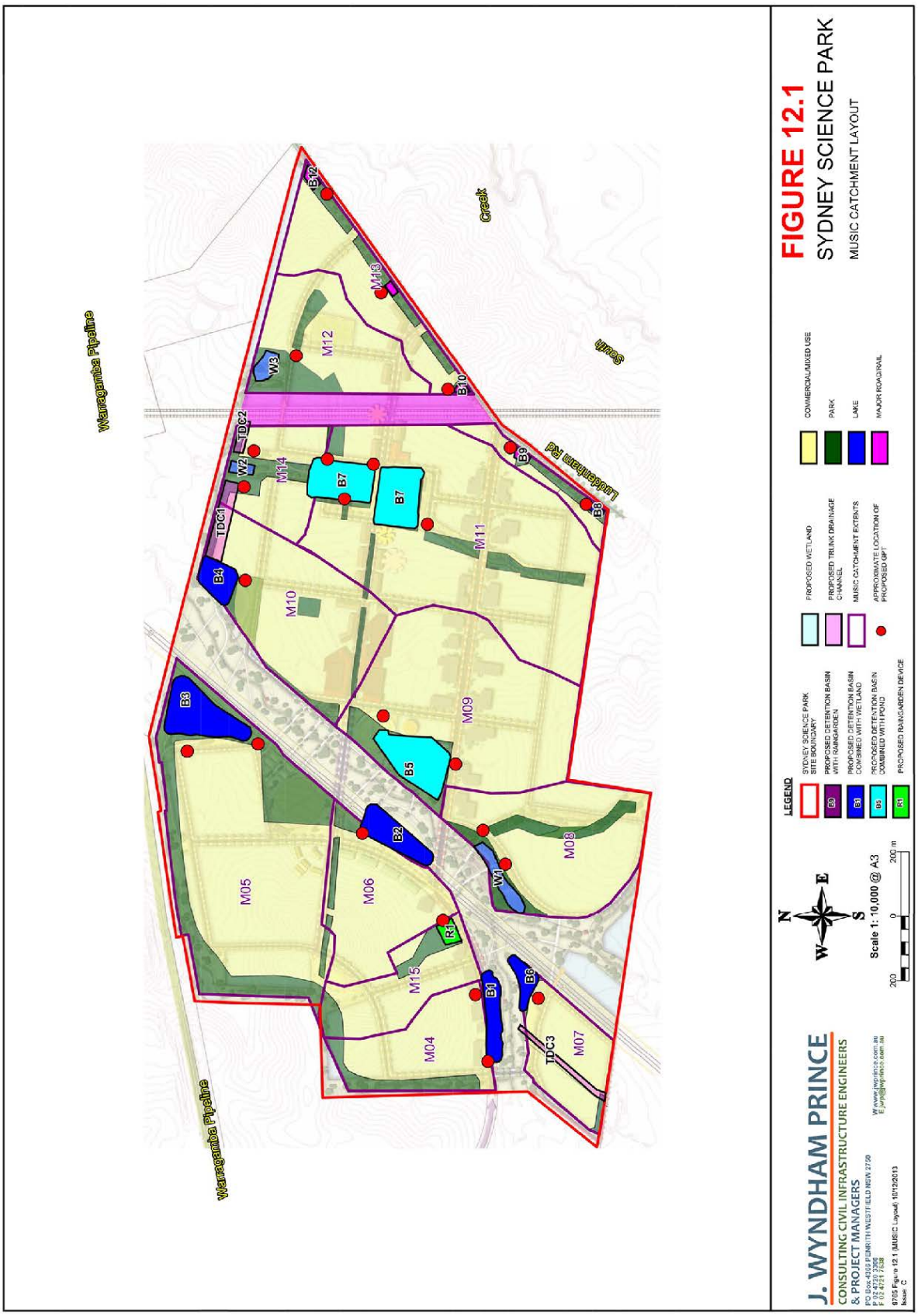


Figure 46 Indicative location of water quality treatment devices

5.7. Built Environment and Design Excellence

The design emphasis within Sydney Business Park will be on the proper resolution of the components that influence streetscape character: how a building is sited and designed to address the street, building façade, roof form and silhouette, articulation, detailing, materials, landscaping and parking arrangements. Contemporary design solutions based on sound urban design principles will be encouraged. Building design is to maximise the opportunity that will exist in Sydney Science Park to establish new architectural forms that directly respond to environmental needs. Buildings are to be modulated both in plan and elevation and articulated to express the building's distinct elements and functions. Buildings will also recognise and architecturally respond to unique streetscape characteristics to achieve dramatic and picturesque visual effects.

5.8. Worker, Student and Residential Amenity

Sydney Science Park will be a sustainable centre, characterised by:

- a strong local culture, both active and safe;
- effective and inclusive participation, representation and leadership of all its members;
- a high level of environmental sensitivity;
- a natural and built environment designed to create a strong sense of place;
- connected open spaces and integrated transport services;
- a thriving local economy;
- private and public services that are accessible and appropriate; and
- regard for the needs of future generations.

For places to be used and loved, they must be safe, comfortable, varied and attractive. They also need to be distinctive, and offer variety, choice and fun. Vibrant places offer opportunities for meeting people, playing in the street and watching the world go by. Sydney Science Park embraces these principles through a combination of urban design and architectural attention in the way built form, streets, roads and buildings will work with each other. The theming of Commercial Road and City Road have been designed as safe walking networks connecting the train station with the town centre with places of employ and places of play in the highly visible and activated main centre park area. Landscaped public domain will create a sense of purpose, culture and safety throughout the grid layout.

New development should enrich the qualities of existing places or landscapes. This means encouraging distinctive responses that arise from and complement the regional, town, neighbourhood, and street setting. Sydney Science Park aims to achieve this by featuring the two main watercourses dissecting the site as high amenity places and main landscape attractions, with built form controls capturing views into these spaces. The east west collector roads deliberately capture the opportunity to focus not only into these green spaces but also capture the distant views of the Blue Mountains.

Places that strike a balance between the natural and man-made environment utilise each site's intrinsic resources — the climate, landform, landscape and ecology to maximise energy conservation and amenity. Sydney Science Park achieves this through its grid layout, maximising solar efficiency and working hard to establish riparian features along the existing watercourses and farm dams currently devoid of natural environmental quality.

Places need to be easy to get to and be integrated physically and visually with their surroundings. This requires attention to how to get around by foot, bicycle, public transport and the car, in that order. Sydney Science Park achieves this by creating a road, cycle and walking network that is organised through its grid layout, that has clear

lines of sight making destinations easily recognisable and by centring the town centre, high density employment areas in walkable transit nodes from the future train station and bus routes.

Stimulating, enjoyable and convenient places meet a variety of demands from the widest possible range of users, amenities and social groups. They also weave together different building forms, uses, tenures and densities. Sydney Science Park achieves this by activating the place at its heart by creating a town centre that will incorporate student life, working activity, home life all focused around quality and active public domain spaces, parks and entertainment uses such as cafes, restaurants and cultural activities that keep people within Sydney Science Park 24 hours a day, seven days a week.

5.9. Evolution and Indicative Staging

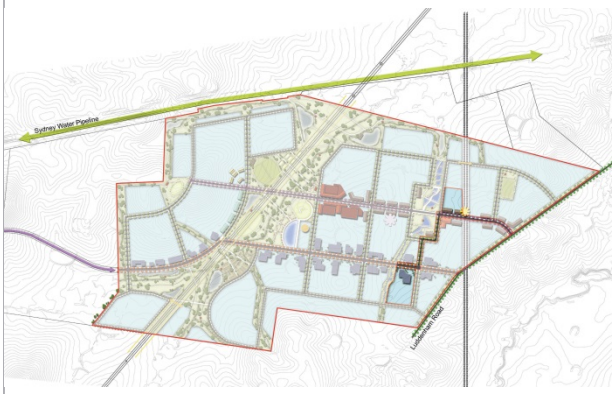
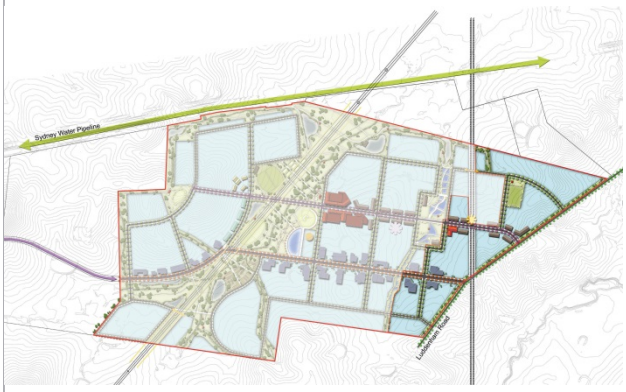
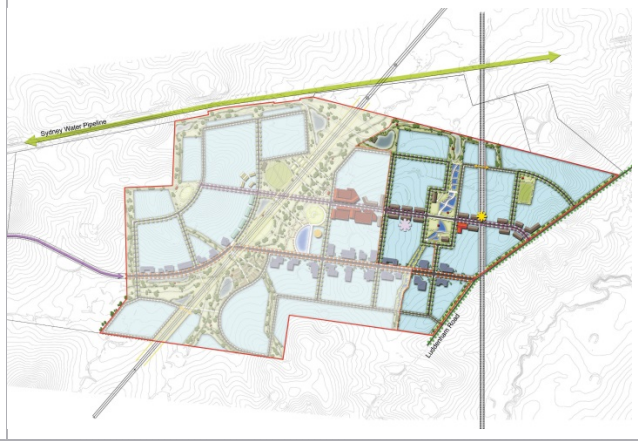
Figure 45 identifies the manner in which Sydney Science Park is intended to be delivered within the site. Seven development stages are currently planned. For each stage, there will be a series of sub-stages. The development of Sydney Science Park will commence in the east, with the first lots ready for development in 2016. The proposed indicative staging is set out below in Table 5. It is important to realise that staging will be limited to market interest over the 25 year duration of the project.

Table 5. Indicative Guide: Incremental yield and staging

Year (leading up to)	2016	2021	2026	2031	2036	2041
Employment (m2)	10,000	50,000	120,000	190,000	290,000	340,000
Education floor space (m2)		10,000	30,000	60,000	80,000	100,000
Retail Floor Space (GLA) (m2)		7,000	12,000	18,000	18,000	30,000
Detached dwellings		50	150	225	300	300
Terrace/townhouse		50	300	850	1,200	1,200
Residential apartments		50	450	575	875	1,500
Student dwellings		50	125	200	300	400
			1,025	1,850	2,675	3,400

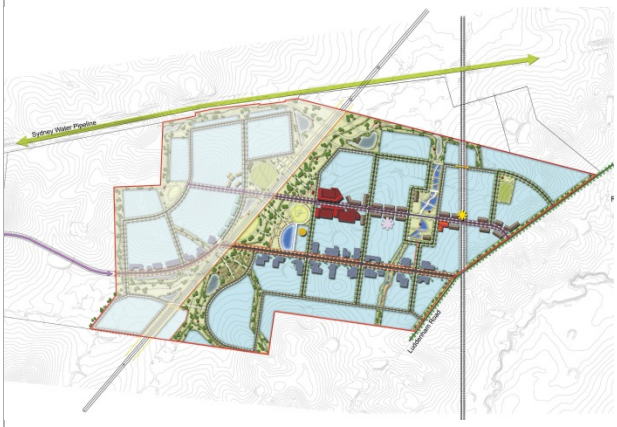
5.9.1. Development Stages

Seven development stages are currently planned.

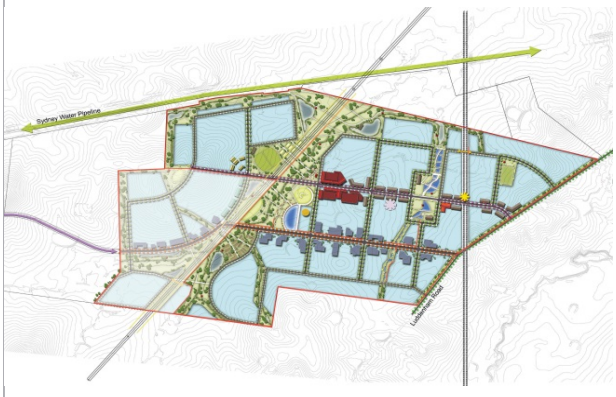
Stage	
Stage One will see a collector road connection to Luddenham Road and will comprise Baiada's National Headquarters, Food Science Laboratories, Research and Tertiary Facilities.	
Stage Two will be to the north-east and south of Stage One. It is expected to contain larger research and development, educational facilities integrated with the first housing. Executive style housing may be developed east of the railway alignment as a land use compatible with the adjacent Twin Creeks Residential Estate and Golf Course. Importantly, the area can be planned to accommodate a railway station.	
Stage Three will see the establishment of the structured lake in the north-eastern portion of the site. The lake will be constructed, possibly in two stages, from a large existing dam. A village centre will be focused around the lake which is aimed to attract additional research companies, the first educational buildings, with high quality public domain treatments.	

Stage Four will see the majority of the new east-west commercial road and major research and development facilities anticipated within the southern portion of the site complete. This stage will highlight the corporate image of the Sydney Science Park. It will also see initial work carried out in the main riparian corridor along with building development on its eastern edge and establishment of community gardens.

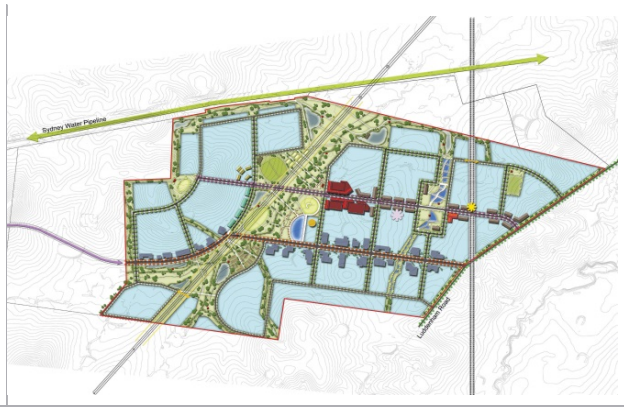
Stage Five will include the first stage of the Town Centre retail, commercial and residential development as well as the cultural precinct and the eastern portion of active open space. At completion, development west of the riparian corridor is expected to be complete. Landscape treatments will have matured throughout this eastern precinct presenting a dominant green image of the Park. The local village, required to support the early stages of the site's development, will have evolved as a result of increased land values and is likely to comprise high quality mixed use residential development. The town centre will be a populous place of workers, students and residents.



Stage Six will extend development to the hill slopes west of the riparian corridor and will include the western portion of active open space (commenced in Stage 5), establishment of a new primary school, sporting fields and multi-purpose courts as well as other employment, education and residential uses. By this time the redevelopment or adaptive reuse of commercial buildings, and higher density residential, in earlier stages may be occurring as a well-educated, knowledge-based workforce understands the benefits of life in Sydney Science Park.



Stage Seven will extend development within the south-western portion of the site and will include research and development facilities and housing oriented east and overlooking the core of Sydney Science Park and parkland spaces. By this time, the redevelopment and adaptive reuse of employment buildings in the earlier stages will be well advanced.



5.9.2. Sydney Science Park by 2041

By 2041, Sydney Science Park will have become an internationally recognised epicentre for research and development focused on food, energy and health amidst contemporary urban life. It will have been a significant catalyst for realising State and local government employment generating and productivity objectives for Western Sydney and will be situated in the midst of highly urbanised activity including the established Second Sydney International Airport. Energy, resource and transport efficiency initiatives, a key element in the community's preparatory planning, will have had notable and positive consequences on occupancy and living costs, the community's image and resident lifestyles. The weaving of building forms, uses, tenures and densities will have made it a stimulating, enjoyable, attractive and safe place that meets a variety of demands from a wide range of users. It will also, have facilitated the creation of new, entrepreneurial activities that maintain and grow Australia's productivity and export businesses in science.

6. Proposed LEP Amendment

6.1. Land to which the LEP amendment will apply

A draft Land Application Map is provided at Figure 47. The draft Land Application Map illustrates the land that is to be included in the LEP Amendment.

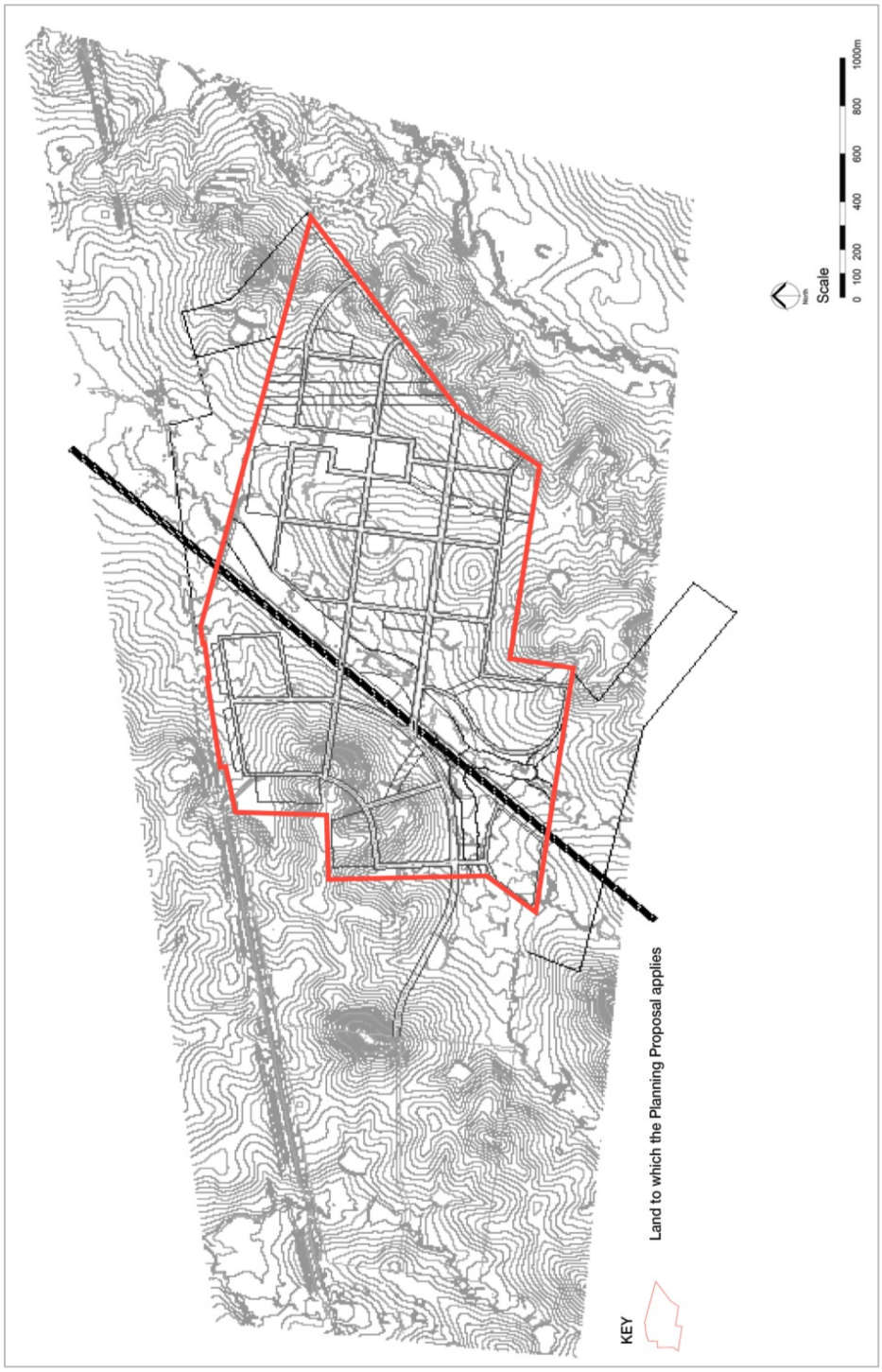


Figure 47 Land Application Map

6.2. Proposed Land Use zones

It is proposed that the following land use zones be applied to the land:

- B4 Mixed Use;
- B7 Business Park; and
- RE1 Public Recreation.

A Draft Land Zoning Map illustrating the intended location of each proposed land use zone is provided in Figure 48. The proposed development that is intended to be permissible without consent, with consent or prohibited in each zone is shown in Table 6. The relevant zone objectives are also shown. The provisions of Table 6 are consistent with Penrith LEP 2010.

It is noted that the existing Penrith LEP 2010 land use table adopts the approach of identifying development that is permissible with or without consent, and then prohibiting all development otherwise not specified.

Table 6. Draft Land Zoning Table

Zone	Purpose (as per DoPI guidelines)	Proposed Land Uses
B4 Mixed Use	This zone is generally used where a wide range of land uses are to be encouraged, including commercial, residential, tourist and visitor and community uses. The residential development component in this zone can form an important element in revitalising and sustaining the area, and increasing housing diversity close to Commercial Cores and major transport routes.	**1 Objectives of zone** • To provide a mixture of compatible land uses. • To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling. • To provide a wide range of retail, business, office, residential, community and other suitable land uses. • To minimise conflict between land uses within this zone and land uses within adjoining zones. • To create opportunities to improve public amenity. **2 Permitted without consent** Home occupations **3 Permitted with consent** Amusement centres; Boarding houses; Car parks; Child care centres; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Home-based child care; Home businesses; Hostels; Hotel or motel accommodation; Information and education facilities; Medical centres; Mortuaries; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor) Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Roads; Seniors housing; Serviced apartments; Sex services premises; Shop top housing; Signage; Veterinary hospitals **4 Prohibited** Rural workers dwellings; Any development not specified in Item 2 or 3
B7 Business Park	This zone is generally intended for land that primarily accommodates office and light industrial uses, including high technology industries. Business Parks perform vital economic and employment roles in a certain region.	**1 Objectives of zone** • To provide a range of office and light industrial uses. • To encourage employment opportunities. • To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area. • To provide for a range of higher order job opportunities including health, cultural and high technology industries. • To provide for a range of development that relates to University activities, creative and cultural industries, and business incubators.

Zone	Purpose (as per DoPI guidelines)	Proposed Land Uses
	Specialised functions must be protected for the long term and competing uses must not override the core activities in these centres.	**2 Permitted without consent** Nil **3 Permitted with consent** Business premises; Car parks; Child care centres; Community facilities; Environmental protection works; Flood mitigation works; Food and drink premises; Function centres; Hotel or motel accommodation; Industrial retail outlets; Industrial training facilities; Information and education facilities; Kiosks; Light industries; Markets; Neighbourhood shops; Office premises; Passenger transport facilities; Recreation areas; Respite day care centres; Roads; Signage; Warehouse and distribution centres **4 Prohibited** Any development not specified in item 2 or 3.
RE1 Public Recreation	This zone is generally intended for a wide range of public recreational areas and activities including local and regional parks and open space. The uses may include 'recreation facilities,' 'community facilities' such as lifesaving clubs, 'environmental facilities,' 'environmental protection works' and other uses compatible with the primary use of the land. Where land is to be reserved for public recreation purposes (e.g. local or regional open space), the land is to be outlined and annotated on the Land Reservation Acquisition Map, and the relevant acquisition authority identified in the table in clause 5.1.	**1 Objectives of zone** • To enable land to be used for public open space or recreational purposes. • To provide a range of recreational settings and activities and compatible land uses. • To protect and enhance the natural environment for recreational purposes. • To ensure development is secondary and complementary to the use of the land as public open space, and enhances public use, and access to, the open space. • To provide land for the development of services and facilities by public authorities for the benefit of the community. **2 Permitted without consent** Nil **3 Permitted with consent** Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Car parks; Charter and tourism boating facilities; Child care centres; Community facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Information and education facilities; Jetties; Kiosks; Markets; Moorings; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Respite day care centres; Restaurants or cafes; Roads; Water recreation structures; Water storage facilities **4 Prohibited** Rural workers dwellings; Any development not specified in Item 2 or 3

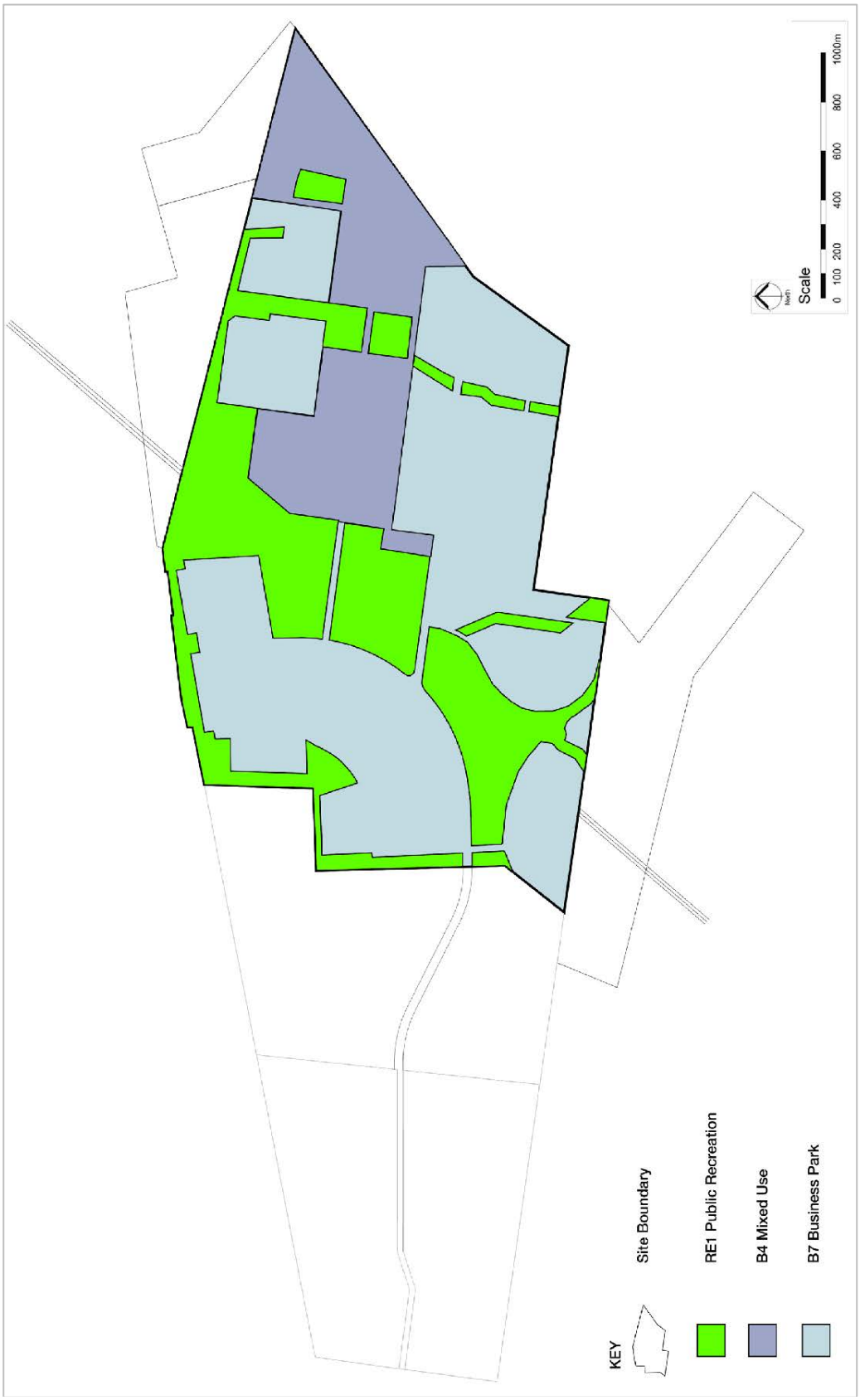


Figure 48 Draft Zoning Plan

6.3. Explanation of land use zone selection

The fundamental objective of the proposed rezoning is to accommodate a new specialised centre integrating research and development, employment, education and supporting retail and residential uses.

6.3.1. B7 Business Park

It is proposed to apply the B7 Business Park zone to the majority of the site. This zone encompasses land that is primarily intended for research and development and high technology industries. The zone also permits a range of ancillary facilities and services to support the day-to-day needs of workers, such as 'child care centres,' 'respite day care centres' and 'neighbourhood shops.' As part of the draft LEP amendment, it is proposed to amend Schedule 1 – Development for Certain Additional Purposes of Penrith LEP 2010 to enable the use of land proposed to be zoned B7 Business Park for the following uses:

"Agricultural produce industry, attached dwellings, dual occupancies, dwelling houses, exhibition home, exhibition village, multi dwelling housing, residential flat buildings, secondary dwellings, semi-detached dwellings, sewerage system, shop top housing, helipad, home-based child care, home business, home occupation, information and education facility, research station, serviced apartment, veterinary hospital"

The proposal provides a critical opportunity to provide a source of highly skilled, quality jobs within Western Sydney. This stands in contrast to the types of jobs being created in other parts of the Western Sydney Employment Area, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited.

6.3.2. B4 Mixed Use Zone

It is proposed to restrict the B4 Mixed Use Zone to the eastern portion of the site, encompassing the proposed Town Centre, the interim local village (located in the early stage of the project) and land to the north and south of proposed City Road. It will also include the proposed cultural precinct adjacent to the central open space corridor. The application of the B4 Mixed Use zone over these areas best reflects the future intended role and development of this portion of Sydney Science Park that will see a true integrated mix of uses. It is considered that application of the B4 Mixed Use Zone is consistent with DoPI's *Promoting Economic Growth and Competition Through the Planning System Review Report April 2010*. The Review Report identifies that land use planning systems should be flexible and should ensure that land use planning policies provide for the growth of centres to be responsive as the worker and population density in an area changes and needs shift over time with changes in demographics. To have the best economic and innovative outcomes, the DoP Review Report concludes that strategic planning documents need to reflect the dynamic nature of land use and in particular, that it is important that centres can accommodate a range of mixed uses. Mixed use land within the areas nominated within Sydney Science Park is to be used for a wide range of research and development, employment, education, retail and residential uses. It is considered that the B4 Mixed Use zone appropriately reflects this outcome.

As part of the draft LEP amendment, it is proposed to amend Schedule 1 – Development for Certain Additional Purposes of Penrith LEP 2010 to enable the use of land proposed to be zoned B4 Mixed Use for the following uses:

"Exhibition home, exhibition village, helipad, light industry, , research station, service station"

6.3.3. RE1 Public Recreation

It is proposed to apply the RE1 Public Recreation zone to the central corridor of open space, parks, sporting fields and ponds within the site. This land is to be dedicated to Council. As part of the LEP amendment, it is proposed to amend Schedule 1 - Development for Certain Additional Purposes of Penrith LEP 2010 to enable the use of land proposed to be zoned RE1 Public Recreation within Sydney Science Park for 'drainage'.

6.3.4. SP2 Infrastructure Zone

It is not proposed to apply the SP2 Infrastructure land use zone to any land that may be required for public infrastructure. This approach is consistent with the DoP's LEP Practice Note PN 08-002 which advocates a zoning approach that provides greater flexibility and adaptive management of government land. The approach moves away from zoning public infrastructure land as 'special use' or 'special purpose' zones, which limits the ability of infrastructure providers to respond to changing demographic trends and provide the public with infrastructure and services outside of nominated locations.

6.4. Principal Development Standards

It is intended that the LEP Amendment will contain principal development standards for:

- minimum lot sizes for residential development; and
- maximum height of buildings

A draft Minimum Lot Size Map and draft Height of Buildings Map are included at Figures 49 and 50.

6.5. Minimum subdivision lot sizes

It is not proposed to adopt the minimum lot sizes for detached dwellings and dual occupancy as currently set out in Penrith LEP 2010. It is proposed to adopt a standard minimum lot size of 225m2 for a single dwelling house. This is consistent with the DoPI's Draft Housing Diversity in Sydney's Growth Centre Policy that aims to support the delivery of housing diversity, and product mix that is responsive to market demand and an increased range of affordable housing options in Western Sydney. In addition, it is proposed to allow the minimum lot size to be reduced to 125m2 as part of an integrated development, also consistent with the DoPI's policy.

It is proposed that the LEP Amendment include a special provision to this effect as follows:

7.25 Sydney Science Park

(1) The objectives of this clause are to:

(a) establish a new specialised centre comprising research and development, employment, education, retail and residential land uses,

(b) facilitate and encourage a range of residential lot types, in particular, small lot housing and to encourage the efficient use of land for residential purposes,

(c) maintain the hierarchy of Penrith's commercial centres by limiting the total area used for retail premises in the Sydney Science Park,

(d) make provision with respect to the delivery of 3,400 new dwellings in the Sydney Science Park, and

(e) enable development for additional permitted uses in the B7 Business Park, B4 Mixed Use and RE1 Public Open Space zones in the Sydney Science Park

(2) This clause applies to land shown as "Sydney Science Park" on the Clause Application Map.

(3) The consent authority must not grant consent to the carrying out of development on land to which this clause applies unless the consent authority is of the opinion that the proposal is consistent with the objectives of Sydney Science Park and the staging plan set out in the relevant Development Control Plan.

(4) *Development consent must not be granted to development for the purpose of warehouse or distribution centres unless they are ancillary to any permitted use in the B7 Business Park zone and occupy no more than 50% of the gross floor area of the development.*

(5) *Development consent must not be granted for a land use shown in Column 1 of the Table to this clause, if the area of the allotment on which the development is proposed is, or will be on the subdivision of the land, be equal or greater that the area specified for that land use shown in Column 2 of the Table*

Column 1	***Column 2***
Dwelling house	*120m^2*
Dual occupancy	*270m^2*
Multi dwelling housing	*800m^2*
Residential flat buildings	*800m^2*

(6) *Despite any other provision of this plan, development consent may be granted to a single development application for development to which this clause applies that is both of the following:*

(a) the subdivision of land into 3 or more lots;

(b) the erection of a dwelling house on each lot resulting from the subdivision, if the size of the lot is equal or greater than 120m2.

(7) *Development consent must not be granted to development for the purposes of retail premises on land within Sydney Science Park unless the consent authority is satisfied that the total gross floor area (GFA) of all buildings used for retail premises will not exceed 30,000m2.*

(8) *Despite any other provision of this plan, development consent must not be granted for more than 3,400 dwellings within Sydney Science Park.*

(9) *Development consent must not be granted to development for residential purposes on land to which this clause applies unless Council is satisfied that:*

(a) before the approval of the 750th residential dwelling and or residential lot, no less than 10,000m2 of non-residential floor space is the subject of development consents for research and development, employment and education uses;

(b) before the approval of the 1,500th residential dwelling and or residential lot, no less than 75,000m2 of non-residential floor space is the subject of development consents for research and development, employment and education uses;

(c) before the approval of the 2,250th residential dwelling and or residential lot, no less than 150,000m2 of non-residential floor space is the subject of development consents for research and development, employment and education uses;

Note. It is proposed that Clause 4.6 – Exceptions to Development Standards would apply to this local provision.

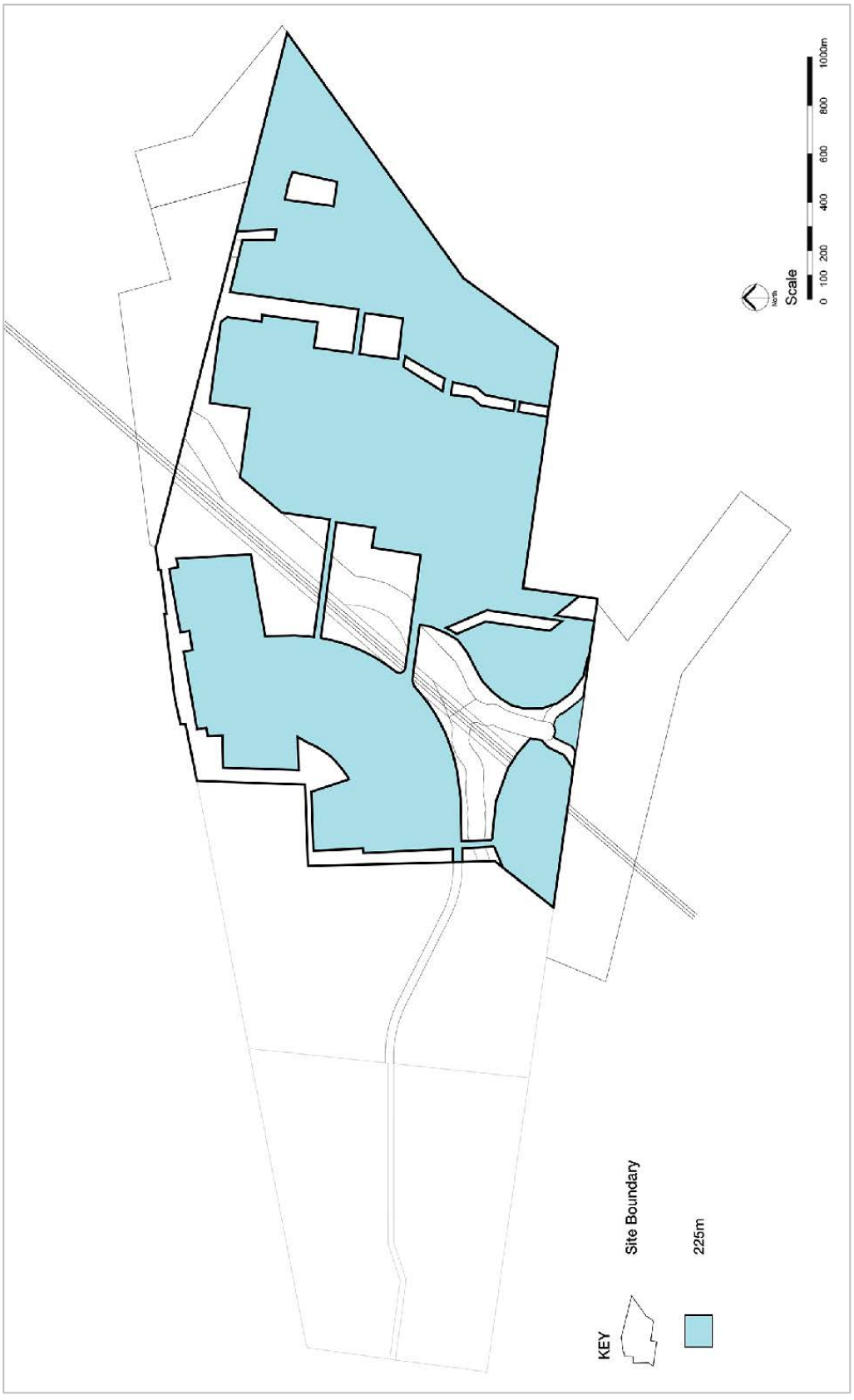


Figure 49 Minimum Lot Size Map

6.5.1. Maximum Height of Buildings

The maximum height proposed for the B7 Business Park and B4 Mixed Use zones is 18 m and 24 m, respectively (refer to Figure 50). It is not intended to develop each zone to its maximum height. A site specific Development Control Plan (DCP) for Sydney Science Park is included as part of the Planning Proposal. It is intended that the Development Control Plan for Sydney Science Park will guide the assessment of future detailed subdivision and built form controls including heights. The DCP provides more direction in relation to how heights are proposed to be distributed across the site.

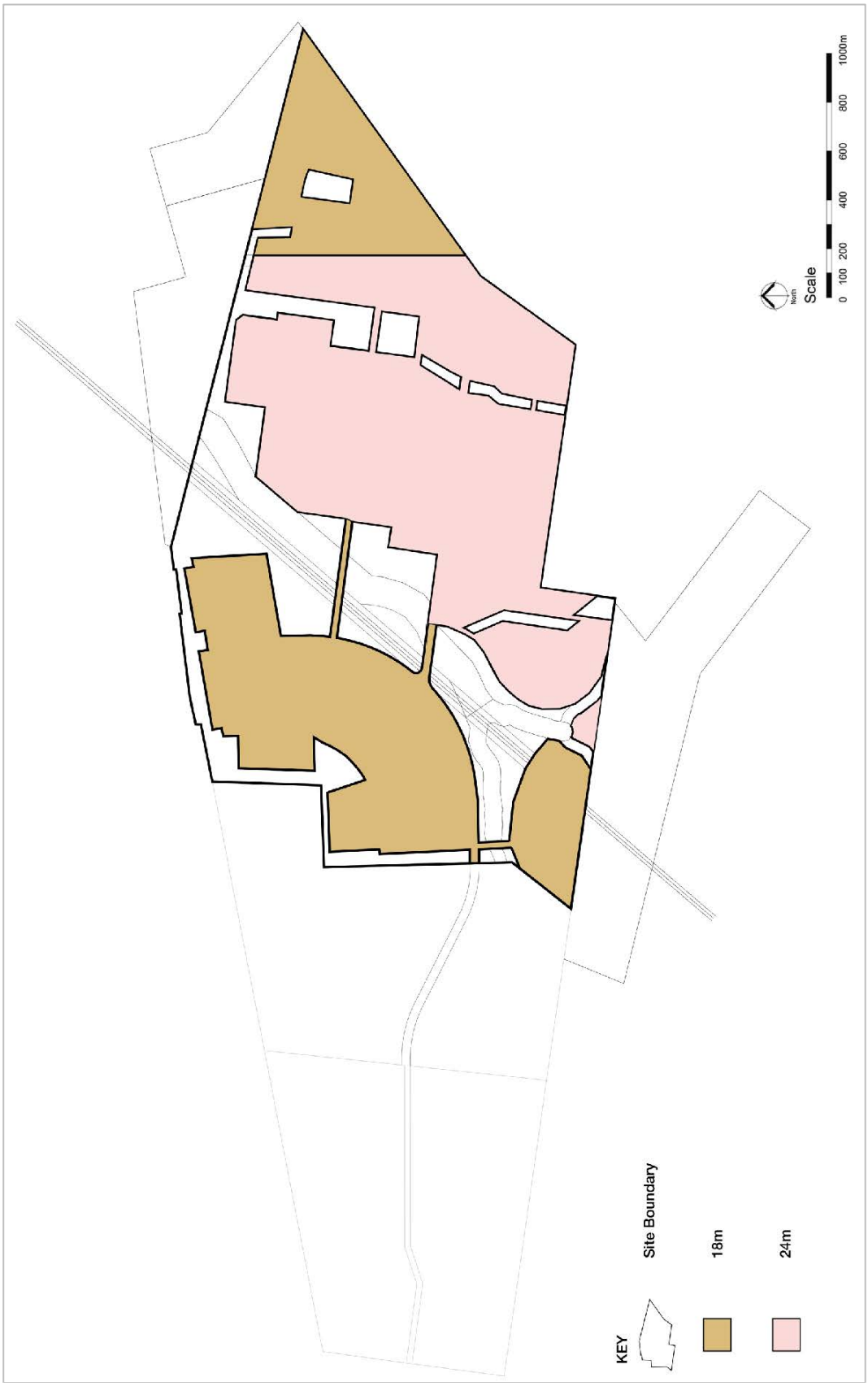


Figure 50 Height of Buildings Map

6.5.2. Floor Space Ratio

It is not proposed to set a maximum FSR for any building on any land within Sydney Science Park. Development envisaged within Sydney Science Park will require a combination of controls to achieve public and private domain outcomes, and different building uses and development types need quite different FSRs. A better alternative to appropriately deal with bulk and scale is use of building footprint limits, minimum landscaped area, solar access controls and minimum rear boundary setbacks. These matters are appropriately dealt with in the Draft DCP for Sydney Science Park.

6.6. Urban Release Areas

Part 6 of Penrith LEP 2010 contains 'satisfactory arrangements' for 'urban release areas' in relation to designated State public infrastructure, public utility infrastructure and a requirement for a development control plan to be in place prior to land being developed. It is proposed to amend the Urban Release Area Map in Penrith LEP 2010 to include the Sydney Science Park site. In this way, the clauses contained within Part 6 will apply to Sydney Science Park. The relevant clauses are set out below.

6.1. Arrangements for designated State Public Infrastructure

(1) The objective of this clause is to require satisfactory arrangements to be made for the provision of designated State public infrastructure before the subdivision of land in an urban release area to satisfy needs that arise from development on the land, but only if the land is developed intensively for urban purposes.

(2) Development consent must not be granted for the subdivision of land in an urban release area unless the Director-General has certified in writing to the consent authority that satisfactory arrangements have been made to contribute to the provision of designated State public infrastructure in relation to that lot.

(3) Subclause (2) does not apply to:

- *a) any lot identified in the certificate as a residue lot, or*
- *b) any lot created by a subdivision previously consented to in accordance with this clause, or*
- *c) any lot that is proposed in the development application to be reserved or dedicated for public open space, public roads, public utility undertakings, educational facilities or any other public purpose, or*
- *d) (d) a subdivision for the purpose only of rectifying an encroachment on any existing lot.*

(4) This clause does not apply to land in an urban release area if all or any part of the land is in a special contributions area (as defined by section 93C of the Act).

6.2 Public utility infrastructure

(1) Development consent must not be granted for development on land in an urban release area unless the Council is satisfied that any public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when required.

(2) This clause does not apply to development for the purpose of providing, extending, augmenting, maintaining or repairing any public utility infrastructure.

6.3 Development control plan

(1) The objective of this clause is to ensure that development on land in an urban release area occurs in a logical and cost-effective manner, in accordance with a staging plan and only after a development control plan including specific controls has been prepared for the land.

(2) Development consent must not be granted for development on land in an urban release area unless a development control plan that provides for the matters specified in subclause (3) has been prepared for the land.

(3) The development control plan must provide for all of the following:

- *a) a staging plan for the timely and efficient release of urban land making provision for necessary infrastructure and sequencing,*

b) an overall transport movement hierarchy showing the major circulation routes and connections to achieve a simple and safe movement system for private vehicles, public transport, pedestrians and cyclists,
c) an overall landscaping strategy for the protection and enhancement of riparian areas and remnant vegetation, including visually prominent locations, and detailed landscaping requirements for both the public and private domain,
d) a network of passive and active recreational areas,
e) stormwater and water quality management controls,
f) amelioration of natural and environmental hazards, including bushfire, flooding and site contamination and, in relation to natural hazards, the safe occupation of, and the evacuation from, any land so affected,
g) detailed urban design controls for significant development sites,
h) measures to encourage higher density living around transport, open space and service nodes,
i) measures to accommodate and control appropriate neighbourhood commercial and retail uses,
j) suitably located public facilities and services, including provision for appropriate traffic management facilities and parking.

(4) Subclause (2) does not apply to any of the following development:
a) a subdivision for the purpose of a realignment of boundaries that does not create additional lots,
b) a subdivision of land if the lot that is proposed to be created is to be reserved or dedicated for public open space, public roads or any other public or environmental protection purpose,
c) a subdivision of land in a zone in which the erection of structures is prohibited,
d) proposed development on land that is of a minor nature only, if the consent authority is of the opinion that the carrying out of the proposed development would be consistent with the objectives of the zone in which the land is situated.

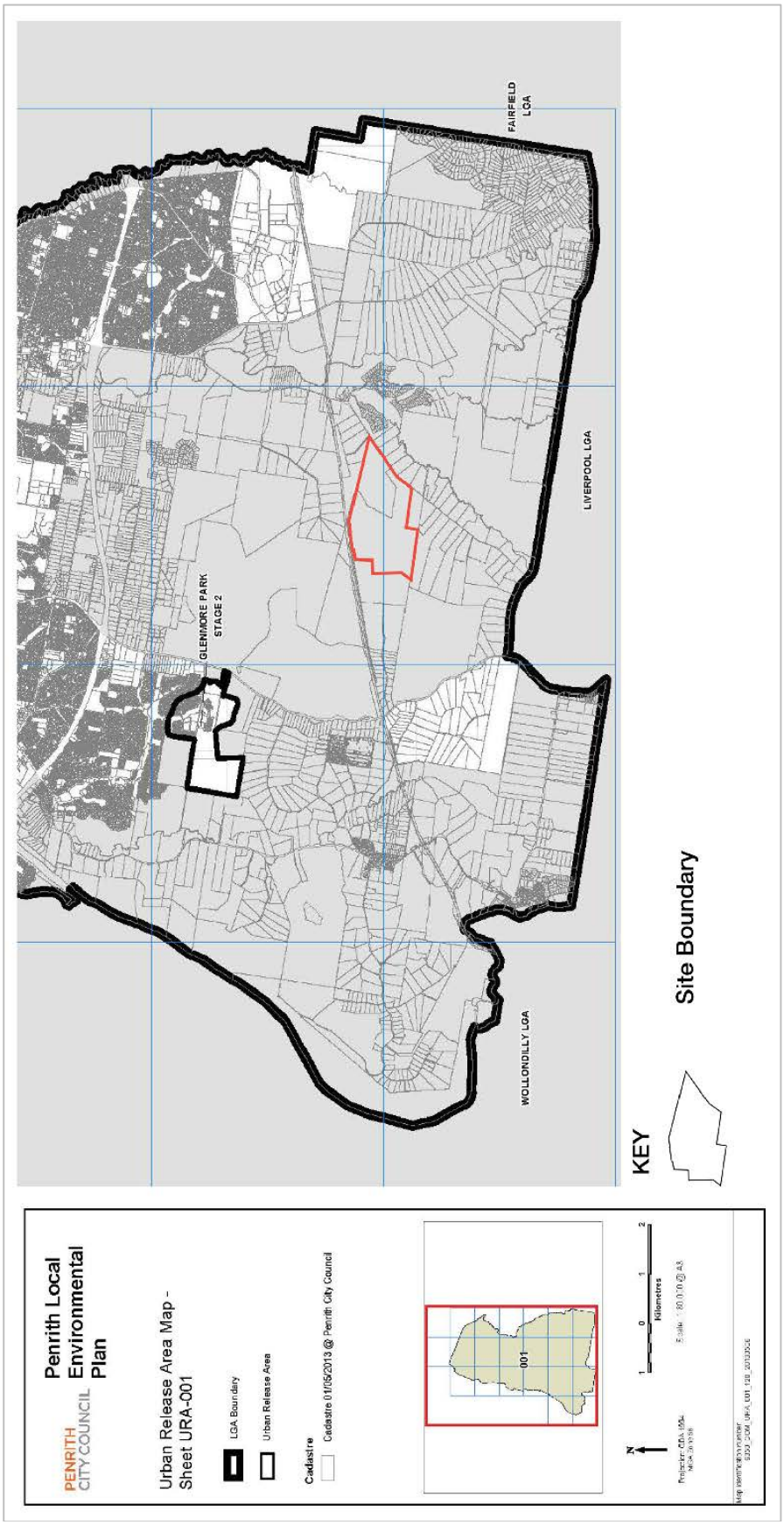


Figure 51 Urban Release Area Map

6.4 Relationship between Part and remainder of Plan

A provision of this Part prevails over any other provision of this Plan to the extent of any inconsistency

6.7. Land Reservation and Acquisition

The proposed LEP Amendment proposes to reserve land exclusively for a public purpose. Land to be included on the Land Reservation Acquisition Map is shown at Figure 52.

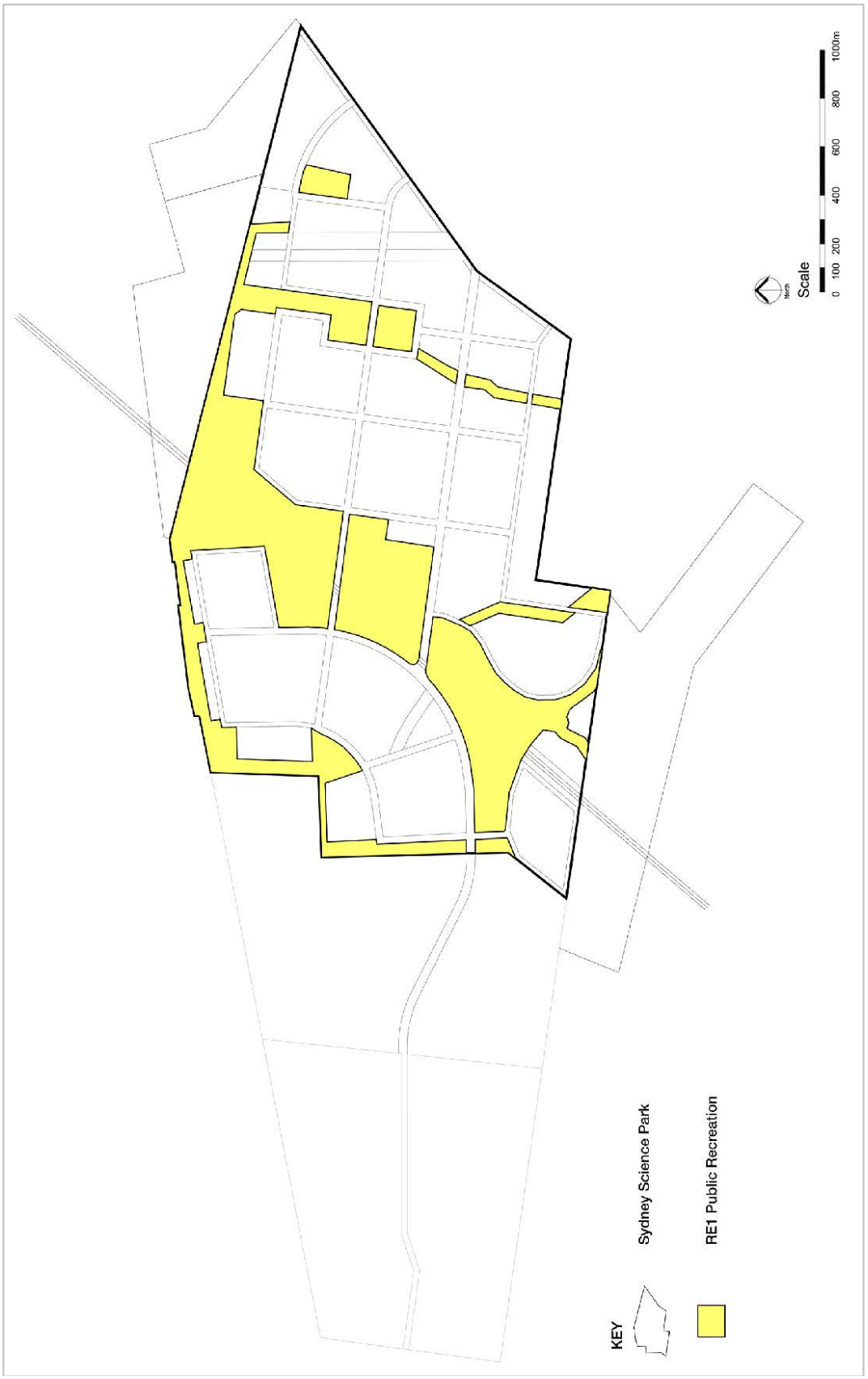


Figure 52 Land Reservation Acquisition Map

6.8. Development Control

A site specific DCP for Sydney Science Park is included as part of the Planning Proposal (refer to **Appendix H**). In the event of any inconsistency between the site specific section of the DCP that relates to Sydney Science Park and any other sections of Council's DCP, the provisions of the site specific DCP shall prevail only to the extent of the inconsistency.

7. Strategic Justification

The relationship of the Planning Proposal to the NSW State Plan 2021, Metropolitan Strategy, Draft Broader WSEA Structure Plan and Draft North-West Subregional Strategy has been considered. The following section provides evidence that the Planning Proposal is consistent with the employment targets, outcomes and actions set out in these State and Local strategic planning documents. The Planning Proposal's consistency with State Environmental Planning Policies and Section 117 Directions is also examined.

The relevant State and local plans, strategies and policies applicable to the Planning Proposal are:

- The NSW State Plan 2021;
- Metropolitan Plan for Sydney 2036;
- Draft Metropolitan Strategy for Sydney to 2031;
- Broader Western Sydney Employment Area;
- Metropolitan Transport Plan – Connecting the City of Cities;
- Draft North West Subregional Strategy;
- North West Sector Bus Servicing Plan;
- State Environmental Planning Policies;
- Section 117 Directions;
- Penrith Regional City Community Strategic Plan 2031;
- Penrith Community Plan (June 2013);
- Penrith Sustainability Blueprint for urban release areas;
- Penrith Regional City – Major Developments and Investment Opportunities;
- Penrith City Centre & St Marys Town Centre Vitality & Viability Review Economic Analysis;
- Penrith Rural Lands Strategy (September 2003).

7.1. The NSW State Plan 2021

The NSW State Plan 2021, released in 2006 and updated in 2010, guides outcomes in priority areas to 2016 notably integrated transport and land use planning, to stimulate the economy and achieve the following targets:

- increase the number of jobs close to home;
- improve housing affordability;
- improve the public transport system;
- provide reliable public transport;
- improve road safety;
- increase walking and cycling; and
- improve the road network.

The proposed rezoning of the site and development of Sydney Science Park as a specialised centre focused around the principles of food security, energy and health is consistent with the following goals included in the NSW 2021 State Plan.

- Goal 1: Improve the performance of the NSW economy – Given the strategic advantages of the site, the current rural land use is considered an under-utilisation of land. The development of a science park will provide additional employment lands specialising in science and technical fields. Being work leading and first of its kind in Australia will draw significant investment attention to Sydney. Hill PDA estimate significant economic benefits for the region.

- Goal 3: Drive economic growth in regional NSW – Rezoning of the site to allow for appropriate science based business and employment uses will stimulate investment and growth in the southern part of Penrith.
- Goal 5: Place downward pressure on the cost of living – The integrated residential component of the development will assist in relieving housing pressure. Residential uses will support the employment land and encourage working close to home and or live /work uses.
- Goal 6: Strengthen the NSW skill base - Sydney Science Park intends to support education, research and development. This facility will greatly contribute to the skill base within NSW and bring highly qualified scientific professionals from overseas to Western Sydney.
- Goal 7: Reduce travel times – locating research and development, employment and education uses in proximity to and integrated with residential uses will greatly assist in reducing travel times and ensure more jobs are located closer to home. Existing professionals residing in Western Sydney will live in proximity to high technology jobs, with the most western location in Sydney currently being Macquarie Business Park.
- Goal 12: Provide world class clinical services with timely access and effective infrastructure – Sydney Science Park will provide for education, research and development which will support world class clinical services.
- Goal 19: Invest in critical infrastructure – Development of Sydney Science Park will prompt investment in critical infrastructure in this area, particularly for water and sewerage. Increased density may also support patronage for planned public transport projects such as the Western Express Program and Strategic Bus Corridors.
- Goal 20: Build liveable centres – The development intends to promote sustainability through the incorporation of solar power, water sensitive urban design and water recycling. Healthy living is encouraged through walking and cycling pathways, parks and ovals. Community Supported Agriculture will be ingrained in the design to promote food security.

7.2. Metropolitan Plan for Sydney 2036

The Metropolitan Plan for Sydney 2036 (the Metropolitan Plan) is an integrated, long–term planning framework that aims to sustainably manage Sydney's growth and strengthen its economic development to 2036 while enhancing its unique lifestyle, heritage and environment. The two key objectives of the Metropolitan Plan are to plan land use, service provision and infrastructure capacity for 760,000 more jobs by 2036, of which 50% of planned employment capacity is expected to be located in Western Sydney and to provide 770,000 additional homes by 2036. The proposal's consistency with the strategic directions and key policy settings which underpin the planning framework of the Metropolitan Plan are discussed below.

Strengthening a city of cities

Penrith occupies a strategic position as the western gateway to Sydney. It offers important advantages including its proximity to the Nepean River, Blue Mountains and Penrith Lakes, key infrastructure assets including the Nepean Hospital, the planned Western Express Rail Line, education hubs at Werrington and its location near a number of urban growth areas. As identified in the Metropolitan Plan, Penrith, in common with Western Sydney, must respond to the challenge of population growth surpassing job growth. Future directions for promoting economic development within Penrith include building upon emerging industry clusters in health and education and other sectors, and capitalising on active local business leadership. The Metropolitan Plan targets an employment capacity of 31,000 jobs for Penrith by 2036. Sydney Science Park will provide a significant contribution to this target.

Growing and renewing centres

As identified in the Metropolitan Plan, the objectives and actions for the ongoing growth and renewal of Sydney's network of strategic and local centres relevantly relates to focusing activity in accessible centres, planning for new centres in urban and greenfield release areas, supporting clustering of businesses and knowledge based activities in major and specialised centres and locating at least 80% of all new homes within the walking catchment of existing and /or planned centres. Sydney Science Park replicates these objectives.

Growing Sydney's economy

Sydney will require 760,000 additional jobs to support the anticipated population growth by 2036. The plan aims for 50% of these jobs to be in Western Sydney, to match expected population growth. The DoPI estimates Sydney is likely to need:

- 10,000,000 m² additional commercial floor space;
- 5,000,000 m² of additional retail floor space, and
- 8,500 hectares of employment lands.

The proposed rezoning of the site will make available 340,000m2 of employment floor space, 100,000m2 of education floor space and 30,000m2 of retail floor space across the site. The proposal will provide approximately 12,000 direct jobs, of which 9,714 are expected in research and development, 1,282 in education and 1,000 jobs in retail. An additional 200 jobs will be derived from Baiada's National Headquarters, Food Science Laboratories, Research and Tertiary Facilities. Additional workers will be employed during the construction stage, equivalent to an estimated 7,270 job years directly provided on the site.

The proposed development of Sydney Science Park provides a critical opportunity to provide a source of highly skilled, quality jobs within Western Sydney. This stands in contrast to the types of jobs being created in other parts of the Broader WSEA Area, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited. The strategic value of the Science Park for this part of Western Sydney is significant.

Sydney Science Park will not compete with other specialised centres identified in the Draft Broader WSEA Structure Plan. Given its size and single ownership it is likely to be developed as a 'specialised centre' ahead of the other centres and serve early demand emanating out of workers in the area. It will provide a distinct offer which will compliment all of the Broader WSEA area including the two earmarked specialised centres. The proposal compliments the Penrith CBD, the Nepean Health Centre and Councils planned development in Werrington through providing different job opportunities. Penrith CBD will attract white collar jobs, the Nepean Health Centre will focus on medical expertise whilst Sydney Science Park will attract scientists in a diversity of research fields. Penrith CBD will remain the hub of services and employment functions for the LGA and can continue on as the civic, cultural, entertainment and administrate centre for the LGA to which Sydney Science Park will contribute.

The Metropolitan Plan anticipates that the professional, scientific and technical services sector will continue to grow as a result of future higher education levels, existing science and research strengths and infrastructure and as such the seeks to encourage and expand the professional, scientific and technical services sector into emerging centres and business parks, particularly in Western Sydney. The Metropolitan Plan wants new business / science parks or hubs in Western Sydney, to support Sydney's growing economy. The research undertaken by both Urbis for the DoPI, as part of the Broader WSEA structure plan, and Hill PDA identified the characteristics or attributes considered to be key success factors. These include:

- access to an efficient public transport network (preferably rail or light rail) and thereby wider metropolitan/regional locations and international airports;
- a land area, preferably under single land ownership, that allows for future expansion;
- a critical mass of employees and proximity to an existing workforce;
- relationship to other important economic infrastructure elements such as hospitals, universities, educational facilities, research institutes or alignments with other knowledge-based activities;
- provision for SMEs to enable new ideas to grow in business incubators;
- on-site amenities including retail, conference, hotel and leisure facilities;
- government support which may include rapid approvals, funding, favourable tax rates, business support and so on; and
- delivery of residential uses, particularly executive housing, as part of the overall community offer to ensure the project is financially viable.

Sydney Science Park has all these attributes and would be a first of its kind development in Australia. There is a strong desire by EJC to capture and develop the concept before it is embraced by someone else, somewhere else. The site satisfies the criteria for a business park as set out in the Metropolitan Plan.

- The site is of a sufficient size (i.e. 287 hectares) and in single ownership;
- There is preference by the research and development industry for land in Western Sydney;
- The site is located in proximity to a source of potential employees and students; and
- The site is ideally located in proximity to the future Badgery's Creek Airport and future freight, road and rail corridors as identified in the Draft Broader WSEA Structure Plan.

The site is not restricted by existing uses, is in single ownership, and can expand over time without potential boundary conflicts.

In summary, the proposed rezoning of the site and establishment of Sydney Science Park will have a number of positive economic benefits to Penrith and Western Sydney include:

- The creation of high value jobs which will:
  - create significant additional retail expenditure locally of which less than half would be captured by new retail facilities in the SSP thereby potentially improving the trading performance of existing centres;
  - support demand for additional dwellings in Penrith LGA including in Penrith CBD;
  - support the construction industry directly and indirectly;
  - support jobs in industries catering for demand from future workers and residents including hospitality, servicing, retail and transportation;
  - diversify the socio-economic profile of residents and jobs in the Penrith LGA;
  - increase the number of skilled jobs provided in the LGA;
  - support further investment in other employment uses locally associated with the research and development supply change and manufacturing processes;
  - support the role of Penrith CBD as the gateway to the North West Subregion by increasing demand for higher order retail, servicing, administrative, cultural, entertainment and civic functions which it provides and which will not be provided in the SSP
- increasing the resident and worker catchment of Penrith CBD as the Regional Centre for the North West Subregion;
- assist the LGA to attract an additional 40,000 jobs between 2009 and 2031 as targeted in the City Strategy1;

- increasing the financial and economic viability of investment in transport and public infrastructure (such as schools, hospitals etc.) in Penrith LGA from which all residents would benefit;
- raise the profile of Penrith LGA at a metropolitan, State, national and international level as a place to live, work, study and invest;
- increase the number of visitors attracted to the LGA in order to work, study or live;
- diversify access to a range of jobs and further education opportunities for residents in Penrith LGA and improving their skills base. The proposal stands in contrast to the types of jobs being created in other parts of WSEA, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited;
- potentially increasing the job containment ratio of Penrith LGA (i.e. the number of residents who both live and work in Penrith);
- Sydney Science Park may act as a catalyst for the development of the Broader WSEA and an exemplar of what the area can achieve. It would represent a vote of confidence in the future potential of this area and support a substantial number of new jobs, many of which will be high value. These high value jobs will in turn support other spin-off employment opportunities in the surrounding area including manufacturing, light industry, retail and support services;
- support the financial and economic rationale for investment in transport and other infrastructure such as schools, hospitals and parklands in Western Sydney from which all residents would benefit;
- diversity the employment and residential base in Western Sydney and widen access to a range of job and educational opportunities for residents; and
- increase the profile of Western Sydney as a place to invest on a national and an international scale. The SSP would allow the area to compete for high-value jobs worldwide and be at the forefront of food security, energy and health related research.

Housing for Sydney's population

In relation to housing, the Metropolitan Plan for Sydney principal aim is to ensure that there is an adequate supply of land to enable the delivery of residential development to accommodate the forecast population growth. The strategy seeks to encourage the provision of housing near jobs, transport and services, to improve housing affordability, upgrade the quality of new development and encourage urban renewal. The Metropolitan Plan provides updated subregional housing targets and a new timeframe to 2036. For the North-West, the new dwelling target is 169,000 new dwellings. Of the 169,000 new dwellings, 83,000 are anticipated to be accommodated in new release areas (Growth Centres and other Greenfield releases in the subregion). The proposed rezoning of Sydney Science Park will deliver 3,400 new dwellings within close proximity to a town centre and supporting services and facilities and will go some way in contributing to the balance of dwellings to be accommodated within the subregion. A mix of housing types that range from small lot, medium and high density are to be provided within Sydney Science Park to facilitate housing diversity and choice and meet the requirements of people with different housing needs. More than 80% of the site is within walking distance of the proposed town centre. Of the 3,400 dwellings anticipated to the accommodated on the site, approximately 400 will comprise student accommodation. It is expected that student accommodation will be provided within walking distance of the town centre to ensure convenience for those without cars and to capture the vibrancy of student life and enliven centres.

There is no certainty that land that has been identified by the State government or Council for housing (or even employment) will in fact be taken up and developed. For a range of reasons, that such land is not developed. State and local government are not required to strictly adhere to a job or dwelling target if there is an existing demand for the provision of a certain type of employment or housing within an area that might result in the target set in 2007

being exceeded. The site is in single ownership and is able to be developed expeditiously whereas the achievement of an employment or residential target, particularly if it comprises fragmented land, may take a significant time to be realised, or in fact, may never be achieved for a range of reasons. The additional dwellings located within Sydney Science Park are a 'bonus' and provided not at a loss of job creation but also provide the nexus to creating high job densities not currently envisaged within the Draft Broader WSEA Structure Plan.

Achieving liveability and social inclusion

Sydney Science Park will generate a population of sufficient size to form a fairly self-contained catchment for local level facilities and services. In terms of social integration between the existing Luddenham / Mulgoa population and the incoming Science Park population, it is noted that population growth will occur over a 25 year timeframe, enabling the existing community to absorb newcomers gradually and adjust to any changes. This growth must be seen in the context of the on-going and significant population growth that has been a feature of this part of Western Sydney and which is set to continue in the future.

The social integration of new and existing communities will be enhanced by:

- The proposed town centre within the Science Park, which will provide a range of retail and commercial facilities and services serving the wider area. It will draw the surrounding community into the development and encourage mixing with the new community;
- The local employment opportunities provided by the town centre and the business, research and development enterprises will also result in the mixing of new and existing populations;
- The proposed extensive open space and walking / cycling trails will be publicly accessible, providing valued recreation opportunities for the benefit of the wider area, and encouraging the mixing of new and existing populations;
- Access to and utilisation of community facilities within the Science Park by residents of the surrounding area (e.g. community centre, primary school, childcare centres);
- Science Park residents using facilities and services in the wider area, especially high schools, private schools, libraries and sporting / social clubs, where new residents will be drawn into the social networks of the district;
- Community development initiatives proposed within the Science Park. The implementation of policies of inclusiveness, to encourage social cohesion and harmony through promotion of access to services and facilities for all groups and individuals in the local Science Park and wider district communities. Where appropriate, particular activities could be initiated to draw together residents of the Science Park and the wider community to foster social integration and community cohesion.

7.3. Draft Metropolitan Strategy for Sydney to 2031

The Draft Sydney Metropolitan Strategy 2031 was released in March 2013 for public comment and will supersede the current Metropolitan Strategy. The Draft Strategy is a revised approach to strategic metropolitan planning and is based on the State Government's 'NSW 2021: A plan to make NSW number one' business plan and the 'NSW Long Term Transport Master Plan'. The Draft Strategy centres on the following five key themes or outcomes in planning for Sydney to 2031 and beyond:

- balanced growth - capitalises on infill and greenfield areas and grow existing local and strategic centres)
- a liveable city – sets minimum housing targets to be achieved through Urban Activation Precincts across Sydney;
- productivity and prosperity – sets minimum employment targets;
- healthy and resilient environment – balances urban growth and the natural environment; and

- accessibility and connectivity – planning major renewal and growth areas around existing and planned transport and road infrastructure projects, including the WestConnex proposal and its effects on the Parramatta Road Corridor.

The Draft Strategy prioritises housing and jobs growth right across Sydney and sets ambitious minimum housing and jobs targets, which are up 17% and 33% respectively on the previous strategy (discussed in detail above). There are nine key 'city shapers' that will play an important role in shaping future growth right across greater Sydney, the Western Sydney Employment Area being of them. Sydney Science Park will provide some 12,200 jobs over the next 25 years, with the first 200 jobs created in 2016.

Most new jobs will be in key centres and specialised employment precincts. This means that certain types of industry, such as creative services, health and education can work together more efficiently. They strategy wants more business parks, we are a business park. Sydney Science Park exceeds the expectations of these Plans, creating quality of jobs and job densities not envisaged by policy.

7.4. Broader Western Sydney Employment Area

The NSW State Government's Broader Western Sydney Employment Area (BWSEA) Structure Plan aims to provide an appropriate supply of well-located serviced employment lands to secure the State's future productivity and growth. It seeks to:

- encourage critical industries that support the economy's global functioning and promote employment, such as industrial uses, freight, logistics and research and development functions as well as opportunities for agribusiness and food production,
- generate approximately 21,000 office based and 36,000 industrial new jobs within the next 30 years,
- identify opportunities to improve road and rail connections to the BWSEA,
- manage the area's natural, environmental, social and cultural resources and values,
- integrate the delivery of regional infrastructure and government activities, and
- create three centres of commercial, retail, administration and community uses on the major rail and road corridors that support the proposed levels of employment.

These objectives are supported as they complement and support the proposed Sydney Science Park proposal, which will create the first jobs by 2016 and eventually contribute 10,000 news jobs to Western Sydney and assist the State Government in the delivery of their employment targets. The Science Park will also provide a much needed catalyst for economic development through the provision of an innovative research and development cluster. Sydney Science Park will exceed the targets envisaged by the Draft Broader WSEA Structure Plan.

Transportation Corridors

The draft Structure Plan identifies a number of critical transportation corridors through Broader WSEA. EJC welcome the provision of the:

- Outer Sydney Orbital – consistent with the NSW Long Term Transport Master Plan and the draft Metropolitan Strategy, the Structure Plan provides for the reservation of a corridor for the Outer Sydney Orbital. Although the precise location of the outer orbital corridor is to be subject to further investigations by Transport for NSW, it provides a significant opportunity for a coordinated planning approach to be undertaken between government and key land owners within the western portion of the employment area.
- Road Networks – a robust road structure has been identified to address future land demands, in the form of an inter-connected grid of east-west and north-south connections. The Sydney Science Park development has

the potential to extend one of the east-west road connections between Luddenham Road and The Northern Road, while providing a key spinal road through the development.

- Passenger Rail – consistent with the NSW Long Term Transport Master Plan and the draft Metropolitan Strategy, the Structure Plan provides for the reservation of a corridor for the proposed connection of the North West Rail Link and the South West Rail Link.

The Passenger Rail Station

The location of the proposed passenger rail station within the EJC site is ideal to capture the dense employment and student numbers that will be generated by the site. The proposed Science Park will utilise strong internal pedestrian and cycle connections and integrated open space networks. It is envisaged that 12,200 employees and 10,000 students will occupy the site. Ideally this train line and station would be underground with a station surfacing near the proposed town centre and interim local village.

Local Centre

The provision of a local centre and the proposed railway station (a proposed extension of the South West Rail Link) within the site, as identified in the draft structure has been incorporated into the proposed master plan (refer to section 5 and figure 27). As discussed in section 5.3, a centre in this location will support the Science Park's 12,200 employees and large student population and will ensure that benefits such as entertainment, dining, transport links, retail opportunities and public place making can occur and the employment experience of those working at the Science Park is enhanced.

It is understood that Council largely supports the Draft Plan noting that addressing the employment demands of past and planned growth the BWSEA requires attention on "…high employment generating developments that provide jobs of the future…" Council believes the Plan should provide for "…high intensity employment…with a high proportion of supportive office space and higher technology type employment generators." To achieve this, Council recommends that catalyst projects to stimulate activity and promote positive economic change, perhaps in mixed use employment zones, should be encouraged. Freight and logistics do not have to be Western Sydney's dominant employment generators.

The April 2013 Urbis study on the Economic Issues and Drivers for the BWSEA talked of the concept of 'hubs' as being the trend for businesses to congregate in a single area to benefit from knowledge sharing. The benefits, particularly in high-tech and creative industries, ICT and research and development, are seen to be innovation and higher productivity. Urbis believed that hubs would become more prevalent and more important to economic development and the competitiveness of Sydney with other global cities. The Urbis report also mentioned the importance of small and medium enterprises (SMEs) to job provision, diversity and innovation. They require support systems to be successful and, it was noted, such systems were more likely to be available in a hub focused on a particular area of business.

A study by Hill PDA of seven research and business hubs in the US, UK, Asia and Australia identified a number of trends and desirable attributes that influence the success of the hubs discussed in the Urbis report. A potential hub, consistent with Western Sydney's natural competitive advantage in poultry farming and horticulture, was considered to be one built around food science and technology. Sydney Science Park will have most of the elements noted by Urbis as being advantages considered to be necessary for office based or business park development. It will, over time, immediately or in the near future, have:

- direct access to the Outer Sydney Orbital and a station on the possible, and desirable, South West Rail Line and the North West Rail Link connection;
- 287 hectares of land with single, entrepreneurial and financially sound owner that will enable a high quality mixed use development to be created;
- the desired critical mass of at least 12,200 employees concentrated in one location providing an appropriate statutory regime is established;
- a driver to immediately stimulate demand for ancillary and supportive employment generating uses;
- a central location between the two Sydney growth centres and the established urban areas of Penrith; and
- access to the growing skills and qualifications of the Western Sydney workforce.

The Vision for Sydney Science Park can be achieved and possibly sooner than predicted.

7.5. NSW Long Term Transport Master Plan

The NSW Long Term Transport Master Plan (NSW Government, December 2012) sets out a framework for addressing the state's transport challenges for the next 20 years. The Master Plan serves as the "guiding transport planning and policy document to support the goals in NSW 2021". The NSW Long Term Transport Master Plan (LTTMP) integrates transport with wider economic, infrastructure, social, housing and land use planning. The Master Plan will also inform future detailed plans, such as modal plans and specific Regional Transport Plans. The LTTMP recognises that "the fastest growing part of Greater Sydney is Western Sydney. Today, Western Sydney is home to 47 percent of Sydney's residents, and 37 percent of Sydney's jobs. Only around a quarter of these jobs are located in Western Sydney's centres, which means Western Sydney residents on average have to commute further than people elsewhere in Sydney. This challenge is increased by lower density development in much of Western Sydney, which increases car dependency and tends towards street-based public transport that can cover wider areas."

The LTTMP identifies the development of "new transport connections for greenfield areas as they grow to support the North West and South West Growth Centres and the Western Sydney Employment Area by embedding public transport services and reducing car dependency which can limit transport access and increase vulnerability to oil price increases". To meet the transport challenges in Western Sydney, the LTTMP has outlined a number of actions using an integrated approach with the Draft Metropolitan Strategy for Sydney to 2031. These include:

- Public transport improvements to enhance links with jobs in Western Sydney, by redesigning the city-wide bus network to better complement rail, with the focus initially on the development of a strategic bus network that complements the rail network outlined in Sydney's Rail Future. The strategic bus network will consist of links with elevated service frequencies and on-road bus priority features that provide cross-regional connections between existing and emerging centres, including in Western Sydney. In particular, one of the actions incorporate the implementation of a Western Sydney bus and road upgrade package which incorporates "optimising North West Rail Link access with bus priority on surrounding road networks, and improving road access to the South West and around Werrington to address social disadvantage in parts of Western Sydney."
- New road projects, such as WestConnex, which is intended to improve links between Sydney Airport and Port Botany and Western Sydney, relieving pressure on the Eastern Distributor to the CBD.
- New intermodal freight terminals in South West and Western Sydney will enable a greater share of freight to be moved out of Port Botany by rail, also relieving pressure on roads.
- Identifying, preserving and protecting transport corridors, including the M9/Western Sydney Orbital, which is also identified in the LTTMP as a potential multi-modal corridor that would incorporate strategic freight road and rail links.

7.6. Draft North West Subregional Strategy

Subregional strategies have been adopted to translate objectives of the Metropolitan Strategy and State Plan to the local level. The draft North West Subregional Strategy prepared in December 2007 is the subregional strategy relevant to precinct planning for the Precincts and aims to guide land use planning until 2031.

7.6.1. Employment

The Draft Strategy projects an increase of 367,000 jobs in the North West Subregion by 2031.

7.6.2. Housing

The Draft Strategy expects that an additional 140,000 new dwellings will be needed in the North- West Subregion by 2031 to accommodate anticipated population growth. Of these, 12,200 are targeted to be located within Penrith LGA. There are a number of factors that will promote or hinder the achievement of these housing targets, such as the ability to meet infrastructure demands, fragmented land ownership and need for site amalgamation, delivery of a variety of housing types to meet market demands and the availability and suitability of greenfield sites to accommodate urban development. Providing approximately 3,400 dwellings as part of the development of the site is aligned with State Government objectives of meeting population and housing growth targets in Sydney.

7.7. North West Sector Bus Servicing Plan

In October 2009, the North West Sector Bus Servicing Plan was released which defines the future long-term bus service needs for the North West Sector. The North West Sector Bus Servicing Plan includes a combination of:

- Regional bus routes – higher frequency services (every 15 minutes during weekday peaks and every 30 minutes off-peak) that run into the evening (hourly) and ensure 90 per cent of residents are within 800 metres of a service; and
- District bus routes – less frequent services (every 30 minutes during weekday peaks and every 60 minutes off-peak) that do not run into the evening. These routes should ensure that 90 per cent of residents are within 400 metres of a service.

Given that there is currently no public transport service available for the site, one bus route to serve Sydney Science Park is proposed as part of the development. This bus route could either be:

- a new bus route linking with either St Marys or Penrith Transport Interchange, or
- extension/rerouting of bus route 779 when Bakers Lane extension is built.

7.8. State Environmental Planning Policies

State Environmental Planning Policies (SEPP) relevant to the planning proposal are

- State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55);
- State Environmental Planning Policy No. 65 – Design Quality of Residential Flat Development (SEPP 65); and
- Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River.

SEPP 55 – Remediation of Land

In accordance with clause 6 of SEPP 55, a planning authority is to consider whether the land to which a planning proposal relates is contaminated and if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state or will be suitable after remediation for the purposes for which the land is proposed to be used.

A Preliminary Site Investigation of the site was undertaken by JBS&G (NSW & WA) Pty Ltd (refer to report included at Appendix A). The preliminary site investigation concluded that the potential for widespread contamination across the site was low and the potential areas of 'environmental concern' identified as part of the preliminary investigation would not prevent planning and development of the land for the proposed uses. The PSI report recommends that a detailed site investigation be completed to assess the extent of contamination prior to future detailed development. It is also recommended that, based on the age of the structures identified onsite, and the presence of suspected asbestos containing material, a hazardous materials building inspection be conducted for all structures located on the site to enable appropriate management during future development.

SEPP 65 – Design Quality of Residential Flat Development

SEPP 65 applies to all new residential flat buildings across the state. The planning proposal envisages the site would accommodate residential flat buildings. The detailed design of future residential flat buildings will be subject to the provisions of SEPP 65 and the Residential Flat Design Code (RFDC) as part of the development application process. The master plan has been prepared with regard to the 10 'design quality principles' set out in SEPP 65 including context, density, resource, energy and water efficiency, landscape, safety and amenity.

SREP 20 - Hawkesbury-Nepean River (No 2 – 1997)

Sydney Regional Environmental Plan No. 20 – Hawkesbury – Nepean River applies to the site. SREP 20 aims to "protect the environment of the Hawkesbury-Nepean river system by ensuring the impacts of future land uses are considered in a regional context". SREP 20 identifies that the site is located in the South Creek catchment. The site does not fall within any other areas of significance (e.g. wetlands, cultural heritage sites, or national parks and nature reserves).

General Planning Considerations

The REP has the following general planning considerations that are relevant to the proposal:

- to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context;
- whether there are any feasible alternatives to the development;
- the relationship between the different impacts of the development and the environment, and how these impacts will be addressed.

One of the other general planning considerations of the REP is to take into consideration the strategies listed in the Action Plan for the Hawkesbury-Nepean Environmental Planning Strategy. In relation to specific policies and recommended strategies, the following are considered relevant to the proposal:

- Total Catchment Management – this policy provides that total catchment management is to be integrated with environmental planning for the catchment.
- Environmentally Sensitive Areas – this policy provides that the environmental quality of environmentally sensitive areas must be protected and enhanced through careful control of land use changes and through management and remediation of existing uses. The site has not been identified in the REP as an environmentally sensitive area.
- Water Quality - this policy provides that future development must sustain the goals of primary contact recreation and aquatic ecosystem protection in the river system. The proposed development adopts suitable environmental controls and principles, such as best practice sewerage and stormwater management and erosion and sedimentation controls (refer to section 8.4 and Appendix I).

- Water Quantity - this policy provides that aquatic ecosystems must not be adversely affected by development which changes the flow characteristics of surface or groundwater in the catchment. The proposed development will achieve the recommended strategies (refer to section 8.4 and Appendix I).
- Flora and Fauna - this policy provides that the ecological processes of the catchment must be managed so that the diversity of flora and fauna communities, species and genetics is conserved and enhanced. The impact of the proposal on flora and fauna on the site is discussed in section 8.2 and Appendix C. The proposal will not have result in a significant adverse environmental impact in relation to flora and fauna.

7.9. Section 117 Directions

The following section 117 Directions are relevant to the Planning Proposal:

Direction 1.1: Business and Industrial Zones

The objectives of this direction are to:
a) encourage employment growth in suitable locations,
b) protect employment land in business and industrial zones, and
c) support the viability of identified strategic centres.

The Planning Proposal delivers employment land in research and development, education and retail sectors to the site, thereby encouraging employment growth in Western Sydney and in Penrith LGA as a whole. The Planning Proposal is consistent with employment targets identified under the Draft Strategy and provides a significant contribution of business park and mixed use zoned land within the site.

Direction 1.2 Rural Zones

The objectives of this direction are to protect the agricultural production value of rural land. The proposed rezoning of the site from RU2 Rural Landscape to B7 Business Park, B4 Mixed Use and RE1 Public Recreation will affect land within an existing rural zone. In acordance with clause 5, a planning proposal may be inconsistent with the terms of this direction if the proposal can be justified by a strategy which gives consideration to the objectives of this direction, identifies the land which is the subject of the planning proposal and is approved by the Director-General of the Department of Planning and Infrastructure. The proposed site is located within the boundary of the Broader WSEA Structure Plan, a plan which aims to provide an appropriate supply of well-located serviced employment lands to secure the State's future productivity and growth.

The site does not comprise prime agricultural land. The proposed rezoning of the site to accommodate a science park that will attract agricultural science research facilities and companies that deal with food security, animal research and development and innovation. In addition, community supported agriculture, urban farm and community gardens, road side food production are also key elements of the science park is considered of minor significance. The proposed rezoning of site does not result in the fragmentation of rural land. Furthermore, the site is located within the Broader WSEA area and has already been earmarked for employment use.

Direction 1.5 – Rural Lands

The objectives of this direction are to protect the agricultural production value of rural land and facilitate the orderly and economic development of rural lands for rural and related purposes. This direction applies to all planning proposals to which State Environmental Planning Policy (Rural Lands) 2008 (Rural Lands SEPP) applies. The site does not comprise prime agricultural land. It is currently used for some low intensity farming (grazing land for cattle). The proposed rezoning of the site will have a negligible impact on the agricultural production value of the

site. Sydney Science Park will become a world-class hub for agricultural research particularly in the areas of food security, adaptive energy and veterinary health, consistent with the rural planning principles set out in clause 7 of the Rural Lands SEPP, which seeks in part to promote opportunities for productive and sustainable economic activities and acknowledges the importance agriculture to the region. Furthermore, the site is located within the Broader WSEA area and has already been earmarked for employment use. There will be changes to the character of the area, as it will move from rural to urban uses. There is limited potential for negative impacts on some adjoining residents in terms of visual amenity, as existing rural outlooks are replaced by urban development. The Master Plan provides for landscaping along the western boundary of the site and along Luddenham Road, which will provide some form of visual buffer to the development from Luddenham Road.

Direction 3.1: Residential Zones

This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed residential zone (including the alteration of any existing residential zone boundary) any other zone in which significant residential development is permitted or proposed to be permitted. In accordance with this direction, a planning proposal must include provisions that encourage the provision of housing that will:

- broaden the choice of building types and locations available in the housing market, and
- make more efficient use of existing infrastructure and services, and
- reduce the consumption of land for housing and associated urban development on the urban fringe, and
- be of good design.

A planning proposal must also contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it). The Planning Proposal will deliver a range of densities, lot sizes and dwelling types and create a diverse community that is demographically balanced. The variety of housing forms will provide opportunities to respond to changing life cycle, lifestyle and work requirements over time, enabling people to age in place. As demonstrated in section 8, the proposal does not result in any significant adverse environmental impacts and can be adequately serviced (refer to section 8.5 and proposed 'satisfactory arrangements' clauses discussed in section 6.6).

Direction 3.3: Home Occupations

The objective of this direction is to encourage the carrying out of low-impact small businesses in dwelling houses. 'Home occupations' are permissible without consent in the B4 Mixed Use zone in accordance with Penrith LEP 2010. The Planning Proposal does not propose to amend the land use tables in respect of 'home occupations'.

Direction 3.4: Integrating Land Use and Transport

The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:

- improving access to housing, jobs and services by walking, cycling and public transport, and
- increasing the choice of available transport and reducing dependence on cars, and
- reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and
- supporting the efficient and viable operation of public transport services, and
- providing for the efficient movement of freight.

The Planning Proposal is consistent with relevant guidance documents in that the site can be suitably serviced by existing and planned future road infrastructure and transport services. It is expected that future capital works for road improvements within the vicinity of the site (i.e. new / upgrades to intersections, localised widening and turning bays, extension of right-turn-bays, road upgrades and traffic management) will arise as a result of redevelopment of the site. These internal road costs will be borne by EJC.

Given that the science park incorporates a variety of employment generating land uses, education, student accommodation and supporting residential uses it is expected to facilitate a self-contained specialised centre that aims to provide residents living alongside to where they work, shop and play.

As demonstrated in the master plan, the site could encourage future residents to utilise walking and cycling modes of transport to access their workplaces and/or community or retail uses from their residences within the site, recreation facilities in the locality or to use public transport links. Design of streets and cycleways will be subject of a future subdivision application which will be prepared in accordance with Improving Transport Choice – Guidelines for planning and development (DUAP 2001).

Direction 4.1 Acid Sulfate Soils

The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils. A review of the NSW Natural Resource Atlas (NRA 2013) indicated that there are no known occurrences of acid sulphate soils on the site.

Direction 4.3: Flood Prone Land

The objectives of this direction are:

- to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and
- to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.

The planning proposal is supported by a Water Cycle and Flood Management Strategy prepared by J.Wyndham Prince is included at **Appendix I**. The aim of the strategy was to identify the stormwater and flood management issues to be considered in the future development of Sydney Science Park and to identify flood impacts, an appropriate evacuation strategy, appropriate options and locations for the control of the quantity and quality of stormwater leaving the site.

The XP-RAFTS modelling undertaken has determined that the proposed detention storages are adequate to restrict post development peak discharges from the site, to pre-development levels for the 50 % and 1 % AEP storm events, consistent with the requirements of the Penrith City Council Development Control Plan 2012. The detention volumes provided reduce peak post development flow rates and assist in minimising the flood impact downstream of the site. It is noted that the average storage volume per hectare is approximately 300 m^3 / ha (including bypassing catchments), which is considered to be within the appropriate range for urban development.

Opportunities to further optimise the detention basins will be considered at the development application and detailed design stages. The 2D flood modelling of the water courses and trunk drainage channels that run through the Sydney Science Park was undertaken using TUFLOW (Two-Dimensional Unsteady Flow). Flood modelling for

the existing and developed scenarios was undertaken to determine the impact of Sydney Science Park on the flood levels in the creeks. Flood extent mapping has been completed for the 50% and 1% AEP and PMF events under existing conditions. A map has then been prepared which indicates the difference in 1% AEP flood levels arising from the existing case and the proposed development within the site. The development of Sydney Science Park, with the recommended controls, will result in some increases in flood levels within the boundary of the site. This increase in level can be accommodated within the site's riparian corridors and drainage reserves and the filling of the urban areas within the site. The increase in flood levels external to the site are generally less than 200mm and are associated with the removal of the steep existing dam embankment slope.

During the PMF event, significant areas of the floodplain are affected by high hazard flooding and the potential impact on infrastructure within these high hazard areas and will need to be considered as part of the future detailed planning of Sydney Science Park. The local PMF event will affect a number of residents adjacent to the riparian corridors and drainage reserves. The local PMF is a short duration event that will occur and recede reasonably quickly (over a number of hours). The proposed development layout and general land formation will allow evacuation of affected residents through a continually rising grade to flood free land. The flood evacuation strategy will ultimately need to be considered and adopted by the State Emergency Services (as applicable) and Penrith City Council.

The proposal will not result in significant flood impacts to other properties, is not likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services. The planning proposal is not inconsistent with s.117 Direction 4.3.

Direction 4.4 Planning for Bushfire Protection

The objectives of this direction are:

- to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and
- to encourage sound management of bush fire prone areas.

This direction applies when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land. The site is **not** identified as Bushfire Prone Land on Penrith's Bushfire Prone Land Map and therefore this practice direction does not apply.

Direction 6.2: Reserving Land for Public Purposes

The objectives of this direction are:

- to facilitate the provision of public services and facilities by reserving land for public purposes, and
- to facilitate the removal of reservations of land for public purposes where the land is no longer required for acquisition.

The proposed LEP Amendment proposes to reserve land exclusively for a public purpose, consistent with this direction (refer to section 6.7 and Figure 60).

Direction 6.3: Site Specific Provisions

The objective of this direction is to discourage unnecessarily restrictive site specific planning controls. The Planning Proposal adopts land use zones and uses drawn from Penrith LEP 2010 and specifies permissible and

prohibited uses which represent as far as practical a role over of the current planning controls. It also makes provision to accommodate additional permitted residential uses on the site consistent with this Direction.

Direction 7.1: Implementation of the Metropolitan Plan for Sydney 2036

The objective of this direction is to give legal effect to the vision, transport and land use strategy, policies, outcomes and actions contained in the Metropolitan Plan for Sydney 2036. As demonstrated in section 7.1, the Planning Proposal is consistent with the vision, transport and land use strategy, polices, outcomes and actions contained in the Metropolitan Plan for Sydney 2036.

7.10. Penrith Regional City Community Strategic Plan 2031

The Penrith Regional City Community Strategic Plan 2031 provides a 'big picture' long term direction for the City – identifying key community aspirations as well as Council and community priorities and objectives.

With its focus on liveability, affordability, accessibility and environmental quality, the Community Strategic Plan 2031 is consistent with many objectives of the draft Metropolitan Strategy for Sydney. It also emphasises the need for equitable access to essential services and facilities and adequate infrastructure (e.g. public transport, roads, education, hospitals and social services) to support growth within the region. Sydney Science Park will support these objectives and contribute towards the infrastructure needs of its future residents.

7.11. Penrith Community Plan (June 2013)

The Penrith Community Plan was developed through extensive engagement with residents, business people, community groups, stakeholders and other agencies and identifies the community's long term aspirations for Penrith. The key messages from the community have presented in seven 'community outcomes' are:

- Outcome 1 – we can work close to home;
- Outcome 2 – we plan for our future growth;
- Outcome 3 – we can get around the city;
- Outcome 4 – we have safe, vibrant places;
- Outcome 5 - we care for our environment;
- Outcome 6 – we are healthy and share strong community spirit; and
- Outcome 7 – we have confidence in our Council.

The proposal's consistency with the Penrith Community Plan is summarised as follows:

- Sydney Science Park will provide jobs closer to homes (Outcome 1). The proposal will provide more than 12,200 jobs over the next 25 years, with 200 jobs expected to be delivered by 2016. The proposed will provide 3,400 new dwellings, 400 of which will comprise student accommodation. Residential uses will be peppered throughout the site, integrated with employment uses, with higher density forms located within and around the proposed town centre. Residential uses are required to support the 440,000m2 of employment and education space proposed to be accommodated within Sydney Science Park.
- Sydney Science Park is supported by infrastructure and service strategies to support its establishment and growth (Outcome 2). Sydney Science Park is to be delivered at 'no additional cost to government'. The proposal includes a servicing and water strategy which demonstrates how infrastructure is to be delivered to Sydney Science Park in a timely and efficient manner. The planning proposal will be accompanied by an offer to enter into a Voluntary Planning Agreement with State Government and Council for the delivery of infrastructure and services and utilities that are required to meet the future demands of Sydney Science Park. This includes transport infrastructure improvements, district and local open space and a community centre.

- Sydney Science Park will be well connected (Outcome 3). The master plan includes legible street network that delivers a flexible grid to deliver multiple land use form in a mixed use environment. The streets will create a legible network of vehicular, pedestrian and bike linkages forming a hierarchy of streets that reinforce arrival and destination points, public realm and built form.
- Sydney Science Park will be a safe and vibrant place (Outcome 4). Clearly articulated and high quality open spaces, a variety of employment and workplace opportunities and a diversity of housing types contained in a compact urban form that integrates multiple uses, encourages the creation of a walkable, pedestrian oriented community and facilitates communication between workers, researchers, academics, students, other residents and visitors, are features of Sydney Science Park.
- Sydney Science Park will care for its environment and have a healthy and strong community spirit (Outcomes 5 and 6). As part of the water, environmental and landscape strategy for the site, the significantly altered central watercourse, will become a key feature of Sydney Science Park and positive environmental benefits, through re-establishing riparian corridor and associated planting, proposed formal and passive areas of open space and a network walking tracks and bike paths along it. A variety of policies and programs will be further investigated to effectively manage water, reduce energy consumption, improve resident and employee health, ensure physical and emotional accessibility, manage waste and materials toxicity and produce a highly valued environment.

7.12. Penrith Planning Strategy 2008

The Penrith Planning Strategy is closely tied in with the preparation of the new City-wide Local Environmental Plan (LEP) and accompanying Development Control Plan (DCP) which together will provide the new planning framework for a sustainable Penrith in the future. The Strategy provides policy direction for: centres; employment and economy; accommodating population growth and change; rural and resource lands; environment; and transport.

The vision of the Strategy is: Council's vision for Penrith is one of a sustainable and prosperous region with a harmony of urban and rural qualities with a strong commitment to environmental protection and enhancement. It would offer both the cosmopolitan and cultural lifestyles of a mature city and the casual character of a rural community. Sydney Science Park will attract the world's leading scientific professionals and organisations to Penrith through the creation of a place built on the fundamental principles of quality architectural and urban design, social cohesion, high connectivity and transport accessibility and environmental excellence. The proposal will exceeds the expectations of Government planning policy for job creation in Penrith and Western Sydney, not just through job numbers but through the tertiary nature of these jobs, their relationship to a strong educational presence and the supporting offering of a quality residential environment where workers can live near their work. The proposal is considered consistent with the Penrith Planning Strategy.

7.13. Penrith Sustainability Blueprint for urban release areas (June 2005)

Penrith Council's Sustainability Blueprint for urban release areas is a guide for Council, developers and other stakeholders to ensure urban release areas are planned using the principles of sustainability. Sydney Science Park would address the objectives of the Sustainability Blueprint related to social sustainability, through its practical response to a number of key principles outlined within the document. These include:

Principle	Response
Principle 1 – value the sites attributes – preserve ecosystems, protect biodiversity, air, water and conserve heritage This principle highlights the requirement to preserve Penrith City's unique cultural and environmental heritage. The principle highlights the requirement for communities to live within natural resource limits, of which can be achieved during design and construction through creating biodiversity corridors which link with flora and fauna corridors, improving air and water quality, managing potential site impacts and working with natural drainage wherever possible.	The Master Plan for Sydney Science Park has been prepared in response to a detailed site analysis and responds to the special characteristics of the site, including topography, flora and fauna and existing creeks and dams.
Principle 2 – create localised landscapes and quality domains – based on the indigenous landscape attributes This principle highlights the necessity to create landscapes and public domains that reflect that culture and character of the community. The principle highlights the need to reinforce the natural landmarks of Penrith, placing particular emphasis on the indigenous landscape attributes. The public domains are also required to provide accessible buildings, facilities and spaces for public recreation. These areas are also intended to include a range of passive and active open space opportunities that incorporate existing vegetation and public art.	The Master Plan includes an extensive passive and active open space and landscape / vegetation network that shapes an identity and character responsive to the topography of the site and integrates a liveable, robust network of parks, reserves, corridors and streetscapes.
Principle 3 – Create communities - not just housing This principle highlights the requirement to develop places that foster social sustainability through the provision of formal and informal meeting places that encourage participation and interaction. The principle highlights the requirement for equitable, accessible and high quality recreational, educational, health and community facilities and services that are provided upfront to service an initial population. The principle highlights the requirement for a mix of dwelling sizes and types that are affordable to a range of demographic groups, key transport infrastructure and the possible consideration of a community development program.	Sydney Science Park proposes a mix of uses that will provide a source of employment close to residences, ensuring the minimisation of long commutes to work.
Principle 4 – Create Employment - promote the economic growth of the City and minimise the need for commuting	Sydney Science Park is consistent with the principles relevant to employment and economic growth outlined within this document. The

This principle highlights the need to provide localised opportunities for employment to minimise the need for commuting. The principle places a great emphasis on the importance of delivering new urban release areas that are self-sufficient and deliver enough jobs to match the incoming workforce participants moving into the community. To ensure the effective delivery of this principle, a diversity of business and employment opportunities must be provided to cater for a diverse demographic group.	development proposes a mix of employment opportunities for a variety of demographics that will stimulate economic growth within the area. Sydney Science Park also proposes a mix of housing opportunities to support employment and education uses that in turn will minimise the need for commuting.
Principle 5 – Save water – water sensitive urban design (WSUD) This principle highlights the need to implement water saving designs to conserve the Hawkesbury/ Nepean River system. The principle exemplifies the importance of conserving natural areas and watercourses as well as developing and implementing water conservation strategies. These strategies will contribute to securing an ecologically sustainable environment in Penrith.	Sydney Science Park has incorporated water sensitive urban design (WSUD) into its water saving strategy. The strategy is consistent with the principles outlined within this document and incorporates WSUD throughout the entire development. The use of water bodies, performing both an aesthetic and functional purpose are a key element of the public domain.
Principle 6 – Save energy and greenhouse gases – smart-lot design This principle highlights the importance of designing all building types and lot layouts to be energy efficient. The principle encourages all dwellings to have north-facing living areas and sunny courtyards/gardens to benefit residents liveability. The objectives of this principle will be achieved through appropriate road, lot and building layout.	The Master Plan optimises solar orientation to maximise energy efficiency.
Principle 7 – maximise liveability & longevity – design for durability and adaptability This principle highlights the necessity to design infrastructure and buildings that are sustainable and of high quality. The intention behind this principle is to minimise the requirement to replace or modify infrastructure and buildings.	The Master Plan sets out the framework for delivery of a sustainable community in terms of employment, environmental outcomes, integrated land use and transport planning.
Principle 8 – reduce resource consumption – energy, land, water and materials This principle highlights the necessity to incorporate building materials that are sustainable and will reduce resource consumption. The principle specifies that all materials used should have low environmental/health impacts and have low embodied energy. The principle also encourages design for sufficiency and not for excess (small is better).	A philosophy of Sydney Science Park is to reduce resource consumption. This concept will be developed as part of development applications for built form.

Principle 9 – minimise waste – return, reuse, recycle This principle highlights the necessity to minimise waste and recycle during the construction phase. The intention behind this principle is to avoid any adverse environmental or amenity issues arising as part of construction.	The principle of return, reuse and recycle will be considered as part of future development applications for built form.
Principle 10 – build-in community safety & crime prevention measures – thoughtful design of the public domain This principle highlights the need design public spaces that reduce the opportunity for crime and encourage public safety. The principle emphasises the importance of designing these spaces in a manner that allows appropriate surveillance, controlled access and management of space.	The Master Plan provides a framework that encourages casual surveillance. The integrated mix of employment, education, residential and retail uses to be accommodated within Sydney Science Park will result in a place of activity 24/7.

7.14. Penrith Regional City – Major Developments and Investment Opportunities

Penrith Regional City 'Major Developments and Investment Opportunities' (March 2013) prepared by the Penrith Business Alliance documents a number of projects currently being undertaken in Penrith which demonstrate Penrith's growth and varied investment opportunities. It outlines Penrith's competitive advantages in relation to its economic attributes, location, workforce, diversity of residential product, recreation opportunities and access to higher order jobs. With the science park concept in mind, a number of sites were evaluated to determine which sites best suited the concept and also were financially viable. Alternate sites that were evaluated didn't have the same opportunities presented as the site at Luddenham. The site at Luddenham was selected because of its competitive advantages:

- the size of its landholding and tenure (not fragmented land);
- industry preference for land in Western Sydney;
- located within the WSEA and Draft Broader WSEA Structure Plan;
- proximity to potential Badgerys Creek Airport and future transport infrastructure; and
- site not restricted by existing uses and can expand over time without potential boundary conflicts.

Of equal importance was capitalising on the competitive advantages of Penrith:

- Economic attributes – it has an economic catchment of 500,000 + people;
- Location – to other parts of Sydney and existing transport infrastructure (road, rail);
- Workforce – with a population base of over 184,500 + residents;
- Recreation opportunities – lifestyle destination and proximity to cultural and shopping facilities within Penrith CBD; and
- Growing locational centre for higher order educational jobs.

As stated *"investors come to Penrith to enjoy a dynamic business environment, a supportive Council, skilled workforce, welcoming business partners and suppliers plus a wealth of opportunity for growth*[2]". Sydney Science Park will attract leading research and development companies that will come and invest in Penrith and take

[2] **Penrith Regional City – Major Developments and Investment Opportunities

advantage of location, recreation and lifestyle opportunities. To help attract benefits of Sydney Science Park, the workforce is likely to require access to the following range of facilities at the local level:

7.15. Penrith City Centre & St Marys Town Centre Vitality & Viability Review Economic Analysis (July 2004)

Penrith City Centre & St Marys Town Centre Vitality & Viability Review Economic Analysis presents an economic framework to revitalise and promote the growth of Penrith CBD and St Marys in line with Council's vision for a *"prosperous region with harmony of urban and rural qualities and a strong commitment to environmental protection and enhancement".* As discussed above, the Metropolitan Plan and North-West Subregional Strategy identify Penrith as a Regional City with a diverse employment base servicing a growing residential catchment. It is essential that Sydney Science Park does not compete with Penrith CBD or other centres in the existing hierarchy, including the Nepean Health Centre or the success of the Werrington Corporate Park. The proposal, being a designated specialised centre comprising a mix of research and development, employment, education, retail and residential uses, will not be reliant on diverting trade or investment away from existing or planned centres such as Penrith CBD. The proposed town centre is serving a demand which would not exist without Sydney Science Park and therefore which would not otherwise be satisfied in existing or proposed centres and employment clusters locally. The focus on food security, energy and health is not an offering currently provided in the region and would therefore not compete with existing employment clusters which cater for a different sector of the market.

Sydney Science Park will not compete with Penrith CBD. Penrith CBD would remain the highest order centre in LGA and the only Regional City. Sydney Science Park will provide only one main activity centre with 30,000m2 of floor space. By comparison Penrith CBD contains 264,747m2 of retail floor space and 315,487m2 of commercial floor space. Retail floor space, as proposed to be accommodated within the town centre and interim local village, will not be of a scale to compete with that of Penrith CBD and it will lack higher order retail provision such as a department stores and bulky goods floor space. As such, Penrith CBD is likely to be able to capture some expenditure from future workers and residents in Sydney Science Park and as such would increase its trading levels as a result.

Beyond purely retail, Penrith CBD will remain the hub of services and employment functions for the LGA. The employment role it provides will not be threatened by Sydney Science Park which is targeting a different employment market and indeed Penrith CBD, as the civic, cultural, entertainment and administrative centre for the LGA will capture increased patronage as a result of Sydney Science Park. In this manner the proposed rezoning of the site and creation of a science park will support the role of Penrith CBD as the gateway to the North West Sydney.

7.16. Penrith Rural Lands Strategy (September 2003)

The Penrith Rural Lands Strategy provides an analysis of the existing situation and discusses various options that could be addressed to ensure that the future of Penrith's rural lands is sustainable. Under this strategy, the village of Luddenham was identified as an investigation area that in the short to medium term could expand and accommodate further development. Since this study, more than 1,400 hectares of land, including agricultural land, has been zoned for employment purposes as part of the Western Sydney Employment Area (WSEA) within the vicinity of the site. In 2008, the NSW government rezoned an additional 826 hectares of land to the north-east of the site, in the Ropes Creek area and south of the Sydney Water pipeline and in 2011-2012, the site was identified as forming part of the Broader WSEA area. The site does not comprise prime agricultural land and has already been earmarked for employment use.

8. Environmental, Social and Economic Impact

8.1. Introduction

This section addresses the environmental assessment of the Planning Proposal in respect to the relevant matters for consideration under Section 55(1) of the EP&A Act. The environmental assessment draws upon the site analysis, which justifies the configuration of the proposed development and the land use zones proposed. The following factors have been considered in this section:

- flora and fauna;
- transport and access assessment;
- water cycle management including flooding, surface water, groundwater quality and riparian corridors;
- services and utilities;
- geotechnical, soils and contamination assessment;
- social planning;
- economic analysis; and
- heritage.

8.2. Flora and Fauna

An Ecological Constraints Analysis for a larger study area, within which the subject site forms only part of, at Luddenham was prepared by Travers Ecology in 2010 (the Travers report) (refer to copy included at **Appendix C**). The 'study area' as defined in the Travers report includes additional land to the west and south of the subject site – areas which are outside of the land to which this planning proposal relates. The Travers Report has been reviewed by Cumberland Ecology in relation to its findings for the subject site. The conclusions of this assessment are as follows:

- The site has been substantially cleared for agriculture, such that it retains very little native vegetation. The majority of the site is now grassland dominated by exotic species, and contains several farm dams.
- The site comprises two highly degraded threatened communities; Cumberland Plain Woodland (CPW) that is listed as a Critically Endangered Ecological Community (CEEC) under both the *NSW Threatened Species Conservation Act 1995* (TSC Act) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and River-Flat Eucalypt Forest on Coastal Woodlands (RFEF), which is listed as an Endangered Ecological Community (EEC) under the TSC Act only. These patches fall into the category of 'Low Condition' under a biometric assessment. All patches within the subject site consist of a small number of trees less than 0.25ha in size. The understorey of these areas consists of mostly exotic pastoral weeds, with no native mid-storey species.
- The site does not contain habitat for most threatened flora species with potential to be found in the area.
- Although suitable habitat in the form of dams exists for the threatened Green and Golden Bell Frog (*Litoria aurea*) on site, they did not find the species during their amphibian survey. During the fauna surveys they recorded two threatened fauna species on site. These were both bats, the East-Coast Freetail Bat (*Micronomus norfolkensis*), and the Large-Footed Myotis (*Myotis macropus*). Two migratory birds protected under the EPBC Act; the Cattle Egret (*Ardea ibis*) and the Great Egret (*Ardea alba*) were also recorded.
- A large number of habitat trees were recorded on site, though few had hollows, and all hollows were less than 20cm in size and therefore not suitable for large fauna species.
- There is potential habitat for the Green and Golden Bell Frog on the site, and although Travers Ecology surveyed for this species and did not record it, it was noted that no rain occurred during the period of surveying.

Cumberland Ecology has concluded that the planning proposal will not result in any significant impact to threatened flora or fauna or Endangered Ecological Community. It is recommended:

- The central drainage area within the site is proposed to be rezoned RE1 Public Open Space and as such under *The Local Government Act 1993* (LG Act) a Plan of Management will be prepared and implemented for this land. Chapter 6, Part 2, Division 2 of the LG Act sets out a number of elements that must be addressed in a plan of management including requirements for land that includes ecological communities. This plan of management would include identification of ongoing management of habitat resources, weeds, future landscaping and site works to retain trees.
- Dam decommissioning studies should be carried out prior to draining any of the larger water bodies on site to mitigate impacts on aquatic and semi-aquatic wild life. Particularly important is the relocation of native fauna species such as the amphibians recorded by Travers Bushfire and Ecology as present, additional survey for unrecorded aquatic native species such as reptiles (turtles) and fish species (eels), and to outline protocols for euthanasia of recorded exotic fauna species (carp, mosquito fish).
- In respect to threatened fauna species the collective retention of the central drainage, the natural vegetated fringes to this drainage, nearby connective remnants and nearby hollows is recommended. Disturbed areas within the conservation limits may be restored to offset habitat loss in remaining locations of the site. Bat boxes could also be provided within the conservation areas to offset the loss of hollows elsewhere within the site.
- Any restoration of the central drainage line should be so that open water areas will not be consumed by aquatic vegetation. Outlier areas (not inundated) should be revegetated as River-flat Eucalypt Forest or Cumberland Plain Woodland.
- Standard *Phytophthora cinnamomi* protocol applies to the cleaning of all plant, equipment, hand tools and work boots prior to delivery onsite to ensure that there is no loose soil or vegetation material caught under or on the equipment and within the tread of vehicle tyres. Any equipment onsite found to contain soil or vegetation material is to be cleaned in a quarantined work area or wash station and treated with anti-fungal herbicides.
- Erosion control measures are to be in place to reduce temporary erosion and sedimentation risks to adjacent EEC vegetation and any nearby drainage channel.

8.3. Transport and Access

A Traffic and Access Impact Assessment of the planning proposal and master plan has been prepared by GTA Consultants, a copy of which is included at **Appendix J**. The assessment considered the anticipated traffic and transport implications of Sydney Science Park on existing traffic conditions surrounding the site as well as the future planned development of the Broader WSEA.

8.3.1. Overview of Traffic Assessment Methodology

The Draft Broader WSEA Structure Plan envisaged that development on the Sydney Science Park site would occur as part of the broader area redevelopment and has planned for the associated transport infrastructure, expected to occur over the next 30 years. Sydney Science Park is likely to be ahead of expected development in the north western corner of the Broader WSEA and as such has the potential to generate transport demands for infrastructure in this area earlier than expected under the BWSEA Structure Plan.

In order to assess the traffic and transport implications of the staged development of both the Sydney Science Park and the BWSEA a two stage approach was undertaken. The staged methodology employed was to:

- Early Development (2021) – determine what level of development could be accommodated on the Sydney Science Park site with the existing transport infrastructure stage.
- Ultimate development (2036) – determine what transport infrastructure (if any) over and above that envisaged for the BWSEA would be required to accommodate the ultimate development of the Sydney Science Park site.

To assist with the assessment of the ultimate development, GHD were engaged to undertake traffic modelling using the traffic model they have developed with the Department of Planning and Infrastructure for the BWSEA Structure Plan.

8.3.2. Traffic Generation Summary

Applying the traffic generation rates, the public transport mode shift, trip containment and directional split assumptions discussed in the preceding sections to the estimated development yield for the site results in the aggregated traffic generation for the site shown in Table 7 for the AM peak and Table 8 for the PM peak.

Table 7. AM Peak Traffic Generation Summary

Use	Peak Period Traffic Generation (car trips)					
	2016	2021	2026	2031	2036	2041
Employment	121	607	1,456	2,305	3,519	4,126
Education		100	300	600	800	1,000
Local Retail		-	-	-	-	-
Detached housing		48	143	214	285	285
Terrace housing/townhouse		20	120	340	480	480
Apartments		20	180	230	350	600
Student accommodation		-	-	-	-	-
Sub-total	121	794	2,199	3,689	5,434	6,491
Mode shift	2%	4%	6%	8%	10%	12%
Trips after mode shift discount	119	762	2,067	3,394	4,890	5,712
Trip containment	0%	0%	5%	10%	15%	20%
Total external traffic generation	119	762	1,963	3,055	4,157	4,569

Table 8. PM Peak Traffic Generation Summary

Use	Peak Period Traffic Generation (car trips)					
	2016	2021	2026	2031	2036	2041
Employment	121	607	1,456	2,305	3,519	4,126
Education		70	210	420	560	700
Local Retail		-	-	-	-	-
Detached housing		50	149	223	297	297
Terrace housing/townhouse		24	144	408	576	576
Apartments		24	216	276	420	720
Student accommodation		-	-	-	-	-
Sub-total	121	774	2,175	3,632	5,372	6,419

Mode shift	2%	4%	6%	8%	10%	12%
Trips after mode shift discount	119	743	2,044	3,342	4,835	5,648
Trip containment	0%	0%	5%	10%	15%	20%
Total external traffic generation	119	743	1,942	3,007	4,109	4,519

Tables 7 and 8 indicate that the likely traffic generation of the site would increase to about 120 trips in the peak periods in the Year 2016, to as high as approximately 4,160 external trips during the Year 2036 AM peak and approximately 50 trips lower during the PM peak.

The level of traffic the site is likely to generate in the year 2016 is within thresholds that could be accommodated by existing road network infrastructure. No additional road works would be required to accommodate the Year 2016 Sydney Science Park traffic generation.

8.3.3. Year 2021 Future Traffic Conditions

8.3.3.1. Traffic Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- configuration of the major road network in the immediate vicinity of the site, including Mamre Road, the M4 Western Motorway, the Westlink M7 Motorway and The Northern Road;
- distribution of residential development in the surrounding areas;
- likely distribution of students' and employees' residences in the Western Sydney region in relation to the site; and
- configuration of access points to the site.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed for the short- to medium-term stages of the proposed development (Year 2021):

- to/from Luddenham Road north (towards Mamre Road) = 50 per cent
- to/from Luddenham Road south (towards Elizabeth Drive) = 50 per cent.
- These were further split at the Mamre Road and the Elizabeth Drive intersections as follows:
- Mamre Road north (to/from the general direction of the M4 motorway) = 25 per cent
- Mamre Road south (to/from Erskine Park Link Road and Lenore Drive) = 25 per cent
- Elizabeth Drive east (to/from Fairfield and Liverpool) = 25 per cent
- Elizabeth Drive west (to/from The Northern Road and Bringelly) = 25 per cent.

8.3.3.2. Traffic Growth Rates

A review of historical traffic growth rates in the surrounding areas indicate that traffic volumes on Luddenham Road have been static if not decreasing over time. In this regard, an average annual traffic growth rate of 1.5 per cent to the year 2021 was assumed and applied to background traffic growth on Luddenham Road, Mamre Road and Elizabeth Drive to determine the potential impacts of traffic generated by the Sydney Science Park.

8.3.3.3. Traffic Impacts

The key traffic impacts arising from the Planning Proposal up to the year 2021 are primarily focused on the Luddenham Road/Mamre Road and the Luddenham Road/Elizabeth Drive intersections.

For purposes of calculating future background traffic, an average annual growth rate of 1.5 per cent per annum has been assumed on background traffic flows. This assumption is considered a conservative estimate, as traffic along Luddenham Road has reduced from 2005 volumes. Notwithstanding, the assumption is consistent with forecast traffic growth rates in the region.

The performance of the Luddenham Road/Mamre Road and the Luddenham Road/Elizabeth Drive intersections with the year 2021 background traffic and Sydney Science Park traffic generation is summarised in Table 9.

Table 9. 2021 Operating Conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Luddenham Road/ Mamre Road (Luddenham Road with left turn merge lane)	AM	South	0.35	3	0	A
		North	0.50	4	14	A
		West	0.56	22	20	B
	PM	South	0.49	2	0	A
		North	0.58	8	26	A
		West	0.82	30	36	C
Luddenham Road/ Elizabeth Drive	AM	East	0.58	14	3	A
		North	0.36	21	10	B
		West	0.29	4	0	A
	PM	East	0.28	3	6	A
		North	0.75	22	38	B
		West	0.10	5	0	A

Against traffic volumes in the vicinity of the site in 2021, the additional traffic generated by the Sydney Science Park development could not be expected to compromise the safety or function of the surrounding road network.

8.3.4. Year 2036 Future Conditions

8.3.4.1. Network Assumptions

The Sydney Science Park traffic modelling for the year 2036 has been undertaken by GHD using the Broader Western Sydney Employment Area (BWSEA) mesoscopic traffic model. This model contains traffic forecasts for the Broader Western Sydney Employment area land release, corresponding to a release of some 2,500 hectares of employment land by 2046.

8.3.4.2. Traffic Impacts

Analysis of traffic flows and traffic density in the vicinity of Sydney Science Park showed that the following roads were likely to experience increases in traffic and congestion:

- Luddenham Road between Elizabeth Drive and Mamre Road;
- Mamre Road between Luddenham Road and the M4 Western Motorway; and
- Proposed extension of Bakers Lane through to Luddenham Road (through Twin Creeks).

The traffic modelling has identified a number of road network improvements to accommodate the Sydney Science Park Planning Proposal and a number of works that will need to be brought forward should development of the Science Park occur in the proposed staging arrangements. These works are identified in the following section of this report.

8.3.5. Transport Infrastructure Requirements and Delivery Timing

8.3.5.1. Vehicle Access

Vehicle access to the Sydney Science Park site would be principally from Luddenham Road. In order to distribute generated traffic and manage potential traffic queues, a total of four (4) access locations are envisioned by full development of Sydney Science Park. These should be spaced approximately 300 metres apart from each other, linking with east-west roads within the site, as shown in the Master Plan. A potential future link could be provided to The Northern Road to the west, via the existing Gates Road.

In view of the potential traffic impacts, the four vehicle access nodes have been modelled as follows:

- Northern left-in/left-out (LILO) intersection;
- Northern signalised T-intersection;
- Southern signalised intersection; and
- Southern left-in/left-out (LILO) intersection.

These intersections would need to be constructed to accommodate full development of the Sydney Science Park.

Year 2021 Road Network Improvements

The following road network improvements are required to accommodate the 2021 development scenario:

Site Vehicular Accesses (Luddenham Road)

- 1 Signalised intersection (City Road); and
- 2 left-in/left-out intersections.

Luddenham Road/Mamre Road Intersection

- Additional slip lane on the eastbound direction of Luddenham Road approaching Mamre Road to allow for approximately a 40-metre long separate right turn lane; and
- A merging lane north of the intersection to allow left turning traffic from Luddenham Road to safely merge with through northbound traffic on Mamre Road.

Luddenham Road/Elizabeth Drive Intersection

- The improvement works required at the Luddenham Road/Elizabeth Drive intersection to mitigate traffic impacts in the year 2021 would primarily consist of a more legible delineation of the existing southbound approach to the intersection to accommodate separate left turn and right turn lanes.
- No other works needed to accommodate 2021 traffic.

8.3.6. Year 2036 Road Network Improvements

The following road network improvements are required to accommodate the 2036 development scenario:

Site Vehicular Accesses (Luddenham Road)

- 2 Signalised intersections; and
- 2 left-in/left-out intersections.

Luddenham Road/Mamre Road Intersection

- Luddenham Road/Mamre Road intersection upgraded from priority to traffic signals, with the left turn from Luddenham Road to Mamre Road widened to two lanes.

Luddenham Road Widening

- Widening of Luddenham Road between proposed new road north of Elizabeth Drive and the Sydney Catchment Authority pipeline.

Bakers Lane

- Proposed extension of Bakers Lane to Luddenham Road was combined with the southern signalised access to Sydney Science Park in a signalised four-way intersection.

Luddenham Road/Elizabeth Drive Intersection

- The improvement works required at the Luddenham Road/Elizabeth Drive intersection to mitigate traffic impacts in the year 2021 would be required for the 2036 scenario.

Mamre Road

- Widening of Mamre Road to two lanes in each direction between Bakers Lane and Luddenham Road and Mamre Road.
- Upgrade of the Mamre Road interchange at the M4 Western Motorway to allow for additional off-ramp capacity and six lanes over the M4 Motorway.

It is likely that the development of Sydney Science Park will accelerate the need for these already identified network upgrades. However this would need to be determined through modelling of the forecast 2026 interim year, which was not undertaken as a part of this exercise.

A summary of the location of the above works is provided in Figure 53.

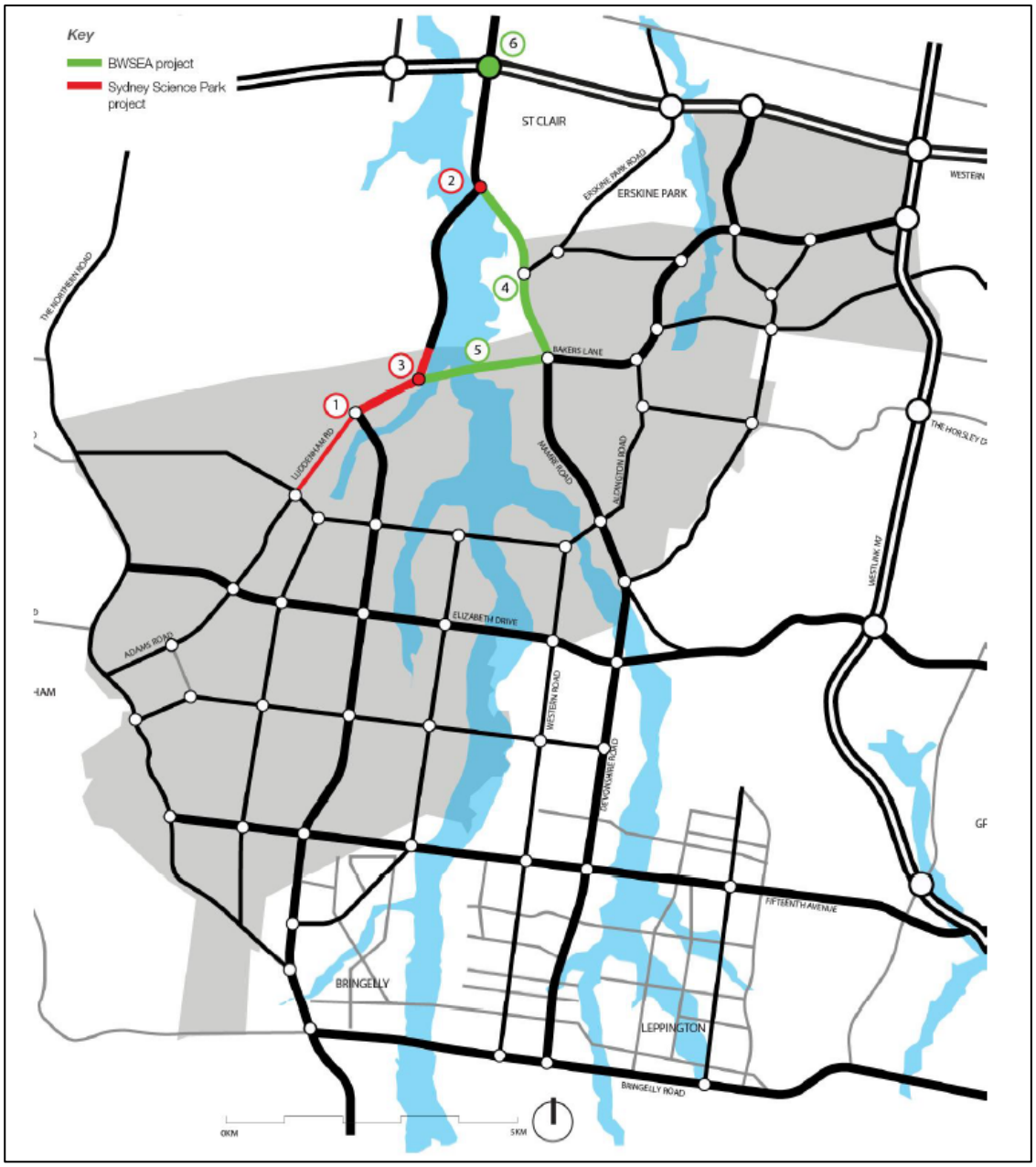


Figure 53 Summary of Proposed Works (source: GHD, December 2013)

8.3.6.1. Public Transport

Given that there is currently no public transport service available, at least one bus route to serve Sydney Science Park would be required as part of the development, as well as to contribute towards attaining public transport mode shift targets. This bus route could either be:

- a new bus route linking with either St Marys or Penrith Transport Interchange, or
- extension/rerouting of bus route 779 when Bakers Lane extension is built.

The frequency of the bus route could initially follow the current frequency of route 779, potentially increasing to more frequent services, or expanding route coverage as development occurs into the future. Internally, the bus

route within the Sydney Science Park is proposed to follow the alignment shown in Figure 42. The Planning Proposal incorporates the provision of a corridor and spatial allocation for a potential future passenger railway station should such railway line be available in the future.

8.3.7. Funding Arrangements for Infrastructure Improvements

As the Sydney Science Park site is located within the Broader WSEA it is expected that development of the Sydney Science Park project will be required to contribute to the provision of transport infrastructure within the Broader BWSEA. It is suggested that the appropriate mechanism for contributions to works be through State Infrastructure Contributions (SIC) funds for works on roads and corridors which attract SIC funds or alternatively through works in kind. The development of Sydney Science Park has the potential to bring forward a range of works, thus providing benefits to the Sydney Science Park and the north western corner of the BWSEA more generally.

It is recommended that payment of SIC levies, or alternatively, provision of Works-in-Kind be linked with the staged development of the Sydney Science Park site. That is, payment of SIC for road infrastructure on a “pay-as-you-go” basis, as the detailed timing of development for the Sydney Science Park and surrounding sites is not precisely known at this stage.

Notwithstanding the above, there are a number of site enabling works, namely site intersections along Luddenham Road that, are considered the responsibility of the development.

8.3.8. Conclusions

Sydney Science Park presents a unique vision for the development of the site and is entirely consistent with the State Government’s vision for Western Sydney employment as set out in the Broader WSEA. Through its consolidated land holdings, Sydney Science Park represents an opportunity to bring forward key infrastructure delivery and potential to accelerate the development of land in the north western corner of the Broader WSEA.

This report has provided an assessment of the anticipated transport implications of the Sydney Science Park Planning Proposal, for both the short term (2021) and longer term (2036) development of the site in the context of development in the broader regional area (i.e. BWSEA). The assessment considered:

- capacity of the existing transport network to accommodate short term (2021) development yields on the Sydney Science Park; and
- capacity of the future transport network as envisaged by the Broader WSEA Structure Plan to accommodate the ultimate development proposal of the Sydney Science Park planning proposal.

The infrastructure improvements to accommodate the short term (2021) and long term development both internally and external to the site have been identified. In summary, the package of transport improvement works identified in this assessment when combined with the identified transport improvement works envisaged in the Draft Broader WSEA Structure Plan will satisfactorily accommodate the future transport demands of the Sydney Science Park planning proposal development.

8.4. Water Cycle and Flood Management

A Water Cycle and Flood Management Strategy prepared by J.Wyndham Prince is included at **Appendix I**. The aim of the strategy was to identify the stormwater and flood management issues to be considered in the future development of Sydney Science Park and to identify flood impacts, an appropriate evacuation strategy, appropriate options and locations for the control of the quantity and quality of stormwater leaving the site. The conclusions of this assessment are detailed below.

8.4.1. Hydrologic Analysis

A hydrologic analysis, using the rainfall - runoff flood routing model XP-RAFTS (Runoff and Flow Training Simulation with XP Graphical Interface) (Willing, 1996 & 1994), for the site was undertaken to determine the size of detention basins needed to restrict peak post development flows to pre development levels and also to generate peak flow rate hydrographs for input to the hydraulic model.

A summary of the proposed detention basin volumes for Sydney Science Park are shown in Table 10.

Table 10. Summary of detention basin volumes

Basin	Total Storage Required (m3)
Basin 1	6,500
Basin 2	5,300
Basin 3	24,000
Basin 4	4,600
Basin 5	17,600
Basin 6	2,500
Basin 7	21,100
Basin 8	500
Basin 9	1,000
Basin 10	1,300
Basin 11	1,200
Basin 12	2,100
Total Storage	**87,700**

The detention storages that are located online to the water courses will also capture and attenuate flows from catchments upstream of Sydney Science Park (Basins B3, B4, B5 and B7). The modelling allows for an increase in imperviousness for these upstream catchments. The total catchment area draining to the basins is approximately 290 hectares. The total volume of storage provided represents approximately 300 m^3 / hectare, which is within the range expected for urban development.

The XP-RAFTS modelling undertaken has determined that the proposed detention storages are adequate to restrict post development peak discharges from the site, to pre-development levels for the 50 % and 1 % AEP storm events, consistent with the requirements of the Penrith City Council Development Control Plan 2012. The detention volumes provided reduce peak post development flow rates and assist in minimising the flood impact downstream of the site. It is noted that the average storage volume per hectare is approximately 300 m^3 / ha (including bypassing catchments), which is considered to be within the appropriate range for urban development.

Opportunities to further optimise the detention basins will be considered at the development application and detailed design stages.

8.4.2. Flood Modelling

The 2D flood modelling of the water courses and trunk drainage channels that run through the Sydney Science Park was undertaken using TUFLOW (Two-Dimensional Unsteady Flow). Flood modelling for the existing and developed scenarios was undertaken to determine the impact of Sydney Science Park on the flood levels in the creeks.

Existing Farm Dams

There are a number of significant existing farm dams, associated outlet channels and diversion structures located throughout Sydney Science Park. These farm dams are located online to the existing watercourses across the site and vary in surface area, with the largest being approximately 10 hectares. In particular, the central watercourse includes a series of interconnected farm dams which do not include formal outlets or spillways. The farm dams and associated structures significantly affect the existing case flood extent mapping and floodway definition from what would have occurred prior to their construction (i.e. due to significant depression storage). For the purpose of the existing case flood modelling, the water level in dams has been artificially filled to the spillway height for the storm durations assessed. Provision has also made for those flows from the embankment crest to be conveyed to the downstream channel.

Developed Channels and Riparian Corridors

There is a significant opportunity for Sydney Science Park to reconstruct and/or embellish selected watercourses with a fully vegetated Riparian Corridor in order to provide a better environmental outcome. Each riparian corridor generally includes a central channel which is sized to convey the 50% AEP event, with the overall corridor to convey the 1% AEP. The central channel takes into consideration the existing electrical easement to ensure that there is no filling in the easement or encroachment on towers. The modelling of the central watercourse currently includes a straight low flow channel which can be meandered during future detailed design works to better emulate natural creek features.

Hydraulic Structures

The existing watercourses at Sydney Science Park generally drain to the north-east through the Sydney Water Warragamba Pipeline Easement via a series of piped crossings and overland flow paths. The Sydney Science Park development will include a number of bridge and road culvert crossings of water courses. For the purposes of modelling, these crossings have currently been excluded and will need to be appropriately sized during future modelling at development application and detailed design stages to ensure they convey the necessary flows and

consider all factors such as losses and blockages. The height restrictions associated with the transmission easement will also drive the final design solution.

Detention Basins

A series of detention basins are proposed as part of the water cycle management strategy for Sydney Science Park. Basins B4, B5, B7 and W2 are all located online to major flow paths. For the purposes of modelling, those remaining basins which are located off line have been excluded from the modelling. The total flow out of the basins have been assigned just downstream of the basin outlets in order to assess the flooding in the main corridors.

Overland Flow Paths

There are a series of significant upstream catchments which are currently conveyed via watercourses through the site (unnamed tributaries) before adjoining South Creek approximately 4 km to the north. A number of the watercourses have been identified to be reconstructed as fully vegetated riparian corridors. The existing watercourses are considered to have little ecological value due to the presence of large farm dams. The reconstructed riparian corridors have therefore been modelled with a profile which will more efficiently convey major flooding through the site.

Flood Extent Mapping

Flood extent mapping has been completed for the 50% and 1% AEP and PMF events under existing conditions. A series of other maps of specific AEP's have also been developed for this study as follows:

Existing Conditions

- Depth Profile – 50 %, 1 % AEP and PMF;
- Hazard Classification (1 % AEP and PMF only); and
- Provisional Hydraulic Categorisations (1 % AEP only).

Post Development Conditions

- Depth Profile – 50 %, 1 % and PMF; and
- Hazard Classification – 1% AEP.

Flood Difference Mapping

A map has been prepared which indicates the difference in 1% AEP flood levels arising from the existing case and the proposed development within the site (refer to Figure 54). Figure 54 indicates that development of Sydney Science Park, with the recommended controls, will result in some increases in flood levels within the boundary of the site. This increase in level can be accommodated within the site's riparian corridors and drainage reserves and the filling of the urban areas within the site. The increase in flood levels external to the site are generally less than 200mm and are associated with the removal of the steep existing dam embankment slope.

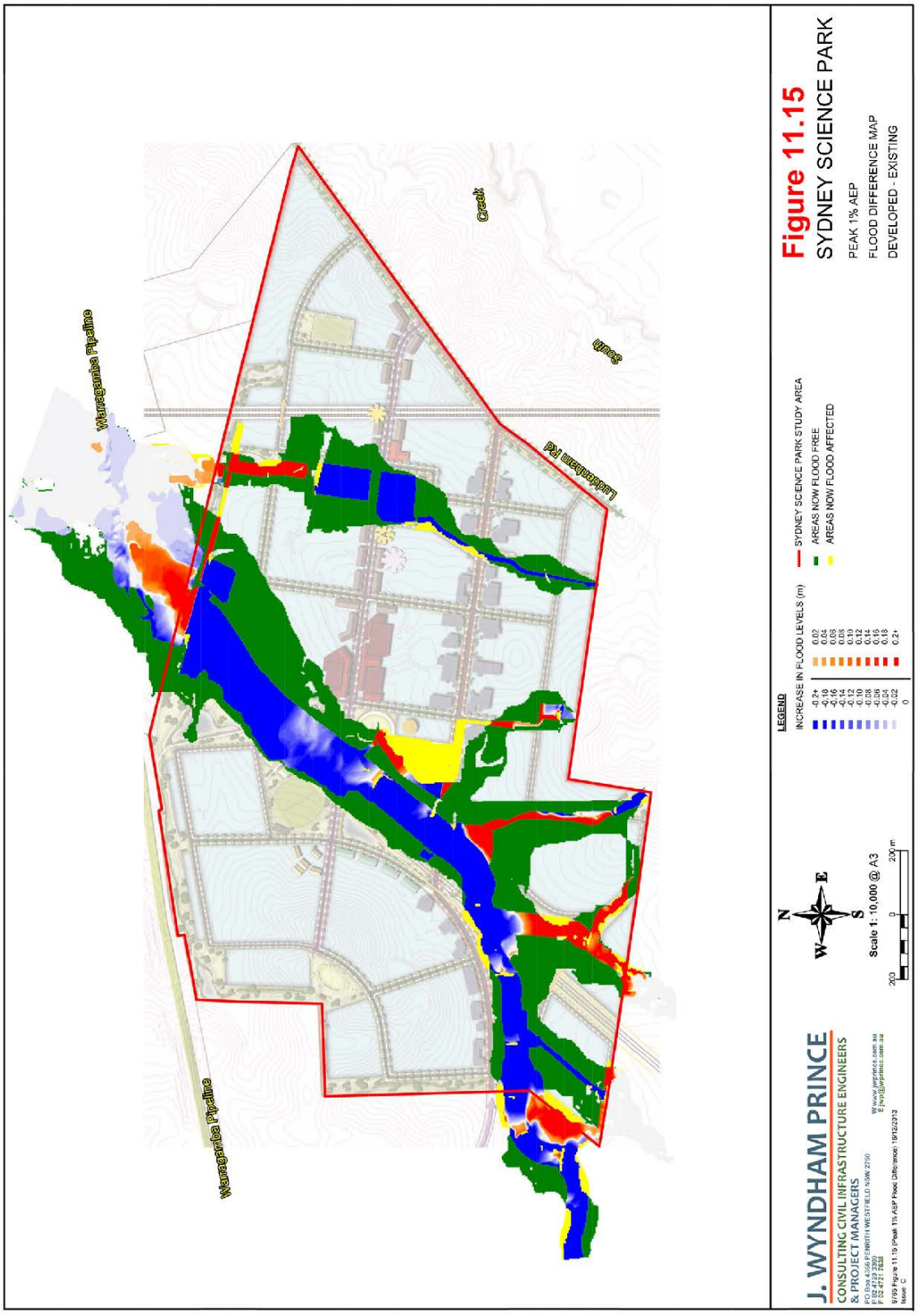


Figure 54 Flood Difference Map

Hazard Categories

Hazard mapping was undertaken for 1% AEP and PMF events from the TUFLOW runs completed as part of this study. Hazard grids are developed directly out of the TUFLOW model and have been used to produce the Hazard plans presented in this report. The floodplain has been divided into three Hazard categories (consistent with the NSW Floodplain Development Manual (FDM, 2005) as follows.

- Low Hazard;
- Transitional Hazard; and
- High Hazard.

Hazards maps are useful to obtain an appreciation of the relative depth and velocity of floodwater within a locality and are a critical element in determining:

- the locations of critical public infrastructure such as hospitals and aged care facilities;
- the areas in the floodplain for which public safety is "at risk"; and
- assist in the Flood Emergency response and Evacuation Management process.

During the PMF event, significant areas of the floodplain are affected by high hazard flooding and the potential impact on infrastructure within these high hazard areas and will need to be considered as part of the future detailed planning of Sydney Science Park.

Climate Change Impacts

The Climate Change flows (i.e. 15% increase in Design Rainfall Isopleths) have been used in the development of a post development post Climate Change hydraulic run. Generally the increases in the 1% AEP flood levels as a result of the impact of climate change are less than 0.03 metres, which is within the component of the standard 0.5 metre freeboard which relates to climate change variability.

Flood evacuation strategy

The local PMF event will affect a number of residents adjacent to the riparian corridors and drainage reserves. The local PMF is a short duration event that will occur and recede reasonably quickly (over a number of hours). The proposed development layout and general land formation will allow evacuation of affected residents through a continually rising grade to flood free land. The flood evacuation strategy will ultimately need to be considered and adopted by the State Emergency Services (as applicable) and Penrith City Council.

8.4.3. Water Quality Analysis

MUSIC modelling was undertaken to demonstrate that the water cycle management system proposed for Sydney Science Park will result in reductions in overall post-development pollutant loads and that concentrations being discharged from the Precinct comply with the designated target objectives. Total annual pollutant load estimates were derived from the results of a MUSIC model based on a stochastic assessment of the developed site incorporating the proposed water quality treatment system. The proposed water quality management strategy for Sydney Science Park, as determined through a stochastic MUSIC assessment, achieves the reduction targets specified by Penrith City Council.

The provision of the proposed water quality treatment devices within Sydney Science Park will ensure that the post development stormwater discharges will meet the Office of Environment and Heritage's and Penrith City Council's

water quality objectives. The hydrologic modelling indicated that inclusion of the proposed detention basins within Sydney Science Park will attenuate peak post development flows to less than existing levels.

The flood assessment demonstrates that flood levels on the creeks with and without development will result in only a minor increase in flood levels downstream of the boundary (up to 200mm). The increase in flood levels is associated with the removal of the steep existing dam embankment slope. The flood levels are returned back to existing where the flow path crosses the Warragamba Pipelines and are located within the downstream riparian corridor and where no development is located. The developed case is therefore considered to be an improvement upon existing conditions.

8.5. Services and Utilities

An Infrastructure Services Assessment to support the planning proposal has been prepared by J.Wyndham Prince and is included at **Appendix E**. The purpose of the assessment was to provide an early indication of the constraints and opportunities for the provision of utility service infrastructure to serve Sydney Science Park and to demonstrate the manner in which it is intended to deliver this infrastructure.

A summary of the investigations findings and conclusions for the following is provided below:

- electricity services;
- sewer services;
- potable water services;
- gas services; and
- telecommunication.

8.5.1. Electricity Services

Endeavour Energy is the energy supply authority for the site and has indicated that the development could be serviced by the existing electrical infrastructure, however, it will require amplification. A TransGrid owned 330 kV transmission line passes through the site that is part of the Sydney West regional network and cannot be used as a direct power supply to the development.

Stage one of Sydney Science Park could be serviced by either of the existing zone substations (Mamre zone substation or Luddenham zone substation). A new zone substation to amplify the existing electrical infrastructure would be required to adequately service the remaining stages of the development. A one hectare site would be required to accommodate the new zone substation.

The cost of constructing the new zone substation is estimated to be $15M. The new sub-transmission lines would be required to be constructed to connect the zone substation to the energy grid. These works would be funded by Endeavour Energy. The internal reticulation works would be constructed and funded by the developer.

8.5.2. Sewer Services

Sydney Water has no current plans to upgrade existing water and sewer infrastructure that may benefit Sydney Science Park. The nearest carrier main is 5km to the north-east of the site, near the Mamre Road/Luddenham Road intersection. The carrier drains to the St Marys Treatment and Recycling Plant off Links Road, approximately

13km to the north of the site. It is anticipated that the Mamre Road carrier will be able to service the development, however, this will need to be confirmed by Sydney Water during the detailed planning process.

A new sewer lead-in is required to connect the development site to Sydney Water's sewer network. The lead-in would connect to the Mamre Road Carrier to the site boundary. Sydney Water would classify the lead in as a carrier since it would pass through other properties along the route to Sydney Science Park. The lead-in would be classified as major works and likely to be funded by Sydney Water.

An internal gravity sewer system is considered to be adequate to service Sydney Science Park. The site topography is undulating with various depressions and ridges. Existing surface levels within catchments vary in height by up to 15 m. The lowest surface level within the development area is AHD 45m, the highest is around AHD 80m. To overcome the undulations in the site, deep sewers can be constructed through the ridges to drain the low lying areas from one sub-catchment through to the lead-in main.

The suggested sewer layout to service the site is to:

- construct a branched lead-in main. Separate lead-in lines would enter the site along the northern boundary, the low points within the sub-catchments
- Regrade the site to provide large level lots suitable for employment development to assist the design of a gravity sewer network within the site. This will also improve the saleability of the employment lots.

If a sub-catchment cannot not serviced directly by a lead-in main, deep sewer trunk lines should be constructed to drain the sub-catchment to the nearest lead-in line.

8.5.3. Potable Water Services

Sydney Science Park is approximately 4.5 km from the closest bulk water supply being Orchard Hills Water Treatment Plant and is within the bulk water treatment plants supply zone. Whilst Sydney Water's Warragamba pipeline runs along the northern boundary of the site, these mains cannot be used to service developments of any description and their sole purpose is to transport bulk water supply.

Sydney Water's potable water infrastructure surrounding the site does not have the capacity to service the proposed development. As such a new trunk main would need to be constructed to connect the site to Sydney Water's water supply network. A new reservoir or booster pumping station would be required to amplify the existing water supply network to provide adequate supply and pressure to the development.

A 450mm diameter trunk main extension from the Bringelly Reservoirs to the site may be adequate to service the development. The trunk main alignment would be along The Northern Road, the shortest route is via Gates Road to the site. Since the eastern side of the site will be developed first, it's likely the trunk main alignment would traverse along Elizabeth Drive and Luddenham Road.

The internal water reticulation works would be funded by the developer with the exception of upsizing works, which Sydney Water currently funds under their procurement policies. Future funding of any works would need to be verified by Sydney Water at the time of the development works.

8.5.4. Gas Services

The site is not currently serviced with natural gas reticulation and there are no gas services surrounding the site. Jemena has confirmed that subject to appropriate notice and planning that the site can be serviced with natural gas.

8.5.5. Telecommunications Services

The site is currently serviced with telecommunication services consistent with rural residential uses currently operating on it. NBN Co state fibre optic infrastructure will be installed into new developments of 100 premises (dwellings/units) or more, released over a three year period. It is assumed NBN Co will service Sydney Science Park. The first stage of development is scheduled for completion by June 2016. The Luddenham area is not on the NBN roll out map for the next three years. Considering this timing, it is assumed the development will be connected to the NBN network via The Northern Road.

8.6. Contamination

A Preliminary Site Investigation of the site was undertaken by JBS&G (NSW & WA) Pty Ltd (refer to report included at Appendix A). The preliminary site investigation has concluded that the potential for widespread contamination across the site is low and the potential areas of 'environmental concern' as identified below will not prevent planning and development of the land for the proposed uses.

8.7. Economic analysis

An economic and retail analysis was prepared by Hill PDA for Sydney Science Park. The aim of the analysis was to assist in the determination of the rezoning of the site. The analysis included undertaking the following:

- Review relevant strategic land use policies and consider the relationship of these to the development of the SSP;
- Prepare estimates of recent, current and future population levels;
- Prepare retail spending forecasts (based on above population estimates);
- Describe the future competitive context in which the main activity centre at the SSP will operate;
- Prepare a market assessment for the development of the main activity centre;
- Advise on the potential size of the main activity centre in gross leasable area (GLA)2 and land requirements;
- Advise on the appropriate location for activity centre in the SSP (include implications to other existing and planned activity centres, if any)
- Provide an employment land demand assessment for the SSP; and
- Provide employment potential estimates for the SSP.

Analysis

Sydney Science Park has the potential to provide permanent employment for a total of nearly 12,200 workers by 2041. This would include 9,714 jobs in research and development, 1,282 jobs in education, 1,000 jobs in retail and 200 jobs as part of Baiada's own food and research laboratories and headquarters. There would be additional workers employed during the construction stage of Sydney Science Park, equivalent to an estimated 7,270 job years directly provided on the site.

The residential component of the Sydney Science Park is an integral part of the overall offer of the development. This is expected to accommodate 3,400 dwellings in a mixture of types including student accommodation. It will

house some 6,910 residents. Sydney Science Park will provide education uses and will accommodate 10,000 students by 2041.

Population

Demographic data for this analysis has been sourced from the 2011 ABS Census for the Statistical Area 1 (SA1) which most closely aligns with the Sydney Science Park, the wider Luddenham suburb within which it is located and the Greater Sydney metropolitan area to provide a benchmark.

The SA1 contained 640 residents at the time of the 2011 ABS Census and the Luddenham suburb some 1,500 residents. These were predominately located in the Luddenham conurbation situated west of the site. The SA1 accommodated 225 private dwellings and the Luddenham suburb contained 442. Based on the resident population this equated to an average household size of 3.3 and 3.2 in the SA1 and the Luddenham suburb respectively, well above the Greater Sydney median of 2.7.

Separate houses dominated dwelling types in the SA1 and the Luddenham suburb. The median age of residents in the SA1 and the Luddenham suburb was broadly comparable to that in Greater Sydney. Families dominated households within the SA1 and the Luddenham suburb and couple families with children dominated family types;

Working residents in the SA1 and the Luddenham suburb exhibited a greater propensity to be employed than those in the Greater Sydney Area with the most prolific occupations being ‘clerical and administrative workers’ and ‘managers’. Median weekly household incomes in the SA1 and the Luddenham suburb were greater than the median for Greater Sydney and it contained a lower proportion of very low earning households (earning less than $600/ week).

Population and dwelling growth data for the travel zone (TZ) that most closely aligns with Sydney Science Park is illustrated in Table 12.

Table 11. Population and Occupied Private Dwelling Forecasts

TZ 1882	2011	2016	2021	2026	2031	2036	2041	2046	Growth 2011 - 46
Population	542	1,162	1,307	1,615	1,956	2,277	2,645	3,022	+2,481
Dwellings	174	380	431	538	658	772	904	1,039	+865

Given the relatively high levels of affluence we expect from future households associated with their employment in Sydney Science Park, we expect them to have a greater than average spending on retail goods and services. This will manifest in both more purchases in total and higher value purchases compared to lower income households.

Table 12. Sydney Science Park Dwelling and Population Forecast

	Persons per Dwelling^	2021	2026	2031	2036	2041
Dwellings						
Detached		50	150	225	300	300
Terrace/ Townhouse		50	300	850	1,200	1,200
Apartment		50	450	575	875	1,500
Student Housing		50	125	200	300	400
Total		**200**	**1,025**	**1,850**	**2,675**	**3,400**
Population						
Detached	3.0	482	450	675	900	900
Terrace/ Townhouse	2.3	115	690	1,955	2,760	2,760
Apartment	1.9	95	855	1,093	1,663	2,850
Student Housing	1.0	50	125	200	300	400
Total		**742**	**2,120**	**3,923**	**5,623**	**6,910**

Based on the data presented above Sydney Science Park will contain a resident population of 6,910 persons in 3,400 dwellings upon completion in 2041. Dwellings will be a mixture of types with apartments and terrace/ townhouses accounting for the majority (44% and 35% of total dwellings respectively). Sydney Science Park will contain a modest component of student housing with a population of 400.

The existing and projected future employment for the TZ that most closely represents Sydney Science Park provided in Table 13.

Table 13. Existing and projected future employment

TZ 1882	2011	2016	2021	2026	2031	2036	2041	2046	Growth 2011-46
Employment	104	106	110	1,107	2,099	2,098	2,102	2,184	+2,080

Source: NSW Bureau of Transport Statistics Population and Dwelling Forecasts (August 2012 release)

These projections were published prior to the release of the draft Broader WSEA and it has been assumed that they do not make any allowance for the development of the SSP.

Employment Lands Demand

Sydney Science Park is unique in Australia. Internationally there is no one-size-fits-all model for science, research and technology parks with each being developed commensurate with local particularities and the nature of end user demand. Ultimately, we expect the format of Sydney Science Park to be driven by end users who will have particular and individual land use requirements that will be reflected in the development.

As Sydney Science Park becomes more successful, a higher intensity of development may be expected leading to higher employment densities. The Sydney Science Park can thus be expected to go through a reiteration as the Region grows and it evolves to meet changing demand, supporting a transposition to higher density development form. To stay competitive in the international market the Sydney Science Park must have the capacity to grow, adapt and readapt over time. Flexibility in planning for the Sydney Science Park should be ensured to allow for this.

Understanding the centre will need to evolve and revolve over time to remain competitive and respond to market demand should underpin future planning for the Sydney Science Park.

A comparative data analysis has been derived from examination of CSIRO sites within Sydney and NSW.

Table 14 illustrates that each of the examined CSIRO sites is unique in terms of the role and function that it performs, its urban form and employment density. The CSIRO sites situated in metropolitan Sydney (North Ryde, Marsfield and North Ryde) sustain the greatest employment densities and the most intense form of development. It would be expected that Sydney Science Park will display characteristics that are akin to the metropolitan CSIRO sites given that it will be part of an urban extension to Sydney, within the Broader WSEA and abutting the South West Growth Centre.

Table 14. Comparable Sydney and NSW CSIRO Sites

Name	Land Area	Building Form	Employees	Employees/ ha	At grade parking
FD McMaster Laboratory	12ha*	1-2 storeys	60	5	✓
Cotton Research Unit	20ha*	1-storey	70	4	✓
CSIRO Energy Centre	5ha	2-3 storeys	110	22	✓
Lindfield Laboratories	7ha	2-storeys	90	11	✓
Lucas Heights Science and Technology Centre	3.4ha	2-storeys	80	24	✓
CSIRO North Ryde	8.5ha	2-5 stories	1,500	59	✓
Radio Physics Laboratory	4.5ha	2-storey	210	47	✓

Source: Hill PDA (2013), CSIRO, NSW Department of Lands Sixviewer

Note * Excludes associated field stations

Retail Floor Space

The retail floorspace demand forecasts have established that Sydney Science Park should be supported by a main activity centre and a number of smaller, localised retail facilities. The demand for retail facilities will come from four sources:

- Workers in Sydney Science Park – expected to generate retail expenditure of at least $31.5m per annum in 2041 (excluding workers in retail uses on site) which could be captured by on-site facilities. This will primarily be related to food catering and some convenience shopping;
- Residents in Sydney Science Park – who are forecast to generate $213m of retail expenditure per annum in 2041 of which around $84m or 39% would be available to be captured by retail facilities in the SSP;
- Students studying in Sydney Science Park – who are anticipated to generate $17m of retail expenditure per annum in 2041 which will largely be directly towards catering, convenience shopping and personal services; and
- Visitors to Sydney Science Park – who could contribute a further 20% to the turnover of retail facilities in the SSP equivalent to $26.5m per annum in 2041.

By applying target turnover rates to the total $159m of retail expenditure in 2041 which retail facilities in Sydney Science Park could capture this equates to some 21,480sqm GLA of retail floorspace. This excludes any allowance for non-retail shopfront uses such as medical facilities, banks, travel agents, estate agents and professional services or the provision of a Discount Department Store for which we believe there is justification in the longer term;

Up to 30,000sqm GFA of retail floorspace is planned in the main activity centre in Sydney Science Park by 2041. Retail provision is anticipated ahead of demand which is an approach we support given that retail is essential supporting infrastructure for residents and workers. We advocate the incorporation of a variety of other non-retail uses as part of the main activity centre, commensurate with centre principles of consolidation of uses and given its supporting role for Sydney Science Park. These uses could include a library, leisure centre, hotel/ service apartments, conference centre and/ or a cinema. We expect small retail centres to be provided elsewhere in Sydney Science Park to serve localised demand. A Village Centre would also be provided at the proposed public transport node; and

Centre Potential Role and Function

The provision of an activity centre to act as the focus for Sydney Science Park is integral to the successful operation and the planned residential component that it would contain. Future workers and residents will demand access to retail goods and services locally. Without such provision residents, workers and students will need to travel greater distances to meet their daily and weekly shopping needs which is contrary to sustainable development principles and could increase externalities such as travel time, travel cost, pollution, traffic, congestion and so on. Beyond this, the provision of a centre would diversify employment opportunities within Sydney Science Park and provide a focal point for social interaction.

Given that Sydney Science Park is at a more advanced stage of planning comparative to the Broader WSEA, it has the potential to support early demand eventuating out of workers in the area, including construction workers. It therefore provides an opportunity to support the functioning and development of the Broader WSEA.

The trade area served by the centre would largely comprise workers, students and residents in Sydney Science Park. The nature of demand from these sources will differ. Workers and students require their daily shopping needs to be met including fast-food/ take-away options, top-up convenience shopping and personal services such as Australia Post, dry cleaners, travel agents and banks. Residents may make use of such facilities but will also require access to weekly convenience shopping and a wider range of retail services including a larger supermarket, evening and weekend dining and fast-food/ take-away options and a broader range of personal services. The role of the centre is therefore to meet demand emanating from workers, students and residents of Sydney Science Park.

The findings of the Broader WSEA Economic Issues and Drivers Study states that:

- "*Retail offer within Broader WSEA would likely be focused on servicing the local workforce, therefore dominated by convenience food and beverage with a likely mix of:*
    - *Smaller food catering tenancies such as cafés*
    - *Fast food/drive through take-away outlets; and*
    - *Service stations servicing passing auto traffic.*
- *A larger supermarket based centre could only be considered in a business park setting also supported by a local resident population*".

As such the main activity centre should provide a range of convenience focused retail facilities to include a full-line supermarket. A strong dining and entertainment offering would be expected and would include cafes and restaurants reflecting the anticipated affluence of residents and workers in Sydney Science Park and their commensurate spending patterns. A sizable component of non-retail shopfront uses will also be required including estate agents, banks and other commercial office uses that support Sydney Science Park including legal services and travel agents. Provision for childcare should also be included.

Sources of Demand

Trade that will support the future activity centre in Sydney Science Park would be from four main sources consisting of workers, residents, students and visitors. Sydney Science Park would support approximately 9,714 local workers by 2041 with a further 1,282 workers associated within the educational precinct, making a total of 10,996 workers. There is anecdotal evidence suggesting that around 15% of total household expenditure is spent close to the place of work, however, the true figure is greatly influenced by a number of factors – the main one being the level of retail offer. In Sydney CBD for example the figure is substantially higher.

Table 15 illustrates estimated workers related retail expenditure over the 2016 to 2041 period commensurate with the worker forecasts derived previously and it is estimated that by 2041 some $31.5m of expenditure will be generated by workers.

Table 15. Worker Related Retail Expenditure ($2013)

	2016	2021	2026	2031	2036	2041
Workers^	286	1,557	3,813	6,198	9,311	10,996
Proportional Capture (15%)	2,182	2,305	2,435	2,572	2,716	2,869
Total Expenditure Capture	**0.6**	**3.6**	**9.3**	**15.9**	**25.3**	**31.5**

Source: ^ Includes workers in both the employment and educational precincts. Note: these estimates are approximate and subject to change during the design process

This expenditure will be directed largely towards convenience items such as top-up food shopping, cafes, take-aways, restaurants and coffee bars. Retail workers employed in the centre itself will bolster this expenditure further.

Future residents within Sydney Science Park will have a mix of socio-demographic characteristics reflecting the anticipated dwelling mix, although residents in the non-student dwellings are expected to be affluent with most being employed in Sydney Science Park. It has been estimated that residents will spend some $17,342 per person on retail goods and services per annum by 2016. This is well above the Sydney metropolitan average ($13,983 in 2016) reflective of the affluence of residents in Bella Vista Waters and the future SSP.

Student surveys have indicated that students spent approximately $10,600 per capita on retail expenditure per annum in 2011. However, to be conservative we have assumed a lower spend of $8,000 per capita for the purposes of estimating retail expenditure associated with the student accommodation proposed. This is projected to increase by 1.1% per annum reflecting the historic long term trend.
The future centre in the SSP can expect to capture a proportion of resident-related expenditure as it relates to convenience and lower order facilities, with higher order shopping demand for items such as bulky goods, clothing and footwear and department stores/ discount department stores being met by larger centres in the wider area such as the Planned Major Centre at Leppington or the Specialised Centres in the Broader WSEA.

Table 16 calculates retail expenditure by retail store type and applies capture rates estimated by Hill PDA to derive the residential expenditure which a centre in Sydney Science Park could capture. These capture rates are dependent upon an appropriate retail floorspace offering being provided.

Table 16. Forecast Expenditure by Retail Store Type: Future Sydney Science Park Residents ($2013)

Retail Store Type		2021	2026	2031	2036	2041
Total Expenditure	**Proportional Spend^**					
Supermarkets & Grocery Stores	27.1%	4.9	15.0	29.5	44.6	57.7
Specialty Food Stores	9.2%	1.7	5.1	10.0	15.1	19.6
Fast-Food Stores	7.9%	1.4	4.4	8.6	13.1	16.9
Restaurants, Hotels and	9.4%	1.7	5.2	10.3	15.5	20.1

Retail Store Type		2021	2026	2031	2036	2041
Clubs*						
Department Stores	8.7%	1.6	4.8	9.5	14.4	18.6
Clothing Stores	6.0%	1.1	3.3	6.5	9.8	12.7
Hardware and Bulky Goods Stores	14.5%	2.7	8.1	15.8	23.9	31.0
Other Personal & Household Goods	13.9%	2.5	7.7	15.2	22.9	29.7
Selected Personal Services**	3.3%	0.6	1.8	3.6	5.4	7.0
Total Expenditure	**-**	**18.3**	**55.5**	**109.0**	**164.8**	**213.2**
Potential Captured Expenditure	Capture Rate^^					
Supermarkets & Grocery Stores	75%	3.7	11.3	22.1	33.4	43.3
Specialty Food Stores	60%	1.0	3.1	6.0	9.1	11.8
Fast-Food Stores	50%	0.7	2.2	4.3	6.5	8.4
Restaurants, Hotels and Clubs*	50%	0.9	2.6	5.1	7.8	10.1
Department Stores	0%	0.0	0.0	0.0	0.0	0.0
Clothing Stores	0%	0.0	0.0	0.0	0.0	0.0
Hardware and Bulky Goods Stores	0%	0.0	0.0	0.0	0.0	0.0
Other Personal & Household Goods	25%	0.6	1.9	3.8	5.7	7.4
Selected Personal Services**	40%	0.2	0.7	1.4	2.2	2.8
Total Captured Expenditure	**39%**	**7.2**	**21.8**	**42.8**	**64.7**	**83.7**

In total residents in the SSP are projected to generate some $18m of retail expenditure by 2021 which will increase significantly to $213m by 2041 as a result of population and real expenditure growth. Using our assumed capture rates retail floor space within the SSP could expect to capture some $84m or 39% of the total retail expenditure generated by residents in 2041.

Educational uses in the SSP will accommodate approximately 10,000 students by 2041. It has been assumed that students will have per capita expenditure levels equivalent to $8,000 per capita in 2011 which will increase by 1.1% per annum that students spend the same quantum of their personal expenditure as workers (i.e. around 15%) near to their place of study. Table 17 provides a summary of student related retail expenditure.

Table 17. Student Related Retail Expenditure ($2013)

	2021	2026	2031	2036	2041
Students^	1,000	3,000	6,000	8,000	10,000
Per Capita Expenditure	$9,122	$9,635	$10,177	$10,749	$11,353
Proportional Capture (15%)	$1,368	$1,445	$1,527	$1,612	$1,703
Total Expenditure Capture	$1.4	$4.3	$9.2	$12.9	$17.0

^ Source: APP (2013)

By 2041 students studying within the educational precinct will generate in the order of $17m of expenditure for retail floorspace locally and will largely relate to food catering facilities and convenience goods, with a component of retail service related expenditure and demand for other non-retail shopfront uses (e.g. banks and travel agents).

Visitors to Sydney Science Park will include day and over-night visitors to the area associated with the expected conference facilities and hotel/ serviced apartment uses that will be developed. We estimate that at least a further 20% of turnover to the centre will be derived from visitors. This would include workers in the wider Broader WSEA who do not have access to other proximate retail facilities.

Based on the four sources of expenditure identified above we estimate that there is demand for some $159m by 2041 which would be available to be captured by retail facilities in Sydney Science Park once it is fully developed and occupied. The assumed expenditure breakdown by retail store types is illustrated in Table 18.

Table 18. Total Potential Expenditure Capture for Retail Floor space in the SSP ($m2013)

Retail Store Type	2016	2021	2026	2031	2036	2041
Supermarkets & Grocery Stores	0.2	6.2	18.4	35.6	53.9	69.4
Specialty Food Stores	0.1	2.1	6.1	11.7	17.8	22.8
Fast-Food Stores	0.1	2.1	5.9	11.2	17.0	21.8
Restaurants, Hotels and Clubs*	0.1	1.9	5.6	10.7	16.2	20.8
Other Personal & Household Goods	0.0	1.4	3.9	7.6	11.5	14.7
Selected Personal Services**	0.1	0.9	2.5	4.7	7.2	9.2
Total Capture	**0.7**	**14.6**	**42.5**	**81.5**	**123.5**	**158.8**

Economic Benefits and Multipliers

The main economic benefits and multipliers associated with Sydney Science Park include attracting international investment, providing a catalyst for the broader WSEA and adding economic value. Direct Employment would

benefit with Sydney Science Park supporting 9,714 jobs directly in research and development, 1,000 jobs in retail operations and 1,282 in education by 2041. Total jobs directly supported could thus be 11,996 by 2041. This is in addition to indirect jobs supported in support services (public transport, servicing and so on) and jobs sustained during the construction process itself. These will largely be high value jobs that are net additional to Australia and reflect the demographic shift towards a more knowledge-based economy. This direct employment will support economic value add for the wider economy. It will also diversify employment opportunities in the Broader WSEA. It would support significant numbers of indirect jobs off-site associated with economic multipliers. Stage 1 will include the Baiada Poultry Pty Limited headquarters and laboratory;

Resident expenditure calculations have estimated that total retail expenditure associated with the residential component of Sydney Science Park could be equivalent to some $84m per annum by 2041 as a result of 6,910 residents. Less than half of this (39%) is assumed to be captured by retail facilities in the SSP. The residual expenditure generated by residents but not captured by retail facilities on site will be available to be captured by existing and planned commercial centres in the City of Penrith, the Broader WSEA and beyond only.

The future main activity centre would largely cater for demand emanating out of future workers, residents and students on Sydney Science Park (i.e. it is demand which would not exist in the absence of Sydney Science Park). On this basis it would not be at the expense of trade which would otherwise be directed towards existing or planned centres in the Broader WSEA or beyond and is thus not expected to adversely impact upon any other centres to any significant extent. The estimated cost of construction associated with this project is approximately $2.55bn (constant 2012 dollars).

Benefits to Penrith

The economic benefits to Penrith LGA have been considered and include the following:

- The creation of high value jobs which will:
    - Create significant additional retail expenditure locally of which less than half would be captured by new retail facilities in Sydney Science Park. The residual retail expenditure would be available to be captured by existing and planned centres in the area including Penrith CBD and could assist to improve their trading performance;
    - Support demand for additional dwellings in Penrith LGA including in Penrith CBD where the promotion of housing is a priority for Council;
    - Support the construction industry by creating demand for construction workers directly and yielding indirect economic multiplier impacts;
    - Support jobs in industries catering for the demands of future workers and residents including hospitality, servicing, retail and transportation;
    - Diversify the socio-economic profile of residents and jobs in the Penrith LGA;
    - Increase the number of skilled jobs provided in the LGA which is a key aim of the City Strategy;
    - Support further investment in other employment uses locally associated with the research and development supply change and manufacturing processes;
    - Support the role of Penrith CBD as the gateway to the North West Subregion by increasing demand for higher retail, servicing, administrative, cultural, entertainment and civic functions which it provides and which will not be provided in the Sydney Science Park.

- Increasing the resident and worker catchment of Penrith CBD as the Regional Centre for the North West Subregion;
- Assisting the LGA to attract an additional 40,000 jobs between 2009 and 2031 as targeted in the City Strategy;
- Increasing the financial and economic viability of investment in transport and public infrastructure (such as schools, hospitals etc.) in Penrith LGA from which all residents would benefit;
- Raising the profile of Penrith LGA at a metropolitan, State, national and international level as a place to live, work, study and invest;
- Increasing the number of visitors attracted to the LGA in order to work, study or live;
- Diversifying access to a range of jobs and further education opportunities for residents in Penrith LGA and improving their skills base. This is important in the context of the City Strategy which acknowledges that jobs growth in the LGA has not kept pace with population growth with fewer than 40 jobs for every 100 working residents in the LGA and the desire to create more jobs in growth industries focused on health and well-being; and
- Potentially increasing the job containment ratio (i.e. the number of residents who both live and work in Penrith). This will support more sustainable travel patterns and lower demands on existing transport infrastructure associated with a reduction in commuting distances.

Consideration of the contribution of Sydney Science Park to the 'Jobs and Economy' related aspirations of the City Plan is provided in Table 19.

Table 19. Contribution of SSP to the Jobs and Economy Goals of the City Plan

Goals		Does the SSP assist this to be achieved?	
J1	An additional 40,000 jobs between 2009 and 2031	✓	The SSP would create an estimated 6,798 jobs by 2031 and contribute 17% towards achieving the additional jobs target in the City Plan.
J2	Businesses that adapt to emerging needs and opportunities	✓	The SSP would be focused on research and development related uses which would be at the forefront of the knowledge based economy and stimulate significant multiplier job opportunities locally.
J3	A diverse economy that provides a range of employment opportunities	✓	The SSP would diversify employment opportunities in this locality including both high value jobs, educational roles and jobs in construction, retail, servicing and other industries.
J4	Infrastructure that improves economic opportunities for existing and new businesses	✓	The SSP has the potential to support significant multiplier impacts from which existing and new businesses will benefit including infrastructure investment.
J5	Rural and agricultural activities play a key part in the City's economic development	✓	The SSP would be focused on non-human poultry research and food security. This will benefit the agricultural industry.
J6	Growth and investment targets new and emerging employment sectors	✓	The SSP would primarily target research and development related jobs and investment.
J7	An effective transport network that	✓	The SSP would be integrated with planned transport infrastructure

	links the City and the region		and will increase the economic and financial viability of investment in links to Penrith CBD and the broader area.
J8	Improved public transport connections to neighbouring growth centres and the Central West, to support Penrith's role as a regional hub servicing these areas		The SSP would support the economic and financial justification for improving transport links to the local area where many workers will live.
J9	Employment land uses are planned to integrate with the existing and proposed transport network, and reduce dependence on long-distance road transport.		The SSP represents a fully integrated approach to planning and infrastructure with the planned rail access being a focal point for the Master Plana and will include a Village Centre.

Benefits to Broader Western Sydney Area

Benefits to the broader Western Sydney area associated with Sydney Science Park would include:

- The potential for Sydney Science Park to act as a catalyst for the development of the Broader WSEA and an exemplar of what the area can achieve. It would represent a vote of confidence in the future potential of this area and support a substantial number of new jobs, many of which will be high value. These high value jobs will in turn support other spin-off employment opportunities in the surrounding area including manufacturing, light industry, retail and support services;
- Assist Western Sydney and the North West Subregion to the achieve the minimum targeted jobs in the draft Metropolitan Strategy for Sydney to 2031;
- Attract new residents into Western Sydney and support demand for housing in LGAs such as Penrith. This will stimulate further development and support direct jobs in the construction industry and indirect jobs through economic multipliers;
- Support the financial and economic rationale for investment in transport and other infrastructure such as schools, hospitals and parklands in Western Sydney from which all residents would benefit;
- Diversity the employment and residential base in Western Sydney and widen access to a range of job and educational opportunities for residents; and
- Increase the profile of Western Sydney as a place to invest on a national and an international scale. The Sydney Science Park would allow the area to compete for high-value jobs worldwide and be at the forefront of food security, energy and health related research.

The centre is defined as a Potential Local Centre in the Broader WSEA, however there is scope for the centre to be identified as a Potential Specialised Precinct in the context of the wider research and development related uses in Sydney Science Park, its role in attracting labour from an international market and its potential to act as a catalyst for the Broader WSEA. This is justifiable based on its scientific, research and development related role which would be a distinct offer differentiated from that to be provided in the two Potential Specialised Centres already identified in the Broader WSEA.

8.8. Social planning

An assessment of the social infrastructure for the site has been prepared by Elton Consulting and is included as **Appendix K**. The assessment considered the demand for community facilities and open space likely to be generated by the proposed development and ways that demand will be addressed.

8.8.1. Community facilities and human services

To create a socially sustainable community which supports the health and well-being of the community and which promotes social interaction and the development of community networks, a population of around 6,900 people will generate demand for access to spaces for:

- neighbourhood retail and commercial services;
- spaces for informal social interaction, such as cafes;
- indoor spaces for community activities, programs and services;
- medical services such as GP's;
- childcare and out of school hours care;
- pre-schools and primary schools;
- local leisure and entertainment facilities; and
- places of worship.

These facilities will not be required until population thresholds have been reached to trigger their provision, likely to be around 2026-2031 for most facility types.

The population will not be large enough to warrant the provision of new district and regional facilities and services that serve a larger catchment, but will instead rely on those existing in the surrounding area, principally in and around Penrith City Centre and St Marys Town Centre. Such facilities will include:

- a range of higher order retail and commercial services;
- information and library resources;
- specialist medical, community health, allied health and hospital services;
- high schools and technical and further education;
- a range of family and individual support services, including youth, family, disability and aged care services; and
- cultural and entertainment facilities (e.g. theatres, cinema).

Workforce and students

Societal expectations are increasing that workplaces should provide an attractive and pleasant environment to support the health and well-being of their workforce, giving rise to higher expectations about the range of services and facilities that can be accessed during the working day and the level of amenity of the working neighbourhood. This is consistent with aspirations for Sydney Science Park to be a leading edge science park that provides a high quality of life for its workers, as well as for residents.

To help attract leading research and development companies and contribute to the lifestyle benefits of Sydney Science Park, the workforce is likely to require access to the following range of facilities at the local level:

- shops and personal services for daily convenience needs;
- spaces to have a break and relax away from the workplace and to socialise and network at lunchtime or after work. This includes cafes, pubs, restaurants, entertainment and leisure facilities;

- childcare for parents with babies and pre-school children, and vacation care for workers with primary school aged children;
- access to medical services, both for accidents / illness at work and to support busy lifestyles;
- spaces for corporate events, functions, business meetings, training courses; and
- a workforce may also make use of local libraries and hobby / interest / personal development classes and groups after work in the local area.

University students are also likely to seek access to a similar range of facilities and services, with the exception of spaces for corporate events, business meetings and training courses. Providing access to such facilities, whether as part of a university campus or in the wider public realm, will be an important factor in attracting students to Sydney Science Park. Large corporations and the universities are likely to provide some of their own facilities in-house.

Community centres

To create a socially sustainable community which supports the health and well-being of its members and which promotes social interaction and the development of community networks, the residential, student and workforce populations of the scale outlined above will generate demand for spaces for:

- organised community activities, programs and classes, such as playgroups, fitness groups, art and craft classes and after school programs;
- meetings of local organisations and community groups;
- accommodation for community services and the delivery of sessional and outreach services;
- a base for community development activities and community cultural events, such as concerts and multi-cultural displays;
- leisure and support activities for young people and older people;
- adult education classes, training courses and business meetings;
- hire for corporate or private functions, such as birthday parties. This is particularly important in medium and higher density developments, where dwellings typically lack the private space for larger gatherings and celebrations. These uses are best provided for in a multi-purpose community centre which can incorporate:
    - a variety of flexible spaces suitable for a range of social, leisure and cultural activities. These typically include a hall suitable for large gatherings and events, together with some additional meeting and activity rooms of different sizes;
    - office space for a community development worker, and for other human service providers;
    - rooms for sessional or outreach health and welfare services such as baby health clinic, counselling or family support services;
    - a room for children's activities which opens onto an enclosed garden. This might be used for child-minding for parents attending centre activities, for playgroups, and for before and after school or vacation care;
    - spaces suitable for activities for young people, usually a multi-purpose room rather than one designated just for young people, but one which may open onto an outdoor barbecue or recreation area (eg half court basketball hoop);
    - kitchen suitable to support private functions such as birthday parties;
    - plenty of storage to meet the needs of a variety of user groups; and

- adjacent outdoor space with children's play equipment and barbecue, to provide for spill over social events and activities for children.

A new multi-purpose community centre of around 550m2 of GFA is required. This is based upon a benchmark of around 80m2 per 1,000 residents (a common benchmark for multi-purpose community centres adopted across a number of other councils in Western Sydney). It is recommended that the community centre within Sydney Science Park be located within or adjacent to the proposed town centre, to create a community focal point and reinforce the role of the town centre as the heart of the community.

Facilities for young people

Within Sydney Science Park, there will be a need for "things for young people to do" at the local level, particularly in the early stages of the development. At the local neighbourhood level, the needs of young people for space for social and leisure activities may be met through the proposed multi-purpose community centre, a well-designed public domain, and the open space, sporting and recreation facilities.

Libraries

The closest branch library to the site is currently at St Clair, with the central library located in Penrith CBD. Council has recently adopted a plan to develop a new district library at Glenmore Park to serve the South Ward which includes the site. Sydney Science Park will not be of a sufficient size to support its own library, but instead should contribute towards the proposed district library at Glenmore Park.

Cultural facilities

Specialist cultural facilities such as spaces for performing and visual arts are provided on a regional basis for large population catchments. The proposed multi-purpose community centre will provide spaces suitable for cultural expression at the local level, including a hall suitable for local concerts, display space for local exhibitions and activity spaces for music, dance, arts and crafts. The Master Plan has identified a site for a future cultural precinct, close to the town centre core, the community centre, the lake and associated open space. At this stage in the planning process, this represents part of the vision and aspiration for the Science Park to promote cultural development and expression, rather than a firm commitment for the construction of specific facilities. The cultural precinct may contain outdoor spaces such as an amphitheatre suitable for events such as outdoor movies, concerts etc. The concept for the cultural precinct will be further developed in subsequent stages of the planning process.

Schools

The Department of Education and Communities (DEC) Advisory Notes for School Site Selection sets out the following criteria for the provision of schools in areas of new residential development:

- one public primary school per 2,000 to 2,500 new dwellings;
- one public high school per 6,000 to 7,500 dwellings (i.e. catchment of three primary schools).

Preliminary advice from DEC indicates that the proposed dwelling mix suggests that numbers of children living in Sydney Science Park may not be as high as in other new release areas in Western Sydney, indicating that the

usual threshold of 2,500 new dwellings may not necessarily trigger the need for a primary school. In any new area, the initial DEC strategy is typically to turn the smaller, rural schools in the surrounding area into larger urban style schools (with capacity for up to 500 students) with additional buildings or additional storeys to accommodate population growth. There are small rural schools with less than 100 students in Mulgoa, Luddenham and Orchard Hills. DEC is assessing the potential for redevelopment of these sites to meet at least part of the demand generated by Sydney Science Park. Recognising the 25 year planning horizon, identifying a "potential" school site in the Master Plan is supported, so long as the statutory zoning remains flexible. In terms of high schools, the Sydney Science Park population will not be large enough to support a new high school, but will instead form part of the catchment of the existing high school at Glenmore Park. The Master Plan has envisaged a primary school in the latter stages of development.

Public health services

The forecast population will not be large enough to warrant the provision of community health or hospital facilities within the development, but will instead rely on those in the wider region. These include community health centres in Penrith and St Marys and the Nepean Hospital at Kingswood. The proposed multi-purpose community centre will contain spaces that may be used on a sessional or outreach basis to deliver community programs, such as an early childhood clinic.

Emergency services

It is too early for emergency services and justice services (including police, ambulance, fire and rescue, rural fire and SES) to identify needs for sites for additional services in this area. The future strategy for servicing this area will depend upon the nature and extent of other development within the surrounding area. No need has been identified for sites for emergency services within the Sydney Science Park.

Neighbourhood shopping

Neighbourhood shopping and commercial services will be available in the proposed town centre. In the shorter term, until the permanent town centre has been built, some limited retail services will be provided in the initial stages of the development. Higher order district and regional shopping facilities will be available in St Marys and Penrith.

Childcare facilities and pre-schools

In common with the provision of childcare in most new developments, childcare within Sydney Science Park will be provided by private sector providers, as demand develops. It is too early to determine the number of childcare places, or number of centres, likely to be required. Larger employers and the university faculties may provide their own childcare centres. It is not necessary that precise requirements for childcare are identified at the rezoning stage. Childcare centres are permitted uses within the B7 Business Park and B4 Mixed Use zone and do not require land to be designated at the planning proposal stage.

Private schools

Providers of independent schools undertake detailed demographic and feasibility assessments before committing to new release areas. They also tend to acquire their sites through market processes, rather than necessarily acquiring sites designated in master plans. There are already a number of private schools in the surrounding area

and given the proposed size of the Science Park population, it is unlikely that another private school would be feasible within the development.

Medical services

A population of around 6,900 people will generate a need for about 5 local general practitioners, based on a Western Sydney benchmark of one GP per 1,500 people. When the needs of the workforce and student populations are included, it is likely that 2-3 medical centres providing group practices may be feasible.

The proposed town centre will provide sufficient floor space for local medical centres. Space within the town centre will also be suitable for local services such as dentists and allied health services (e.g. physiotherapists).

Welfare and support services

The Science Park population is expected to be reasonably affluent and active, and demand for welfare and support services will be modest. However, given the experience of nearby release areas, there may be a need generated for some family support services. The proposed multi-purpose centre will contain spaces that may be used on a sessional or outreach basis to deliver support services, such as family counselling.

Places of worship

As well as providing places of worship, churches can provide an important base for community development, youth, volunteer and welfare support activities in new communities, and are important in building community spirit and identity. It is important that places of worship can be established within the Sydney Science Park area. The acquisition of sites for places of worship is generally left to market forces, according to their ability to purchase sites, and it is difficult to specifically identify sites in the precinct planning process. Places of public worship are permissible uses within the B4 Mixed Use zone under Penrith LEP 2010. The planning proposal does not propose to amend the land use table in respect of 'places of public worship'.

Residential aged care

Residential aged care facilities are funded by the Commonwealth Government according to planning benchmarks based on numbers of people aged 70+. As these numbers cannot be forecast at this early stage of planning, (and as the planning benchmarks are regularly changed in line with policy shifts) it is not possible to predict precise needs now. As the focus of the residential component of Sydney Science Park will be on providing housing for the workforce and student populations, the development is not expected to have a high population of older people, nor to provide a particularly appropriate location for residential aged care facilities. Sites for these facilities are purchased through market processes and do not need to be identified at the rezoning stage.

Leisure and entertainment

Entertainment and leisure facilities such as restaurants, cinemas, bars, clubs and pubs are provided on a commercial basis according to market demand. This demand will be generated by the workforce and student populations as much as by the residential component. It is anticipated that, over time, the town centre within the Sydney Science Park will provide a variety of such facilities. The population will also draw on facilities in the wider area, such as the Twin Creeks Golf and Country Club, the Penrith Panthers entertainment complex at Penrith and cinemas in Penrith Plaza.

8.8.2. Open space and recreation needs

In terms of open space and recreation, the broad needs of Sydney Science Park will potentially include the following:

- a variety of parks for informal play and passive recreation that support family and community activities. There will be demand for both locally accessible parks (i.e. within 400-500m walking distance of most dwellings) and larger recreation parks and linear parks that provide a focus for family activities such as walking, bike riding, play, picnics and social gathering opportunities.
- The quality of facilities and open space is as important as the quantity. Open space should be carefully designed and embellished to provide a diversity of recreation settings and opportunities for all age groups and all abilities. High quality and well maintained facilities should be provided to support recreation and play, including shade, water, seats, play equipment and bike areas.
- There will be a need for pleasant outdoor spaces within the town centre and employment areas for workers to have a break away from the workplace or eat lunch. This includes plazas and town squares as well as parks with seating.
- There will be demand for outdoor areas for larger gatherings and cultural events e.g. extended family and group picnics, amphitheatre, markets. The increase in community events within parks requires additional facilities and utilities such as power, water and parking infrastructure.
- A significant proportion of children is likely and this highlights the need for playgrounds and other outdoor activity opportunities such as bike tracks, mounds for BMX and skateboarding.
- Playgrounds should offer a range of play experiences for different age groups and include paths, play equipment, fencing, landscaping and shelter from sun, wind and rain. Opportunities
- The likely significant proportion of young people highlights the need for parks and public spaces that are designed to be friendly to young people, providing meeting places that are safe and welcoming and allow for social interaction and informal games.
- The large proportion of adults suggests potential high demand for lower impact and flexible physical activity opportunities such as walking and bike riding. Linear connections and a network of walking and cycling tracks should be provided to support the potential high participation in walking and provide links to key destinations and recreation nodes. This network of paths will also be used by the workforce for fitness activities, such as jogging and walking.
- National health issues will continue to stress improving opportunities within the built environment for everyday incidental physical activity. Opportunities that increase incidental physical activity, through design of footpaths, road networks and accessible, safe and well lit walking and cycling tracks should be provided. Bike tracks that provide safe and appealing activity and transport opportunities, particularly for children and young people, will be essential.
- Options to enhance individual fitness in parks and trails will also be important, pointing to a need for fitness equipment. This demand will come from the workforce and student populations, as well as local residents.
- The open space network should also include areas to walk dogs, and off leash exercise areas for dogs.
- Opportunities to enjoy bushland, water and other natural settings, for picnics, bushwalking and as spaces for reflection, rest and relaxation will be valuable to broaden recreation opportunities.
- Demand for sporting facilities will be generated by the residential population (including children, young people and adult competition sports), the workforce (including informal lunchtime games as well as office team sports) and students (inter-university competitions and informal games).

- To meet the demand for organised sport, multi-purpose playing fields that are suitable for a variety of field sports, and able to accommodate both junior and adult sporting activities for males and females, will be required. Access to multi-functional outdoor courts will also be a necessity.
- There will also be demand for access to indoor courts for court sports, and indoor spaces for activities such as dance, martial arts, yoga, fitness, gym. Demand for indoor facilities for health and fitness will also be generated by the student and workforce populations.
- Access to aquatic facilities that include a variety of leisure and fitness activities and programs consistent with local needs and preferences will also be required.

Some of these needs will be satisfied by local open space and facilities to be provided within the Sydney Science Park, while others will be addressed by accessing higher order facilities in the wider district and more broadly in the region.

8.8.3. Council policy and standards

Penrith Council's requirements for open space in new release areas are documented in the Penrith Open Space Action Plan (2007) and summarised in Table 20 below. This document states that it is important to apply qualitative or needs based standards in conjunction with quantitative standards. Discussions with Council officers have indicated that consideration should be given to likely demands, site opportunities and constraints and the merit of what is proposed, rather than just a simple and strict application of the numerical standards.

Table 20. Penrith Council open space requirements in new release areas

Type of open space	Minimum quantum	Features
Local active open space	1.4 ha per 1000 people Additional required if higher than average demand anticipated	Requires high quality embellishment of less constrained land Not to be constrained by: • Power line corridors • Underground easements • Flooding (should be above 1% AEP flood event zone) • Steep gradients or slopes
Local passive open space	1.64 ha per 1000 people	May include: Neighbourhood park (up to 5 ha) Local park (0.5 to 3 ha) Pocket park (0.25 to 1 ha) and within 5 minute walk of all dwellings
Total local open space	3.04 ha per 1000 people	Does not include land required for drainage or designated biodiversity corridors, or land classified as natural areas
Linear open space / drainage reserve		Primarily serves a drainage function, but also allows pedestrian and cycle paths. No formal recreation structures.

Type of open space	Minimum quantum	Features
District open space	Embellish existing district open space to enable more intense utilisation	Separate contribution required as per District Open Space Development Contributions Plan

8.8.4. Overall quantum of open space

The quantum of public open space to be provided within Sydney Science Park has been determined with regard to:

- the vision for Sydney Science Park;
- the likely characteristics and needs of the forecast population;
- opportunities and constraints of the site;
- best practice; and
- Council policies and requirements.

The proposed quantum has considered likely requirements for:

- Sporting fields and outdoor courts;
- Local parks for informal recreation;
- Local playgrounds;
- Linear open space and linkages for walking / cycling trails.

The Master Plan proposes a total of 61.92 hectares of land to be provided as open space. This includes land under the transmission line easement (approximately 10.49 ha) but excludes the designated riparian corridors. It also includes 5.15 ha of open space for sporting fields.

A comparison of this provision against Council's minimum open space requirements for the forecast population of 6,900 people is provided in Table 21 below.

Table 21. Comparison of Council requirements and proposed provision

Type of open space	Council requirement	Proposed provision
Local passive open space	11.31 ha	56.77 ha
Local active open space	9.66 ha	5.15 ha
Total local open space	20.97 ha	61.92 ha

The draft Master Plan provides well in excess of Council's minimum requirements for public open space. The proposed 61 hectares includes some land of lesser recreation value (i.e. under transmission lines), along the pipe line and several wetlands/ water bodies / detention basins and drainage corridors, which should not be considered as part of the Council minimum requirement. Excluding these areas, the quantum of open space still meets Council's requirements.

While there is an abundance of open space overall, the allocation of open space for active recreation falls below Council's minimum requirements, being only around half of what the Council standards indicate is needed for the forecast residential population.

Open space for sporting facilities

The sporting facilities likely to be required by the future workforce, students and residents will include playing fields, outdoor courts, indoor courts and aquatic facilities. The forecast population will not be large enough to make feasible the provision of aquatic facilities, indoor courts and some types of outdoor courts within the site, and will instead make use of existing facilities in the wider region. It will, however, be large enough to create demand for playing fields and some types of outdoor courts for active recreation. It will also generate demand for gyms / fitness centres, typically provided on a commercial basis in appropriately zoned areas.

It is expected that the presence of university faculties within Sydney Science Park will generate some provision of sporting facilities by the universities to attract and support the student population. It is too early in the planning process to anticipate what sport and recreation facilities might be provided by the universities. Opportunities for community and workforce access to any future university facilities and their provision on a shared basis will need to be explored as planning for Sydney Science Park proceeds.

Sporting fields

The master plan has made provision for three single (soccer size) playing fields, with two fields together (4 ha), able to be used also as a cricket /AFL oval, to the west of the transmission lines, and a single field (1.14 ha) in the eastern part of the development. The proposed distribution provides for equitable access across the development and particularly ensures that residents of the eastern part of the development will also have access to local active (and passive) open space, should the proposed rail and outer orbital corridors act as a barrier to easy access to facilities in the balance of the precinct.

At this early stage of planning, the playing fields are proposed as multi-use facilities, rather than being allocated for specific sporting codes. Many sports can share space, and flexibility to respond to emerging demand is required at this stage of the development process. In the detailed design stage, consideration should be given to including features that will help to maximise use of the sporting fields, including lighting for training and evening games.

To meet Council requirements, the sporting fields will need to be located on relatively flat land outside of the flooding zone, and not underneath the transmission lines. The locations proposed in the Master Plan meet these requirements. Council requirements for embellishment of sporting fields have not been identified, but are likely to include parking (e.g. 50 spaces per single field) and amenities buildings (toilets, change rooms for both men and women, canteen). Lighting to enable evening use and synthetic surfaces to enable intensive use in all weathers are further issues for discussion with Council. Additional space for active recreation will be provided in the form of “kick about areas” which allow for informal games and less structured use, without the need for formal full-sized playing fields. Such areas are likely to be used particularly by the workforce for lunchtime and after-work games.

Outdoor sports courts

Additional areas of active open space are proposed to be provided throughout the proposed open space network, in the form of ‘multi-use recreation zones’ which provide an outdoor health and fitness area with fitness equipment, half basketball court and other embellishments to encourage physical activity. These zones would occupy the approximate size of a basketball court. This recognises the trend towards individual active leisure and fitness activities.

Indoor sports and aquatic facilities

The forecast population will not be large enough to support Council indoor recreation or aquatic facilities, but will instead rely on those available in the wider area, particularly the St Clair Leisure Centre and the Ripples Leisure Centre at St Marys. Gyms and fitness centres are likely to be provided on a commercial basis by the private sector, as the workforce and residential populations grow and such facilities become viable. There is also potential for the universities to provide such facilities in the longer term. The proposed multi-purpose community centre for Sydney Science Park will contain spaces suitable for physical activities such as yoga, aerobics and martial arts.

Open space for informal recreation

Areas of open space for informal recreation (neighbourhood, local, pocket and linear parks) are shown in the master plan and amount to 56.77 hectares. The proposed parks range in size from small pocket parks to the large linear park along the main creek corridor, allowing for a diversity of recreation opportunities. The parks have been distributed to ensure that all residents will be within 400m walking distance from an area of open space to support accessible participation in recreation.

It is too early in the planning process to identify the particular facilities to be included in each of the various parks. However, as a general principle, the parks together should provide for a range of different experiences which complement each other. The major parks should include seating, shelters, picnic and barbecue facilities, water and toilets in line with Council requirements. An indication of likely embellishments is provided in the separate Landscape Strategy for the Sydney Science Park. These include kickabout spaces, play equipment, youth activity areas, community gardens, and garden feature spaces.

The proposed location of the town centre, adjacent to the a formal park and pond, will enable the development of a quality town park, to enhance the appeal and amenity of the centre. This large park will contain a substantial water body and is likely to include picnic and barbecue facilities, play areas and walking and cycling paths, creating a major recreation destination. The main and secondary corridor parks will also include other water bodies and wetland areas, which will provide a pleasant setting for picnics and play and an aesthetic backdrop to walking and cycling trails.

Based upon a common standard of around 1 playground per 1300 residents (from other Western Sydney councils), the development is likely to require around 5 playgrounds, although this will depend upon the number of children living in the development. These should be provided across the precinct according to Council's preferred hierarchy, to include:

- one central district level playground with high quality equipment which caters to both young and older children, along with picnic and barbecue facilities to meet the need for “something for everyone” family activities; and
- around 4 local playgrounds in local parks, with some for toddlers and some for older children.

Together the playgrounds should ensure that there is a range of play equipment and play opportunities for children of different ages across the precinct. Each play area should offer a different experience, and provide fencing if adjacent to water, road, or steep slope, seating, shade, and drinking water. The likely high proportion of older children and young people will also justify some facilities for this age group with more of an adventure focus. Subject to Council strategies, this might include facilities for skateboarding, bike riding, a climbing wall, BMX dirt jump facility or half court for informal games.

Linear open space

The extensive riparian corridors throughout the site and associated land which is flood affected present opportunities to create a network of linear open space for informal recreation along the main creek lines and its tributaries. The location of the Sydney Water Pipeline along the northern site perimeter provides further opportunity for additional linear open space. This is reflected in the Master Plan. These parks will be appropriately vegetated to create the amenity of a natural setting. These spaces will be an integral feature of the urban design, connecting the community to the town centre and playing fields, encouraging walking and cycling. These areas will also provide high levels of amenity for surrounding areas. The extensive network of linear open space will be embellished to provide low key recreation opportunities including pathways and cycleways, seating, lighting, barbecue and picnic facilities, signage, fitness equipment and playgrounds.

8.9. Heritage

An Aboriginal Heritage Assessment Report, prepared by Kelleher Nightingale Consulting Pty Ltd is included in **Appendix C**. The report assesses the Aboriginal cultural values of the site and the potential impacts of the proposed development on Aboriginal cultural heritage.

An assessment of the impact of the Draft Indicative Master Plan has been prepared for the study area, which includes the majority of the land being developed. Based on this indicative layout, an impact assessment can be made for the identified Aboriginal archaeological features as detailed in Section 2.10.

All identified archaeological sites will be impacted to some degree by the proposed development. Based on the indicative master plan, Aboriginal archaeological features will be impacted by the following proposed land uses.

RPS LTPAS01 (AHIMS 45-5-4189) is located within an area planned as major central open space associated with the main drainage line through the property, incorporating grade 3 and 4 Riparian Corridors, active and passive recreation and water management features such as wetland and lakes. Part of the site exists within an area proposed as special use zone and local roads to the west of the site. It also borders a proposed recreational sports field. The transmission line easement also crosses the site.

The site was assessed as being of low archaeological significance, based on its location in a less defined landform context, association with colluvial and alluvial material and low archaeological integrity.

RPS LTPAS01 will be at least partially impacted by the proposed future development layout, although it is likely that adjacent development, sports field and roads, as well as construction of water management features within the open space corridor will impact on the site, meaning that only small pockets, if any, of the site may remain within the proposed open space corridor. The site context has been partially disturbed by flooding and colluvial movement so that the archaeological integrity of the site has already been diminished. As a result, while the site will be impacted, it is not considered to be a significant impact in terms of archaeological value. The site holds cultural value and a cultural salvage (collection) of Aboriginal objects at this location may be an appropriate mitigation measure for this site.

SSP 1 is also generally located within the planned central open space corridor, although will be predominantly impacted by the sports field and proposed main collector road, which would bisect the site. These direct and

adjacent impacts effectively impact the majority of the site area, with the potential for only small pockets, if any, to remain within the proposed open space corridor. Similarly to RPS LTPAS01, the site was assessed as being of low archaeological significance, being in a similar environmental context. The overall impact would be similar to RPS LTPAS01 and consistent mitigation measures would be appropriate.

SSP 3 is located wholly within a planned special use zone and minor collector road. The site was considered to have potential for further intact subsurface archaeological deposit, being situated on a terrace landform adjacent to a drainage line, albeit as a moderate to low density archaeological deposit. Aboriginal sites contained within the study have been identified as being important to Aboriginal people. The Land Council recommended further detailed investigation prior to development. Mitigation requirements for SSP 3 should be determined following rezoning.

SSP 4 was an isolated artefact on a gentle lower slope immediately above the creek flats and main drainage channel where it meets the western boundary of the study area. Due to the site context and stability of the landform, the site was considered to have potential for further intact subsurface archaeological deposit, albeit as a low density archaeological deposit. The draft indicative master plan shows most of the site would be impacted by the major collector road/ East-West link as well as local roads. Mitigation requirements for SSP 4 may include a cultural salvage (collection).

The four identified sites within the study area do not pose a constraint to the future development of the land but will require a process of further assessment, consultation and mitigation to comply with relevant legislation and the associated requirement.

Rezoning will not affect identified Aboriginal heritage items, however an Aboriginal heritage impact permit (AHIP) will be required prior to any activities which may harm Aboriginal objects. It is recommended the AHIP application be made for the entire study area to allow for impacts (harm) to identified and potential Aboriginal objects on site.

The next step in obtaining an AHIP would be the preparation of a Cultural Heritage Assessment Report (CHAR) and associated Aboriginal stakeholder consultation. An AHIP application can be lodged following completion of the CHAR and associated development application. Recommendation is for a bulk earthworks DA to accompany the AHIP application.

8.10. Impact on Surrounding properties

Sydney Science Park will generate a population of sufficient size to form a fairly self-contained catchment for local level facilities and services. In terms of social integration between the existing Luddenham / Mulgoa population and the incoming Science Park population, it is noted that population growth will occur over a 25 year timeframe, enabling the existing community to absorb newcomers gradually and adjust to any changes. This growth must be seen in the context of the on-going and significant population growth that has been a feature of this part of Western Sydney and which is set to continue in the future.

The social integration of new and existing communities will be enhanced by:

- The proposed town centre within Sydney Science Park, which will provide a range of retail and commercial facilities and services serving the wider area, ensuring that existing residents are not disadvantaged in their

access to services and facilities, but are able to enjoy access to the new social infrastructure. It will draw the surrounding community into the development and encourage mixing with the new community;

- The local employment opportunities provided by the town centre and the business, research and development enterprises will also result in the mixing of new and existing populations;
- The proposed extensive open space and walking / cycling trails will be publicly accessible, providing valued recreation opportunities for the benefit of the wider area, and encouraging the mixing of new and existing populations;
- Access to and utilisation of community facilities within Sydney Science Park by residents of the surrounding area (e.g. community centre, primary school, childcare centres);
- Science Park residents using facilities and services in the wider area, especially high schools, private schools, libraries and sporting / social clubs, where new residents will be drawn into the social networks of the district;
- The implementation of policies of inclusiveness within Sydney Science Park, to encourage social cohesion and harmony through promotion of access to services and facilities for all groups and individuals in the local Science Park and wider district communities. Where appropriate, particular activities could be initiated to draw together residents of the Science Park and the wider community to foster social integration and community cohesion (i.e. within the proposed community gardens, cultural space).

There will be changes to the character of the area, as it will move from rural to urban uses. However, community concerns about this change will be addressed by developing Sydney Science Park as a quality, master planned specialised centre, with a mix of employment uses, establishment of a town centre, a range of community facilities and a strong focus on landscaping. There is limited potential for some negative impacts on some adjoining residents in terms of visual amenity, as existing rural outlooks are replaced by urban development. The Master Plan provides for landscaping along the western boundary of the site and along Luddenham Road, which will provide some form of visual buffer to the development from Luddenham Road. The open space network, particularly within the southern portion of the site is able to be extended south. The proposed grid street hierarchy can also be extended south, as this part of the Broader WSEA develops.

9. Conclusion

The Planning Proposal presented in this report has been prepared to support an amendment to Penrith LEP 2010 to rezone a 287 hectare parcel of land at 565-609 Luddenham Road, Luddenham to enable the development of Sydney Science Park - a new specialised centre comprising research and development, employment, education, retail and residential uses.

The Planning Proposal has been prepared in accordance with the DoPIs *'A guide to preparing planning proposals' (October 2012)* and addresses the relevant matters for consideration as set out in section 55(2) of the EP&A Act.

The strategic justification for the rezoning of Sydney Science Park has been demonstrated by the identification of the site within the Broader Western Sydney Employment Area (Broader WSEA) and the Metropolitan Plan 2036 which encourages the establishment of employment hubs around emerging sectors including food science and technology to increase and provide diversity in jobs within Western Sydney.

The proposed rezoning of the site will make available 340,000m2 of employment floor space, 100,000m2 of education floor space and 30,000m2 of retail floor space across the site. The proposal will provide approximately 12,000 direct jobs, of which 9,714 are expected in research and development, 1,282 in education and 1,000 jobs in retail. An additional 200 jobs will be derived from Baiada's National Headquarters, Food Science Laboratories, Research and Tertiary Facilities, thereby exceeding the targets envisaged by the Draft Broader WSEA Structure Plan and Metropolitan Plan in terms of employment density.

The proposal provides a critical opportunity to provide a source of highly skilled, quality jobs within Western Sydney. This stands in contrast to the types of jobs being created in other parts of the WSEA, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited. As the site is single ownership it is able to be developed in a streamlined way. This opportunity is rare as many other development areas in Western Sydney, including other land within the Broader WSEA, are in fragmented land holdings that can prevent timely and efficient development.

The Planning Proposal is supported by a Master Plan, which represents the overall planning framework and preferred outcome for Sydney Science Park. The Master Plan includes:

- approximately 340,000m^2 of research and development floor area;
- approximately 100,000m^2 of education floor area and associated student accommodation;
- a Town Centre comprising up to 30,000 m^2 of retail space;
- 3,400 dwellings;
- a primary school site;
- new roads and infrastructure; and
- landscaped open space, sporting fields and parks.

The Planning Proposal includes a servicing and water strategy which demonstrates how the infrastructure is to be delivered to Sydney Science Park in a timely and efficient manner. It is also accompanied by an offer to enter into a Voluntary Planning Agreement with State Government and Council for the delivery of infrastructure and services that are required to meet the future demands of Sydney Science Park. A site specific Development Control Plan (DCP) for Sydney Science Park is included as part of the Planning Proposal. It is intended that the Development

Control Plan for Sydney Science Park will guide the assessment of future detailed subdivision and built form controls.

Sydney Science Park will have a number of positive social and economic benefits, namely:

- **Delivering high end jobs to Western Sydney**. The proposal will deliver 12,200 jobs in the fields of scientific research and development, education and support services.
- **Bringing international recognition in the fields of science, research and development to Sydney** and attracting internationally recognised scientific professionals to live and work in Western Sydney.
- **Acting as a Catalyst for development in the Broader WSEA**. It would represent a vote of confidence in the future potential of this area and support a substantial number of new jobs, many of which will be high value.
- **Creating a Lifestyle Centre to live and work.** This will bring jobs and home closer together, creating a 24 hour vibrant employment area with life on weekends and evenings.

As demonstrated throughout the planning proposal, the proposed development will not result in any significant adverse environmental, social or economic impact. Environmental impacts with respect to flora and fauna, transport and accessibility, contamination, social and community impacts, utility servicing, and indigenous heritage are demonstrated to be appropriately managed.

This Planning proposal will positively change the character of Western Sydney, it will benchmark the way in which people work, live and study and will bring significant environmental, social and economic benefits to Australia. Through its single ownership and commitment by a land owner, emerging developer and organisation who are themselves involved in scientific research and development its vision is well grounded, real and attainable in the near future.