

WestConnex



M4 East

Environmental Impact Statement

Main Volume Chapters 12 to 31

Volume 1B

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WestConnex Delivery Authority

WestConnex M4 East
Environmental Impact Statement
September 2015

Prepared for

WestConnex Delivery Authority

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Glossary of terms and abbreviations

Term	Meaning
A	
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, song lines and places) cultural practices and traditions associated with past and present day Aboriginal communities.
Aboriginal object	Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW.
Aboriginal place	Any place declared to be an Aboriginal place under section 94 of the <i>National Parks and Wildlife Act 1974</i> .
ABS	Australian Bureau of Statistics
ACM	Asbestos containing material(s)
ADT	Average daily traffic
ADWG	<i>Australian Drinking Water Guidelines</i> (National Health and Medical Research Council 2013)
AHD	Australian height datum A common national surface level datum approximately corresponding to mean sea level
AHIMS	Aboriginal Heritage Information Management System. A register of NSW Aboriginal heritage information maintained by the NSW Office of Environment and Heritage.
Alignment	The geometric layout (eg of a road) in plan (horizontal) and elevation (vertical).
AMO	Allied Meteorological Office
AM peak period	6.00 am to 10.00 am weekdays
Ancillary	A subordinate part of an element.
ANZECC	Australian and New Zealand Environment Conservation Council
Aquifer	A groundwater bearing formation sufficiently permeable to transmit and yield groundwater
AR5	Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (IPCC 2013)
ARI	Average recurrence interval The average period in years between the occurrence of a flood of a particular magnitude or greater. In a long period of say 1,000 years, a flood equivalent to or greater than a 100 year ARI event would occur 10 times. The 100 year ARI flood has a 1 per cent chance (i.e. a one-in-100 chance) of occurrence in any one year The frequency of floods is generally referred to in terms of their AEP or ARI. In this report the frequency of floods generated by runoff from the study catchments is referred to in terms of their ARI, for example the 100 year ARI flood.
ARMCANZ	Agriculture and Resources Management Council of Australia and New Zealand
Arterial roads	The main or trunk roads of the State road network.
AS	Australian Standard
ASC NEPM	<i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> (Commonwealth)

Term	Meaning
Asphalt or asphaltic concrete	A dense, continuously graded mixture of coarse and fine aggregates, mineral filler and bitumen usually produced hot in a mixing plant.
ASS	Acid sulfate soils Naturally occurring soils, sediments or organic substrates (eg peat) that are formed under waterlogged conditions. These soils contain iron sulfide minerals (predominantly as the mineral pyrite) or their oxidation products. In an undisturbed state below the water table, acid sulfate soils are benign. However if the soils are drained, excavated or exposed to air by a lowering of the water table, the sulfides react with oxygen to form sulfuric acid.
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
At-grade	A road at ground level, not on an embankment or in a cutting.
AWS	Automatic weather station
AWT	Average weekday traffic
B	
Background concentration	Describes all contributing sources of a pollutant concentration other than road traffic. It includes, for example, contributions from natural sources, industry and domestic activity.
Background noise level	The ambient sound-pressure noise level in the absence of the sound under investigation exceeded for 90 per cent of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.
Bank cubic metres	A measure of volume representing a cubic metre of unexcavated material. Once material is excavated, it expands to varying degrees depending on its constituents.
bgl	Below ground level
BH	Borehole
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BoM	Bureau of Meteorology
Bore	Constructed connection between the surface and a groundwater source that enables groundwater to be transferred to the surface either naturally or through artificial means.
BTS	Bureau of Transport Statistics
Bus lane	A traffic lane dedicated to buses, but which can also be used by taxis, bicycles and motorcycles.
C	
Carriageway	The portion of a roadway used by vehicles including shoulders and ancillary lanes.
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
CBD	Central business district
CCTV	Closed circuit television
CEMP	Construction Environmental Management Plan A site specific plan developed for the construction phase of the project to ensure that all contractors and sub-contractors comply with the environmental conditions of approval for the project and that the environmental risks are properly managed.

Term	Meaning
CETU	Centre d'Etudes des Tunnels
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CO	Carbon monoxide
CO ₂	Carbon dioxide
Concept design	Initial functional layout of a road/road system or other infrastructure. Used to facilitate understanding of a project, establish feasibility and provide basis for estimating and to determine further investigations needed for detailed design.
Construction ancillary facility	Facilities used to support the operation of a construction site including (but not limited to) site offices, workshops, delivery areas, storage areas, crib sheds, staff vehicle parking, material and plant equipment.
Construction footprint	Area required for the construction of the project. This includes the operational footprint and temporary construction ancillary facilities.
Contributory item	Place within a Heritage Conservation Area that contributes to its heritage significance.
CPTED	Crime Prevention Through Environmental Design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cul-de-sac	A street or road that is open for vehicular traffic at one end only.
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact considered alone.
Cut-and-cover	A method of tunnel construction whereby the structure is built in an open excavation and subsequently covered.
Cutting	Formation resulting from the construction of the road below existing ground level, the material is cut out or excavated.
D	
dBA	A-weighted decibels A-weighting is applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.
DCP	Development Control Plan
DECC	Former Department of Environment and Climate Change (now OEH).
DECCW	Department of Environment, Climate Change and Water (formerly DECC, but now OEH).
Design speed	A nominal speed which determines the geometric design features of a road.
Detailed design	The stage of design where project elements are designed in detail, suitable for construction.
Deviation	An alteration to the alignment of a portion of a road.
DFO	Direct Factory Outlet
Discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m ³ /s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving (eg metres per second [m/s]).
Divided road	A road with a separate carriageway for each direction of travel created by placing a physical separation (eg median) between the opposing traffic directions.

Term	Meaning
DGRs	Director-General's requirements. Now Secretary's Environmental Assessment Requirements (SEARs).
DP&E	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industries
DPI – Water	NSW Department of Primary Industries – Water (formerly NSW Office of Water)
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Drawdown	Reduction in the height of the water table caused by changes in the local environment.
E	
Enabling works	Works which are required to enable the commencement of the main construction works.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
EC	Electrical conductivity The measure of a material's ability to accommodate the transport of an electric charge.
EEC	Endangered ecological community
Egress	Exit
EIS	Environmental impact statement
Embankment	An earthen structure where the road (or other infrastructure) subgrade level is about the natural surface.
Emergency management	A range of measures to manage risks to communities and the environment. In the flood context it may include measures to prevent, prepare for, respond to and recover from flooding.
ENMM	<i>Environmental Noise Management Manual</i> (Roads and Traffic Authority 2001)
ENSO	El Nino-Southern Oscillation
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPBC Act	<i>Environment Protection and Biodiversity Act 1999</i> (Commonwealth)
EPL	Environment protection licence
Erosion	A natural process where wind or water detaches a soil particle and provides energy to move the particle.
ESD	Ecologically sustainable development.
ESP	Electrostatic precipitator
EU	European Union
F	
FBA	<i>Framework for Biodiversity Assessment</i> (Office of Environment and Heritage 2014a)
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements.

Term	Meaning
Flash flooding	Flooding which is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. It is often defined as flooding which peaks within six hours of the rain event.
Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
Flood prone land	Land susceptible to flooding by the probable maximum flood. Note that the flood prone land is also known as flood liable land.
Flood storage area	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. It is necessary to investigate a range of flood sizes before defining flood storage areas.
Floodplain	Area of land which is inundated by floods up to and including the probable maximum flood event (ie flood prone land).
Floodplain Risk Management Plan	A management plan developed in accordance with the principles and guidelines in the NSW <i>Floodplain development manual</i> (DIPNR 2005). Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.
Footprint	The extent of impact that a development makes on the land.
FFDI	Forest Fire Danger Index
Fracture	Cracks within the strata that develop naturally or as a result of underground works
Freeboard	A factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. It is usually expressed as the difference in height between the adopted flood planning level and the peak height of the flood used to determine the flood planning level. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour and impacts that are specific event related, such as levee and embankment settlement, and other effects such as “greenhouse” and climate change. Freeboard is included in the Flood Planning Level.
FTE	Full-time equivalent
G	
GCCSA	Greater Capital City Statistical Area
GHG	Greenhouse gas
GIS	Geographic information systems
Global Sydney	As defined in <i>A Plan for Growing Sydney</i> (NSW Government 2014). Global Sydney includes the Sydney CBD, North Sydney CBD, Barangaroo, Darling Harbour, the Bays Precinct, Pyrmont-Ultimo, Broadway and Camperdown Education and Health Precinct, Central to Eveleigh, Surry Hills and City East.
Grade	The rate of longitudinal rise (or fall) with respect to the horizontal expressed as a percentage or ratio.

Term	Meaning
Grade separation	The separation of road, rail or other traffic so that crossing movements at intersections are at different levels.
Groundwater	Water that is held in rocks and soil beneath the earth's surface.
GRAL	Graz Lagangrian dispersion model Air quality modelling package.
GRAMM	Graz Mesoscale Model
GRP	Gross Regional Product
GSP	Gross State Product
H	
HAMU	Historical archaeological management unit
Hazard	A source of potential harm or a situation with a potential to cause loss. In relation to the <i>NSW Floodplain development manual</i> (DIPNR 2005) the hazard is flooding which has the potential to cause damage to the community.
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Ausroads Vehicle Classification System.
Heritage Act	<i>Heritage Act 1977</i> (NSW)
Heritage item	Place listed on a statutory heritage register
Hydraulic conductivity	A characteristic of soil that describes how easily water moves through it.
Hydrogeology	The area of geology that deals with the distribution and movement of groundwater in soils and rocks.
Hydrology	The term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
I	
IAQM	Institute of Air Quality Management
ICNG	<i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change 2009a)
ICOMOS	International Council on Monuments and Sites
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Infiltration	The downward movement of water into soil and rock. It is largely governed by the structural condition of the soil, the nature of the soil surface (including presence of vegetation) and the antecedent moisture content of the soil
INP	<i>Industrial Noise Policy</i> (Environment Protection Authority 2000)
Intrusive item	Place within a heritage conservation area that detracts from its heritage significance.
Inside shoulder	The area of pavement outside the traffic lanes that is closest to the 'fast' lane
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways.
IPCC	Intergovernmental Panel on Climate Change
ISCA	Infrastructure Sustainability Council of Australia

Term	Meaning
ITS	Intelligent Transport Systems Systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport.
K	
KGRIU	King Georges Road Interchange Upgrade
kL	Kilolitres
kL/day	Kilolitres per day
km/h	Kilometres per hour
L	
LA90	The noise level exceeded for 90 per cent of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
LAC	Local area command (when referring to police stations)
LAeq	The 'energy average noise level'. It is often expressed with a time period eg 1 hour, 9 hour (to represent the night-time period from 10.00 pm to 7.00 am) or 15 hour (to represent the daytime and evening periods from 7.00 am to 10.00 pm). The LAeq can be likened to a noise dose representing the cumulative effects of all the noise events occurring in the relevant time period.
LALC	Local Aboriginal Land Council
Lane	A portion of the carriageway allotted for the use of a single line of vehicles.
LEP	Local environmental plan
LGA	Local government area
Licensed discharge point	A location where a licensed operation discharges water to the environment in accordance with conditions stipulated within the site environment protection licence (EPL).
LoS	Level of service
LSJH JV	Leighton, Samsung C&T and John Holland Joint Venture
L/s/km	Litres per second per kilometre
M	
M4 and Parramatta Road corridor	The M4 and Parramatta Road Corridor is the area from Parramatta CBD to Sydney CBD, generally between the Main Western Rail Line in the south and the Parramatta River to the north.
m ²	Square metres
m ³	Cubic metres
M	Metres
m/day	Metres per day
Mainline tunnels	The main two tunnels to be constructed as part of the project. This does not include tunnels for on- and off-ramps.
Mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
Managed motorway	A managed motorway uses active traffic management to reduce congestion, improve reliability of travel times and inform travellers of real-time incidents and expected travel times to set destination along the motorway.

Term	Meaning
Mathematical/computer models	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
Median	The central reservation which separates carriageways from traffic travelling in the opposite direction.
Methodology	The method for analysis and evaluation of the relevant subject matter.
mg/L	Milligrams per litre
microSiemens per centimetre	A measure of electrical conductivity. Commonly used to measure the salinity of water.
ML	Megalitres
ML/day	Megalitres per day
Motorway	Fast, high volume controlled access roads. May be tolled or untolled.
N	
NATA	National Association of Testing Authorities
NCG	<i>Noise Criteria Guideline</i> (Roads and Maritime Services 2014a)
NEPM	National Environmental Protection Measure
Neutral item	Place within a heritage conservation area that does not contribute to or detract from its heritage significance
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007</i> (Commonwealth)
NMG	<i>Noise Mitigation Guideline</i> (Roads and Maritime Services 2014b)
NML	Noise management level
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NOW	(former) NSW Office of Water (now the Department of Primary Industries – Water)
NSW	New South Wales
NWQMS	National Water Quality Management Strategy
O	
OEH	NSW Office of Environment and Heritage (formerly DECCW)
Off-ramp	A ramp by which one exits a limited-access highway/tunnel.
On-ramp	A ramp by which one enters a limited-access highway/tunnel.
Operational footprint	Areas to be directly impacted by the operational components of the project such as roadways and associated facilities (eg motorway operations complex and ventilation facilities. The operational footprint also includes sections of the M4 East that are located below ground in tunnel.
Outcrop	Bedrock exposed at the ground surface.
Outside shoulder	The area of pavement outside the traffic lanes that is closest to the 'slow' lane.
Overbridge	Bridge which conveys another road, rail or pedestrians over the described road.
Overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.

Term	Meaning
P	
PACHCI	<i>Procedure for Aboriginal Cultural Heritage Consultation and Investigation (Roads and Maritime 2011b)</i>
PAD	Potential archaeological deposits
PAH	Polycyclic aromatic hydrocarbons
Parramatta Road corridor	The Parramatta Road Corridor is the area from Parramatta CBD to Sydney CBD, generally between the Main Western Rail Line in the south and the Parramatta River to the north.
Pavement	The portion of a carriageway placed above the subgrade for the support of, and to form a running surface for, vehicular traffic.
PEA Act	<i>Protection of the Environment Administration Act 1999 (NSW)</i>
Peak discharge	The maximum discharge occurring during a flood event.
Peak flood level	The maximum water level occurring during a flood event.
pH	Numeric scale ranging from zero to 14 used to specify the acidity or alkalinity of an aqueous solution. Solutions with a pH less than seven are acidic and solutions with a pH greater than seven are alkaline. Pure water has a pH of seven and is neutral.
PIARC	Permanent International Association of Road Congress
Photo-ionisation detector measurements	A measurement of the concentration of volatile organic compounds and other gases within the soil.
PM	Particulate matter
PM ₁₀	Particulate matter of up to 10 micrometres
PM _{2.5}	Particulate matter of up to 2.5 micrometres
PMF	Probable maximum flood The flood that occurs as a result of the probable maximum precipitation on a study catchment. The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land (i.e. the floodplain).
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
POEO Regulation 2005	<i>Protection of the Environment Operations (Waste) Regulation 2005 (NSW)</i>
Pollutant	Any measured concentration of solid or liquid matter that is not naturally present in the environment.
Potential heritage item	Place identified in this report as potentially having heritage significance, which is not recognised on a heritage register.
PPFL	Preliminary peak flood level
Preferred design	The design that is the subject of this environmental impact statement.
Probability	A statistical measure of the expected chance of flooding (see annual exceedance probability).
Proponent	The person or organisation that proposes to carry out the project or activity. For the purpose of the project, the proponent is the NSW Roads and Maritime Service.
Project	M4 East project
R	
RBL	Rating background noise level

Term	Meaning
RCP	Representative concentration pathway
REP	Regional Environmental Plan
Residual land	Land acquired for construction that is not required during operation of the project.
Risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.
RNP	<i>Road Noise Policy</i> , Department of Environment, Climate Change and Water (DECCW) 2011.
Roadheader	A commonly used machine for excavation in sandstone using pics mounted on a rotary cutter head attached to a hydraulically operated boom.
Road reserve	A legally defined area of land within which facilities such as roads, footpaths and associated features may be constructed for public travel.
Roads and Maritime	NSW Roads and Maritime Services
Roadside furniture	A general term covering all signs, street lights, protective devices for the control, guidance and safety of traffic and convenience of road users.
RTA	(Former) NSW Roads and Traffic Authority (now Roads and Maritime Services)
Runoff	The amount of rainfall that ends up as streamflow, also known as rainfall excess.
RWC	Regulatory worst case
RWR receptors	Residential, workplace and recreational receptors.
S	
SA1	Statistical area level 1 district
SA2	Statistical area level 2 district
SCATS	Sydney Co-ordinated Adaptive Traffic System
SEARs	Secretary's Environmental Assessment Requirements Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning and Environment under section 115Y of the <i>Environmental Planning and Assessment Act 1979 (NSW)</i> .
Section 170 register	State Government agency section 170 Heritage and Conservation Register
SEPP	State Environmental Planning Policy
SES	State Emergency Services
Shotcrete	Concrete and mortar that is sprayed onto a surface at high velocity.
Shoulder	The portion of the carriageway beyond the traffic lanes adjacent to and flush with the surface of the pavement.
SO ₂	Sulfur dioxide
Socio-economic	Involving combination of social and economic matters.
Span	The distance between the centres of adjacent supports of a bridge.
Spoil	Surplus excavated material
SSROC	Southern Sydney Region of Councils
Stockpile	Temporarily stored materials such as soil, sand, gravel, spoil/waste.
Strata	Geological layers below the ground surface.

Term	Meaning
Streamflow	
Stream order	A classification system which assigns an 'order' to waterways according to the number of additional tributaries associated with each waterway, to provide a measure of system complexity.
Structure (soil)	The way soil particles group together to form aggregates.
Stub tunnel	Driven tunnels constructed to connect to the possible future M4–M5 Link.
Surface road concentration	Describes the contribution of pollutants from the surface road network. It includes not only the contribution of the nearest road at the receptor, but also the net contribution of the modelled road network at the receptor.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Sydney Catchment REP	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
T	
TAGG	Transport Authorities Greenhouse Group
TBM	Tunnel boring machine. An excavation machine that 'bores' through soil or rock to create a tunnel with a circular cross section (as opposed to drilling and blasting methods).
TDS	Total dissolved solids
TEC	Threatened ecological community
TfNSW	Transport for NSW
The Blue Book	<i>Managing Urban Stormwater – Soils and Construction</i> Volumes 1 and 2, NSW Government 2004 and 2006
TMSP	Traffic Management and Safety Plan
Total concentration	The sum of the background, surface road and ventilation outlet concentrations. It may relate to conditions with or without the project under assessment.
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
TSP	Total suspended particulate matter
Transport Master Plan	<i>NSW Long Term Transport Master Plan</i> (Transport for NSW 2012a)
TRH	Total recoverable hydrocarbons
Typical cross section	A cross section of a carriageway showing typical dimensional details, furniture locations and features of the pavement construction.
U	
µg	microgram
UFP	Ultrafine Particle
UNFCCC	United Nation Framework Convention on Climate Change
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments.
V	
VDV	Vibration dose value
VENM	Virgin excavated natural material
Ventilation facility	Facility for the mechanical removal of air from the mainline tunnels, or mechanical introduction of air into the tunnels.
Ventilation outlet concentration	Describes the contribution of pollutants from tunnel ventilation outlets.

Term	Meaning
VKT	Vehicle kilometres travelled
VMS	Variable message signs
VOC	Volatile organic compounds
W	
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
Waterway	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent).
WCL	Workers compensation liability
WDA	WestConnex Delivery Authority
WHO	World Health Organisation
WHS	Work Health and Safety Plan
WM Act	<i>Water Management Act 2000 (NSW)</i>
WRTM	WestConnex Road Traffic Model

12 Property and land use

This chapter assesses the property and land use impacts associated with construction and operation of the M4 East project (the project). A full list of properties to be acquired or leased is provided in **Appendix D**. Shadow diagrams indicating the extent of overshadowing as a result of permanent operational infrastructure are provided in **Appendix K**.

The Secretary of the NSW Department of Planning and Environment (DP&E) has issued a set of environmental assessment requirements for the project; these are referred to as Secretary's Environmental Assessment Requirements (SEARs). **Table 12.1** sets out these requirements as they relate to property and land use, and identifies where they have been addressed in this environmental impact statement (EIS).

Table 12.1 Secretary's Environmental Assessment Requirements – property and land use

Secretary's Environmental Assessment Requirement	Where addressed in the EIS
Impacts on directly affected properties and land uses, including impacts related to access, land use, property acquisition (including relations and expenses for those properties acquired) and amenity related changes.	<p>Impacts on properties, access and land use, and details of property acquisition, are described in sections 12.3 and 12.4 of this chapter.</p> <p>Further details regarding amenity related changes are provided in Chapter 14 (Social and economic).</p>

12.1 Assessment methodology

12.1.1 Overview

The assessment of impacts from the project on property and land use has been carried out by undertaking the following key tasks:

- Providing an overview of the existing character, land use and zoning in the vicinity of the construction ancillary facilities and other locations where construction works would be undertaken
- Reviewing the zoning and minimum lot size provisions of the relevant local environmental plans:
 - *Auburn Local Environmental Plan 2010* (Auburn LEP)
 - *State Environmental Planning Policy (Major Development) 2005*, (Major Development SEPP) which applies to Sydney Olympic Park
 - *Strathfield Local Environmental Plan 2012* (Strathfield LEP)
 - *Canada Bay Local Environmental Plan 2013* (Canada Bay LEP)
 - *Burwood Local Environmental Plan 2012* (Burwood LEP)
 - *Ashfield Local Environmental Plan 2013* (Ashfield LEP)
- Reviewing strategic planning documents, including *A Plan for Growing Sydney* (NSW Government 2014a) and the *New Parramatta Rd: Draft Parramatta Road Urban Renewal Strategy* (UrbanGrowth NSW 2015) (Parramatta Road Strategy)
- Identifying the properties and land uses that would be impacted by the project
- Assessing the potential for land used for construction and not containing permanent operational infrastructure ('residual land') to be redeveloped following construction
- Identifying the planned future development within the project area that may be impacted by the project
- Compiling mitigation measures (general and specific) that would assist in reducing the property and land use impacts.

12.1.2 Residual land assessment criteria

Land used for construction but not containing permanent operational infrastructure would potentially be available for redevelopment following construction. The future use of this residual land would be subject to separate assessment and planning approval.

For the purposes of assessing any potential change in use of residual land, **Table 12.2** sets out the minimum subdivision sizes for single dwellings, dual occupancies, multi-dwelling housing and residential flat buildings in the three local government areas (LGAs) where there would be residual land.

Table 12.2 Minimum lot sizes in residential zones

LEP	Zone	Minimum lot size in residential zones (m ²)					
		Subdivision	Single dwelling	Dual occupancy		Multi-dwelling	Residential flat building
Strathfield	R3 Medium Density Residential	1,000	None	560	560	1,000	1,000
Canada Bay	R2 Low Density Residential	450	None	450	800	Prohibited	Prohibited
	R3 Medium Density Residential	450	None	Prohibited	Prohibited	800	800
Ashfield	R2 Low Density Residential	500	None	500	Prohibited	Prohibited	Prohibited

The minimum subdivision lot sizes would only apply where a residual land property is proposed to be subdivided or consolidated with another.

There are no minimum lot sizes for commercial zones.

12.2 Existing environment

12.2.1 Regional context

The project is generally located in the inner west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield LGAs. The project travels through 10 suburbs: Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield.

The project is generally located within the M4 and Parramatta Road corridor, which links Broadway at the southern end of the Sydney central business district (CBD) and Parramatta in Sydney's west, about 20 kilometres to the west of the Sydney CBD. This corridor also provides the key link between the Sydney CBD and areas further west of Parramatta (such as Penrith and western NSW).

Development along the M4 and Parramatta Road corridor is well established. Generally, land uses fronting Parramatta Road are retail, commercial and light industrial. A significant number of commercial properties on Parramatta Road have been closed and the premises untenanted for long periods.

Away from Parramatta Road, land use is generally residential. Traditionally, residential development was low to medium density. Urban renewal is occurring in some areas, and medium to high density residential and mixed use development has occurred in parts of the corridor.

The project footprint does not contain any major retail and commercial centres. Instead, retail, commercial and light industrial development along the Parramatta Road corridor is 'strip' or 'ribbon' development, where development is concentrated on Parramatta Road but typically does not extend further north or south.

A Plan for Growing Sydney (NSW Government 2014a) identifies a number of strategic centres, being locations that currently have, or are planned to have, at least 10,000 jobs and are priority locations for employment, retail, housing, services and mixed uses. The following strategic centres have been identified in *A Plan for Growing Sydney* in the M4 and Parramatta Road corridor, near the project:

- Sydney Olympic Park – located immediately to the north-west of the M4 and Homebush Bay Drive intersection. This is currently primarily a sporting precinct, but also contains a number of commercial and residential buildings
- Rhodes – located about three kilometres to the north of the Concord Road interchange. It is centred around Rhodes Station and extends south along Concord Road, Rider Boulevard and Homebush Bay Drive. It contains a large shopping centre, and commercial and residential buildings
- Burwood – located about 600 metres to the south of Cintra Park. It is centred around Burwood Station and also extends north and south along Burwood Road, and east and west along Railway Parade. It includes a large shopping centre, and commercial and residential buildings.

There are also a number of smaller centres in the Parramatta Road corridor:

- North Strathfield – located about 500 metres north of Parramatta Road around North Strathfield Station, and extending south and including the Bakehouse Quarter on George Street
- Homebush – located about 200 metres south of Parramatta Road around Homebush Station
- Strathfield – located about 500 metres south of Parramatta Road around Strathfield Station
- Concord – located about one kilometre north of Parramatta Road around the Majors Bay Road and Wellbank Street intersection
- Croydon – located about one kilometre south of Parramatta Road around Croydon Station
- Five Dock – located about 300 metres north of Parramatta Road along Great North Road
- Ashfield – located about 600 metres south around Ashfield Station.

All the above centres are readily accessible from the project corridor via arterial or main roads.

12.2.2 Local context

The project traverses a variety of zones within the five LGAs, but surface works would only be carried out in the Auburn, Strathfield, Canada Bay and Ashfield LGAs. No surface works are proposed in the Burwood LGA. The local context for each surface work site in terms of land use and zoning is discussed below. The local context for each surface work site can be seen in **Figure 12.1** to **Figure 12.4**.

Homebush Bay Drive interchange

Work in this area would be mostly confined to the existing M4 road reserve and the immediately adjoining land. Much of the land within the road reserve is used as landscaped areas adjacent to the motorway. In addition to permanent infrastructure, this area would include three construction ancillary facilities:

- Homebush Bay Drive civil site (C1)
- Pomeroy Street civil site (C2)
- Underwood Road civil and tunnel site (C3).

Work to the west of Homebush Bay Drive would involve construction of the re-routed eastbound cycleway to the north of the M4. This land is currently used for sporting facilities (hockey stadium and tennis centre) associated with Sydney Olympic Park, as well as access roads, car parking and landscaping.

Between Homebush Bay Drive and Saleyards Creek, land use on either side of the existing M4 consists of predominantly industrial or commercial development including the Direct Factory Outlet (DFO) and Ausgrid's Mason Park substation. A small group of residential dwellings is located between Welfare Street and Flemington Road on the southern side of the M4, adjacent to industrial properties.

East of Saleyards Creek, land use on either side of the existing M4 consists of predominantly residential dwellings of varying densities; the majority are detached dwellings. Commercial properties do, however, line Parramatta Road to the south of the M4.

Bill Boyce Reserve is an area of open space which is located to the north of the existing M4. The reserve is accessed off Pomeroy Street and is located between the M4 and residential properties which front Pomeroy Street and Underwood Road. A vegetated corridor (currently consisting of Ismay Reserve and Allen Street Reserve north of Allen Street, and Arnotts Reserve south of Allen Street) is located on the western side of Powells Creek. To the east of Powells Creek is the Bakehouse Quarter, which is a commercial, retail and entertainment precinct.

The Strathfield Guide Hall at 53 Ismay Avenue is located within the project footprint. Two places of worship are located close to the project footprint, at 38 Wentworth Street (60 metres from the project footprint) and 74 Underwood Road (30 metres from the project footprint).

The project would be located predominantly on land within the existing M4 road reserve, which is zoned SP2 Infrastructure under both the Auburn and Strathfield LEPs. The project would also be undertaken within the R3 Medium Density Residential, RE1 Public Recreation and SP2 Infrastructure – Electricity Supply zones. Land use zones in the vicinity of the project under the Auburn and Strathfield LEPs and the Major Development SEPP are described in **Table 12.3** and shown in **Figure 12.1**.

Table 12.3 Land use zones surrounding the Homebush Bay Drive interchange

Land use zone	Location
Auburn LEP	
SP2 Infrastructure	M4 road reserve as well as the western half of Homebush Bay Drive.
Major Development SEPP	
B4 Mixed Use	All land to the north of the M4 west of Homebush Bay Drive within the southern end of Sydney Olympic Park.
Strathfield LEP	
R3 Medium Density Residential	North of the M4 between Saleyards Creek and Powells Creek
R4 High Density Residential	South of the M4 along Park Road between Parramatta Road and Kanoona Avenue
B4 Mixed Use	South of the M4 and generally land that fronts onto Parramatta Road between Kanoona Avenue and Powells Creek
B6 Enterprise Corridor	South of the M4 and north of Parramatta Road between Homebush Bay Drive and Kanoona Avenue
IN1 General Industrial	North of the M4. Includes the DFO
RE1 Public Recreation	A number of areas to the north of the M4, including Bill Boyce Reserve and along Powells Creek
SP1 Special Activities	Sydney Markets on the southern side of Parramatta Road
SP2 Infrastructure – Classified Road	M4 road reserve and Parramatta Road
SP2 Infrastructure – Electricity Supply	Ausgrid Mason Park Substation
SP2 Infrastructure – Rail Infrastructure	Main Western Rail Line, Main North Rail Line and Olympic Park Rail Line
SP2 Infrastructure – Stormwater Management	Saleyards Creek and Powells Creek

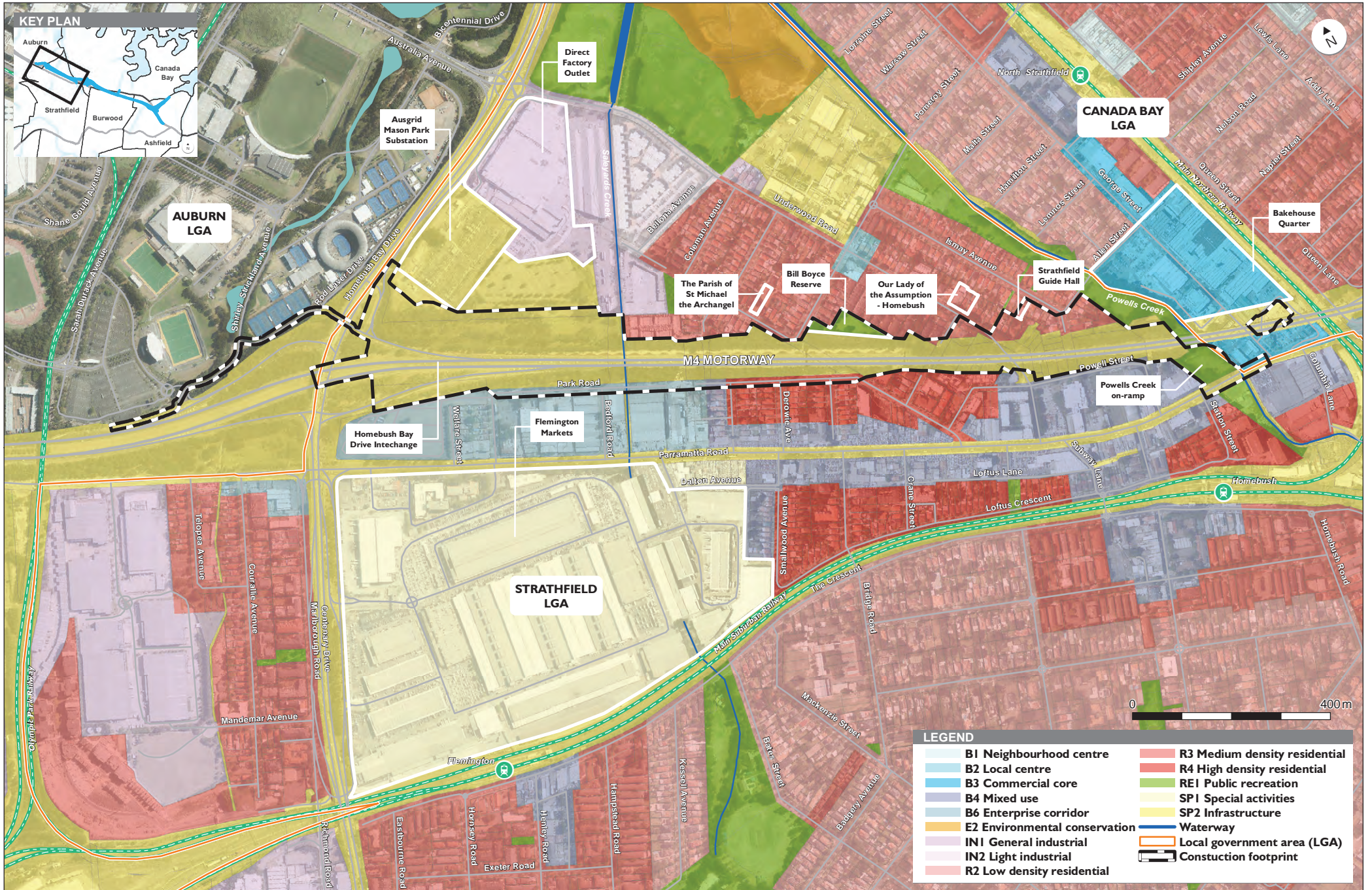


Figure 12.1 Homebush Bay Drive interchange and Powells Creek on-ramp local context

Powells Creek M4 on-ramp and North Strathfield construction car parking

The proposed on-ramp would be located between Parramatta Road and the existing M4 (which is located on a viaduct at this location) on the western side of Powells Creek and south of the existing M4. This land is not currently publicly accessible. The land at the site of the proposed on-ramp is currently vacant and partly vegetated. As part of the Powells Creek Masterplan prepared by Strathfield Council, this land is proposed to be remediated by Council to address previous contamination, then those parts of the site not acquired for the on-ramp would be developed for use as part of a public reserve (proposed to be known as Arnotts Reserve). This site would also be used as a construction ancillary facility (Powells Creek civil site (C4)).

To the north of the proposed on-ramp, beneath and north of the existing M4 viaduct, is the remainder of Arnotts Reserve. Part of this reserve south of Allen Street was recently opened to the public. The remainder of the site is vacant and fenced to prevent public access.

To the west of the proposed on-ramp are commercial and residential land uses, as well as vacant land. To the east of the proposed on-ramp are commercial land uses and land owned and used by NSW Roads and Maritime Services (Roads and Maritime) for car parking. This car park would be used as an overflow car park for construction personnel for the project.

South of the proposed on-ramp, on the southern side of Parramatta Road, are multi-storey residential buildings, including a major mixed use development site (known as the Columbia precinct), and some commercial development.

The on-ramp would be located on land zoned RE1 Public Recreation and SP2 Infrastructure – Classified Road. Land use zones in the vicinity of the project under the Strathfield and Canada Bay LEPs are described in **Table 12.4** and shown in **Figure 12.1**.

Table 12.4 Land use zones around Powells Creek on-ramp and North Strathfield construction car parking

Land use zone	Location
Strathfield LEP	
R4 High Density Residential	Land south of Parramatta Road but not fronting Parramatta Road
B4 Mixed Use	South of the M4 and generally land that fronts onto Parramatta Road between Kanoona Avenue and Powells Creek. Also south of Parramatta Road
RE1 Public Recreation	Corridor to the west of Powells Creek
SP2 Infrastructure – Classified Road	M4 road reserve and Parramatta Road
SP2 Infrastructure – Stormwater Management	Powells Creek south of Parramatta Road
SP2 Infrastructure – Rail Infrastructure	Main Western Rail Line and Main North Rail Line
SP2 Infrastructure – Electricity Supply	Ausgrid Strathfield Substation
Canada Bay LEP	
B3 Commercial Core	Bakehouse Quarter between Powells Creek, Parramatta Road and the Main North Line
SP2 Infrastructure – Classified Road	M4 road reserve
SP2 Infrastructure – Railway	Main North Rail Line

Concord Road interchange and westbound cycleway ramp

The Concord Road interchange would be positioned near where Concord Road crosses the existing M4. In addition to permanent infrastructure, this area would include the Concord Road civil and tunnel site (C5). The new cycleway on-ramp connecting to the existing M4 westbound would be located near Queen Street at North Strathfield, just north of Parramatta Road between the Main North Rail Line and Concord Road.

The interchange and construction ancillary facility are located in a predominantly residential area, which consists of mostly low density detached and attached dwellings. The cycleway on-ramp is surrounded to the north, west and south by the existing M4, the Main North Rail Line and Parramatta Road, with commercial and multi-storey residential development to the east and on the southern side of Parramatta Road.

In the vicinity of the interchange, there are two places of worship: one located on the corner of Concord Road and Sydney Street, and another located on the corner of Carrington Street and Concord Lane. Further to the south of the interchange, there a number of commercial properties on Parramatta Road.

The existing M4 is zoned SP2 Infrastructure – Classified Road, while land fronting Parramatta Road is zoned B6 Enterprise Corridor. All other land impacted by works associated with the interchange are zoned residential (R2 Low Density Residential and R3 Medium Density Residential). Land use zones in the vicinity of the project under the Canada Bay LEP are described in **Table 12.5** and shown in **Figure 12.2**.

Table 12.5 Land use zones surrounding the Concord Road interchange

Land use zoning	Location
R2 Low Density Residential	Generally on the eastern side of Concord Road
R3 Medium Density Residential	Generally on the western side of Concord Road to Napier Street, north of Parramatta Road east of the M4, beyond the B6 zone. South of Parramatta Road near the M4 intersection, beyond the B6 zone
R4 High Density Residential	South of Parramatta Road west of Leicester Avenue
B6 Enterprise Corridor	Generally land that fronts onto Parramatta Road east of the Main North Rail Line
RE1 Public Recreation	Isolated pocket parks including adjacent to the existing M4 westbound on-ramp from Concord Road northbound
SP2 Infrastructure – Classified Road	M4 road reserve
SP2 Infrastructure – Railway	Main North Rail Line

Cintra Park

Cintra Park would be used as a construction ancillary facility (Cintra Park tunnel site (C5)), as well as for permanent operational infrastructure including a water treatment facility, fresh air intake, substation and incident response centre. In addition, an existing unsealed car park on the northern side of Concord Oval would be upgraded and used as car parking for the adjacent construction ancillary facility.

Cintra Park contains a hockey field (including small grandstand), and a stormwater treatment plant that is owned and operated by Canada Bay Council for irrigation. A separate environmental assessment to relocate the hockey field to St Lukes Park on the northern side of Gipps Street has been prepared and determined by Roads and Maritime, and construction of the new hockey field has commenced. The new hockey field would be completed and in operation before construction work at Cintra Park starts.

Land to the north of Cintra Park consists of sporting facilities including ovals, tennis courts and netball courts. To the east, on the northern side of Parramatta Road, land use consists primarily of detached residential dwellings.

Immediately to the west of Cintra Park is Concord Oval, which is the head office and training venue for the Wests Tigers NRL team, the home ground of the West Harbour Rugby Football Club and used by the Inter Lions Soccer Club. Further to the west, land use consists of a mix of attached and detached residential dwellings, multi-dwelling housing and residential flat buildings.

Land fronting Parramatta Road on both the northern and southern sides generally consists of a mixture of commercial and light industrial uses. This includes a Sydney Buses Depot located at the corner of Shaftesbury Road and Parramatta Road. Land further to the south is predominantly detached residential dwellings.

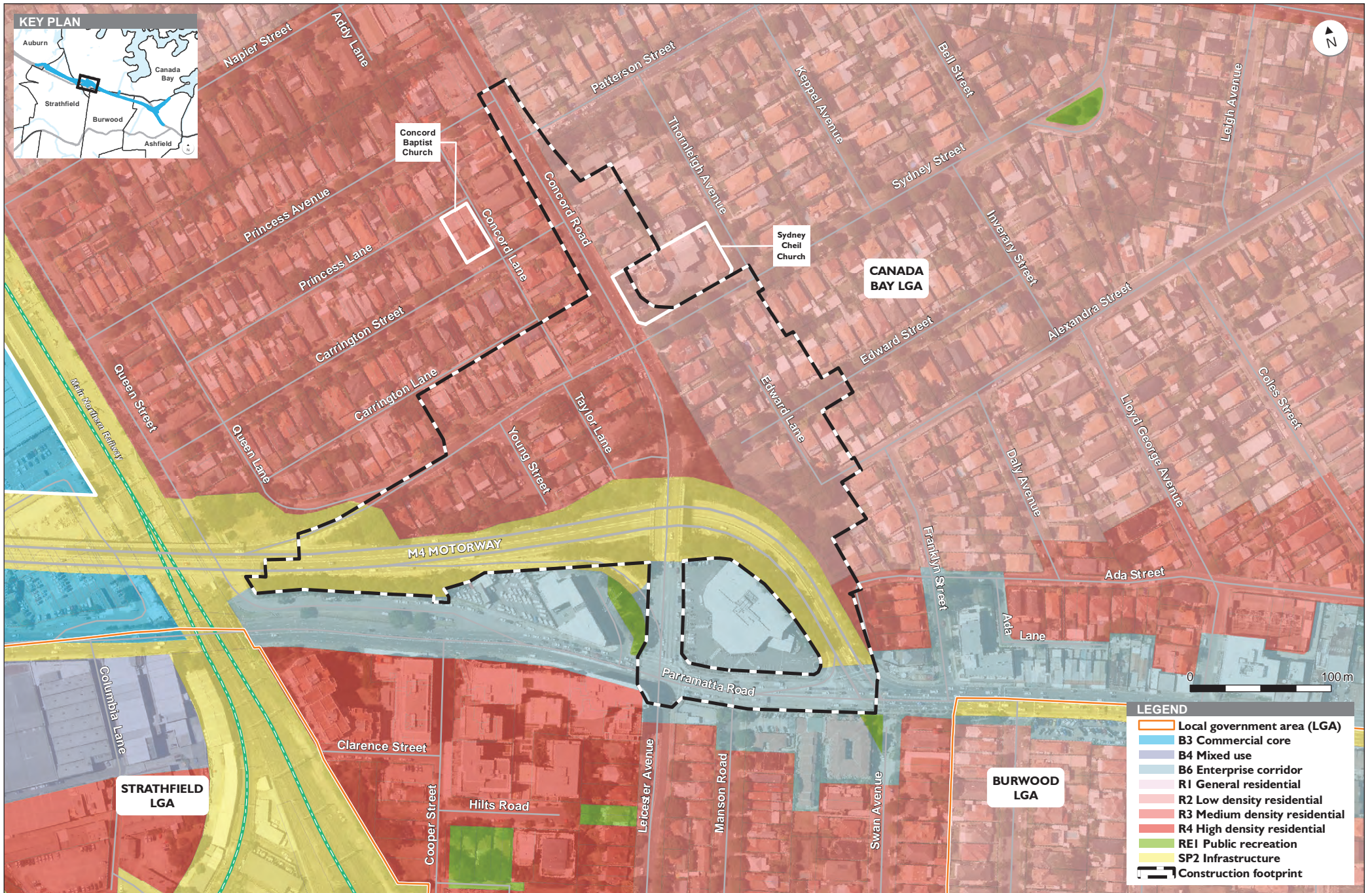


Figure 12.2 Concord Road interchange local context

Work associated with the project at Cintra Park would be carried out on land zoned RE1 Public Recreation. Land use zones in the vicinity of the project under the Canada Bay and Burwood LEPs are described in **Table 12.6** and shown in **Figure 12.3**.

Table 12.6 Land use zones surrounding Cintra Park

Land use zone	Location
Canada Bay LEP	
R2 Low Density Residential	East of Cintra Park and west of Concord Oval
R3 Medium Density Residential	West of Concord Oval and St Lukes Park
B6 Enterprise Corridor	Land fronting Parramatta Road, extending east to Walker Street, and the northern half of the Parramatta Road road reserve in front of these properties
IN1 General Industrial	Land fronting Parramatta Road, east of Walker Street, and the northern half of the Parramatta Road road reserve in front of these properties
RE1 Public Recreation	Cintra Park, Concord Oval and St Lukes Park
Burwood LEP	
R2 Low Density Residential	South of Parramatta Road (except for land that fronts Parramatta Road)
R3 Medium Density Residential	Block bounded by Lucas Road, Princes Street, Cheltenham Road and land that fronts Parramatta Road
B4 Mixed Use	Land that fronts Burwood Road and also land south of Meryla Street and Park Avenue
B6 Enterprise Corridor	Land that fronts Parramatta Road
SP2 Infrastructure	Southern half of the Parramatta Road road reserve

Wattle Street interchange

Work associated with the Wattle Street interchange would extend along Wattle Street from Parramatta Road to Loudon Avenue, mostly on the eastern side of Wattle Street. In addition to permanent infrastructure, this area would include three construction ancillary facilities:

- Northcote Street tunnel site (C7)
- Eastern ventilation facility site (C8)
- Wattle Street and Walker Avenue civil site (C9).

With the exception of land fronting Parramatta Road, this area consists of predominantly residential land uses, comprising attached and detached dwellings and some residential flat buildings. A mixture of commercial and light industrial land uses front onto Parramatta Road.

A place of worship is located on the western side of Wattle Street near the intersection with Parramatta Road, adjacent to the Northcote Street tunnel site (C7). Haberfield Public School is located about 300 metres east of the intersection of Wattle Street and Allum Street. Dobroyd Point Public School is located about 200 metres east of the intersection of Wattle Street and Loudon Avenue. There is a small group of commercial and retail properties on Ramsay Street, at the intersection with Alt Street.

Reg Coady Reserve is an area of open space located on the western side of Wattle Street, north of Martin Street. It forms part of a larger open space corridor which runs along Iron Cove Creek (Dobroyd Canal). A Sydney Water pumping station is located in the south-western corner of the reserve, near the intersection of Martin and Wattle Streets. Algje Park is another area of open space on Ramsay Street, about 300 metres east of Wattle Street.



Figure 12.3 Cintra Park tunnel site local context

Most of the land that would be affected by the project at Wattle Street is zoned residential (R2 Low Density Residential or R3 Medium Density Residential). In addition, work would be undertaken in areas zoned B6 Enterprise Corridor, RE1 Public Recreation and SP2 Infrastructure – Classified Road. Land use zones in the vicinity of the project under the Ashfield LEP are described in **Table 12.7** and shown in **Figure 12.4**.

Table 12.7 Land use zones surrounding the Wattle Street interchange

Land use zone	Location
R2 Low Density Residential	Generally on the western side of Wattle Street, and parts of the eastern side of Wattle Street
R3 Medium Density Residential	On the eastern side of Wattle Street from near Parramatta Road to near Ramsay Street, as well as a small areas near Martin Street
B1 Neighbourhood Centre	North-eastern corner of Ramsay Street and Alt Street
B6 Enterprise Corridor	Generally all land that fronts onto Parramatta Road
RE1 Public Recreation	Along Iron Cove Creek including part of Reg Coady Reserve, and Algie Park on Ramsay Street
SP2 Infrastructure – Classified Road	Parramatta Road, Wattle Street, Dobroyd Parade and Frederick Street road reserves
SP2 Infrastructure – Drainage	Along Iron Cove Creek
SP2 Infrastructure – Educational Establishment	Haberfield and Dobroyd Point public schools

Parramatta Road interchange

Work associated with the Parramatta Road interchange would extend along Parramatta Road, from Bland Street to Orpington Street, mostly on the southern side of Parramatta Road. In addition to permanent infrastructure, this area would be used as a construction ancillary facility (Parramatta Road civil site (C10)).

Land use on Parramatta Road is predominantly commercial and light industrial. Beyond Parramatta Road, land use is generally residential, with predominantly detached dwellings north of Parramatta Road, and a mix of detached dwellings and residential flat buildings south of Parramatta Road.

The following key land uses are located in the vicinity of the interchange:

- Yasmar at 185 Parramatta Road, which is used by Juvenile Justice NSW as a training facility
- Haberfield Public School, on Bland Street to the north of Yasmar
- Former Brescia Furniture site at the corner of Parramatta Road and Bland Street. This site is currently vacant following a fire which destroyed most buildings on the site
- Philip Lodge Motel and Restaurant (a Best Western Motor Inn) located at 156 Parramatta Road
- Ashfield Park and Bowling Club, located at the corner of Orpington Street and Parramatta Road.

There are three child care centres near the construction ancillary facility, with the closest at 183 Parramatta Road, on the northern side of Parramatta Road at the corner of Chandos Street. There are also aged care facilities located at 169-171 Parramatta Road and 84 Orpington Street; the latter adjoins the Parramatta Road civil site. The office building at 154 Parramatta Road includes a spiritual centre run by the Zongde Buddhist Temple community.

The project would primarily affect land zoned B6 Enterprise Corridor. The project would also have an impact on residential zones (R2 Low Density Residential and R3 Medium Density Residential) and SP2 Infrastructure – Classified Road. Land use zones in the vicinity of the project under the Ashfield LEP are described in **Table 12.8** and shown in **Figure 12.4**.

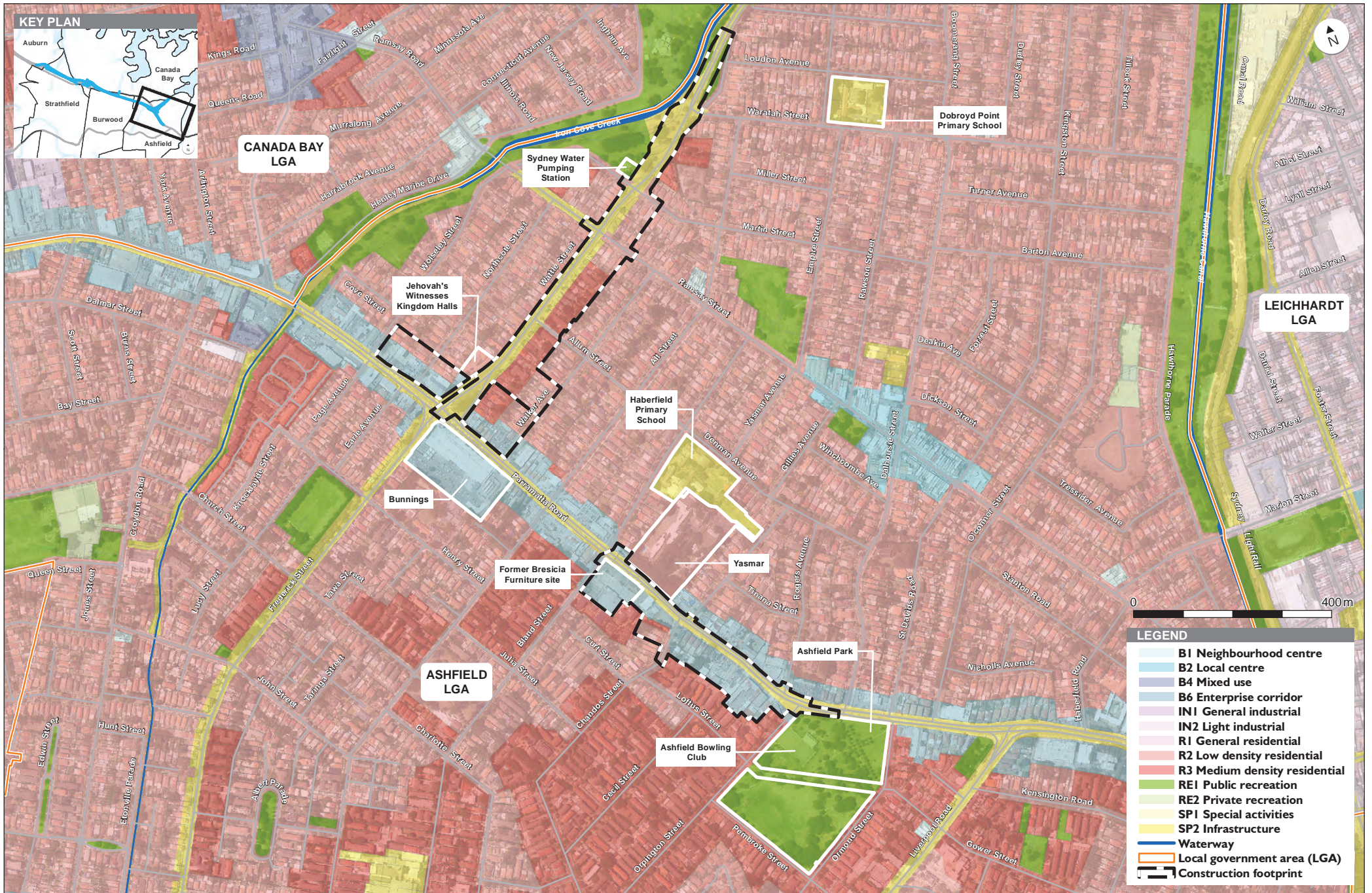


Figure 12.4 Wattle Street and Parramatta Road interchanges local context

Table 12.8 Land use zones under the Ashfield LEP surrounding the Parramatta Road interchange

Land use zone	Location
R2 Low Density Residential	Generally on the northern side of Parramatta Road, beyond the B6 zone
R3 Medium Density Residential	Generally on the southern side of Parramatta Road, beyond the B6 zone
B6 Enterprise Corridor	Generally all land that fronts onto Parramatta Road
RE1 Public Recreation	Ashfield Park
SP2 Infrastructure – Classified Road	Parramatta Road road reserve
SP2 Infrastructure – Educational Establishment	Haberfield Public School

12.2.3 Potential future development

As outlined in **Chapter 3** (Strategic context and project need), the *Draft Parramatta Road Urban Renewal Strategy* (UrbanGrowth NSW 2015) (Parramatta Road Strategy) identifies areas along the corridor where there will be a focus on encouraging growth and changes in the long term (about 20 years).

The project (as part of WestConnex) is identified within the Parramatta Road Strategy as a catalyst for the restoration of the Parramatta Road corridor, because it would remove through traffic from the Parramatta Road corridor. The reduction in through traffic, particularly trucks, would assist in improving public transport and urban amenity, both of which would support future growth along the corridor, in particular residential development.

The Parramatta Road Strategy identifies eight urban renewal precincts located along the Parramatta Road corridor between Granville and the Sydney CBD. Three of these precincts are located in the vicinity of the project: Homebush, Burwood and Kings Bay (Five Dock).

The Homebush precinct is generally located between Homebush Bay Drive, Parramatta Road and the Main North Rail Line. It has been identified for significant future growth given its central location and very good access to transport and employment opportunities in Sydney Olympic Park, Burwood, Parramatta CBD, Rhodes, Macquarie Park and the Sydney CBD, to complement the adjoining Sydney Olympic Park. The Parramatta Road Strategy identifies that the precinct could accommodate areas of high-rise residential development (average of 14 storeys with a maximum of 25 storeys), particularly because it is within walking distance of three railway stations with connection to the wider public transport network. The precinct is projected to have 10,350 to 16,200 additional dwellings by around 2050.

The Burwood precinct is centred on the intersection of Burwood Road and Parramatta Road, extending south towards existing commercial and medium density residential development in Burwood, and north towards Crane Street in Concord. The Burwood precinct has been identified for future growth given its good access to transport, as well as employment opportunities accessible by rail and bus, including Sydney Olympic Park and the Parramatta and Sydney CBDs. The north part of the precinct has also been identified for future growth, given the amenity offered by Kings Bay and its associated network of foreshore open spaces. The Parramatta Road Strategy identifies that the precinct could evolve to support the existing Burwood town centre with business uses fronting Burwood Road to Parramatta Road, surrounded by mixed use/residential development. The precinct is projected to have 4,300 to 6,400 additional dwellings by around 2050.

The Kings Bay (Five Dock) precinct is located along Parramatta Road and Queens Road, generally between Regatta Road and Courland Street. The Kings Bay precinct has been identified for future growth given its very good access to bus services traveling to Sydney CBD and Burwood. The Parramatta Road Strategy identifies that the precinct could evolve to have a residential/mixed use focus, while maintaining the employment lands south of Parramatta Road. The precinct is projected to have 3,200 to 4,200 additional dwellings by around 2050.

Following public display of the Parramatta Road Strategy in late 2014 and early 2015, further planning work is being undertaken by UrbanGrowth NSW to develop the next version of the Parramatta Road Strategy and an Integrated Land Use and Transport Concept Plan. This work is being undertaken in conjunction with the nine collaborating councils along Parramatta Road: Ashfield Council, Auburn Council, Burwood Council, City of Canada Bay, City of Parramatta, City of Sydney, Holroyd Council, Marrickville Council and Strathfield Council. Further discussion on the Parramatta Road Strategy is located in **section 3.1.7** in Chapter 3 (Strategic context and project need).

It is anticipated that the next version of the Parramatta Road Strategy will be released for further consultation in the second half of 2015, subject to Government approval. The mechanism to implement the Parramatta Road Strategy and potentially change local planning controls will be discussed by UrbanGrowth NSW, DP&E and relevant Councils over the coming months. Future statutory planning will be subject to further consultation.

12.3 Assessment of construction impacts

Property and land use impacts would occur from the start of construction and continue through the operation of the project. Property impacts during, or as a result of, construction of the project would include:

- Acquisition of property required for construction and permanent operational facilities, including partial acquisition
- Leasing of property for construction work and facilities
- Changes to property access during construction.

Land use impacts during, or as a result of, construction would include:

- Temporary changes in land use caused by the presence of construction works and facilities
- Potential medium to long term changes to the land use of property that needs to be acquired for construction purposes but which is not required for permanent infrastructure (residual land)
- Impacts on property currently used for community purposes
- Amenity impacts such as noise, air quality, visual and traffic.

Further details regarding the social impacts of property acquisition and amenity impacts associated with the construction and operation of the project are provided in Chapter 14 (Social and economic).

12.3.1 Property and land use impacts

Overview of property impacts

A key driver in the development of the project was the need to minimise impacts on privately owned land through land acquisition and changes in land use. Following public display of the preliminary concept design between November 2013 and February 2014, Roads and Maritime commenced acquisition of some affected properties. While Roads and Maritime has already acquired a number of properties needed for the project, a number of additional properties would also need to be acquired.

Where possible, construction ancillary facilities have been sited on land that is owned by Roads and Maritime or land that would also be required for permanent operational infrastructure, to minimise acquisition of land for construction purposes only.

Property acquisition numbers outlined below are based on the preferred design and would be subject to detailed design, including potential design refinement.

The project would involve full acquisition of 167 properties and partial acquisition of 15 properties: a total of 182 properties comprising private property and land owned by councils, public authorities or the State of NSW. In addition, 10 local road reserves would be acquired and 98 properties owned by Roads and Maritime would be affected by the project.

In addition to land to be acquired, it is anticipated that four properties would be leased during construction. One of these properties would be returned to its owner in its entirety following construction, while the other three would also be affected by permanent partial acquisition (and are included above as properties to be acquired).

All acquisition required for the project will be undertaken in consultation with the affected landowners and subject to the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

A full list of properties to be acquired (either in full or in part) or leased is provided in **Appendix D**. **Figure 12.6** to **Figure 12.10** show the location of property to be acquired and land already owned by Roads and Maritime.

Of the 182 properties to be acquired, 39 properties would be required during construction only and would not contain any operational project components. Four additional properties are only partially required for operation. These properties have been grouped into 15 residual land areas, which are shown in **Figure 12.6** to **Figure 12.10**. The areas of residual land are outlined in **Table 12.9** in **section 12.3.1**.

Following construction, Roads and Maritime would investigate the appropriate use of any residual land. Where feasible, residual land not required for operational project components would be made available for redevelopment. The future use of this residual land would be subject to separate assessment and planning approval.

In addition to the 291 properties affected by surface works, land (or interests in land such as easements) below the surface of the ground would be acquired. This is called subsurface acquisition and is illustrated in **Figure 12.5**. About 700 properties would be affected by subsurface acquisition.

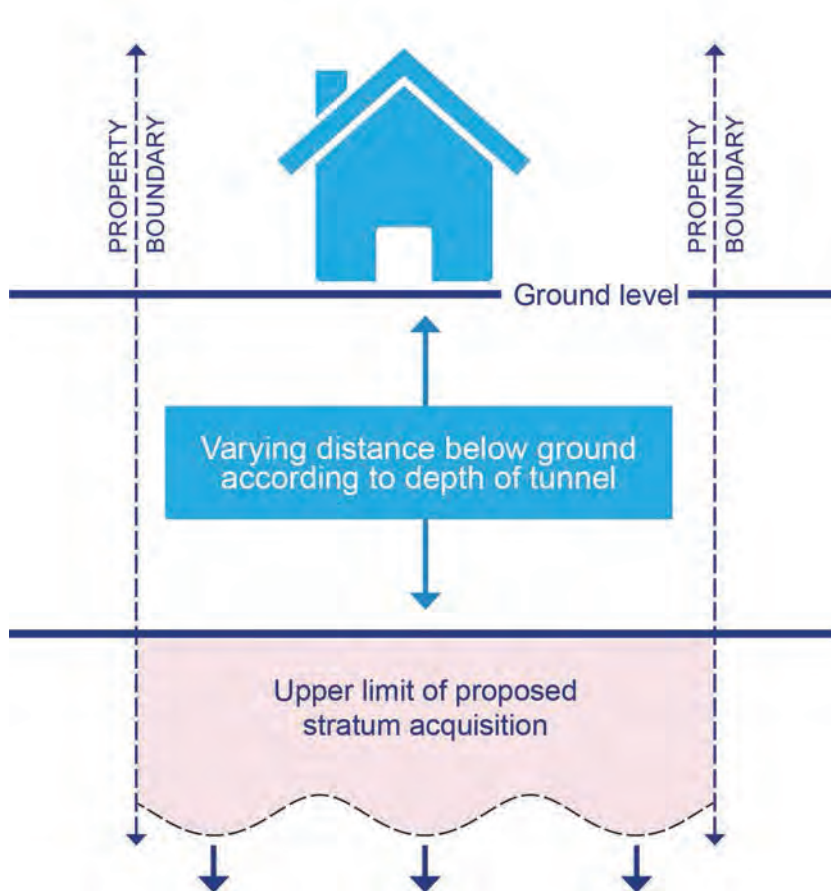


Figure 12.5 Example of sub-surface stratum acquisition

The *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) provides that compensation is not payable for the majority of subsurface acquisition of land or easements, unless specific circumstances as detailed in that Act apply. Appendix C of the Roads and Maritime *Land Acquisition Information Guide* (Roads and Maritime 2014d) sets out in detail the compensation provisions of the Act relating to subsurface acquisition.

Land affected by subsurface acquisition is shown in **Figure 12.11** to **Figure 12.17**.

Overview of land use impacts

The existing land use of properties to be fully acquired is as follows:

- 142 residential properties containing 168 dwellings including:
 - 95 residential properties containing 104 dwellings
 - 57 dwellings located within nine residential flat buildings
 - Six townhouse dwellings located on a single residential property.
- One property containing the Strathfield Guide Hall
- 23 commercial properties containing 20 commercial buildings. 11 of these commercial properties are vacant
- One property containing part of Reg Coady Reserve.

The existing land use of properties owned by Roads and Maritime is as follows:

- 39 residential properties containing 34 dwellings
- Four dwellings located within residential flat buildings
- 42 properties used for road reserves (mostly part of the existing M4)
- Six properties formally used as open space adjacent to Concord Road
- Seven properties used for car parking beneath the existing M4 at North Strathfield
- Two properties used for the Bland Street pedestrian overbridge at Ashfield
- Two vacant lots.

In most cases, subsurface acquisition would not affect the future use of property at the surface. Subject to Council regulations and approvals, property owners would generally be able to:

- Carry out improvement such as installing a swimming pool
- Dig deeper foundations for a new building, second storey additions, etc
- Undertake property development.



Figure 12.6 Property acquisition and residual land - Map 1



Figure 12.7 Property acquisition and residual land - Map 2



Figure 12.8 Property acquisition and residual land - Map 3



Figure 12.9 Property acquisition and residual land - Map 4

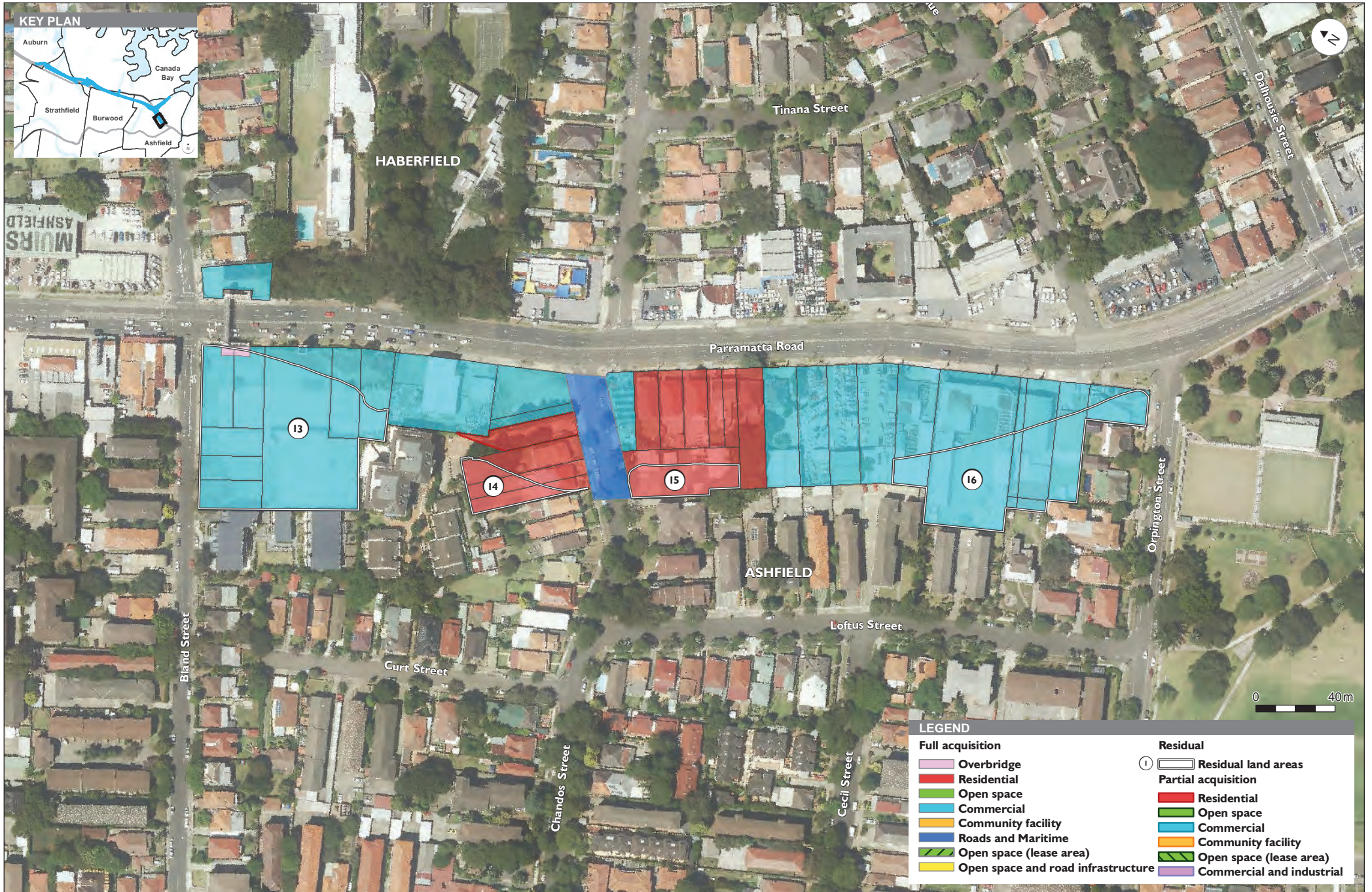


Figure 12.10 Property acquisition and residual land - Map 5



Figure 12.11 Subsurface acquisition Map 1