

EDMONDSON PARK SOUTH

PART 3A APPLICATION -

STAGE 1 PROJECT APPLICATION

UTILITY SERVICES – INFRASTRUCTURE REPORT



Prepared for:

LANDCOM

August, 2010

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Edmondson Park South Part 3A Stage 1 Project Application
Utility Services – Infrastructure Report

- DOCUMENT CONTROL SHEET -

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EXECUTIVE SUMMARY

This Utility Services Infrastructure Report has been prepared by J Wyndham Prince to accompany a Project Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) for Stage 1 of Edmondson Park South.

Landcom is proposing to deliver a new diverse and sustainable urban community at Edmondson Park South. Once complete, Edmondson Park will accommodate a mix of land uses, a diversity of housing (approximately 3,200 dwellings), a new town centre incorporating 35,000 – 45,000m² retail, business and commercial floor space with employment opportunities for 1,000 people, multi-purpose community and education facilities, a new 150 hectare Regional Park, a number of other local parks and environmental conservation areas.

The new urban community at Edmondson Park South will meet the State Government's objectives to increase housing supply, provide community benefits and create jobs.

The Edmondson Park South project is the subject of a Part 3A Concept Plan and proposal to list Edmondson Park South as a State significant site under SEPP Major Development 2005. The purpose of the Concept Plan is to secure statutory approval for the overall planning framework for the site and to further resolve a number of remaining site-wide infrastructure delivery and land use planning issues. The Stage 1 Project Application (submitted concurrently with the Concept Plan) relates to early works, infrastructure and subdivision for the initial phases of the development and will enable site works to begin in 2010.

In this regard the following is a summary of the consultation process, the information derived and the outcomes to be applied specifically to the planning implementation of Stage 1 being the 221 lots of Edmondson Park South.

Potable Water

As there is adequate capacity within the existing potable water network to service 250 – 300 lots, there will be no need for lead in water main works to fully service Stage 1

The servicing of all lots within Stage 1 will be by way of extension of the network by normal in street pipe reticulation from MacDonald Road to connections within each proposed new allotment.

Recycled Water

All lead in recycled water infrastructure will be delivered by Sydney Water within a timeframe which services all Stage 1 lots.

Landcom will service each individual future allotment by extension of the recycled water pipe network by normal in street reticulation from MacDonald Road to connections with each proposed lot.

Sewer

There is no existing sewer available to the Stage 1 site. The subdivision and creation of Stage 1 lots will be subject to Sydney Water's issue of a Section 73 Certificate which will be dependent on the extension of the existing sewer network (Maxwell's Creek Carrier) from the Ash Road Carrier. This main is 2900m downstream adjoining Camden Valley Way.

Having constructed this sewer lead in main the servicing of Stage 1 lots will be by means of normal gravity pipe and access chamber networks.

The servicing of the proposed Environmental Living lots within Stage 1 will be serviced by sewer by a connection to existing sewer adjoining the M5 to the south of the site.

The sewer carrier main design approval process with Sydney Water will be extensive and subject to Landcom securing written permissions to enter from all affected property owners.

Electricity

There is inadequate existing electrical supply with Edmondson Park South to service Stage 1 lots.

Integral Energy has agreed to the electrical servicing of the Stage 1 lots subject to Landcom undertaking the following.

- Construction of HV lead in mains from the Prestons Zone Substation to the site of the proposed Town Centre via Croatia Avenue. (3070km).
- Resolving an agreement as to the location and transfer of a suitable parcel of land to accommodate the required zone substation in close proximity to the Town Centre.

Subject to addressing these items Stage 1 lots will be provided with electrical servicing by way of extension of the HV and LV cabling network by normal reticulation from MacDonald Road to a connection within each new allotment.

Telecommunications

In order to satisfy the Federal Governments National Broadband Network (NBN) policy it will be necessary for Landcom to enter into an agreement with Telstra and/or another suitable telecommunications provider to make arrangements to extend the existing optical fibre network to service connections to each new allotment within Stage 1.

Gas

There is existing mains with capacity to service Stage 1 within MacDonald Road. Each new allotment will be serviced with a gas connection by extension of the existing reticulation network from MacDonald Road.

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Edmondson Park South Part 3A Stage 1 Project Application
Utility Services – Infrastructure Report

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1 INTRODUCTION

The new urban community at Edmondson Park South will meet's the State Government's objectives to increase housing supply, provide community benefits and create jobs.

The purpose of the Concept Plan is to secure statutory approval for the overall planning framework for the site and to further resolve a number of remaining site-wide infrastructure delivery and land use planning issues. The Project Application (submitted concurrently with the Concept Plan) for early works, infrastructure and subdivision relating to the initial phases of the development will enable site works to begin in 2010.

1.1 The Site

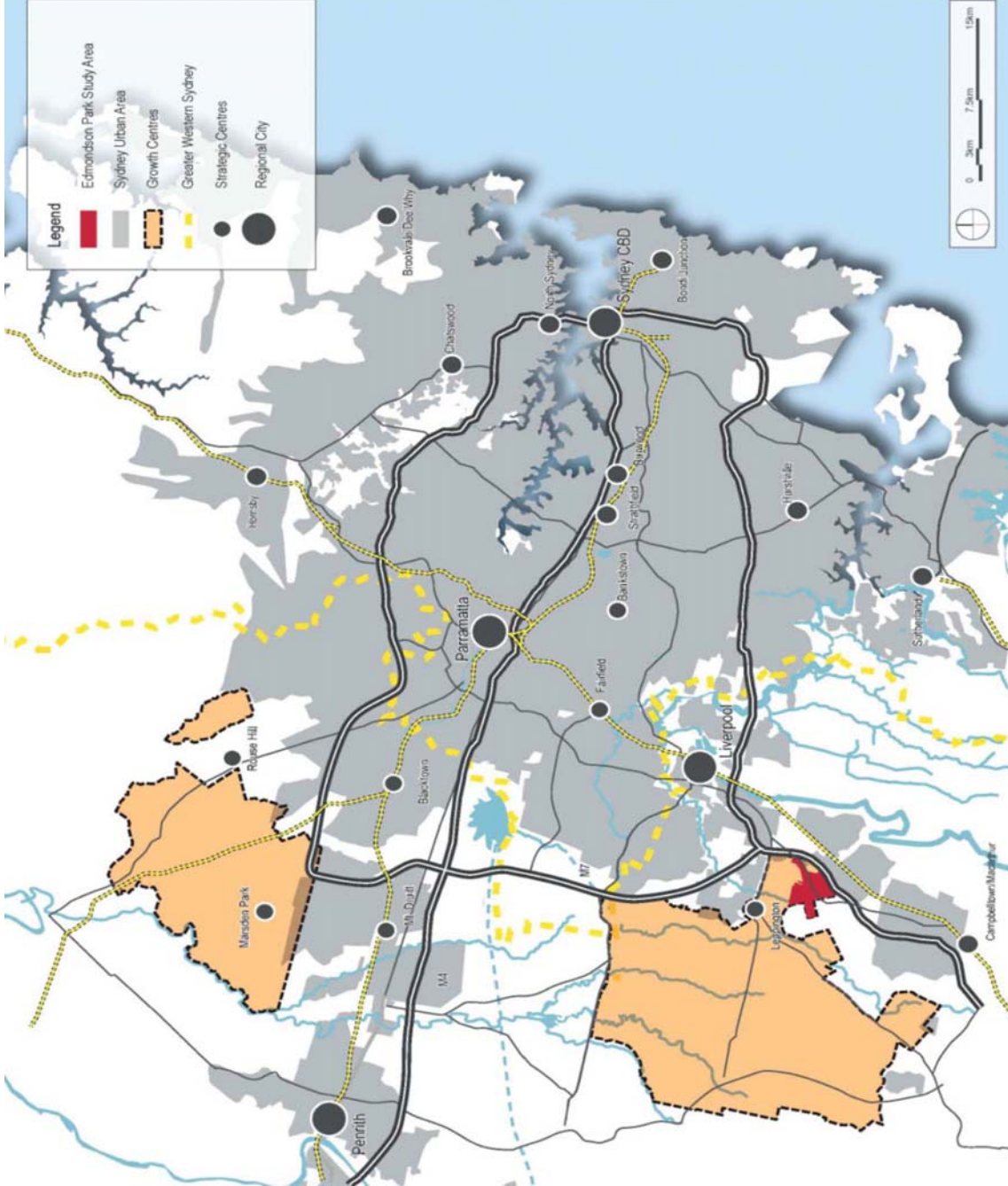
The Stage 1 Project Application site comprises an area of approximately 40 hectares and forms part of the larger Edmondson Park Release Area within the South West Growth Centre. It is located within the southernmost portion of the larger development site to the north of the M5 Motorway and to the east of Zouch Road and is approximately 40 km to the south west of Sydney CBD. The site is wholly located within the Campbelltown LGA.

Refer to Location Plans - Figures 1, 2 and 3

The Stage 1 Project Application

The Concept Plan establishes the overall planning framework for the site, including:

- land use type and distribution
- a mix of housing types and densities (approximately 3,200 dwellings)
- concept location of and approximately 35,000 – 45,000 m² of retail / business / commercial floor space within the new Edmondson Park Town Centre
- identification and location of open space and drainage corridors, environmental conservation lands (to form the new Regional Park), and local active and passive recreation facilities, including levels of embellishment
- expanded Ingleburn North Primary School and new combined Primary/High School to the north of the site
- road network layout
- pedestrian and cycleway network layout
- pedestrian bridge over the south western railway
- Campbelltown Road corridor including the establishment of key intersection locations and configuration
- utilities (including power, telecommunications and gas), infrastructure strategy, potable water strategy, sewer concept plan and water cycle management plan
- location and dimensions of Bushfire Asset Protection Zones
- appropriate interpretation of European and Aboriginal heritage located on the site;
- erection of signage and billboards
- remediation works
- decommissioning of the existing Sewerage Treatment Plant (STP)
- demolition



Dwg Name: Metropolitan Context
Date: 23 Aug 2010



Figure 1 - Location Metropolitan Context

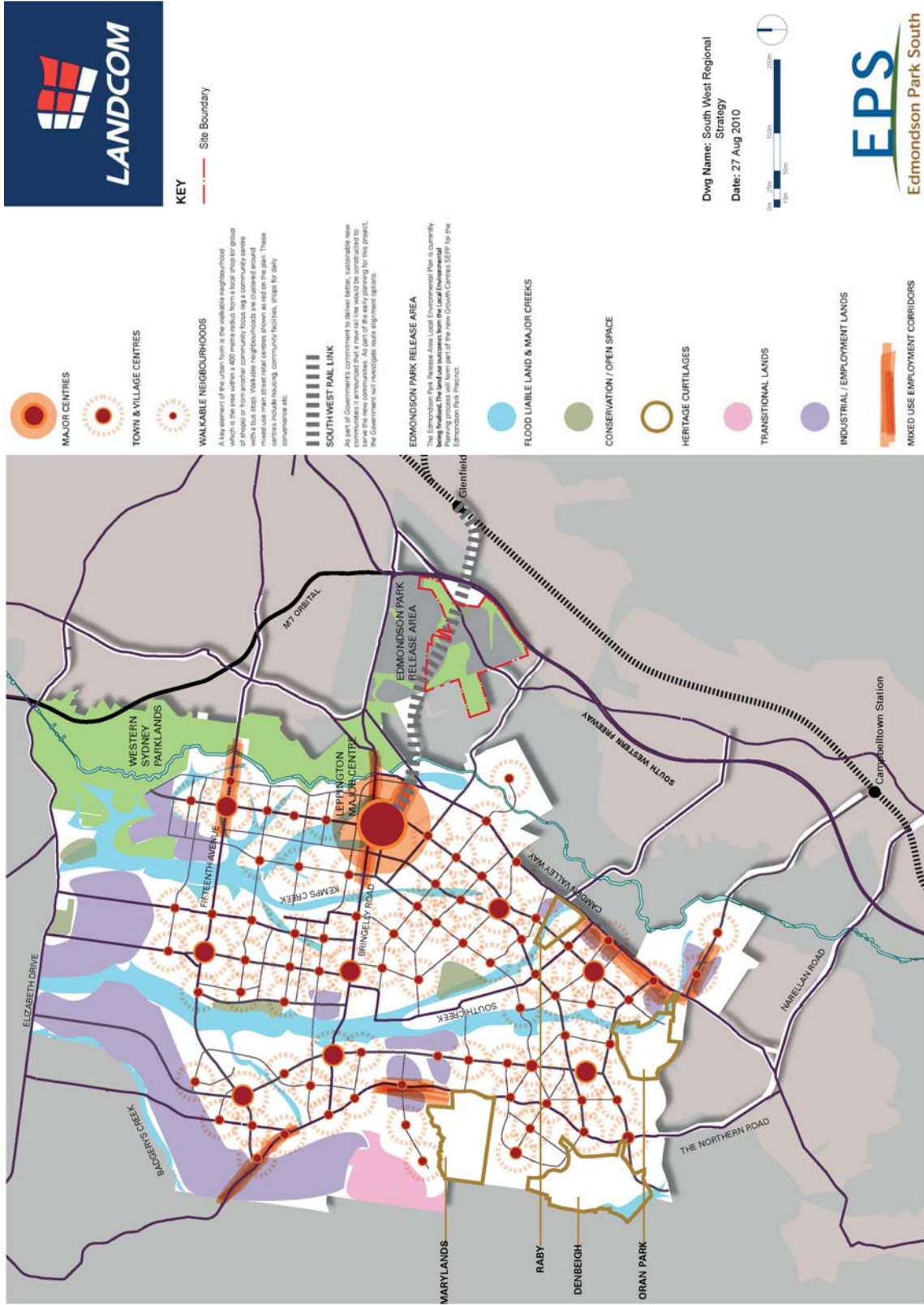


Figure 2 – Location South West Regional Strategy

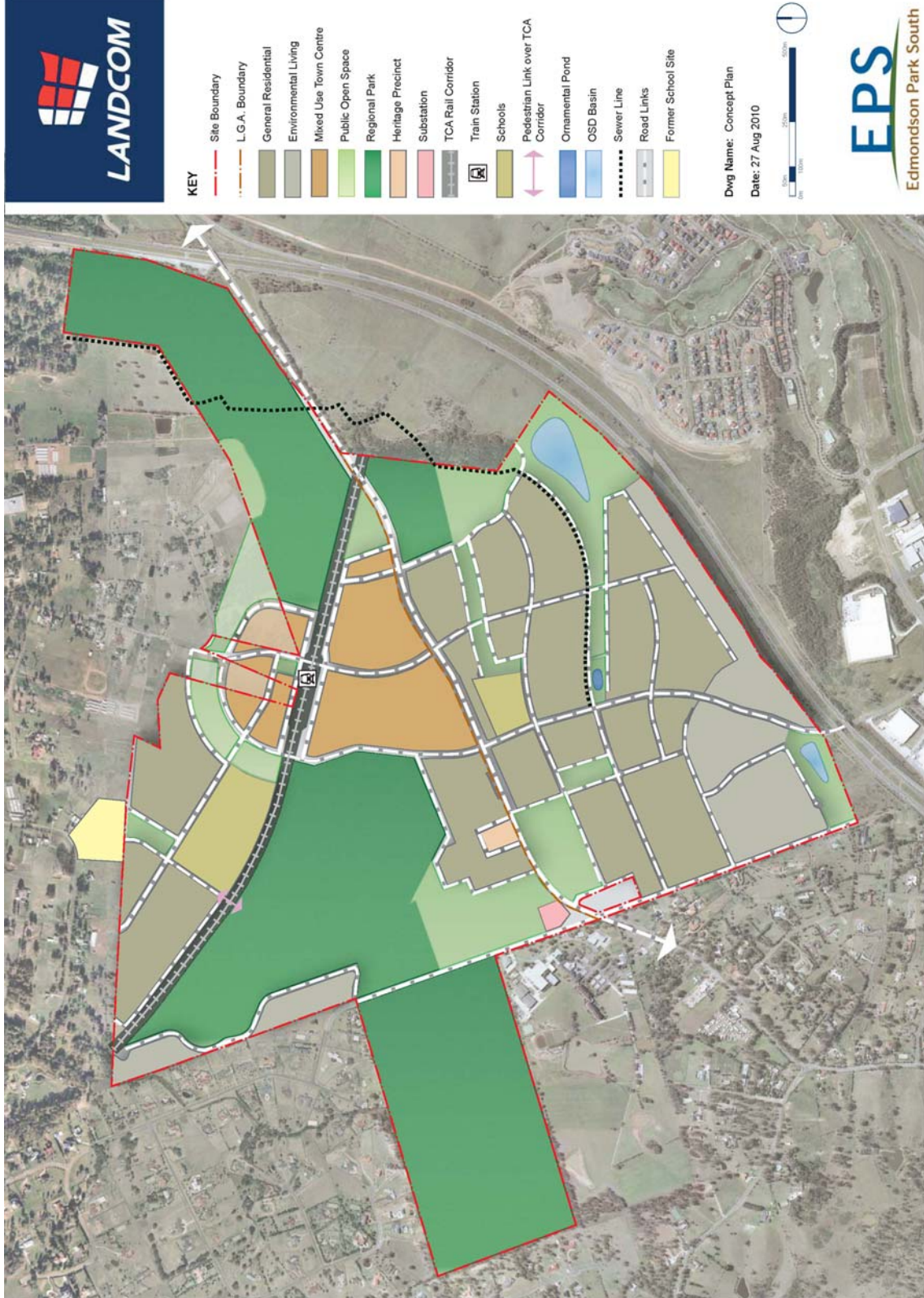


Figure 3 – Concept Plan

The Concept Plan also sets out an approval framework that will enable the carrying out of the works necessary to remediate the site in accordance with a Remediation Strategy without the need for undertaking further environmental assessment.

A variety of housing types is proposed to be delivered. This will provide for a range of housing price points and will include moderate income housing and housing for seniors. It is proposed to develop the Edmondson Park site progressively in stages over a 15-20 year period. The Concept Plan will address the staging and delivery of the overall development having regard to the progressive delivery of necessary infrastructure, services and facilities; and market demand.

The Concept Plan is accompanied by a proposal with respect to the future developer contributions framework for the provision of local facilities and services within the Liverpool and Campbelltown LGAs as well as State Infrastructure.

Project Application

The residential subdivision Project Application comprises:

- the creation of 206 residential lots, 8 super lots for future subdivision 15 Environmental Living lots and 3 lots for dedication to Campbelltown City Council as Public Reserve in 5 stages
- the dedication of roads to Campbelltown City Council
- On-site works comprising
 - tree removal
 - earthworks including excavation, cut and fill
 - design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, establishment of open space areas
 - retaining walls as determined during detailed design
 - design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site
 - demolition of all existing structures
 - erosion and sediment control to areas of roadworks and bulk earthworks including provision of temporary sedimentation ponds and diversion drains
 - Design and construction of an ornamental pond
 - Landscaping of road reservations
 - erection of signage and billboards; and
 - Embellishment of open space
- Off-site works comprising
 - construction of the sewer lead in from the Sydney Water carrier main at Ash Road
 - upgrade of overhead mains and construction of electrical lead-in feeders from the existing zone substation at Prestons
 - connection to utility services, potable and recycled water, electricity, gas and telecommunications in Campbelltown and MacDonald Roads

- Connection to existing stormwater drainage
- tree removal
- earthworks including excavation, cut and fill
- design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, including the connection to the existing MacDonald Road
- design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site
- erection of an acoustic wall
- erection of signage and billboards
- extension or relocation of existing services including potable and recycled water, gas, telecommunication, power
- demolition of all existing structures
- Proposed new intersection to existing Macdonald Road

It is intended to seek staged Construction Certificates as necessary to facilitate the efficient delivery of each phase of, the development works.

The first stage residential Project Application will include the proposed construction of a gravity sewer line through the future Regional Park.

1.2 Planning Background

The Edmondson Park Release Area, including the site, has been the subject of broad strategic planning investigation and environmental assessment over a number of years by Liverpool and Campbelltown City Councils, the Department of Planning, the Department of Defence (the current landowner of the Ingleburn Army Camp) and Landcom (owner of certain lands).

The whole of the Edmondson Park Release Area has been released for urban development by the Minister for Planning. Part of the site; the Ingleburn Army Camp, is currently the subject of a 'delayed' rezoning for urban purposes under Liverpool Local Environmental Plan 2008 and Campbelltown (Urban Area) Local Environmental Plan 2002.

In June 2010 the Minister for Planning considered a Preliminary Assessment Report for the Edmondson Park South Project that provided justification for the planning, assessment and delivery of the project to occur under Part 3A of the EP&A Act, having regard to the demonstrated contribution that the project will have to achieving State and regional planning objectives.

Subsequently, on 23 July 2010, pursuant to Clause 6 of SEPP Major Development, the Minister for Planning formed the opinion that the Edmondson Park Project constitutes a Major Project to be assessed and determined under Part 3A of the EP&A Act, and also authorised the submission of a Concept Plan for the site. In doing so, the Minister also formed the opinion that a State Significant Site (SSS) study be undertaken to determine whether to list the site as a State Significant Site in Schedule 3 of SEPP Major Development.

The Part 3A process under the EP&A Act allows for the Edmondson Park South Project to be planned, assessed and delivered in a holistic manner, with a uniform set of planning

provisions and determination by a single consent authority. Given the scale of the proposal, the Concept Plan and SSS listing provide the opportunity to identify and resolve key issues such as land use and urban form, development staging, infrastructure delivery and environmental management in an integrated and timely manner.

This report has been prepared to fulfil the Environmental Assessment Requirements issued by the Director General for the inclusion of the Edmondson Park site as a State Significant Site under SEPP Major Development, and for a Concept Plan approval for the development.

Specifically, this report addresses the following requirements:

In accordance with the Director General's Requirements this Utility Services Infrastructure Report has been prepared following consultation with the following agencies:

- | | |
|-------------------|------------------------------|
| • Landcom | - Overall Scope and Planning |
| • Sydney Water | - Potable Water |
| | - Recycled Water |
| | - Sewer |
| • Integral Energy | - Electricity |
| • Telstra | - Telecommunications |
| • Jemena | - Gas |

For discussion of the consultation process and outcomes please see Section 4 of this Report. In this regard we also understand that Landcom has prepared a separate Consultation Report as part of the part 3A Application.

1.3 Director General's Requirements

Whereas this specific report relates only to Utility Services Infrastructure, J Wyndham Prince has included below comment on the relevant responses to all elements of Infrastructure as specified with the Director General's Requirements (DGRs). The aim of this section is to direct the reader to the relevant sections of this report of the other reports where the specific DGRs have been addressed.

Table 1.1 List of DGRs addressed in this report

LIST OF DGRS BEING ADDRESSED BY THIS REPORT	
General Requirements	(8) report from a quantity surveyor identifying the capital investment value of the Concept Plan and Project Applications including the estimated cost of future development.
	<i>JWP has prepared and certified estimates of Construction Costs under separate cover the Capital Investment Value Report to be included in the Part 3A application</i>
Key Requirements	Assessment Traffic/Transport
	(2)(d) vehicular access options for adjoining sites;
	<i>Response - A proposed vehicular access has been proposed on the Masterplan through to</i>
	<i>• northern Edmondson Park via MacDonald Rd &</i>

	<p><i>Croatia Avenue,</i></p> <ul style="list-style-type: none"> • <i>Ingleburn Gardens via the open space road along the southern most riparian/open space corridor,</i> • <i>Existing Ingleburn industrial zone via MacDonald Rd,</i>
	Utilities
	(1) Prepare a utility and infrastructure servicing report and plan for the site in consultation with relevant utilities providers to:
	(a) identify existing utilities and infrastructure such as the supply of water, sewerage, stormwater, gas, electricity and telephone services.
	<i>Response – see Section 5 and Figure 5 of this report covering all services including recycled water</i>
	(b) assess the capacity of utility infrastructure to service the proposed development in conjunction with existing uses, proposed uses and potential future uses (including fire suppression).
	<i>Response – see Section 5 and 6, especially but not limited to SWC bulk water and water pressure limitation, electrical supply limitation etc</i>
	(c) demonstrate compliance with the requirements of any public authorities in regard to the connection to, relocation and/or adjustment of services affected by the development proposal.
	<i>Response – see Section 6, especially but not limited to Integral substation requirements, SWC supply RL limitations etc.</i>
	(d) Detail technologies which may reduce the demand or need for servicing or provide for the supply of sustainable services (such as water sensitive urban design measures and sediment control measures).
	<i>Response – see Section 6, especially but not limited to SWC leak tight system technology and water quantity and quality infrastructure. Recycled water to reduce demand on potable water. See J Wyndham Prince Engineering Plans for details of WSUD and SWM controls.</i>
	(e) Justify any staging of proposed infrastructure works.
	<i>Response – see Section 7, especially but not limited to SWC bulk water to dwelling number limitation and Integral dwelling supply limitation due to lack of a zone substation south of SWRL corridor,</i>
	(2) Clearly identify the proposed location of any new utilities and infrastructure and justify any changes to Sydney Water's existing

	trunk servicing scheme.
	<i>Response – see Section 7, especially but not limited to water and wastewater infrastructure augmentation/upgrades and Integral's zone substation requirements,</i>
	(3) Prepare an Integrated Water Management Plan to identify any alternative water supply, water sensitive urban design, and any other water conservation measures.
	<i>Response – see Section 6, especially but not limited to SWC recycled water supply to assist in demand on potable water. See separate J Wyndham Prince Water Cycle Management Report for details of WSUD and OSD</i>

Table 2.2 List of DGRs supported in this report

LIST OF DGRS BEING SUPPORTED BY THIS REPORT		
Key Requirements	Assessment	Surface water, groundwater quality and riparian corridors
		(1) Assess any potential impacts of proposed development on hydrology and hydrogeology of the site and adjacent areas in terms of impact on water quality having regard to environmental targets for new urban development set out in Managing urban stormwater: environmental targets – Consultant draft (DECC in association with the Sydney Metropolitan CMA, October 2007). In particular, identify how any potential water quality impacts on wetlands both within and adjoining the site, and the ecological values of the Regional Park, will be avoided, mitigated or managed.
		<i>Response – The primary response to this DGR will be contained within both the JWP WCM and Riparian Corridor assessment with regard to WSUD treatments such as sediment basins and raingardens, however with respect to utility servicing the removal of the DoD STP, associated holding ponds and trickle discharge to Maxwell Creek with replacement by a leak tight sewer system to serve new properties as well as existing dwelling, albeit after a short duration and isolated construction activity, will provide medium and ongoing benefits for the ecological values of the regional park.</i>
		(3) Identify drainage and stormwater management infrastructure, including: on site detention of stormwater; water sensitive urban design (WSUD); and drainage infrastructure. Identify the future management and ownership arrangements for stormwater infrastructure, and identify how any requirements of the future owner will be met.
		<i>Response – The primary response to this DGR will be contained within both the JWP WCM and Riparian Corridor assessment, however it is proposed that after a suitable agreed period, whereby the maintenance and management</i>

	<i>function will be initially undertaken by Landcom, ongoing ownership of the infrastructure maintenance of the infrastructure will be passed to the relevant Council authority and funded through rates. Critical to the success of this transfer of ownership and maintenance will be the establishment of parameters for infrastructure design and delivery agreed by both Landcom and the relevant Council.</i>
	Bushfire Risk Assessment
	(1) Provide an assessment against the current version of Planning for Bush Fire Protection 2006, including the proposed location of, and ongoing management arrangements for Asset Protection Zones.
	<i>Response – The primary response to this DGR will be contained within the Bush fire report by Brian McKinlay</i>
	Traffic/Transport
	(1) Identify a road layout and design which is responsive to existing and proposed land uses including providing linkages to key destination points such as centres, employment lands, and recreation areas, within and surrounding the site. In particular identify the future design of Campbelltown Road having regard to potential heritage and ecological impacts, location of utility infrastructure, urban design considerations, and impact on school sites and open space areas.
	<i>Response – The road layout and design has been detailed with AECOM's Traffic and TMAP Report. This layout has been prepared.</i>
	(2) Prepare a Traffic Management and Accessibility Plan (TMAP) in accordance with the Draft Interim Guidelines for Transport Management and Accessibility Plans(NSW Transport) to identify:
	<i>Response – The primary response to this DGR will be contained within the AECOM TMAP below, with supporting references as per the response to (c) and (f).</i>
	(c) regional and local intersection and road improvements together with priority works to support efficient bus access;
	<i>Response – The primary response to this DGR will be contained within the AECOM TMAP.</i>
	(f) the implications of the proposed development for non-car travel modes (including public transport, walking and cycling);
	<i>Response – The primary response to this DGR will be contained within the AECOM TMAP</i>

2 METHODOLOGY

This report has been prepared by J Wyndham Prince to accompany the Part 3A application for Edmondson Park South Stage 1 Project Application to the Department of Planning. Its aim is to demonstrate that the following key steps have been considered and addressed throughout the development and preparation of the Stage 1 Project Application to which Landcom is seeking approval.

- Services Search and review of existing data
- Consultation with relevant utility service authorities
- Investigation into nature and extent of existing services
- Impact of servicing requirements under the strategic planning and urban design processes
- Detail of nature and extend of utility services augmentation works required to adequately service the release area
- Staging and funding implications in the delivery of the regional infrastructure

3 SCOPE

Due to the timing constraints in the preparation of this report the scope of the investigation and reporting to date has been limited to the following.

- Dial Before You Dig services searches
- Formal meeting with each of the utility service authorities including:
 - Sydney Water
 - Integral Energy
 - Telstra
 - Jemena
- Assessment of existing services including constraints and opportunities
- Assessment of future services requirements to deliver
 - a. Stage 1 – 221 lots
- Assessment of implications on planning layouts, staging and funding requirements
- Level of future negotiations and approvals required

4 CONSULTATION

In view of the objectives stated in the above methodology and the limits of the above scope the following items discuss the consultation held with each of the utility service authorities.

4.1 Sydney Water (SWC)

Several meetings have been held with Sydney Water with regards to the services of potable Water, recycled water and sewer.

The matters of water supply have been relatively conclusive and the details offered as to the availability of existing services and the requirements of augmentation works have been considered in the planning processes and detailed in the following sections of this report.

With regard to recycled water secondary discussions were held with SWC to agree upon the planning and design requirements for adjustment to the proposed alignment for the lead in recycled water main. It has been agreed that the alignment can be adjusted and Landcom will accommodate the planning approval for the section with the Town Centre as Part of its Part 3A Concept Plan Application.

A number of meetings have been held with SWC with regard to sewer lead in main requirements. Landcom has a strong desire to avoid the cost and item impacts of complying with Sydney Water's previous plan to adopt a Sewer Pumping Station option to drain South Edmondson Park.

Following investigations and negotiations SWC has agreed in principle to the proposal of a gravity sewer main option which crosses the proposed regional park subject to the written concurrence of DECCW, full servicing of Ingleburn Gardens and compliance with all SWC design guidelines and requirements.

4.2 Integral Energy

Formal meetings have been held with Integral Energy to determine details of the capacity for its existing infrastructure and its requirements with regard to providing immediate supply to the initial Stage 1 lots as well as to the long term requirements to service all of the Edmondson Park South Release Area.

Integral Energy has indicated that there is little capacity to service any of the Stage 1 lots and that its highest priority is to resolve an agreement with Landcom as to the location of the future zone substation in close proximity to the Town Centre.

Integral Energy has agreed that Stage 1 can be serviced in the short term by HV lead in mains from Prestons via Croatia Avenue subject to reaching an agreement on the transfer of the zone substation site.

In the longer term Integral Energy will plan for and construct HV transmission mains to adequately energise the zone substation to service all of the future 3200 Edmondson Park South properties.

4.3 Telstra

General discussions have been held with Telstra representatives along with utility service searches to establish that the site has extensive copper telecommunications cabling available. However in accordance with National Broadband Network (NBN) policy there will be a need for Landcom to enter into an agreement with Telstra and/or another private

telecommunications provider to upgrade all services to fibre with the intention of replacing all existing cabling.

4.4 Jemena

Discussions have been held with Jemena to determine that there is adequate gas supply infrastructure within the Campbelltown Road / MacDonald Road frontages to ensure gas supply to all future proposed properties by means of normal reticulation within the future road alignments.

The existing gas main within MacDonald Road will need to be reconstructed when that road is realigned in future stages.

5 EXISTING UTILITY SERVICES

Having undertaken services searches and consultation with the respective utility service authorities the following is a description of the nature and extent of existing services.

5.1 Potable Water

- There are two existing reservoirs within relative close proximity to Edmondson Park South being
 - Minto Reservoir
 - Raby (Denham Court) Reservoir
- At present the site is serviced with water supply from the Minto Reservoir via a 150mm carrier main along Campbelltown Road
- Sydney Water advised that this existing supply main has the capacity to service approximately 250-300 additional dwellings within Edmondson Park South
- Due to water pressure limitations all of those 250-300 Stage 1 dwellings will need to be located at an elevation below RL75mAHD
- For details of the locations of the existing reservoirs and potable water supply mains and restrictions please see Figure 4 of this report

5.2 Recycled Water

At present there is an existing recycled water main within the Campbelltown Road reserve for the full length of the site.

- It is understood that some sections of this main are in an alignment which will necessitate partial reconstruction due to conflict with future road infrastructure
- Sydney Water has advised that there will be adequate supply of recycled water to service all of the future Edmondson Park South properties in both the short term and long term
- For details of the existing recycled water infrastructure please see Figure 5 of this report

5.3 Sewer

Investigations into Sydney Water's mapping and planning documentation reveal that the closest existing sewer carrier main to the site is the Ash Road Carrier adjoining Camden Valley Way and being approximately 2800m downstream along Maxwell's Creek.

- Ingleburn Gardens Estate adjoining the site is currently service by means of a temporary sewer pumping stations which delivers effluent by means of a pressure main under the M5 Motorway to the east of the site.
- Sydney Water has confirmed that the Ash Road Carrier has been designed to have sufficient capacity to service the needs of the Edmondson Park South catchment. For details of the existing sewer infrastructure please see Figure 6 of this report.

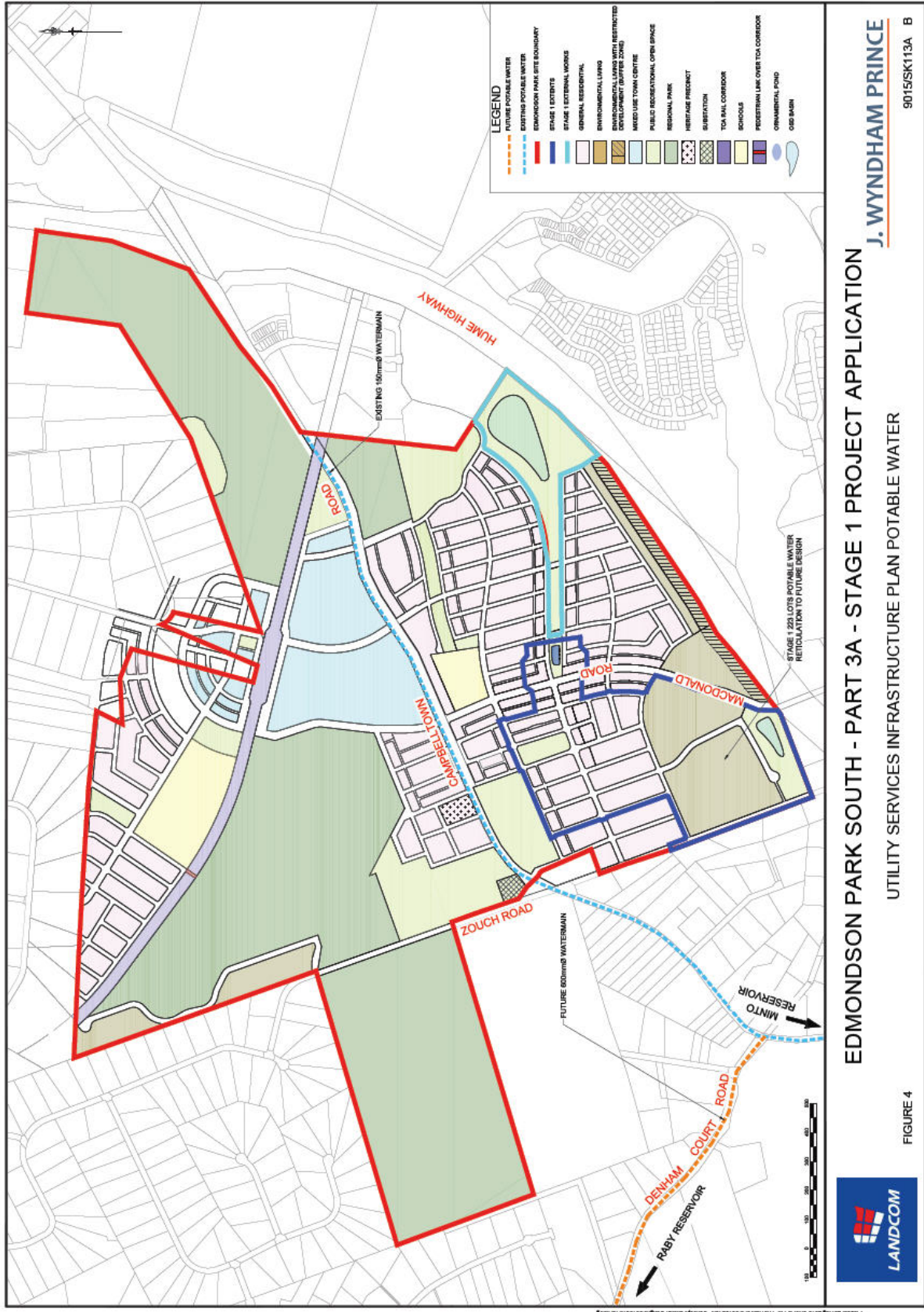


Figure 4 – Potable Water

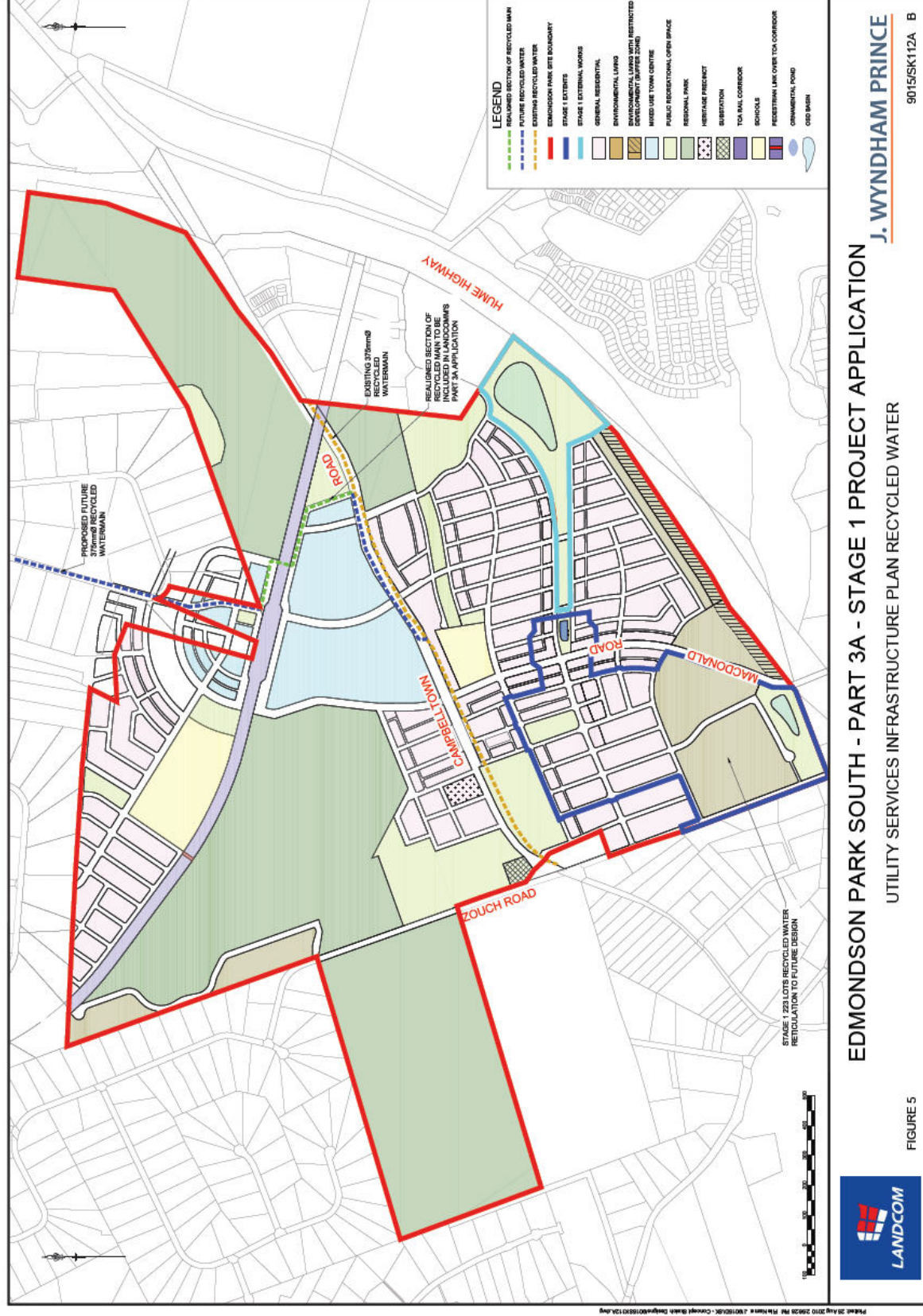


Figure 5 – Recycled Water

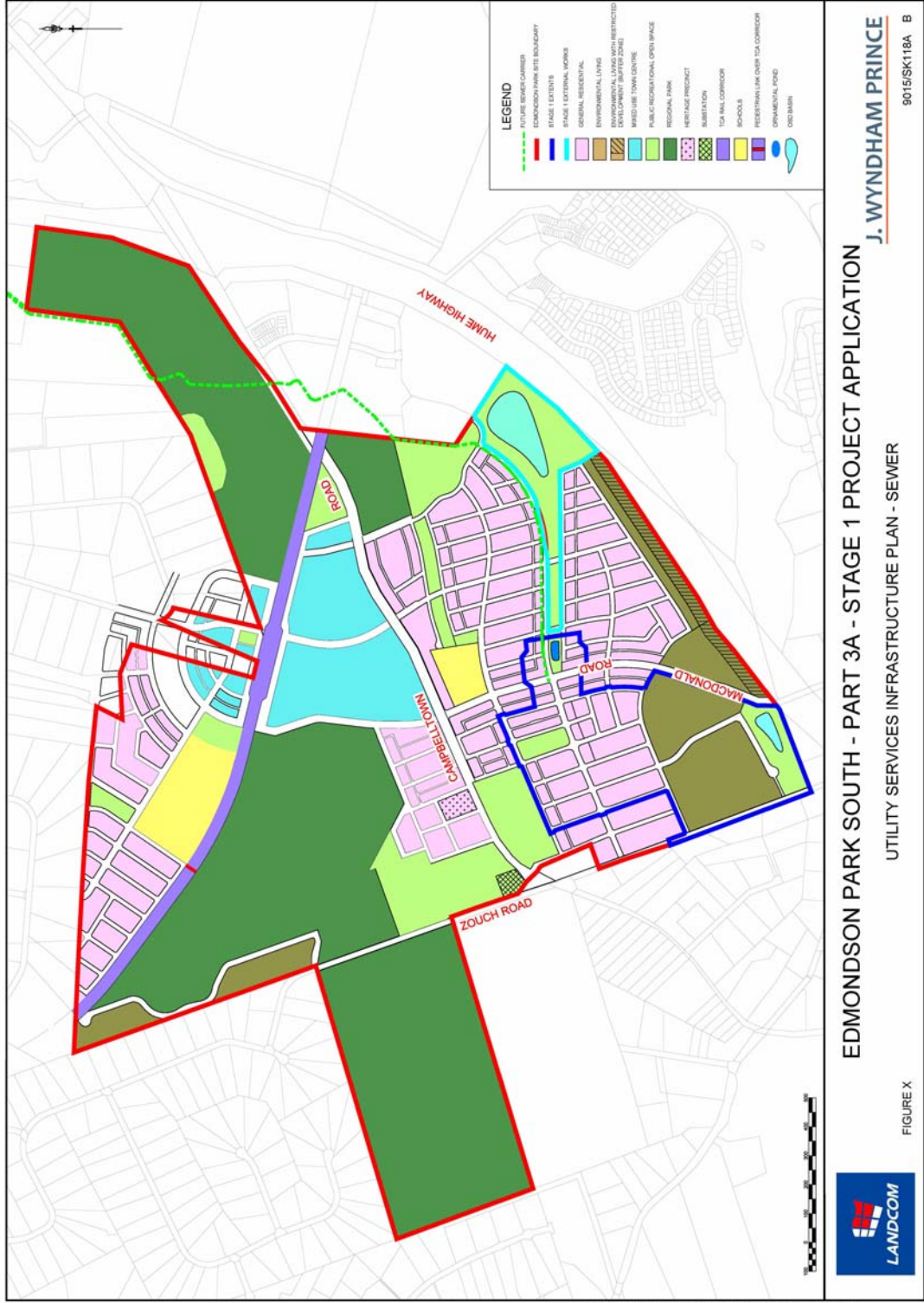


Figure 6 – Sewer

5.4 Electricity

- Investigations with Integral Energy and utility services searches have revealed that there is extensive electrical HV and low voltage mains throughout the site being along both Campbelltown Road and MacDonald Roads
- Integral Energy has advise that there is inadequate capacity within the existing infrastructure to service any additional lots with Edmondson Park South without augmentation.
- There are zone substations at Prestons from which HV electrical capacity can be provided in the short tem and Bow Bowing from which supply can be extended to the site in the long term
- For details of existing electrical infrastructure please Figure 7 of this report

5.5 Telecommunications

- The site is currently service with an extensive network of copper wire telecommunications cabling which under the Federal Governments NBN policy will become redundant.
- The location of existing optic fibre networks which can be connected to service the site will be subject to negotiations with the most suitable/competitive telecommunications provider being either Telstra and/or another private provider.

5.6 Gas

- Jemena and utility services searches have revealed that there are existing gas mains along Campbelltown Road and MacDonald Road frontages of the site.
- Jemena has advised that these mains have adequate capacity to service the future needs of Edmondson Park South Release Area.
- For details of existing gas mains locations see Figure 8 of this report.

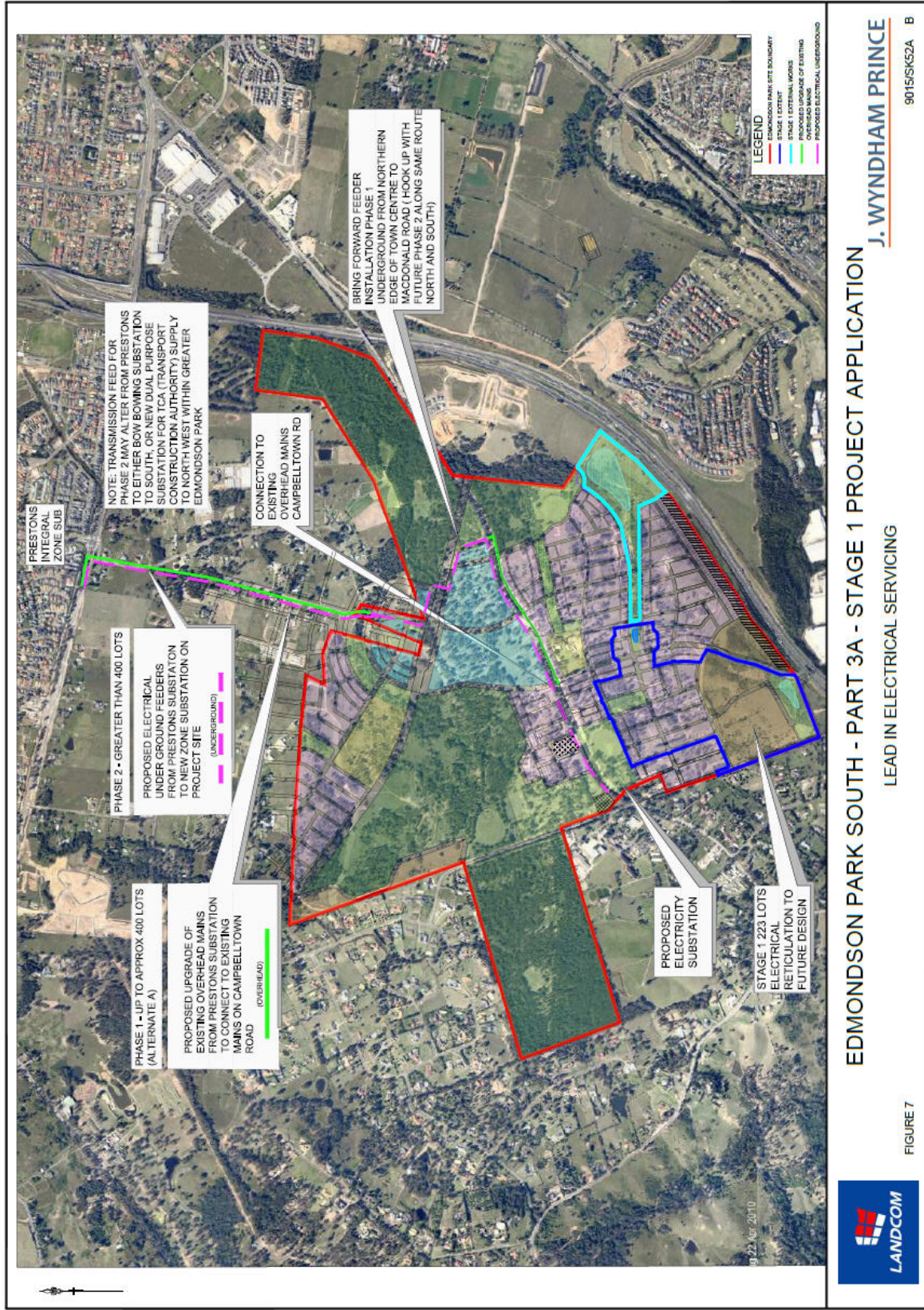


Figure 7 – Electrical

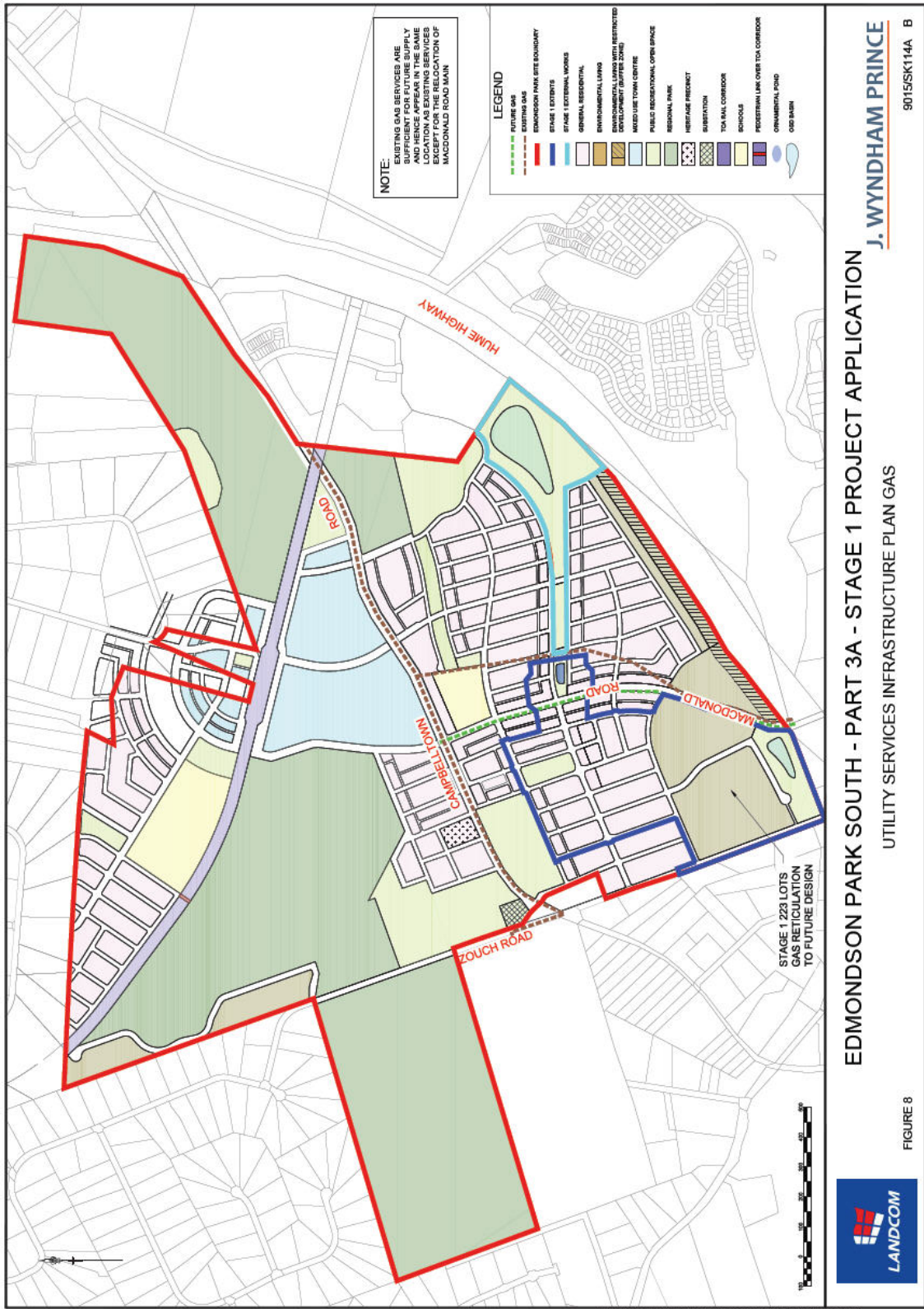


Figure 8 – Gas

6 UTILITY SERVICES AUGMENTATION WORKS

Having liaised with the respective utility service authorities and assessed the advice of each J Wyndham Prince has formulated the following details as to the anticipated augmentation works and onsite reticulation works required to service all of the proposed 221 Stage 1 lots.

6.1 Potable Water

The advice of Sydney Water is that there is adequate capacity with the existing Edmondson Park South potable water network to service all of the 221 Stage 1 lots without the need for offsite augmentation works.

Sydney Water has advised that due to water pressure limitations the Stage 1 lots will need to be located at an elevation below RL 75m AHD. In this regard the planning and urban design process has been conscious of this limitation and ensured that all lots are below the stipulated elevation.

The extent of construction works required by Landcom to service all Stage 1 lots with potable water will only include the normal reticulation in street pipe network from MacDonald Road through to connections within each individual allotment.

For details of proposed gas works see Figure 4 of this report

6.2 Recycled Water

Sydney Water is in the process of planning for designing and constructing the offsite lead in recycled water main infrastructure. It is understood that this infrastructure will be available to the site with the timeframes to satisfy the connection to and servicing of all 221 Stage 1 lots.

This being the case the extent of works required by Landcom to service all Stage 1 lots with recycled water will only include the normal reticulation in street pip network from MacDonald Road through to connections with each individual allotment.

For details of proposed gas works see Figure 5 of this report

6.3 Sewer

Sydney Water's current proposal for sewer servicing of Edmondson Park South is by way of a proposed Sewer Pumping Station adjoining the proposed Regional Parkland and Ingleburn Gardens. The purpose of this proposed SPS is to avoid the construction of an underground gravity sewer main through the Regional Parkland.

Having crossed the parkland by pressure means Sydney Water's proposal includes the construction of the Maxwell's Creek gravity carrier main down to the existing Ash Road Carrier adjoining Camden Valley Way. Upstream of the parkland the carrier mains would be extended along the edge of the riparian corridors to service Stage 1 and the remainder of the site.

J Wyndham Prince in conjunction with Qalchek have undertaken preliminary investigations into the feasibility of avoiding the undesirable time and cost impacts of a SPS by procuring Sydney Water's agreement to the gravity main connection across the parkland. Again having crossed the parkland it would be intended to generally adopt the alignment and grading of the Maxwell's Creek gravity carrier main as proposed by Sydney Water.

Landcom and J Wyndham Prince has secured Sydney Water's in principle agreement to adopt the gravity main option subject to the following criteria

- Written concurrence of DECCW to the Regional Park crossing
- Full gravity servicing of Ingleburn Gardens
- Compliance with Sydney Water's design guidelines and requirements

J Wyndham Prince and Qalchek are conducting ongoing investigations and negotiations with Sydney Water as to satisfying compliance with design guidelines and requirements.

Although Sydney Water's documented guidelines and procedures are extensive and protracted the early indications give no cause to suggest that the gravity connection will not be approvable.

Prior to the servicing and release of the Stage 1 lots the sewer carrier mains will need to be fully constructed and handed over to Sydney Water. Prior to the commencement of construction Landcom will need to secure the written permissions to enter from all affected property owners including the Tree Valley Golf Club.

The Maxwell's Creek Carrier Main is not included in Sydney Water's current GSP program to a time which will satisfy Landcom's Stage 1 construction needs. Thus Landcom will need to upfront fund the design and construction of the sewer mains and negotiate future reimbursement arrangements.

In addition to designing and constructing the above offsite augmentation (lead in) works Landcom will need to design and construct the normal sewer reticulation network (pipes and access chambers) this network will discharge into the above mentioned carrier at the downstream Stage 1 site boundary and extend up to and provide a connection point to each individual allotment within Stage 1.

The Environmental Living lots within Stage 1 will be serviced by a connection to the existing sewer to the south of the site adjoining the M5 motorway.

For details of proposed sewer works see Figure 6 of this report.

6.4 Electricity

Integral Energy has advised that there is inadequate electrical supply to service all of the Stage 1 allotments. It has clearly stated that prior to energising any HV lead in services Landcom will need to enter into an agreement with Integral Energy as to the location and transfer of suitable parcel of land to accommodate the future zone substation in close proximity to the proposed Edmondson Park South Town Centre.

In order to service the short term needs of Stage 1 Integral Energy has advised that it will be necessary for Landcom to construct HV lead in mains from Prestons zone substation along Croatia Avenue to the proposed Town Centre substation site.

Upon energisation of those mains there will be sufficient electrical supply to service Stage 1 (300 lots). For the longer term servicing of the balance of the 3200 lots Integral Energy will arrange to deliver the regional zone substation (or alternative interim arrangements) together with transmission feeder mains from the Bow Bowling zone substation.

In addition to the above mentioned offsite augmentation works it will be necessary to extend the electrical reticulation network from the Macdonald Road frontage to provide connections to each individual Stage 1 allotment. This reticulation will include the normal cabling, ducting, road crossings, HV substations, house connection boxes and street lighting.

For details of the proposed electrical augmentation works see Figure 7 of this report.

6.5 Telecommunications

As stated previously in this report it will necessary to upgrade all future telecommunications infrastructure to optical fibre in order to comply with the requirements of the Federal Governments NSW Policy. The extent of future upgrading and lead in works will be subject to an agreement between Landcom and Telstra and for another suitable telecommunication provider. This agreement will be subject to extensive negotiations as to the level of services and the most appropriate and competitive provider's submission.

It will be necessary to extend all such services by reticulation with all to the future lots and road networks.

In addition to any offsite works in conjunction with the appointed telecommunications provider Landcom will deliver an appropriate telecommunications reticulation network to all of the Stage 1 lots.

Under normal circumstances the provider enters into a shared trench arrangement with Integral Energy to provide cabling and ducting services with connection points to each individual allotment.

6.6 Gas

As Jemena has advised that there is adequate gas supply within the existing gas infrastructures along Campbelltown Road and MacDonald Roads there will be no need to undertake any augmentation works other than provision of normal reticulation mains within the lot and road networks.

The existing gas main along MacDonald Road will need to be reconstructed when that road is realigned in the future stages.

For details of proposed gas works see Figure 8 of this report

7 IMPLEMENTATION, TIMING AND FUNDING CONSIDERATIONS

Having discussed the consultation, existing and proposed services in the previous sections of this report J Wyndham Prince offer the following as those matters requiring consideration as to the implementation, timing and funding of utility services infrastructure for Edmondson Park South.

7.1 Potable Water

There is no specific implementation, timing and funding considerations arising from the delivery of potable water services to Stage 1.

7.2 Recycled Water

As discussed in previous sections of the report Sydney Water is currently will underway with the timely design and delivery of recycled water infrastructure. Thus there are no specific implementation issues to be considered by Landcom.

With regard to providing infrastructure to facilitate Sydney Water's internal design processes Landcom has agreed to provide preliminary road design details to Sydney Water along the perimeter of the Town Centre. The aim of providing such early information will be to minimise the possibility of reconstruction costs associated with changes along the prescribed route of the recycled water main in that area.

7.3 Sewer

As discussed Sydney Water has offered in principle concurrence to the adoption of the gravity sewer option through the Regional Parkland. This concurrence is subject to Landcom complying with all of Sydney Water's design criteria and requirements. The process of demonstrating such compliance is extensive and invariably lengthy.

J Wyndham Prince advises that the appropriate applications with Sydney Water be made to progress the detailed design and approval process.

It should be noted that Sydney Water's design approval and concurrence to construct cannot be achieved until Landcom has secured written permissions to enter from all affected property owners including Tree Valley Golf Club.

In that Stage 1 lots cannot be release until such time that the sewer lead in carrier main has been designed, approved, tendered, constructed and handed over to Sydney Water it is considered that time as of the essence in this regard.

7.4 Electricity

Integral Energy's prime consideration in its agreement to energise HV Lead in mains to facilitate the servicing of Stage 1 is the resolution of and agreement with Landcom as to the location and dedication of a suitable parcel of land to accommodate the Town Centre zone substation.

Given the timeframes involved in resolving an agreement excising the land by subdivision and transferring this land to Integral Energy it is considered that this activity is a matter of high priority.

7.5 Telecommunications

The main issue for consideration with regard to implementation of this element of infrastructure is the need for Landcom to commence negotiations with Telstra and/or other suitable providers to receive competitive submissions as to the most beneficial and cost effective telecommunications infrastructure package.

The various providers may offer differing deals with regard to capital investment in lead in infrastructure versus the cost of providing household reticulation and connections versus end user cost benefits.

It is recommended that Landcom commence negotiations with providers at the earliest possible time to firm up costs, supply issues and the timing of infrastructure delivery.

7.6 Gas

There appears to be no significant issues for consideration with regards to the timing, funding and delivery of gas reticulation infrastructure.

8 CONCLUSIONS AND RECOMMENDATIONS

The following items offer J Wyndham Prince's conclusions and recommendations with regard to the various elements of utility servicing infrastructure required to service Edmondson Park South.

8.1 Potable Water

- There is adequate water supply available to service the initial 250-300 lots (Stage 1)
- Beyond the initial 300 lots it will be necessary for Landcom to design and construct 5500m of 600mm potable water carrier main from Raby Reservoir along Denham Court to the site.
- Due to the timing of the design, approval, tender, construction and handover processes it is recommended that Landcom arranges to facilitate the commencement of the design process at the earliest possible date. (No later than January 2010).
- Due to the absence of this carrier main from Sydney Water's 5 year GSP we recommend that Landcom facilitate commencement of negotiations with Sydney as to the funding and/or reimbursement of costs associated with design and construction of this section of main.

8.2 Recycled Water

- Sydney Water will design and implement the required recycled water infrastructure to service all future lots within Edmondson Park South
- Due to Sydney Water timing of delivery we recommend that Landcom fulfil its agreements with Sydney Water with regard to matters relating to the design and approval processes, these being
 - Inclusion of a section of the recycled water main with Edmondson Park South under the SWRL and adjoining the Town Centre to Campbelltown Road within Landcom's Par 3A Concept Plan Application
 - Preparation and provision to Sydney Water of preliminary road design details along the perimeter of the Town Centre to minimise possibility of reconstruction of mains due to future changes

8.3 Sewer

- Sydney Water has offered in principle concurrence to the adoption of the gravity sewer option through the Regional Parkland into the Maxwell's Creek Carrier. This concurrence is offered subject to
 - Written confirmation by DECCW
 - Full gravity servicing of Ingleburn Gardens
 - Compliance with Sydney Water design guidelines
- J Wyndham Prince and Qalchek investigations to date indicate a high likelihood that the proposed gravity sewer option is feasible and will be approvable by Sydney Water

- Sydney Water's design and approval processes are extensive and lengthy. Thus J Wyndham Prince recommends that Landcom facilitates the continuous high priority of those processes with involvement from Sydney Water at the highest levels
- It should be noted that the design approval will not be granted by Sydney Water until Landcom has secured the written permissions to enter from all effected land owners including Tree Valley Golf Club.
- J Wyndham Prince recommends that the negotiations for and securing of all necessary permissions to enter be one of Landcom's highest priorities.

8.4 Electricity

- Both the short term and long term electrical supply needs for Edmondson Park South will require Landcom to undertake the following matters
 - design and construction of HV feeder mains from the Prestons Zone Substation
 - resolution of an agreement with Integral Energy as to the location and transfer of a suitable parcel of land for the required Town Centre Zone Substation
- J Wyndham Prince recommends that Landcom arranges to proceed with the design of HV electrical feeder mains to facilitate tender and construction processes to coincide with Stage 1 works and release
- J Wyndham Prince also recommends that Landcom expedites the resolution of the agreement with Integral Energy as to the location and transfer of the Town Centre Zone Substation

8.5 Telecommunications

- J Wyndham Prince recommends that Landcom facilitates the negotiations with Telstra and/or suitable Telecommunications providers in order to enter into an arrangement with the most beneficial and competitive provider.

8.6 Gas

- There are no specific conclusions or recommendations with regard to gas infrastructure.

