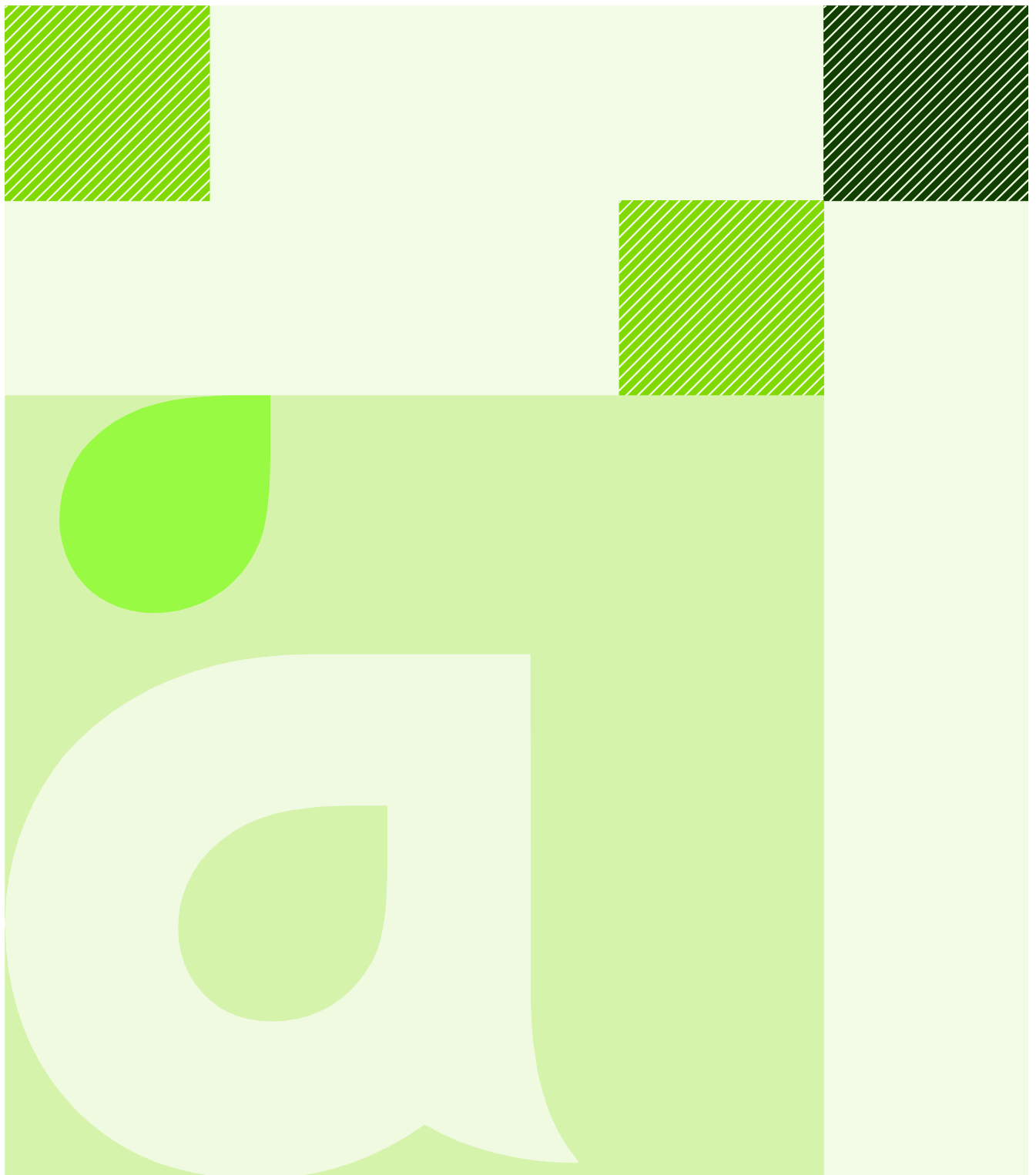


Utilities and Infrastructure Report

Aurecon



Western Sydney Stadium
Services Infrastructure Report
Lendlease

2 March 2017
Revision: 06
Reference: 253451



Western Sydney Stadium

Date 2 March 2017

Reference 253451

Revision 06

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Contents

1	Introduction	1
1.1	Introduction	1
1.2	Overview of Proposed Development	1
1.3	Background	2
1.4	Site Description	3
2	Potable Water	6
2.1	Authority	6
2.2	Existing Infrastructure	6
2.3	Demand Assessment	6
2.4	Water Balance	7
2.5	Utility Interaction	7
2.6	Initial Design Assessment	7
3	Wastewater – Sewer	8
3.1	Authority	8
3.2	Existing Infrastructure	8
3.3	Demand Assessment	8
3.4	Utility Interaction	8
3.5	Initial Design Assessment	9
4	Stormwater	10
5	Natural Gas	11
5.1	Authority	11
5.2	Existing Infrastructure	11
5.3	Demand Assessment	11
5.4	Utility Interaction	11
5.5	Initial Design Assessment	12
6	Electrical	13
6.1	Authority	13
6.2	Existing Infrastructure	13
6.3	Demand Assessment	13
6.4	Utility Interaction	14
6.5	Initial Design Assessment	14
7	Telecommunications	15
7.1	Authority	15
7.2	Existing Infrastructure	15
7.3	Demand Assessment	16
7.4	Utility Interaction	16
7.5	Initial Design Assessment	16

Appendices

Appendix A

Drawings



1 Introduction

1.1 Introduction

This report supports a State Significant Development (SSD) Development Application (DA) submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application (referred to as SSDA16_8175) follows the approval of a Stage 1 SSD DA (SSDA16_7534) in December 2016. The Stage 1 SSDA sets out a Concept Proposal for the redevelopment of the Western Sydney Stadium and future supporting uses. In summary, the Stage 1 Consent includes the following components:

- **Concept Proposal** for the Western Sydney Stadium, including building envelopes, a new 30,000 seat stadium, 500 surface car parking spaces, access, ancillary infrastructure and landscaping; and
- **Detailed works** for staged demolition and removal of the existing stadium and associated infrastructure and the Parramatta Swimming Centre

1.2 Overview of Proposed Development

The proposal relates to a detailed ('Stage 2') DA for the detailed design and construction of the stadium. This SSD DA seeks approval for the following components of the development:

- Detailed design of the stadium, public domain and car parking spaces;
- Construction and use of the 30,000 seat stadium including:
 - General Admission Facilities including bars, food and drink stalls, amenities and viewing areas;
 - A function centre and kitchen facility;
 - Associated Stadium facilities including player and coaching facilities, media and press conference rooms, security and stadium managers facilities;
 - Waste storage and loading dock;
- Construction and embellishment of the public domain including:
 - Outdoor sporting and recreation facilities;
 - Public plazas and entertainment areas;
 - General landscaping works;
- Provision of up to 500 car parking spaces with vehicle access to the development from O'Connell Street and internal roads for vehicular circulation;

- Provision of signage zones, lighting and other ancillary stadium elements;
- Pedestrian access and footpath upgrades along O'Connell Street; and Extension and augmentation of physical infrastructure / utilities as required.

1.3 Background

1.3.1 Stadia Strategy

The stadium is the first project to be delivered under the NSW Government's \$1.6 billion Stadia Strategy, the largest investment in sporting infrastructure since the 2000 Olympics. The new Western Sydney Stadium will:

- Generate approximately 1,200 jobs during construction and between 600 and 900 jobs once operational for sporting event days and major events
- Be able to cater for bigger crowds, provide an improved game day experience and bring major benefits to the Western Sydney economy and community uses within the precinct.
- Cater for a range of sporting and community uses within the precinct.

1.3.2 Concept Proposal (SSDA 16_7534)

Infrastructure NSW (iNSW) on behalf of Venues NSW submitted a State Significant Development

Application (SSDA) for the Stage 1 concept proposal and demolition of the existing stadium in July 2016. Consent for the Stage 1 SSDA was granted by the Minister for Planning on 7 December 2016 and includes:

- a maximum total GFA of approximately 60,000 m² (excluding the playing pitch) for the stadium development, including:
 - additional seating for approximately 10,000 more spectators in a seating bowl with 30,000 seats, including 27,000 general admission seats and 3,000 corporate seats;
 - playing pitch;
 - five levels of premium box/terrace, function/lounge offerings and a number of suite offerings;
 - flood lighting, stadium video screens and other ancillary fittings;
 - additional facilities for team, media, administration and amenity, including:
 - police facility and security office;
 - players changing rooms;
 - ticket gates and ticket boxes;
 - media interview rooms;
 - green room;
 - production suite and joint operation control room;
 - event briefing rooms;
 - hirers office and patron services offices;
 - first aid facilities;
 - loading docks for deliveries; and
 - food, beverage and retail facilities.
- a maximum GFA of approximately 20,000 m² for future development of ancillary uses within the northern corner of the Site;

- 
- transport, parking and accessibility;
 - public domain elements; and
 - landscaping elements throughout the Site.

1.3.3 Design Excellence and Project Tender Phase

Since receiving the development consent for Stage 1, Venues NSW have appointed Lendlease as the contractor for the Stage 2 detailed design and the demolition and construction of the stadium. The tender process also served as a competitive design process in accordance with the Director General's Design Excellence Guidelines and Clause 7.10 of the *Parramatta Local Environmental Plan 2011*.

1.3.4 Site Establishment works Modification

A modification application (MOD 1) was made to the Stage 1 DA pursuant to Section 96(2) of the EP&A Act in February 2017. The modification seeks to expand the approved range of site preparation works to include piling and remediation/earthworks, as outlined below:

- Remediation works comprising the excavation and storage of contaminated materials and bulk excavation. Contaminated materials will be stored on site and capped below ground in accordance with the recommendations outlined in the Remedial Action Plan.
- Piling works which will comprise the driving and drilling of concrete piles to establish foundations for the construction of a stadium located within the Stage 1 building envelope

The modification application is currently under assessment by the Department of Planning and Environment (DPE) and is awaiting determination.

1.4 Site Description

The Western Sydney Stadium is located at 11-13 O'Connell Street, within the Parramatta Park on the north-eastern edge of the Parramatta CBD. It is bound to the south and west by the Parramatta Park and the Parramatta River, the Parramatta Leagues Club to the north and O'Connell Street to the east. The Site is located within the City of Parramatta local government area (LGA).

A locational context plan is provided at **Figure 1** below.

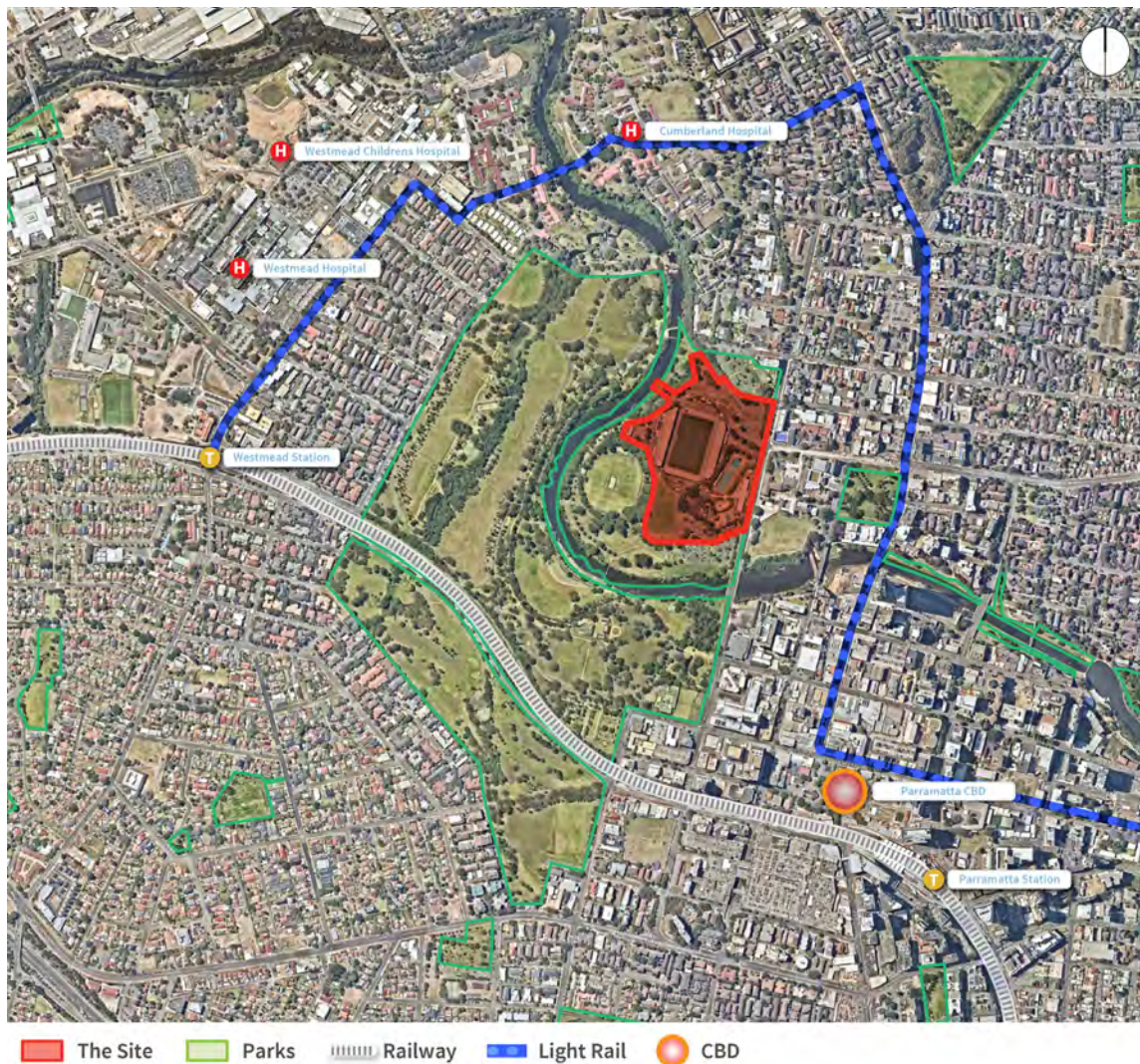


Figure 1 – Site context Plan

The site has an area of approximately 100,000m² and owned by Venues NSW and The Parramatta Park Trust.

The site is irregular in shape and is illustrated in **Figure 2** below.



 The Site

Figure 2 – Site Aerial Plan



2 Potable Water

2.1 Authority

The water service provider throughout the area is Sydney Water.

The Site is supplied with water through the Prospect Supply system sourcing water from Prospect Reservoir. Water is treated through the Macarthur Water Treatment Plant, and delivered through the Ryde Gravity Water Supply Zone.

2.2 Existing Infrastructure

The existing Sydney Water potable water infrastructure in the vicinity of the site has been identified based on Dial Before You Dig (DBYD) records. These records indicate the presence of numerous potable water mains within streets around the existing Parramatta Stadium. No Sydney Water owned potable water infrastructure has been identified within the site boundary. Investigations (survey) may be required during detail design to validate that no further Sydney Water Assets exist within the site boundary.

The existing potable water infrastructure surrounding the site includes the following:

- DN200mm DICL and DN225mm CICL water mains along O'Connell Street;
- DN900mm CICL main along Phillip Street;
- DN100mm CICL water main along Eels Lane;
- DN375mm CICL water main along Church Street; and
- Private potable water infrastructure throughout the site.

Further investigations will be undertaken during detail design phase to confirm the exact layout and depths of the infrastructure described above. It is noted that the above only considers Sydney Water infrastructure. Other potable water infrastructure may exist that has not been identified from the DBYD information.

2.3 Demand Assessment

The demand assessment for the stadium has been based on the figures below:

- 30,000 Public Seats
- 3,000 Staff

- 3 hour event time

The estimated cold water demand is 16.66 l/s Potable Simultaneous Demand (PSD).

2.4 Water Balance

A water balance assessment has been undertaken based on the project demand and sustainable aspirations for the project.

It is our understanding that rainwater collection is not suitable for pitch irrigation due to the contaminants it may contain and the health risk it presents to the players using it.

The water balance analysis described below is based on the following:

- Pitch irrigation is from a potable water source and not collected rainwater. Note this is subject to ongoing development and subject to change
- The landscaping does not require irrigation beyond its establishment period
- -Rainwater is used for toilet flushing, with a target to reduce consumption in line with sustainability targets for the development

The rainwater tank size has been estimated at 50kL on that basis.

2.5 Utility Interaction

The project is currently liaising with Sydney Water via a Water Services Coordinator and a Section 73 application has been lodged on 7/02/2017.

A pressure flow enquiry has been received on 23/09/2016 for the O'Connell St mains:

Size (mm)	Location	Min Press (m head)	Max Pressure (m head)
DN225	10m north from Victoria Rd	33	48
DN200	150m south from Victoria Rd	36	52

2.6 Initial Design Assessment

The Water Supply Code of Australia – Sydney Water Edition (SWC, 2014) suggests a minimum DN150mm pipe size for industrial and commercial developments. The sizing required for the development will be based on the Maximum demand and will need to be approved by Sydney Water.

It is anticipated that the potable water supply will connect to the Sydney Water infrastructure along O'Connell Street via a 1 x 150mm combined domestic and fire water site connection to the 200mm DICL water main located in O'Connell Street.

SWC has confirmed via RFT Tender Clarification dated 19 August 2016 that

- Domestic water connection shall be at the of O'Connell Street, to the 200mm domestic water main
- Fire water connection shall be via a 1 x 150mm to the O'Connell Street 225mm domestic water main

It anticipated the maximum day demand may approximately double as a result of the proposed development and it is possible that some external local network upgrades may be required to achieve the required supply depending on the existing spare capacity in the network. Augmentation of infrastructure capacity is outside the scope of this project and will need to be undertaken by the authorities if required.



3 Wastewater – Sewer

3.1 Authority

Sydney Water owns wastewater infrastructure servicing the site. Wastewater from the site is discharged to Wastewater Pumping Station 0067 (located approximately 4 kilometres east of the stadium site), and pumped through to the North Head Wastewater Treatment Plant.

3.2 Existing Infrastructure

The existing local Sydney Water wastewater infrastructure near the site has been identified based on Dial Before You Dig (DBYD) records sourced by Aurecon and documents within the original RFT package.

These records indicate the presence of various wastewater infrastructure in the vicinity of the stadium site including:

- DN300mm EW wastewater main from the site's northern boundary, across the site and into O'Connell Street. DBYD records indicate the wastewater main is part of Sydney Water's sewer rehabilitation program; depth approx. 8m
- Various wastewater mains throughout the streets to the east of the site; and
- Private wastewater infrastructure throughout the site.

The DN300mm wastewater main connects into a DN600mm VC main near Church Street, and travels along the south edge of the Parramatta River towards the Wastewater Pumping Station 0067.

Other wastewater infrastructure may exist that has not been identified from the DBYD information.

3.3 Demand Assessment

A wastewater demand has been estimated, based on the stadium visitor and staff populations, event duration and quantity of sanitary fixtures.

The current sewer discharge estimate is 5,200 sewer loading units.

3.4 Utility Interaction

The project is currently liaising with Sydney Water via a Water Services Coordinator and a Section 73 application has been lodged on 7/02/2017.



3.5 Initial Design Assessment

The Sewerage Code of Australia – Sydney Water Edition (SWC, 2014) suggests a minimum DN225mm pipe size for Industrial lots larger than 300m² and other complexes where large flows may be expected. This sizing will need to be confirmed with Sydney Water and developed through the design process.

It is anticipated that the wastewater from the development will be discharged into the existing DN300mm wastewater main through the site as for the current stadium. The Sewerage Code of Australia – Sydney Water Edition (SWC, 2014) suggests that the EP (equivalent population) capacity limitation for a DN300mm reticulation sewer main is 3200. The existing sewer loading on the DN300mm main is unknown; however an increase in EP of 465 – 715 is expected due to the development, and augmentation works may be required either to this main or the downstream pump station.

Ongoing consultation with Sydney Water is required to confirm the existing wastewater layout, the existing capacity and potential demand. Potential augmentation works of the infrastructure will be undertaken by the relevant authority and is outside the project scope.



4 Stormwater

A separate Stormwater Management Plan (SMP) prepared by Aurecon describes the flooding, water quality and drainage considerations for the site and proposes a design intent that shall be carried through to construction.

The SMP addresses the requirements placed upon the stadium team by The Department of Planning & Environment. It details the drainage system for this site and demonstrates that the design adheres to the applicable stormwater management system design criteria.

Stormwater drainage and flood management infrastructure is not considered in this report.



5 Natural Gas

5.1 Authority

The area is currently serviced with natural gas by Jemena. It is proposed to disconnect the connection to the existing Stadium.

5.2 Existing Infrastructure

The existing Jemena infrastructure has been identified based on Dial Before You Dig (DBYD) records and documents within the original RFT package. These records indicate the presence of various Jemena assets in the vicinity of the stadium.

The existing natural gas infrastructure includes the following:

- A secondary main (1050 kPa) along O'Connell Street. The main crosses into the site near the intersection of Ross Street and O'Connell Street, travelling west and across the Parramatta River;
- Along O'Connell Street, a stub crosses into the site boundary, potentially indicating connection to internal gas infrastructure.
- A network main (210 kPa) along O'Connell Street;
- Private gas infrastructure throughout the site; and
- Various other gas assets within surrounding streets.

Other gas infrastructure may exist that has not been identified from these information sources

5.3 Demand Assessment

A preliminary demand figure for the development has been calculated estimated at 14,100 MJ/hr based on:

- Kitchen Appliances determined with Kitchen Consultant
- Domestic Hot Water Requirements
- Mechanical Heating Plant

5.4 Utility Interaction

An application for connection has been submitted to Jemena on 11/02/2017.



5.5 Initial Design Assessment

It is anticipated that the project will be supplied with gas via a connection to O'Connell Street.

The existing natural gas infrastructure within the Site has been identified from DBYD information.

Further consultation with Jemena is required to confirm the existing network layout and existing capacity.

6 Electrical

6.1 Authority

Endeavour energy is the electrical supply authority for the site area. It is serviced by three main zone substations through their 11kV network:

- North Parramatta Zone Substation;
- West Parramatta Zone Substation; and
- Parramatta Zone Substation (Due to be decommissioned)

6.2 Existing Infrastructure

The current electrical infrastructure around the site includes assets such as:

- Electrical cables within the streets adjacent to the eastern boundary of the site, along O'Connell Street and Victoria Road;
- Two existing pad mount substations No. 17262 & 17263 and associated 11kV HV feeders on the western side of the site which supply the existing stadium;
- One existing pad mount substation No. 17261 and associated 11kV HV feeders on the eastern side of the site which supply the existing stadium;
- Two substations and associated 11kV HV feeders near the existing Parramatta Swimming Centre;
- During the site walk with INSW it was mentioned the HV infrastructure may serve a small facility across the river, whilst this is not identified on the DBYD pack, this will require validation, and
- Private electrical infrastructure throughout the site.

The existing pad mount substation supplying power to O'Connell St will be retained.

6.3 Demand Assessment

High level electrical demand figures have been calculated based on the current proposed plans developed by the Architect (Populous) and the Landscape Designers (Aspect). Whilst the design is under development and subject to change, the figures presented in this document are expected to be representative of the final maximum demand for the development.

The Following tables outline the initial Electrical Demand assessments:

Table 1 Max Demand of each level/system with diversification

LOAD	Diversified Max Load (kVA)	Max. Load (A)
Area Loads	1,480	2,136
Lifts	74	107
Mechanical loads	920	1328
Other loads	1,151	1,661
TOTAL	3,625	5,232
TOTAL (incl. 10% spare capacity)	3,988	5,755

6.4 Utility Interaction

Initial feedback received from Endeavour Energy dated 26 September 2016 as part of the preliminary planning advice states that the local Endeavour Energy Network does not have capacity to provide the total load required to supply the proposed stadium and it is likely that a new 11kV feeder from an Endeavour Energy substation will be required to supply proposed stadium.

The request identified the total maximum demand for the proposed stadium is 4MVA, Endeavour Energy 11kV feeders are rated for 4.5MVA therefore the proposed stadium load will utilise the majority of one feeder. The capacity of the existing stadium and pool complex has been estimated at 1.8MVA using the maximum demand indicators on existing padmount substations 840 and 22953 on O'Connell Street supplying the Parramatta pool complex and existing padmount substations 17261 and 17261 supplying Parramatta Stadium. These padmount substations are supplied via Endeavour's North Parramatta Zone substation located on Grose Street North Parramatta approximately 1km from the proposed development.

Alternate supply options may be available to establish a new 11kV feeder from Endeavour's more recent West Parramatta Zone substation located on Macquarie Street, approximately 750 metres from the proposed development.

6.5 Initial Design Assessment

There are a number of configurations being considered for the substation locations. From our investigations it appears Endeavour Energy do not have a preference for External Kiosk type transformers or indoor chamber types. The Design team have progressed the design based on the following configuration:-

- Two (2) indoor substations with (2x1000kVA Transformers) to serve equal halves of the stadium

Consideration will need to be made to the development (by others) of a carpark adjacent to the EELs Leagues Club as this may influence electrical infrastructure



7 Telecommunications

7.1 Authority

Telstra is believed to be the primary service provider in the area however we understand there are a number of other telecommunications suppliers present in the area.

7.2 Existing Infrastructure

The existing telecommunications infrastructure within the vicinity of the proposed stadium has been identified based on Dial Before You Dig (DBYD) records. These records indicate the presence of infrastructure belonging to various utility authorities in the vicinity of the stadium. Based on the DBYD records provided, Telstra is the only authority with telecommunications infrastructure within the site boundary.

7.2.1 Telstra

Telstra assets are located throughout the site, entering the site at multiple locations along O'Connell Street and at the north-west boundary. Various Telstra infrastructure is also located throughout surrounding streets.

DBYD records suggest properties to the west of the Parramatta Stadium may rely on Telstra infrastructure passing through the site and across the river (overhead) for supply.

Further investigation is recommended to confirm the exact layout and depths of the infrastructure described above. It is noted that the above only considers Telstra infrastructure, and records of other assets, including privately owned telco/comms infrastructure, has not been made available or surveyed for this report.

7.2.2 NBN – National Broadband Network

The National Broadband Network is currently being rolled out across NSW. According to the NBN website, infrastructure for businesses and homes is not currently available in the area

7.2.3 Other Telcos

Other telecommunications providers, including Nextgen, Optus, and Verizon, have infrastructure within surrounding streets.



7.3 Demand Assessment

7.3.1 Broadcast Requirements

The Western Sydney Stadium will require particular telecommunications infrastructure in order to broadcast sporting events. Infrastructure will need to be located throughout the site to provide connection of camera and audio equipment to the location of broadcasting trucks.

OB trucks may be connected to the external network via satellite or via a dual communications system, and hence will require unobstructed transmission paths to the Northern sky.

If a dual communications system is adopted, standard (non-broadcasting) telecommunications infrastructure may be contained within the adopted connections. Two connections to external infrastructure is highly likely under a dual communications system.

7.4 Utility Interaction

To date there has been preliminary consultation with the Telco providers.

We are aware the NBN rollout is occurring across Australia, and includes the transfer of Telstra infrastructure ownership to NBN. Therefore a feasibility assessment will need to be submitted to NBN Co to identify any augmentations to existing infrastructure and potential new infrastructure needed to support the development.

7.5 Initial Design Assessment

It is anticipated that the point of connection for telecommunications will be on O'Connell Street.

Any required upgrades to infrastructure will need to be confirmed with the telecommunication providers. Augmentation of infrastructure provisions is outside the project scope.



8 Next steps

A number of elements will need to be confirmed as part of the design development and further interaction with the authorities need to take place, in particular:

- Obtain confirmation from the authorities that the infrastructure will be able to sustain the proposed development
- Obtain approval from the relevant authorities for the proposed connections to the infrastructure
- Consider submitting an application to NBN Co



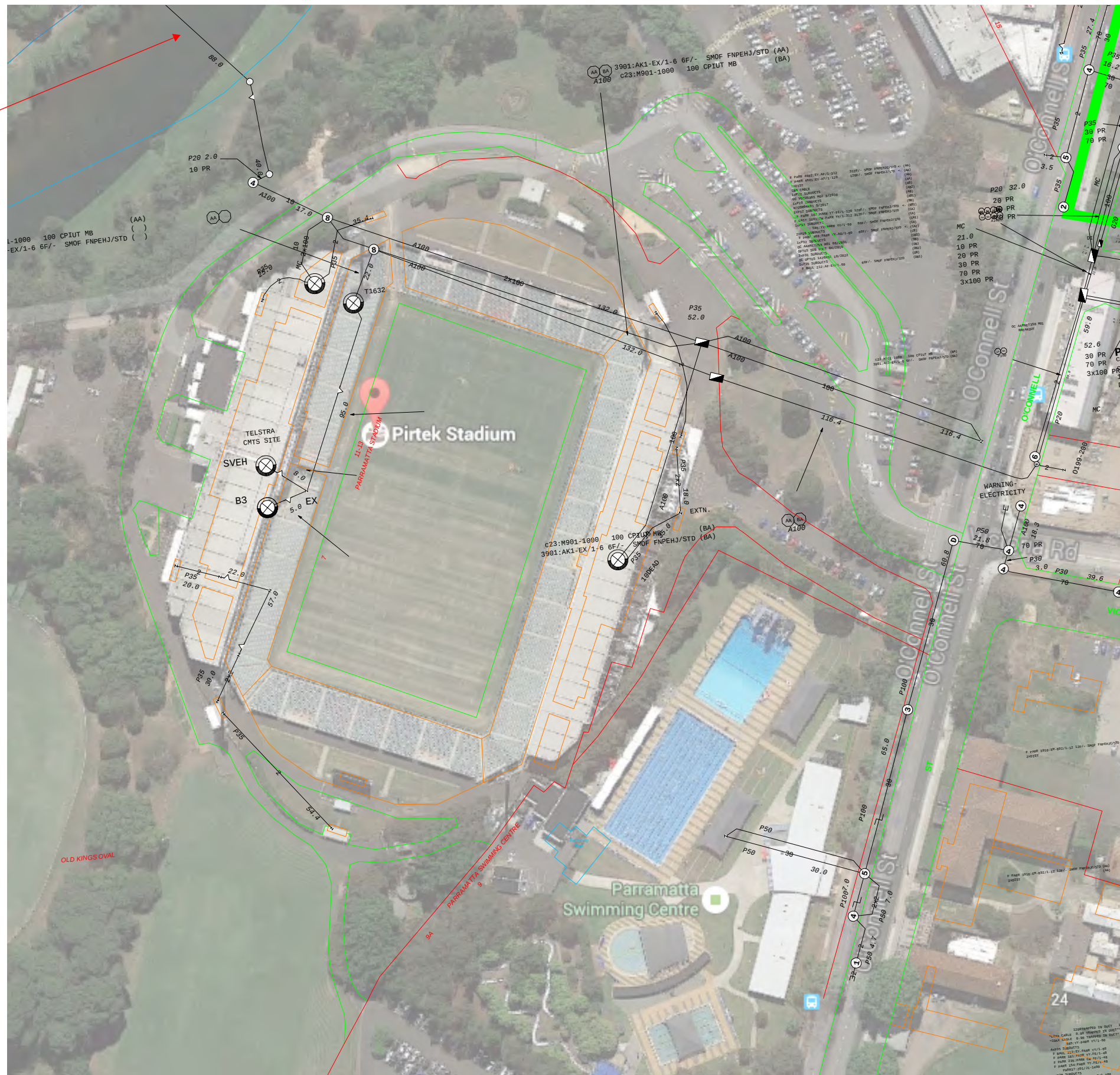
Appendix A

Drawings

Consolidated Dial Before you Dig Drawings

For Information Only

Note River Crossing



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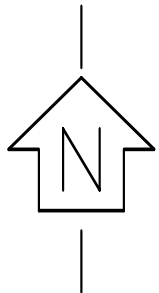
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01	12.08.16	Preliminary Issue	
02	15.02.17	First Issue	

DRAWN	DESIGNED
JL	JL
CHECKED	
MLM	
APPROVED	
DATE	

PROJECT
WSS PARRAMATTA
LENDELEASE

TITLE
EXISTING COMMS INFRASTRUCTURE

PROJECT No.
253451
SCALE
NTS
DRAWING No.
I-SK03
SIZE
A3
REV
01

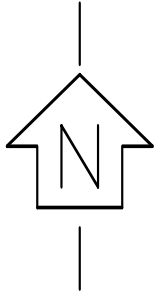


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02	15.02.17	First Issue	

DRAWN	DESIGNED
JL	JL
CHECKED	
MLM	
APPROVED	
DATE	

PROJECT
WSS PARRAMATTA LENDLEASE
TITLE
EXISTING ELECTRICAL INFRASTRUCTURE

PROJECT No.	253451
SCALE	NTS
DRAWING No.	I-SK01
SIZE	A3
REV	01

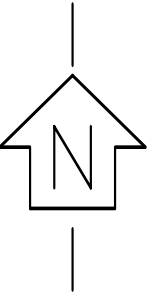


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01	12.08.16	Preliminary Issue	
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DRAWN	DESIGNED
JL	JL
CHECKED	
MLM	
APPROVED	
DATE	

PROJECT
WSS PARRAMATTA LENDEASE
TITLE
EXISTING GAS INFRASTRUCTURE

PROJECT No. 253451	
SCALE NTS	SIZE A3
DRAWING No. I-SK04	REV 01



REV	DATE	REVISION DETAILS
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DRAWN	DESIGNED
JL	JL
CHECKED	
MLM	
APPROVED	
DATE	

PROJECT
WSS PARRAMATTA LENDEASE
TITLE
EXISTING POTABLE & WASTE WATER INFRASTRUCTURE

PROJECT No. 253451	
SCALE NTS	SIZE A3
DRAWING No. I-SK02	REV 01



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