



APPLICATION ON NOTIFICATION – CROWN DEVELOPMENT

Applicant:	SA Health
Development Number:	252/V020/18
Nature of Development:	Alterations to existing hospital complex comprising the construction of a multi-deck car park (5 storeys) with associated entry canopy, landscaping and removal of one (1) regulated tree
Type of development:	State Agency Development
Zone / Policy Area:	District Centre Zone (Policy Area 5 and Precinct 18)
Subject Land:	6, 8 and 28 Woodville Road, Woodville South
Contact Officer:	Darby Schultz
Phone Number:	(08) 7109 7330
Start Date:	18 April 2018
Close Date:	10 May 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders Street, Adelaide during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

Written representations must be received by the close date (indicated above) and can either be posted, hand-delivered, faxed or emailed to the State Commission Assessment Panel (SCAP). A representation form is provided as part of this pdf document.

Any representations received after the close date will not be considered.

Postal Address:

The Secretary
State Commission Assessment Panel
GPO Box 1815
ADELAIDE SA 5001

Street Address:

Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders Street
ADELAIDE

Email Address: scapadmin@sa.gov.au

Fax Number: (08) 8303 0753

SECTION 49 & 49A – CROWN DEVELOPMENT DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

COUNCIL: CHARLES STURT
APPLICANT: SA HEALTH INFRASTRUCTURE
ADDRESS: 11 HINDMARSH SQUARE
CROWN AGENCY: DEPARTMENT HEALTH AND AGEING

FOR OFFICE USE

DEVELOPMENT No: _____
 PREVIOUS DEVELOPMENT No: _____
 DATE RECEIVED: / /

CONTACT PERSON FOR FURTHER INFORMATION

Name: GRAHAM BURNS
 Telephone: 8193 5600 [work] 0413 832 602 [Ah]
 Fax: _____ [work] _____ [Ah]
 Email: GRAHAMB@MASTERPLAN.COM.AU

<input type="checkbox"/> Complying <input type="checkbox"/> Merit <input type="checkbox"/> Public Notification <input type="checkbox"/> Referrals	Decision: _____ Type: _____ Finalised: / /
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NOTE TO APPLICANTS:

(1) All sections of this form must be completed. The site of the development must be accurately identified and the nature of the proposal adequately described. If the expected development cost of this Section 49 or Section 49A application exceeds \$100,000 (excl. fit-out) or the development involves the division of land (with the creation of additional allotments) it will be subject to those fees as outlined in Item 1 of Schedule 6 of the *Development Regulations 2008*. Proposals over \$4 million (excl. fit-out) will be subject to public notification and advertising fees.
 (2) Three copies of the application should also be provided.

	Decision required	Fees	Receipt No	Date
Planning:	_____	_____	_____	_____
Land Division:	_____	_____	_____	_____
Additional:	_____	_____	_____	_____
Minister's Approval				

EXISTING USE: _____

DESCRIPTION OF PROPOSED DEVELOPMENT: MULTI DECK CAR PARK INCLUDING LINKWAYS, LANDSCAPING AND INFRASTRUCTURE UPGRADE

LOCATION OF PROPOSED DEVELOPMENT: WOODVILLE ROAD, WOODVILLE SOUTH

House No: _____ Lot No: _____ Street: _____ Town/Suburb: _____
 Section No [full/part] _____ Hundred: YATALA Volume: 5988 Folio: 587
 Section No [full/part] _____ Hundred: YATALA Volume: 5719/5723 Folio: 215/236

LAND DIVISION:

Site Area [m²] _____ Reserve Area [m²] _____ No of existing allotments _____
 Number of additional allotments [excluding road and reserve]: _____ Lease: YES NO

DEVELOPMENT COST [do not include any fit-out costs]: \$ 17,400,000

POWERLINE SETBACKS: Pursuant to Schedule 5 (2a)(1) of the *Development Regulations 2008*, if this application is for a building it will be forwarded to the Office of the Technical Regulator for comment unless the applicant provides a declaration to confirm that the building meets the required setback distances from existing powerlines. The declaration form and further information on electricity infrastructure and clearance distances can be downloaded from the DPLG website (www.dac.sa.gov.au).

I acknowledge that copies of this application and supporting documentation may be provided to interested persons in accordance with the *Development Act 1993*.

SIGNATURE: _____ 

Dated: 23/03/2018



DEVELOPMENT ACT 1993

NOTICE OF APPLICATION FOR CONSENT TO DEVELOPMENT

SECTION 49 – STATE AGENCY DEVELOPMENT

Notice is hereby given that an application has been made by **SA Health** seeking consent for alterations to existing hospital complex comprising the construction of a multi-deck car park (5 storeys) with associated entry canopy, landscaping and removal of one (1) regulated tree. **Development Number: 252/V020/18**

The land to be developed is within the grounds of the existing Queen Elizabeth Hospital complex at 28 Woodville Road, Woodville South and on adjacent land parcels situated at 6-8 Woodville Road, Woodville South (being formally described as a70, DP3994: CT 5719/215; a71, DP3994: CT 5723/360; and a602, DP73137: CT 6184/480).

The subject land is located within the District Centre Zone (Policy Area 5 and Precinct 18) of the Charles Sturt Council Development Plan (Consolidated 30 January 2018).

The application may be examined during normal office hours at the office of the State Commission Assessment Panel, Level 5, 50 Flinders Street, Adelaide and at the office of the Charles Sturt Council, (72 Woodville Rd, Woodville. Application documentation may also be viewed on the State Commission Assessment Panel (SCAP) website: www.saplanningcommission.sa.gov.au/scap/public_notices

Any person or body who desires to do so may make representations concerning the application by notice in writing delivered to the Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide 5001 **NOT LATER THAN 10 MAY 2018**. Submissions can also be emailed to scapadmin@sa.gov.au

Each person or body making a representation should state the reason for the representation and whether that person or body wishes to be given the opportunity to appear before the SCAP to further explain the representation.

Submissions may be made available for public inspection.

Should you wish to discuss the application and the public notification procedure please contact Darby Schultz on (08) 7109 7330.

Alison Gill

SECRETARY

STATE COMMISSION ASSESSMENT PANEL

www.saplanningcommission.sa.gov.au/asap

**DEVELOPMENT ACT, 1993
S49– CROWN DEVELOPMENT
REPRESENTATION ON APPLICATION**

Applicant:	SA Health
Development Number:	252/V020/18
Nature of Development:	Alterations to existing hospital complex comprising the construction of a multi-deck car park (5 storeys) with associated entry canopy, landscaping and removal of one (1) regulated tree
Zone / Policy Area:	District Centre Zone (Policy Area 5 and Precinct 18)
Subject Land:	6, 8 and 28 Woodville Road, Woodville South
Contact Officer:	Darby Schultz
Phone Number:	(08) 7109 7330
Close Date:	10 May 2018

My name: _____

My phone number: _____

PRIMARY METHOD(S) OF CONTACT: Email address: _____

Postal address: _____

_____ Postcode _____

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard by the State Commission Assessment Panel in support of your submission.

- My interests are:
- owner of local property
 - occupier of local property
 - a representative of a company/other organisation affected by the proposal
 - a private citizen

The address of the property affected isPostcode.....

The specific aspects of the application to which I make comment on are:

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.....

- I wish to be heard in support of my submission
- do not wish to be heard in support of my submission
- (Please tick one)

- by appearing personally
- being represented by the following person :
- (Cross out whichever does not apply)

Date: Signature:

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or
scapadmin@sa.gov.au

MARCH 2018

PLANNING REPORT

REMOVAL OF REGULATED TREE, CONSTRUCTION OF MULTI-DECK CAR PARK & NEW OUTPATIENTS CANOPY

THE QUEEN ELIZABETH HOSPITAL
WOODVILLE ROAD, WOODVILLE SOUTH
FOR SA HEALTH



MASTERPLAN
TOWN + COUNTRY PLANNERS

PLANNING REPORT (SECTION 49, DEVELOPMENT ACT)

**REMOVE ONE REGULATED TREE, DEMOLISH AND RECONSTRUCT NEW
OUTPATIENTS ENTRY CANOPY AND CONSTRUCT NEW MULTI-LEVEL CAR PARK**

at the Queen Elizabeth Hospital, Woodville Road Woodville South
for the Department for Health and Ageing (SA Health)



Prepared by

MasterPlan SA Pty Ltd

ABN 30 007 755 277, ISO 9001:2015 Certified

33 Carrington Street, Adelaide SA 5000

Telephone: 8193 5600, masterplan.com.au

23rd March 2018

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1.0 INTRODUCTION

This Planning Report is prepared in accordance with Section 49 of the *Development Act 1994* (Crown Development and Public Infrastructure).

The Report describes a proposal by the Department for Health and Ageing to remove one regulated tree, to demolish and reconstruct a new entrance canopy to the Outpatients wing and develop a multi-level car park at the southern end of The Queen Elizabeth Hospital (TQEH) campus at Woodville Road Woodville South. The proposal is shown on the set of drawings prepared by DesignInc Architects at **Appendix A**.

An assessment of the proposal against the relevant provisions of the City of Charles Sturt Development Plan is also included in this Report.

2.0 HOSPITAL REDEVELOPMENT

TQEH is being upgraded and expanded as part of a \$270 million investment by the South Australian Government to provide the western Adelaide region with improved emergency, cardiology, surgical, medical, mental health and rehabilitation services.

The upgrade and expansion will commence with the construction of a new multi-deck car park at the southern end of the hospital campus. The new car park must be constructed at the beginning of the upgrade and expansion process because the new hospital extensions are to be built on the existing patient and Northern Car Park which is located on the northern side of TQEH – see images below.



Car park site in relation to proposed hospital expansion



Impression of proposed hospital facing Woodville Road

The new multi-deck car park will be for patients and visitors to the existing hospital and the upgraded hospital campus. Hospital employees will continue to park in the multi-deck car park on the north-western side of Woodville Road.

3.0 RELEVANT PLANNING AUTHORITY

The applicant in this matter is the Department for Health and Ageing (SA Health).



SA Health is a “State agency” within the meaning of Section 49(1) of the *Development Act 1993*. When a State agency proposes to undertake the development of public infrastructure¹, the State Commission Assessment Panel is the relevant planning authority pursuant to Section 49(2)(b) of the Act.

4.0 SUPPORTING INFORMATION

This Report and the Drawing set at **Appendix A** is to be read with:

- the relevant Certificates of Title and the Deposited Plan for the main hospital site (**Appendix B**);
- a Vegetation Survey prepared by the Department for Environment Water and Natural Resources (**Appendix C**);
- a Traffic Assessment prepared by Wallbridge Gilbert Aztec Engineers (**Appendix D**);
- a Stormwater Management Plan prepared by Wallbridge Gilbert Aztec Engineers (**Appendix E**);
- a Carpark Noise Impact Assessment prepared by Resonate Acoustics (**Appendix F**);
- a Landscaping Plan prepared by Bruce Oswald for DesignInc (**Appendix G**); and
- a Shadow Casting study prepared by DesignInc Architects at **Appendix H**.

The completed Crown Development Application form and Electricity Declaration form (Schedule 5, Clause 2A) are enclosed.

5.0 THE DEVELOPMENT SITE

The proposed multi-level car park will be located on the campus of TQEH at 6, 8 and 28 Woodville Road Woodville South.

¹ Public infrastructure is defined in Section 49(1) to include hospitals as well as all other facilities that have been traditionally provided by the State (but not necessarily only by the State) as community or public facilities.



The development site occupies three (3) Certificates of Title:

- Allotment 70 in Deposited Plan 3994 in Certificate of Title 5719/215;
- Allotment 71 in Deposited Plan 3994 in Certificate of Title 5723/360; and
- portion of Allotment 602 in Deposited Plan 73137 in Certificate of Title 6184/480.

The Certificates of Title and DP73137 for Allotment 602 are at **Appendix B**.

The Title documents indicate that no part of the site is affected by easements or other registered encumbrances.

The development site is at the south-western end of the hospital campus. Improvements consist of:

- 'Redevelopment House' at 6 Woodville Road (now demolished);
- 'Diabetes House' at 8 Woodville Road (vacant, now demolished); and
- an at-grade car park used for emergency drop-offs and pick-ups by visitors, outpatients and other hospital users (the Southern Car Park).



'Redevelopment House' now demolished



'Diabetes House' now demolished

The proposed car park site is bisected by a service driveway providing access to the Emergency Department drop-off and pick-up car park, and to other parts of the hospital site. The service driveway is accessed from Woodville Road, with vehicles permitted to turn left and right via a break in the Woodville Road median strip.



Break in Woodville Road median strip opposite hospital entry



Emergency Department/Outpatients car park

WGA's Traffic Assessment at **Appendix D** identifies that off-street parking on the hospital campus is distributed as follows:

Table 1 – Distribution of Off-Street Parking

	GENERAL PARKING	DISABLED	STAFF	MOTORCYCLES
Northern Car Park (Public)	216	26	28	13
Southern Car Park (Public)	35	14	-	-
Multi-Deck Car Parking (Staff)	566	-	-	-
Total	817	40	28	13

Source: WGA Traffic Assessment 16 March 2018.

A row of established street trees (*Koelreuteria bipinnata*, or Chinese Flame Tree) are planted at regular intervals along the eastern side of Woodville Road in front of the development site.



Street trees on eastern side of Woodville Road



Street trees in front of Outpatients Department



Various tree species occupy the site, as detailed on the Vegetation Survey prepared by the Department of Environment, Water and Natural Resources at **Appendix C**. Only one tree (Tree 34) is *Regulated*. This tree is a Common Coral. It is in the Emergency Department car park and is one of many of the same species and general appearance.



Regulated tree in Southern Car Park, recommended for removal

The Tree Survey accompanying the Vegetation Survey recommends this tree for removal, along with other non-regulated trees on the site of the proposed development.

6.0 THE LOCALITY

The site of the proposed development is at the south-western end of TQEH campus. Immediately to the south-west of the site is the Woodville South Medical Centre at 4 Woodville Road. The medical centre operates out of a single storey red brick building originally used for residential purposes. The medical centre is provided with off-street parking accessible from Glenrowan Road.



Woodville South Medical Centre, 4 Woodville Road



The opposite (north-western) side of Woodville Road is taken up with non-residential development, aged persons' housing and a multi deck staff car park associated with TQEH. A large vacant allotment at the corner of Woodville Road and Findon Road is currently used for temporary (paid) public car parking. The site is for sale.



Temporary car park, corner Woodville Road and Findon Road

Single storey housing is located along Glenrowan Road. Most of this housing is of 1950's style, but with evidence of residential redevelopment for higher density, townhouse style housing. The house closest to the development site at 38 Glenrowan Road is in a poor state of repair but appears to be occupied (external observation only).



Front yard, 38 Glenrowan Road

The rear yard of 38 Glenrowan Road is overgrown and poorly maintained. It is characterised by mature trees which screen and shade much of this space, and the house itself. No part of the rear yard appears to be used for outdoor recreation or living purposes.



Overgrown rear yard of 38 Glenrowan Road

Woodville Road is an arterial road under the care and control of the Commissioner of Highways. According to the Traffic Assessment prepared by WGA² at **Appendix D**, Woodville Road adjacent to the site carries an estimated 19,300 vehicles per day. The posted speed limit along this road is 50 kilometres per hour.

Woodville Road carries various bus services, with bus stops conveniently located alongside TQEH on both sides of the road.

Glenrowan Road is a local road under the care and control of the City of Charles Sturt. Traffic volumes on this road are not known, but from observation they appear to be low. The road has recently been resurfaced and re-kerbed, with no parking allowed on the north-eastern side of the road and a two-hour parking limit on the south-western side from 7.00 am to 5.00 pm Monday to Friday. Very few cars were parked in Glenrowan Road during our site inspection on Monday 8th January 2018 at approximately 4.00 pm. The absence of vehicles in Glenrowan Road can be seen in the image below.



Glenrowan Road looking north-east

² The Queen Elizabeth Hospital Multi Deck Car Park – Traffic Assessment, Wallbridge Gilbert Aztec [Revision B 16 March 2018]



7.0 THE PROPOSAL

The proposal is shown on the drawing set prepared by DesignInc Adelaide Pty Ltd in association with JBG Architects Pty Ltd at **Appendix A**.

The proposal is for the removal of one regulated tree, the replacement and reconstruction of the Outpatients' entry canopy facing Woodville Road, and construction of a multi-level car park with associated access driveways to Woodville Road at the south-western end of TQEH campus.

The new car park will replace the ground level car park to the north of the multi-storey main hospital building (the Northern Car Park). The Northern Car Park occupies the site which has been identified for the redevelopment of a new multi-level hospital building which will house a new emergency department, outpatient rehabilitation, cardio and other hospital and medical services.

The proposed multi-deck car park will be used by hospital visitors and outpatients of the expanded hospital complex. Hospital staff will continue to use the multi-deck car park on the north-western side of Woodville Road.

7.1 Proposal Deliverables

The new multi-deck car park and Outpatients' canopy have been designed to:

- enhance and expand parking and outpatient facilities at TQEH by improving accessibility for all hospital users;
- maximise the car park building's environmental sustainability;
- respond to the specific needs of TQEH users, a significant proportion of whom are likely to be older persons and persons with mobility and access impairments;
- deliver a safe, secure, weatherproof and undercover entry canopy and on-site car park for visitors and patients alike;
- reconfigure parking facilities across the hospital campus for optimal utilisation, and to service the entire TQEH campus;
- maintain a safe and secure environment within and adjacent to the site, whilst minimising impacts on the operations of TQEH;
- improve accessibility for all TQEH services;
- improve the streetscape canopy presentation from Woodville Road;
- optimise the utilisation of TQEH resources; and
- deliver a high quality, robust built form that responds appropriately to TQEH and its surrounding locality.



7.2 Site Works

'Redevelopment House' at 6 Woodville Road and 'Diabetes House' at 8 Woodville Road have been demolished.

The existing Outpatients' entry canopy will be removed to make way for the new canopy.

Below ground services will be disconnected and removed.

All trees and other vegetation will be cleared from the site, including one *Regulated* tree from the Emergency Department car park. As detailed above, the tree is a Common Coral tree. It has been recommended for removal in the Vegetation Survey prepared by DEWNR at **Appendix C**.

7.3 Parking

The new car park will have capacity for the parking of 507 vehicles over five levels, consisting of 487 spaces for general parking and 76 spaces for disabled parking. The distribution of parking spaces at each level is detailed in Table 2 below.

Table 2 – Proposed Parking Spaces Distribution

	DISABLED SPACES	GENERAL PURPOSE SPACES
Ground/Level 1	14	65
Level 1/2	16	79
Level 2/3	16	80
Level 3/4	16	80
Level 4/5	14	82
Upper Level 5	-	101

Bicycle parking facilities will be provided in a dedicated room at Ground Level closest to the main hospital complex. The bicycle room will have capacity for the safe and secure parking of 46 bicycles. End-of-journey male and female change rooms, showers and toilets are provided next to the bicycle room.

7.4 Access

The car park will be accessed via a split driveway entrance onto Woodville Road. The new entrance will be located a short distance north east along Woodville Road from the existing car park entry. The new entrance will allow car park users to ingress by turning left from Woodville Road, and egress by turning left back onto Woodville Road.



The raised median on Woodville Road adjacent to the new entrance will be retained. This will prevent right hand turns into and out of the new car park across Woodville Road. The existing median opening will be closed.

Vehicles entering the car park building will proceed via dedicated entry lanes behind the new car park building, and will depart the building via dedicated exit lanes. The exit lanes have been designed to allow for departing vehicles to turn either left and depart the site back onto Woodville Road, or to turn right and depart via the hospital loop road system.

The new driveway system has also been designed to permit service vehicles, hospital and related workers to proceed past the car park entrance lanes to other hospital services including the emergency generator, oxygen compound, boiler house, hospital kitchen, Crammond Clinic and research laboratories.

7.5 Environmental Sustainability

SA Health has adopted its own Green Building Rating System, known as the Independent Green Rating Tool, or IGRAT. D-squared have been appointed by SA Health to the role of Independent ESD Advocate to ensure that SA Health's ESD requirements are embedded in the design and construction of all SA Health facilities.

To maximise the car park's environmental sustainability, solar PV panels capable of generating up to 500 kW of electricity will be fitted to the roof. This detail is shown on Roof Plan Drawing 1805-A111. SA Health is aiming to generate in the order of 500kW of solar energy to off-set the hospital's reliance on electricity sourced from the grid. The solar panels will be flat mounted to maximise generating capacity and minimise visual impact³.

Other environmentally sustainable features of the building include the use of natural (non-mechanical) ventilation throughout, the provision of disability parking at rates substantially above Development Plan requirements, the provision of bicycle parking and end-of-journey facilities at rates substantially above Development Plan requirements, energy efficient LED lighting both internally and externally, energy efficient lifts and high-quality landscaping surrounding the building.

The sustainability measures which will be embedded into the building's design are expected to deliver an IGRAT rating of more than five stars.

³ SA Health's commitment to solar PV enablement is subject to funding authority. The installation and connection of the PV arrays may be implemented after the car park's practical completion.



7.6 Building Height

The building will have a maximum building height of 18.95 metres⁴.

To minimise building height and to optimise the installation of PV solar panels, the roof will drain at a 1.0-degree slope to a box gutter running through the middle of the building.

The building's height to all elevations remains the same, namely 18.95 metres.

7.7 External Colours and Finishes

To facilitate natural ventilation, the façade will be clad with 'push-pull' perforated mesh, as detailed on the Elevation Drawings 1805-A201 and the 3D image at Drawing 1805-A901. The replacement canopy to the Outpatients wing will be similarly clad and coloured to complement the appearance of the new car park.

The push-pull screens will be in shades of Shale Grey, Paperbark, Sandstone and Pale Eucalypt, as detailed on Drawing 1805-A901.

Structural support for the building will be achieved using concrete panels to all building corners, and to the northern elevation mid-section. These panels will be red oxide or painted ('Rojo Rock').

To further soften the appearance of the car park façade facing Woodville Road, the stairwell at the southwestern end of the building will be externally clad with a vertical band of glazing. This detail is best shown on the 3D view at Drawing 1805-A901.

7.8 Set Backs

The building will be setback:

- 6.0 metres from Woodville Road;
- 3.1 metres from the boundary shared with Woodville South Medical Centre; and
- 9.5 metres from the boundary shared with 38 Glenrowan Road.

The building has been deliberately sited closer to Woodville Road than the distance prescribed in the Development Plan to maximise its separation distance from the closest residential property at 38 Glenrowan Road.

7.9 Landscaping

The Landscaping Plan (Drawing TQEH-A101) at **Appendix G** features:

⁴ This excludes the lift shaft, which is located well away from all building edges. The lift shaft projects an additional 1.55 metres above parapet height.



- a row of Tuckeroo trees planted at regular intervals in the Woodville Road setback, with Lomandra sedges planted beneath these trees as groundcover;
- a row of Spotted Gum trees in the garden bed behind the car park building, together with Callistemon (Bottlebrush) alongside the boundary shared with 38 Glenrowan Road; and
- Native Frangipani planted at close intervals along the southern boundary shared with Woodville South Medical Centre.

The Woodville Road street trees will be retained, as will the row of established Chinese Flame Trees in the garden bed situated between the Outpatients' canopy and Woodville Road.

8.0 DEVELOPMENT PLAN

The relevant Development Plan for assessment purposes is the Charles Sturt Council Development Plan, consolidated version dated 30 January 2018.

The development site forms part of TQEH campus, which is in the District Centre Zone identified on Zone Map ChSt/8 of the Development Plan. The adjacent Woodville South Medical Centre at the corner of Woodville Road and Glenrowan Road is also located in the District Centre Zone, but is not part of the hospital campus.

The hospital campus is also located in Woodville Policy Area 5 and in Precinct 18: Woodville Road Medical of the District Centre Zone.

A hospital is one of many land use developments envisaged in the District Centre Zone (Zone Principle 1), while Woodville Policy Area 5 encourages "*the concentration of activities of a hospital and related medical and consulting room nature...*" (Policy Area 5 Objective 1).

Precinct 18: Woodville Road Medical applies specifically to TQEH campus, nearby facilities including properties on the north-western side of Woodville Road and the multi-level staff car park, and Woodville South Medical Centre at 4 Woodville Road. The Desired Character for Precinct 18 states:

"The precinct contains The Queen Elizabeth Hospital, ancillary health facilities, consulting rooms, aged care accommodation and community facilities. Development related to the hospital is appropriate. It is envisaged that the heritage and streetscape significance of the historic church complex at the junction of Woodville Road and Church Street will be retained, and complemented by new development to the south.

It is desirable to minimise the visual and operational impact of the hospital and associated car parking and traffic impact on adjacent residential areas. This can be achieved through the careful siting and design of new development in the hospital grounds.



It is envisaged that development will be scaled down in intensity towards the boundaries of the precinct. To improve amenity in the precinct it is desirable that buildings are of a high standard of design with car parking areas consolidated and landscaped at the rear of properties facing Woodville Road. A plaza setting will be created by siting buildings back from the road with landscaped set back areas. The amenity of Woodville Road will be improved through high quality building designs with articulated facades.

A mixture of residential, office, community and hospital uses is envisaged in the western section of the precinct of a lower scale and intensity to be compatible with a residential environment”.

[our underlining for emphasis]

9.0 ASSESSMENT OF RELEVANT PLANNING ISSUES

The planning issues considered to be most relevant to an assessment of the proposal’s merits are:

- Is the building an appropriate and envisaged kind of development for the Zone, Policy Area and Precinct?
- Is the building’s height acceptable in relation to Woodville Road and its proximity to houses in Glenrowan Road?
- Is the building appropriately designed and sited?
- What impact is the building likely to have on the amenity of the nearest residential properties in terms of overshadowing, overlooking and headlight glare?
- Is the development environmentally sustainable?
- Can the Regulated Tree’s removal be justified in planning terms?
- Has adequate and appropriate provision be made for the parking of vehicles and bicycles?
- Is safe and convenient ingress and egress provided from Woodville Road for all car park users?
- Will noise from the car park be acceptable having regard to the building’s proximity to housing in the adjacent Residential Zone and any other sensitive receptors? and
- Can stormwater be safely and efficiently managed?



9.1 Appropriate and Envisaged Kind of Development

The car park will be used by staff and visitors to TQEH. As such the building will be ancillary and incidental to the use of the overall site for hospital purposes.

A hospital is an envisaged kind of development in the District Centre Zone, and in Policy Area 5 and Precinct 18 of that Zone.

It is therefore concluded that the car park is both an appropriate and envisaged kind of development for the Zone, Policy Area and Precinct.

9.2 Building Height

The building will have a maximum height of 18.95 metres, rising to 20.5 metres at the lift core. Having regard to the definition of 'building height' in the *Development Regulations 2008*, the additional height represented by the lift core should not in our opinion not treated as part of the building height because it is not the finished roof height⁵.

While the building's 18.95 height slightly exceeds (by 950 millimetres) the 18-metre height limit specified in Woodville Policy Area Principle 5 for buildings on the eastern side of Woodville Road, the exceedance is minor and reasonable when considered in context with the height of the nearby Outpatients Building on the eastern side of Woodville Road, and the main hospital complex further to the north east again. The retention of mature street trees along this section of Woodville Road in front of the new building will also assist in immediately softening and screening the building's height from Woodville Road.

High quality landscaping will be planted in the 6.0 metre setback zone adjacent Woodville Road and this will further screen and soften the building's appearance from Woodville Road.

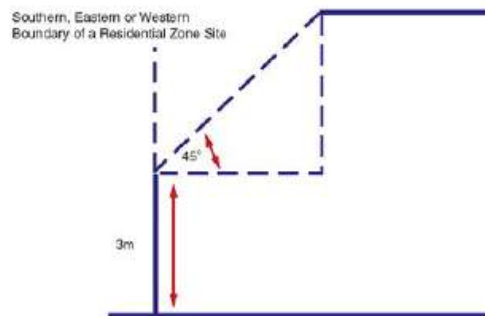
The Desired Character for Precinct 18 encourages buildings to be "*scaled down in intensity towards the boundaries of the Precinct*". The scaling down of the building's height would significantly reduce parking numbers, to the extent that the hospital campus following redevelopment of the northern car park could result in a shortage of off street visitor parking. To offset the impact of the building's height towards the Precinct boundary, the new building will be setback 3.1 metres from the southwestern boundary shared with the medical centre (which as noted previously is in the same Zone, Policy Area and Precinct as the hospital campus), and 9.5 metres from the Residential Zone boundary shared with 38 Glenrowan Road. High quality landscaping will be established along both boundaries, and in front of the building facing Woodville Road, to soften and enhance the built form and visual impact of the new building.

⁵ **building height** is defined in Schedule 1 of the *Development Regulations 2008* to mean the maximum vertical distance between the natural or finished ground level at any point of any part of a building and the finished roof height at its highest point, ignoring any antenna, aerial, chimney, flagpole or the like.



General Section: Interface Between Land Uses Principle 7 states that where a building in a Centre Zone abuts the southern, eastern or western boundary of a site in Residential Zone, building development should not intrude into the building plane in the diagram below.

- (b) abuts the southern, eastern or western boundary of a site in a zone where residential development is envisaged, building development should not intrude into a plane angled 45 degrees above the horizontal into the site, as measured from a point 3 metres above the boundary, as shown in the figure below:



The proposed building will be setback 9.5 metres from the *north-western* boundary of the residential property at 38 Glenrowan Road in the adjacent Residential Zone. It can also be seen from the diagram below that only a small percentage of the building will penetrate the 45-degree plane.



The extent to which the car park building penetrates the 45-degree building plane is considered acceptable for the following reasons:

- the overwhelming majority of the building's mass is contained within the 45-degree plane;



- the Residential Zone boundary in question runs north-west, not true west as specified in Principle 7(b);
- the building will be setback 9.5 metres from the Residential Zone boundary to allow for effective landscaping and new fencing at the residential interface;
- the Woodville South Medical Centre immediately south west of the site is in the same Zone, Policy Area and Precinct as the hospital campus;
- the proposed building only slightly exceeds (by 950 millimetres) the 18-metre building height limit specified by Precinct 18 Principle 6 ("*Building development east of Woodville Road should not exceed 18 metres in height.*"); and
- the rear yard of the closest residential property in question features a dense band of tall, evergreen trees.

On balance, we are satisfied that the building's height is acceptable adjacent to the Residential Zone boundary and alongside Woodville Road having regard to the relevant provisions of the Development Plan.

9.3 Design and Siting

The building will be setback 6.0 metres from Woodville Road, 3.1 metres from the boundary shared with the Woodville South Medical Centre at 4 Woodville Road and 9.5 metres from the boundary shared with the closest residence at 38 Glenrowan Road.

The Landscaping Plan at **Appendix G** will deliver high quality landscaping surrounding the building. The trees, shrubs and groundcovers to be planted have been carefully chosen to soften and enhance the building's appearance from Woodville Road, and to soften and screen the building's impact at the residential interface shared with 38 Glenrowan Road. The row of established street trees along Woodville Road in front of the car park site and the new Outpatients entry canopy will also help to soften and screen the new multi-level building form when viewed from Woodville Road.

The landscape treatment formulated for the 9.5 metre setback space adjacent to the rear yard of 38 Glen Rowan Road has been carefully selected to screen the proposed building from direct view from the rear yard of this residence, even though it could be argued that the rear yard is so overgrown that only limited use could be made of this space for amenity and outdoor relaxation purposes. In this regard, the Development Plan at General Section: Landscaping, Fences and Walls Principles 1, 2 and 3 requires landscaping *for proposed development* to:

- complement the built form and reduce the visual impact of larger buildings;
- enhance the appearance of road frontages; and
- maintain privacy.



The proposed building will be setback 6.0 metres from Woodville Road, or 2.0 metres less than the distance specified by Precinct 18: Woodville Road Medical Principle 7. This Principle calls for a building setback of 8.0 metres *"behind a landscaped plaza to Woodville Road"*. A slightly lesser setback distance is considered appropriate having regard to the 4.5 metre setback distance of the adjacent Outpatients Building at one end of the site, the zero setback of the adjacent Woodville South Medical Centre at the other end of the site, and SA Health's ambition to create a *"landscaped plaza to Woodville Road"* in accordance with Principle 7.

The retention of mature street trees along Woodville Road in front of the site, in combination with high quality, carefully designed landscaping in this setback space as shown on the Landscaping Plan, further justifies a slightly reduced building setback from Woodville Road.

9.4 Overshadowing, Overlooking and Headlight Glare

General Section: Interface between Land Uses Principle 1 requires development to not cause unreasonable interference from light spill, while Principle 3 requires development adjacent to a Residential Zone or residential area to be *"located, designed and/or sited to minimise overlooking and overshadowing of adjacent dwellings and private open space"*. These provisions are particularly applicable to the adjacent residence at 38 Glenrowan Road.

The external façade of the car park structure will be clad with perforated metal sheeting to eliminate the need for mechanical ventilation. This will consist of 'Push-Pull' perforated screening to enhance and add interest to the building's external appearance. This cladding will also minimise light spill from headlight glare to the extent necessary *"to not cause unreasonable interference"*. The provision of effective landscaping in the 9.5-metre setback zone will furthermore assist in reducing headlight glare, as will the dense landscaping already in the rear yard of 38 Glenrowan Road.

Push-pull perforated cladding combined with effective landscaping at the interface will furthermore minimise overlooking from the upper level parking decks towards the private open space and habitable rooms of adjacent dwellings, as required by General Section: Interface between Land Uses Principle 3.

The proposed car park will cast shadow in the afternoon, but the extent of such overshadowing is minimal as shown on the Shadow Casting Drawing A801 prepared by DesignInc at **Appendix H**.

The proposed car park's position relative to adjacent houses at 38 and 36 Glenrowan Road is such that both houses and their private open space will be progressively shadowed from 12 mid-day onwards on 21 June. Furthermore, these properties will receive close to four hours of sunlight on 21 June, which exceeds the standard contained in General Section: Design and Appearance (Overshadowing) Principle 10 that *"north-facing windows to habitable rooms received at least three hours of direct sunlight over a portion of their surface between 9.00 am and 3.00 pm on 21 June"* and that the ground level open space receives at least two hours of direct sunlight to at least half of that open space or 35 square metres (whichever is the smaller) on 21 June. This requirement is repeated at Woodville Policy Area 5 at Principle 33.



The Shadow Casting diagrams indicate that 38 Glenrowan Road closest to the proposed car park will receive morning sunlight on 21 June from at least 9.00 am until 12 mid-day, with properties further along Glenrowan Road in an easterly direction receiving even more than this amount of sunshine at this time of the year.

9.5 Environmental Sustainability

The proposed car park's environmentally sustainable features are described in Section 7.5 of this Report, and as noted the collective provision of these features is expected to achieve an IGRAT rating in excess of five stars. Central to achieving this rating is the use of natural ventilation throughout the building and the installation of solar panels laid flat on the roof to generate up to 500 kW of electricity for use throughout the hospital complex.

General Section: Renewable Energy Facilities Principle 1 requires renewable energy facilities to be located where they will "... *maximise efficient generation and supply of electricity*". The installation of solar panels on the car park roof will maximise energy generation because the panels will be laid flush with the roof to maximise the amount of direct sunlight received throughout the day and the year.

The PV arrays will furthermore be consistent with General Section: Energy Efficiency Principles 1, 3, 4, 5 and 6, in that:

- the entire roof of the car park building will be used to generate solar power (Principle 1);
- the building has been designed so that adjacent properties in the Residential Zone will continue to receive at least three hours of sunlight at the winter solstice (Principle 3);
- the roof of the building will be pitched at 1.0 degrees to maximise PV efficiency throughout the day and throughout the year (Principles 4 and 5); and
- all lighting in the building, and external to it, will be LED lighting to significantly reduce energy consumption (Principle 6).

9.6 Regulated Tree

Only one regulated tree will need to be removed. The tree is one of a number in the southern car park that must be removed to make way for the proposed car park building.

General Section: Regulated Trees Principle 2 lists five (5) circumstances under which a regulated tree may be removed. It is necessary that only one or more (but not all) of these circumstances needs to be demonstrated. The circumstance which is most relevant to the proposal is Principle 2(d), which states:

... **development that is reasonable and expected [and] would not otherwise be possible.**



The tree is located deep within the building footprint of the proposed car park building. It simply cannot be retained without altering the building design, or relocating the building to another part of the site. Neither of these options are realistic or physically possible.

In addition, the tree has been recommended for removal in the Vegetation Survey undertaken by DEWNR for the Department of Planning, Transport and Infrastructure (refer **Appendix C**).

For these reasons it is concluded that the tree's removal is justified having regard to the inability to reposition the building and DEWNR's recommendation supporting the tree's removal. The removal is also justified given that the use of this part of the hospital campus for new public parking purposes as part of TQEH's overall redevelopment is both reasonable and expected.

9.7 Parking of Vehicles and Bicycles

The new car park has been designed to compensate for the loss of 283 parking spaces from the Northern public car park (216 spaces for general parking, 26 disabled parking, 28 staff parking and 13 motor cycles) and a loss of 49 spaces from the Southern public car park (35 spaces for the general public plus 14 spaces for disabled parking). The new car park has also been designed to accommodate parking demand from the hospital extensions planned on the site of the Northern car park.

Allowance has also been made for the safe and secure parking of approximately 50 bicycles.

The new car park will have 507 parking spaces. This means there will be a net increase of 175 spaces (507 proposed, less 332 spaces removed from the Northern and Southern public car parks).

WGA's Traffic Assessment at **Appendix D** finds that:

- parking demand is not expected to increase significantly from the existing situation⁶;
- there is a surplus of staff parking at TQEH, but a shortage of visitor parking;
- the provision of 507 parking spaces is expected to address this deficiency, and allow for future expansion if required;
- providing a total of 102 disabled parking spaces (76 of which will be in the proposed car park) will exceed BCA requirements; and
- the provision of approximately 50 bicycle parking facilities is expected to meet employee demand for bicycle storage facilities.

⁶ WGA has not allowed for the additional demand likely from the planned extension of the hospital on the Northern Public Car Park, but has factored this into consideration elsewhere in the Traffic Assessment.



The car park will provide off-street parking not only for the existing hospital complex but for extensions planned over the northern public car park site. There will be a net gain in off-street parking to satisfy existing and projected demand⁷.

The WGA report also notes that the Development Plan is silent with respect to parking rates for hospitals, but has referenced the *SA Planning Bulletin (Parking Provisions for Selected Land Uses)* to determine an appropriate rate of 2.5 parking spaces per bed for all parking - staff, visitors and disabled.

It is concluded that the proposed multi-level car park will have sufficient off-street parking for visitors to satisfy demand from the existing hospital and the planned expansion of the hospital (General Section: Transportation and Access Objective 2(b)).

The proposal also makes appropriate and generous provision for cyclists, consistent with General Section: Transportation and Access Principles 20, 21 and 22.

9.8 Safe and Convenient Access to Woodville Road

WGA is of the opinion that the new car park will be provided with safe and convenient access to and from Woodville Road, given that right-hand turns will be not be permitted. However, WGA has recommended that 'No U-Turn' signs be installed on the Woodville Road median to prevent vehicles (including hospital emergency service vehicles) making U-turns at the nearby median break adjacent to the hospital's Emergency Department driveway entrance.

WGA also notes that the Level of Service (LOS) at the nearby signalised intersection of Woodville Road and Findon Road is expected to decrease (from LOS E to LOS D) but the additional delay of only four seconds is acceptable.

The Development Plan at General Section: Transportation and Access calls for:

- a high level of safety (Objective 1(b));
- minimal environmental and social impacts (Objective 1(d));
- development to provide safe and efficient movement for all transport modes (Objective 2(a)); and
- development to provide safe and convenient access to public transport stops (Objective 2(e)).

⁷ Detailed plans for the proposed hospital extension have not been made available. However, WGA notes in its report that even with the removal of parking spaces from the Northern Car Park to make way for the new development, there will still be 1,073 spaces provided which will exceed the requirement for off-street parking by 295 spaces. This excess is equivalent to about 118 beds, which WGA considers will adequately cater for any future development.



The proposal delivers on all of these requirements, noting that no right turns will be permitted into or out of the site via Woodville Road, the car park will provide exclusively for the needs of the visiting public, the facility itself fronts onto Woodville Road, which road carries various bus routes with bus stops directly in front of the site, and the facility caters for able-bodied and disabled motorists and cyclists.

9.9 Noise Impact

General Section: Interface between Land Uses/Noise Generating Uses Principle 8 calls for *“development that emits noise (other than music noise) should include noise attenuation measures that prevent noise from causing unreasonable interference with the amenity of noise sensitive premises”*.

The proposed public car park is in close proximity to houses in the adjacent Residential Zone, and an aged care facility at 9 Woodville Road on the opposite side of this road. These properties would be considered as “noise sensitive premises” within the meaning of Principle 8.

Moreover, the car park will operate 24 hours per day, 7 days a week, although in practice the car park will be at its busiest only during daylight hours and into the early evening only. Very few visitors are expected after 10.00 pm or before 7.00 am.

Resonate Acoustics has modelled predicted noise levels from the movement of vehicles into and out of the proposed car park at the closest sensitive receptors. Its Noise Impact Assessment is at **Appendix F**.

According to Resonate, noise levels at the closest sensitive receptor at 38 Glenrowan Road *“is in exceedance of the Criteria described in Section 4 of this report; however, the exceedance is by no more than 2 decibels and is predicted to occur during the 15 minutes of peak carpark movement in the daytime. The exceedance in this case is not sufficient to be easily discerned by the human ear and is considered negligible”*.

Resonate have excluded noise from the car park’s use at night time (ie after 10.00 pm) because the noise levels associated with the car park’s night time use will be significantly less than during peak times.

Resonate concludes that *“the noise emission from the proposed TQEH carpark complies with the requirements of the Noise EPP”*.

Based on Resonate’s investigations and findings, we are satisfied that the proposed car park’s use will not generate noise at levels likely to unreasonably interfere with the amenity of noise sensitive premises.



9.10 Stormwater Management

WGA's Stormwater Management Plan is at **Appendix E**. The SMP, which has been prepared in consultation with the City of Charles Sturt, notes that the proposed development of the car park and its associated landscaping will result in a marginal reduction in the amount of impervious area, compared to pre-development conditions (84.3% pre-development, 80.7% post-development). Consequently, no on-site detention is required to achieve Council's requirement for post-development flows to not exceed pre-development flows.

WGA has also identified that the proposed car park site is prone to flooding to a depth ranging from 100 millimetres to 150 millimetres (see Figure 2.2 of the SMP). To manage this risk, WGA has recommended that the car park FFL at ground level be established at 7.4 metres AHD to ensure that the lower building floor level is a minimum of 300 millimetres above the flood level.

WGA also notes that the new development will generate clean stormwater runoff (from the roof) compared to the concentration of pollutants draining from the existing Southern Car Park. This will have an overall positive impact on the quality of stormwater discharging from the site.

The Development Plan at General Section: Natural Resources/Water Sensitive Design calls for development to:

- minimise surface water run off (Principle 7(b));
- ensure water discharging from a development site is in a better condition than its pre-developed state, and that the discharge rate does not exceed the rate of discharge compared to its pre-development state (Principles 8 and 10); and
- not be adversely affected or be put at risk from damage during a 1 in 100-year ARI flood (Principle 9).

It is not practical to capture and reuse water resources (Principles 5 and 7(a)), nor will the proposal harvest stormwater by any of the methods listed in Principle 4. However, all stormwater from the site will be of superior quality compared to the quality of pre-development stormwater discharging from the site. As such, the proposal's stormwater system will be consistent with Principle 15 which provides for clean stormwater to discharge into the public stormwater drainage system "*where it is not practical to detain or dispose of stormwater on site*".

The SMP prepared by WGA will satisfy all the relevant Water Sensitive Design requirements of the Development Plan.



10.0 CONCLUSIONS

It is concluded that the proposal by SA Health to remove one regulated tree, demolish and reconstruct a new Entry Canopy to the Outpatients Wing and construct a new multi-level car park at the south-western end of the hospital campus substantially conforms to provisions of the City of Charles Sturt Development Plan.

In particular, the proposal:

- (i) is an appropriate and envisaged kind of development for the District Centre Zone, as well as for Policy Area 4 and Precinct 18 of that zone;
- (ii) slightly exceeds the maximum allowable building height applying to the eastern side of Woodville Road, but the exceedance is minor and acceptable;
- (iii) will slightly penetrate the 45-degree plane as measured 3.0 metres above ground level at the Residential Zone boundary, but the extent of such penetration is acceptable because adjoining residential properties will not be unreasonably overshadowed or overlooked, and they will furthermore be effectively screened by high quality landscaping at the residential interface;
- (iv) is setback an appropriate distance from Woodville Road and from the Residential Zone boundary, with effective landscaping proposed in both setback spaces to soften and screen the car park's appearance from Woodville Road and nearby residential properties in Glenrowan Road;
- (v) will not unreasonably overlook or overshadow the private open space or habitable rooms of nearby residential properties in the adjacent Residential Zone;
- (vi) incorporates a suite of environmentally sustainable design features which will deliver an IGRAT rating in excess of five stars;
- (vii) will require the removal of only one regulated tree, the removal of which is justified because the proposed car park structure is a form of development which is reasonable and expected. The proposal would furthermore not otherwise be possible if the tree was retained;
- (viii) makes provision for off-street public parking for general and disabled parking purposes in excess of normal requirements, and will more than compensate for the unavoidable loss of off-street public parking from the Northern Car Park when the hospital's redevelopment commences on that site;
- (ix) provides dedicated bicycle parking and associated end-of-journey change rooms, toilets and showers in excess of normal requirements;



- (x) incorporates safe and convenient access for all car park uses, through the provision of left turn in and left turn out movements via Woodville Road;
- (xi) has been designed to ensure that noise emissions from the proposed car park will comply with the requirements of the *Noise (Environmental Protection) Policy*, and thereby will not unreasonably interfere with the amenity of nearby noise sensitive premises; and
- (xii) has been designed so that stormwater discharged from the site of the proposed development will satisfy all relevant Water Sensitive Design requirements of the Development Plan.

For all of these reasons we are of the opinion that the proposal is deserving of Development Plan Consent.

Graham Burns FPIA
B/A in Planning

23rd March 2018

Appendix A

Drawing Set by DesignInc Architects

THE QUEEN ELIZABETH CARPARK NEW CARPARK DEVELOPMENT

ARCHITECTURAL DRAWING LIST

DWG No.	DWG CONTENT	ISSUE	DATE	ISSUED FOR	DWG No.	DWG CONTENT	ISSUE	DATE	ISSUED FOR
A000	COVER SHEET + BLOCK PLAN	A	16.03.18	DEVELOPMENT APPROVAL	A106	FLOOR PLANS - LEVEL 5	A	16.03.18	DEVELOPMENT APPROVAL
A001	SITE PLAN	A	16.03.18	DEVELOPMENT APPROVAL	A111	ROOF PLAN	A	16.03.18	DEVELOPMENT APPROVAL
A051	DEMOLITION PLAN	A	16.03.18	DEVELOPMENT APPROVAL	A201	ELEVATIONS	A	16.03.18	DEVELOPMENT APPROVAL
A101	FLOOR PLANS - GROUND & LEVEL 1 LOWER	A	16.03.18	DEVELOPMENT APPROVAL	A301	CROSS SECTIONS	A	16.03.18	DEVELOPMENT APPROVAL
A102	FLOOR PLANS - LEVEL 1 & LOWER 2 LEVEL	A	16.03.18	DEVELOPMENT APPROVAL	A302	CROSS SECTIONS	A	16.03.18	DEVELOPMENT APPROVAL
A103	FLOOR PLANS - LEVEL 2 & LOWER 3 LEVEL	A	16.03.18	DEVELOPMENT APPROVAL	A311	LONG SECTION	A	16.03.18	DEVELOPMENT APPROVAL
A104	FLOOR PLANS - LEVEL 3 & LOWER 4 LEVEL	A	16.03.18	DEVELOPMENT APPROVAL	A401	RAMP CANOPY	A	16.03.18	DEVELOPMENT APPROVAL
A105	FLOOR PLANS - LEVEL 4 & LOWER 5 LEVEL	A	16.03.18	DEVELOPMENT APPROVAL	A901	3D VIEW	A	16.03.18	DEVELOPMENT APPROVAL

CARPARKING

CARPARKS	ACCESS	TOTAL	
CARPARKING - GROUND LEVEL	15	14	29
CARPARKING - LEVEL 1 LOWER	50		50
CARPARKING - LEVEL 1	25	16	41
CARPARKING - LEVEL 2 LOWER	54		54
CARPARKING - LEVEL 2	25	16	41
CARPARKING - LEVEL 3 LOWER	54		54
CARPARKING - LEVEL 3	25	16	41
CARPARKING - LEVEL 4 LOWER	54		54
CARPARKING - LEVEL 4	28	14	42
CARPARKING - LEVEL 5 LOWER	54		54
CARPARKING - LEVEL 5	46		47
TOTAL	430	76	506

ACCESS CARPARKING REQUIREMENTS

ACCESS CARPARKING NOTES

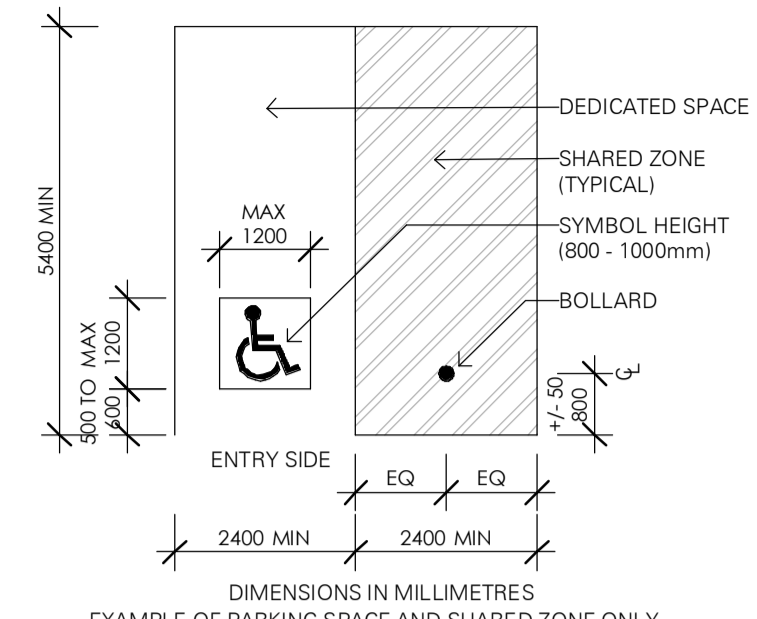
SPACE IDENTIFICATION
EACH DEDICATED SPACE SHALL BE IDENTIFIED BY MEANS OF A WHITE SYMBOL OF ACCESS IN ACCORDANCE WITH AS 2890.6 OFF STREET PARKING FOR PEOPLE WITH DISABILITIES BETWEEN 800mm AND 1000mm HIGH PLACED ON A BLUE RECTANGLE WITH NO SIDE MORE THAN 1200mm, PLACED AS A PAVEMENT MARKING IN THE CENTRE OF THE SPACE.

SPACE DELINEATION
DEDICATED PARKING SPACES SHALL BE OUTLINED WITH UNBROKEN LINES 80mm TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.

SHARED AREAS SHALL BE MARKED AS FOLLOWS:
1. WALKWAYS WITHIN OR PARTLY WITHIN A SHARED AREA SHALL BE OUTLINED WITH UNBROKEN LONGITUDINAL LINES 80mm TO 100mm WIDE ON BOTH SIDES OF THE WALKWAY EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
2. OTHER VACANT NON-TRAFFICATED AREAS, WHICH MAY BE INTENTIONALLY OR UN-INTENTIONALLY OBSTRUCTED (eg BY UNINTENDED PARKING), SHALL BE OUTLINED WITH UNBROKEN LINES 80 TO 100 MM WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL, AND MARKED WITH DIAGONAL STRIPES 150 TO 200 MM WIDE WITH SPACES 200 MM TO 300 MM BETWEEN STRIPES. THE STRIPES SHALL BE AT AN ANGLE OF 45 ± 10 DEGREES TO THE SIDE OF THE SPACE.

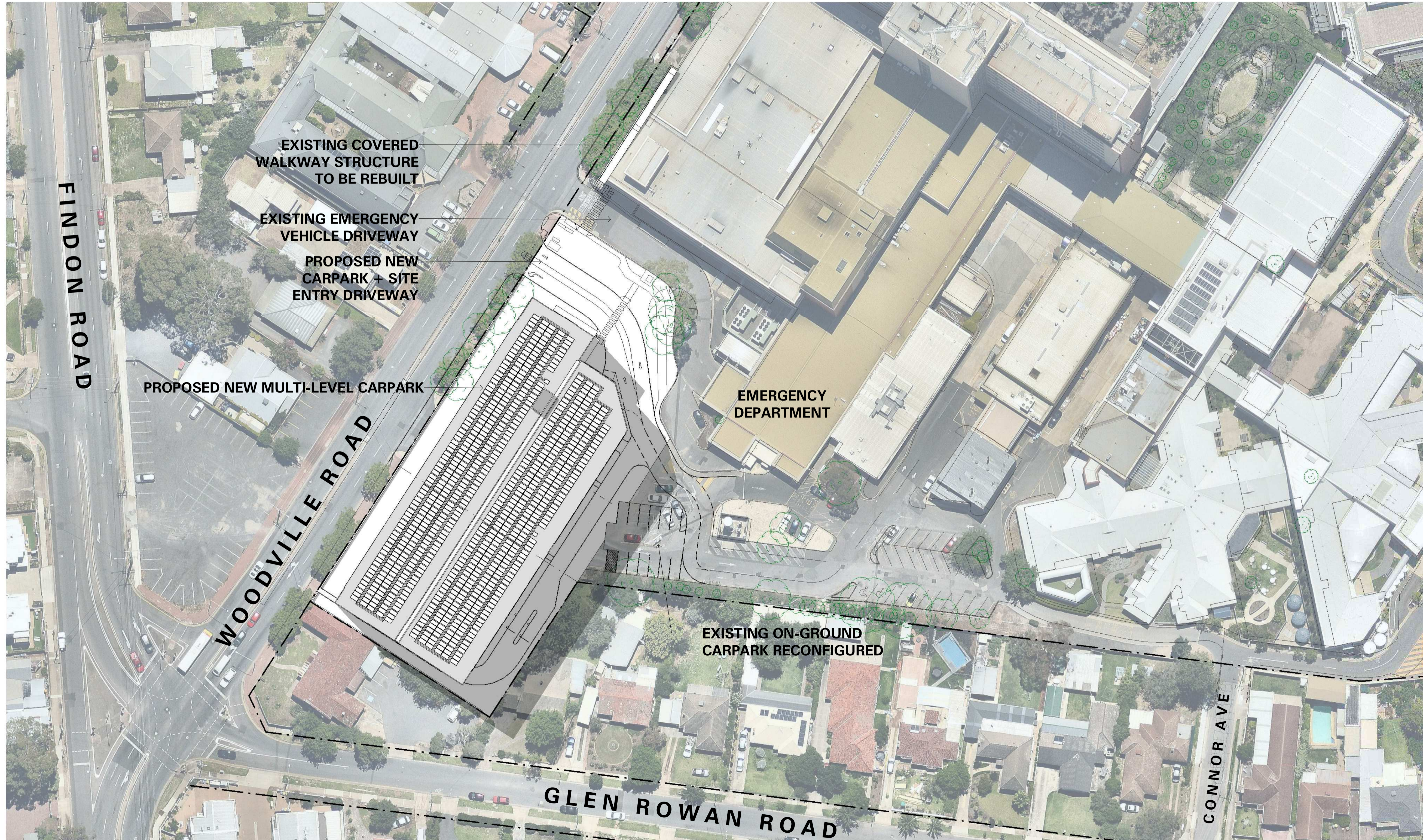
GENERAL NOTES

- NO SHARED AREA MARKINGS SHALL BE PLACED IN TRAFFICATED AREAS.
- PAVEMENT MARKINGS SHALL BE YELLOW AND SHALL HAVE A SLIP RESISTANT SURFACE.
- RAISED PAVEMENT MARKERS SHALL NOT BE USED FOR SPACE DELINEATION.
- ENSURE ACCESS CARPARK AND SHARED ZONE COMPLIES WITH LOCAL COUNCIL DEVELOPMENT GUIDELINES.
- PLEASE REFER SITE PLAN FOR SETOUT DETAILS.



CARPARK NOTES

- STANDARD CAR PARKING SPACES - 2.6m WIDE X 5.5m DEEP
- ACCESSIBLE CAR PARKING SPACES - 2.6m WIDE X 5.5m DEEP WITH SHARED ZONE 2.6m WIDE X 5.5m DEEP
- PROVIDE CONCRETE WHEEL STOP AT EACH PARKING SPACE



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No.	DATE	REVISIONS	BY
A	16.03.18	DEVELOPMENT APPROVAL	TN

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PROJECT
THE QUEEN ELIZABETH
HOSPITAL NEW CAR PARK
ADDITION STAGE 3

TITLE
COVER SHEET + BLOCK PLAN

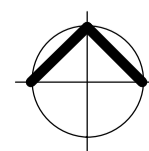
DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY			
FOR INFORMATION ONLY			
FOR D.A. APPROVAL	WS	WS	16.03.18
CONSTRUCTION CERTIFICATE			
FOR TENDERS			
FOR CONSTRUCTION			
AS BUILT DOCUMENT			

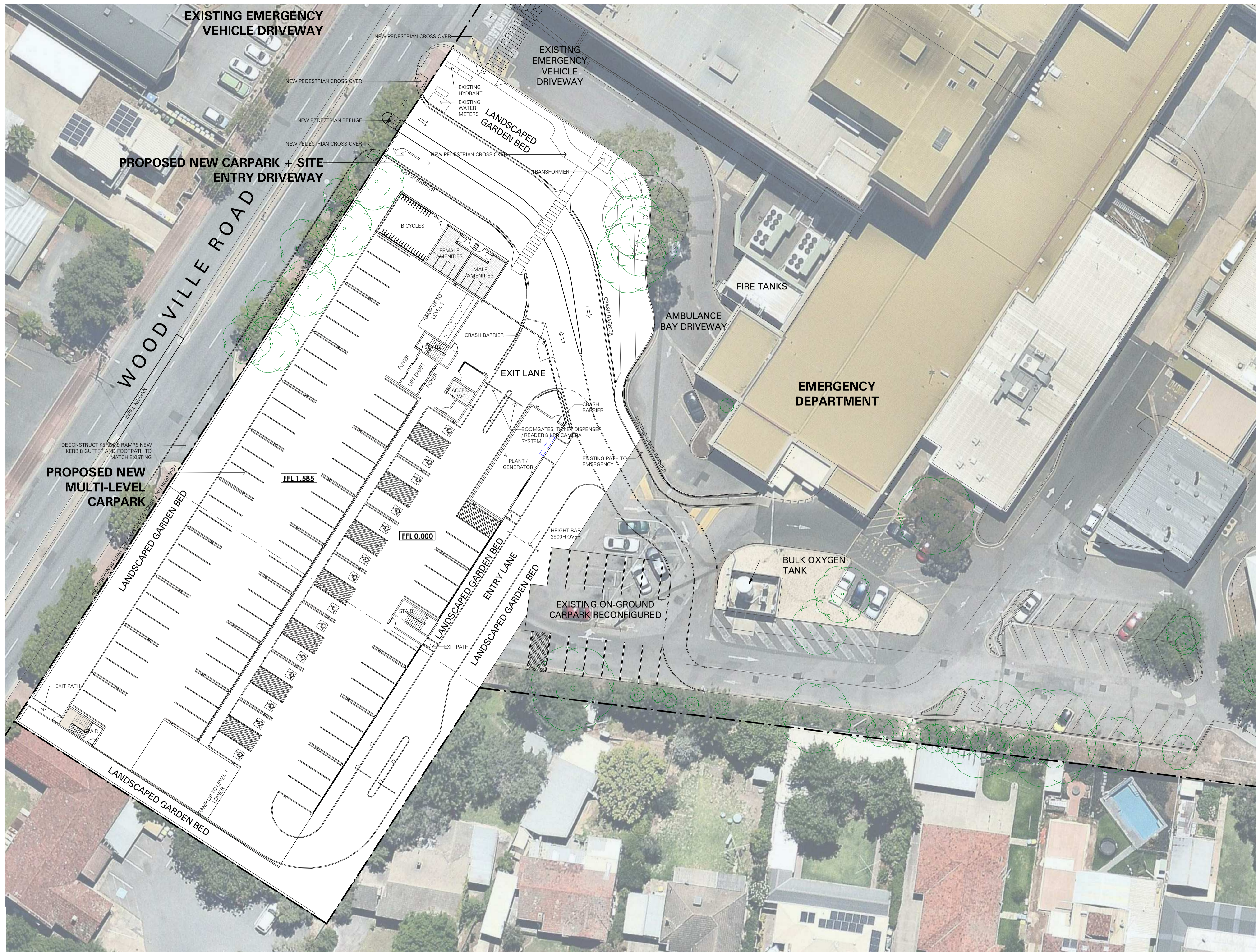
DRAWN	TN
SCALE @ A1	As indicated
DATE	16.03.18

DRAWING NO. 1805-A000 **REV.** A

ISSUE: DEVELOPMENT APPROVAL **ISSUED DATE:** 16.03.18

1 BLOCK PLAN
A201 1:500 0 5m 10m 15m 20m 25m
1:500 @ A1, 1:1000 @ A3





1 SITEPLAN
 A201 1:250
 0 5m 10m 15m 20m 25m
 1:500 @ A1, 1:1000 @ A3

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Figured dimensions take preference to scale readings, verify all dimensions on site. Report any discrepancies to the Superintendent for decision before proceeding with the work.

No.	DATE	REVISIONS	BY
A	16.03.18	DEVELOPMENT APPROVAL	TN

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STRUCTURAL CONSULTANT
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PROJECT
THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

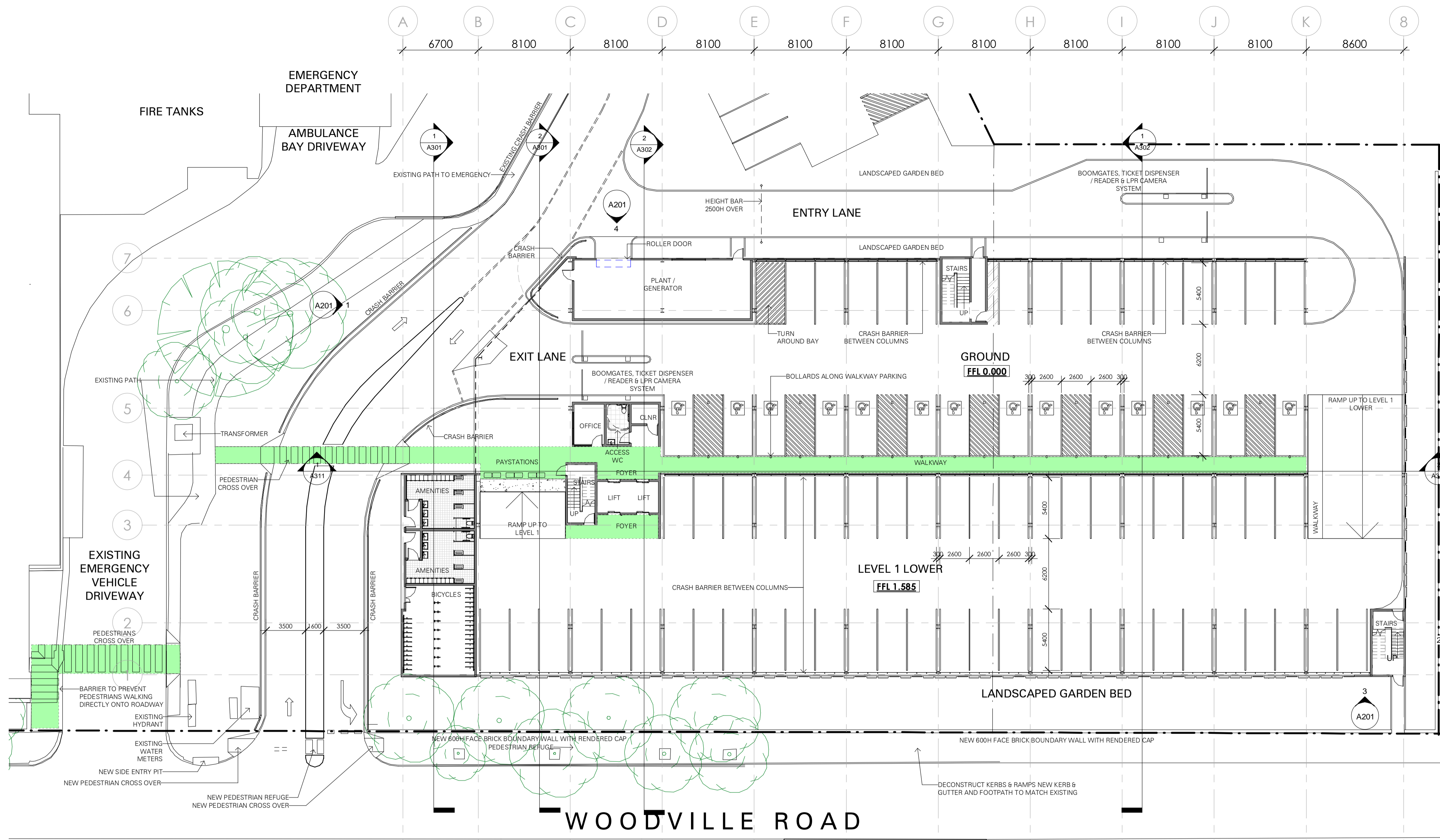
TITLE
SITE PLAN

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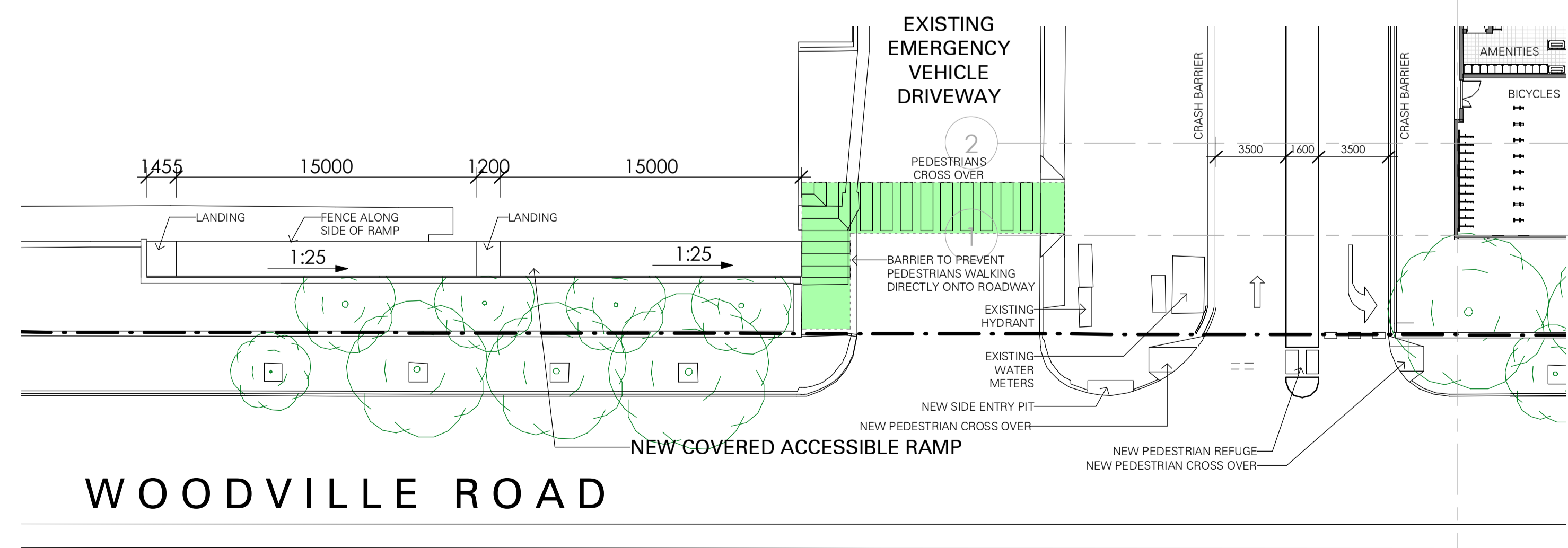
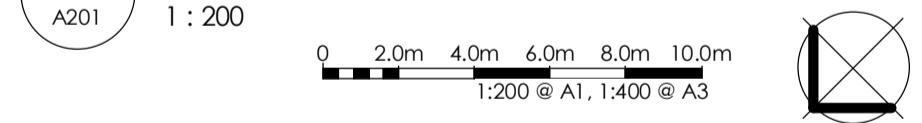
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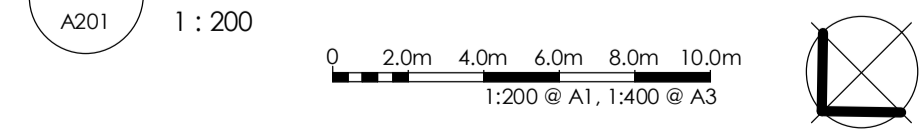
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1 FLOOR PLAN - GROUND LEVEL & LOWER 1 LEVEL



3 ACCESS RAMPS



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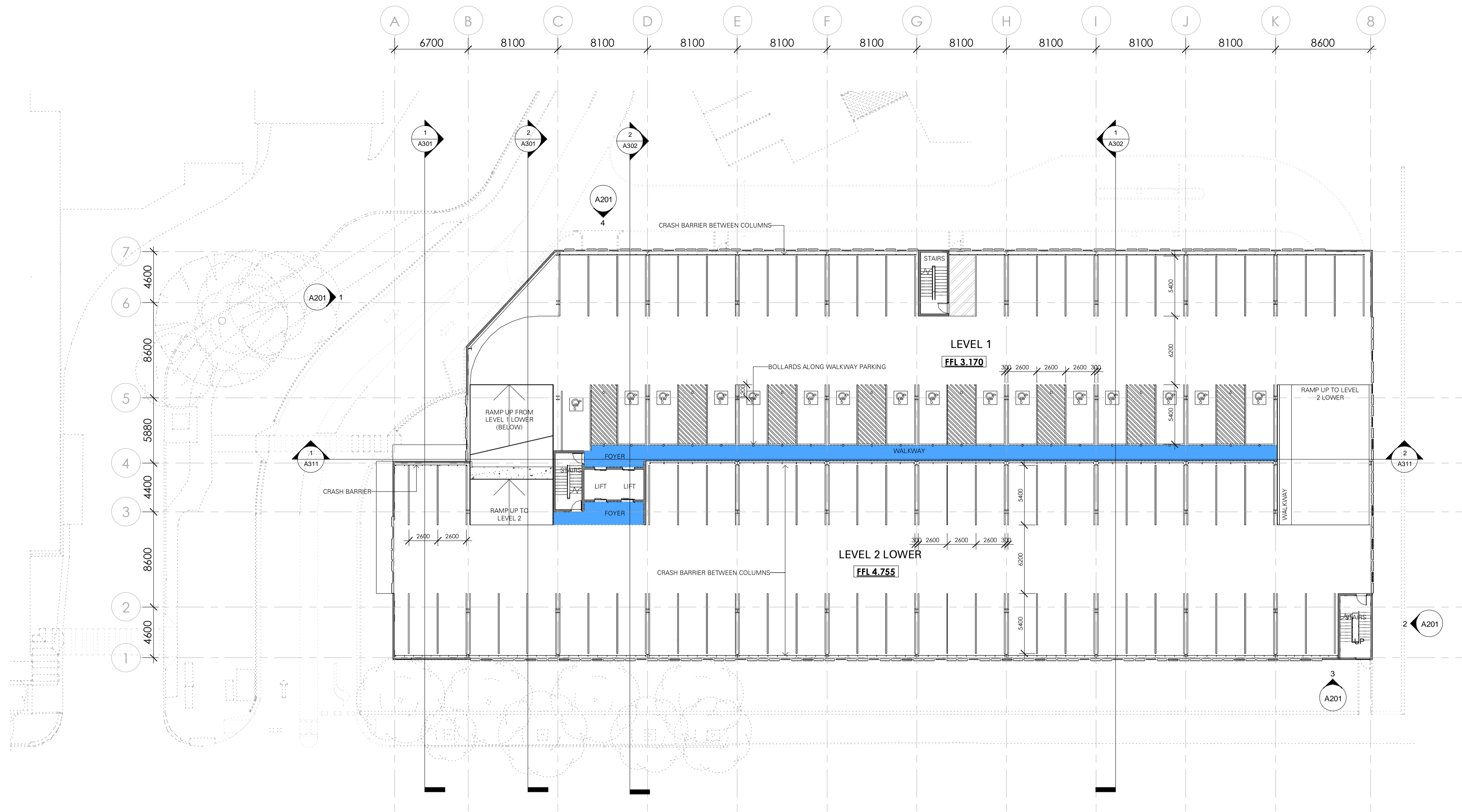
PROJECT
 THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE
 FLOOR PLANS - GROUND & LEVEL 1 LOWER

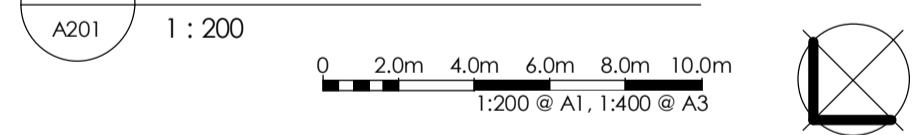
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1 FLOOR PLAN - LEVEL 1 & LOWER 2 LEVEL



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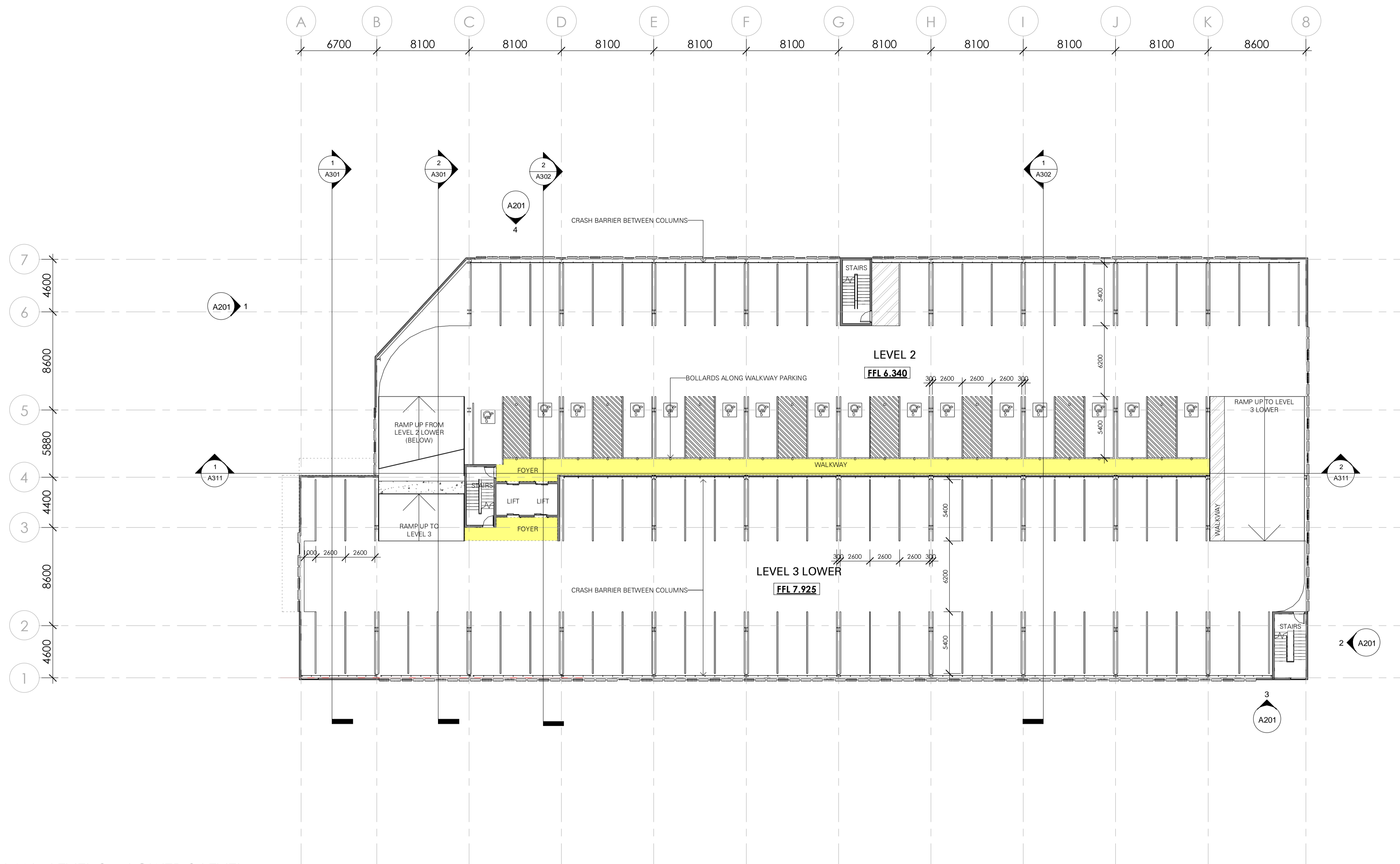
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THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE
FLOOR PLANS - LEVEL 1 & LOWER 2 LEVEL

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1 FLOOR PLAN - LEVEL 2 & LOWER 3 LEVEL
 A201 1:200
 0 2.0m 4.0m 6.0m 8.0m 10.0m
 1:200 @ A1, 1:400 @ A3

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PROJECT
THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE
FLOOR PLANS - LEVEL 2 & LOWER 3 LEVEL

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1 FLOOR PLAN - LEVEL 3 & LOWER 4 LEVEL
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 1:200 @ A1, 1:400 @ A3

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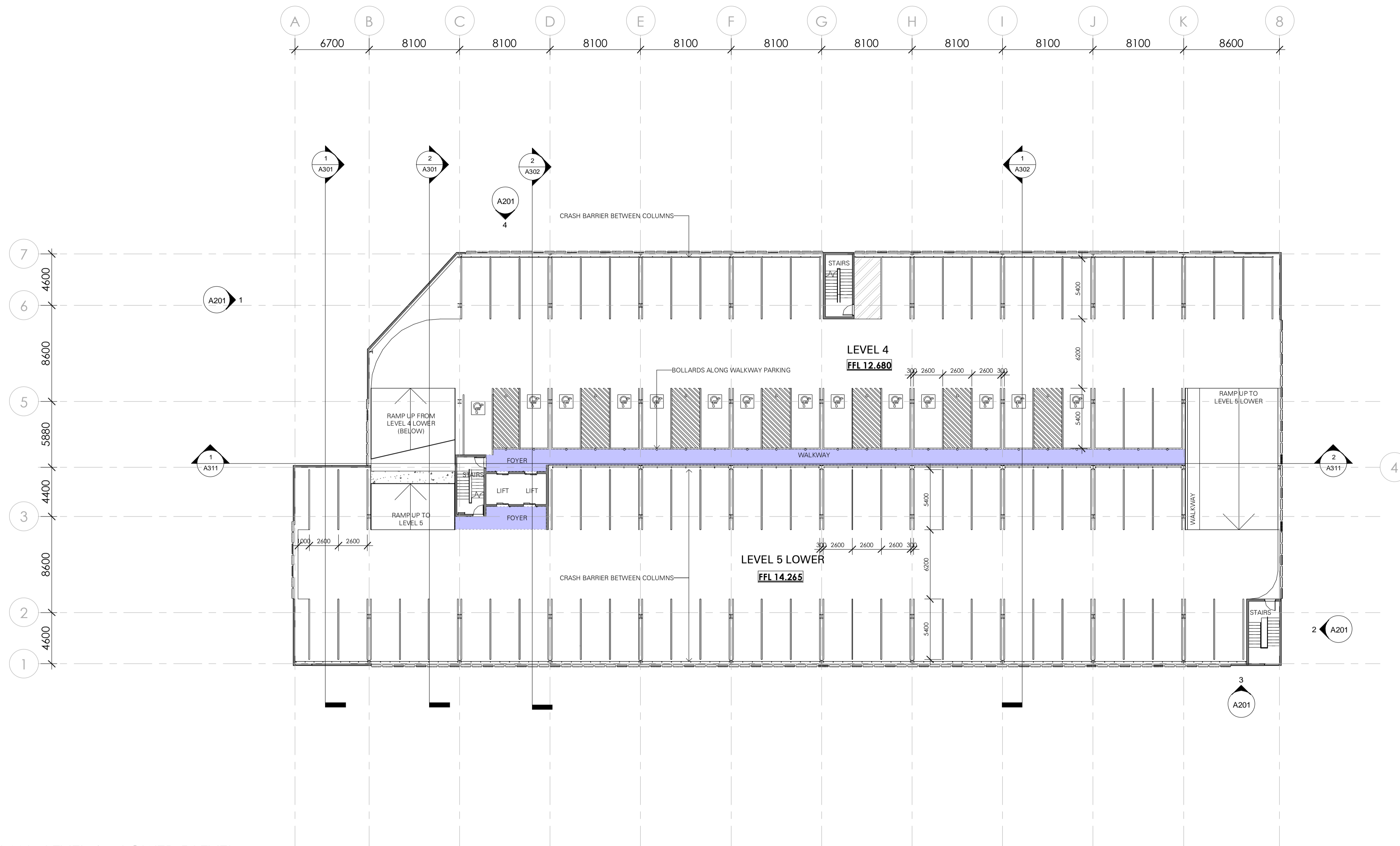
PROJECT
THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE
FLOOR PLANS - LEVEL 3 & LOWER 4 LEVEL

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1 FLOOR PLAN - LEVEL 4 & LOWER 5 LEVEL
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 0 2.0m 4.0m 6.0m 8.0m 10.0m
 1:200 @ A1, 1:400 @ A3

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PROJECT
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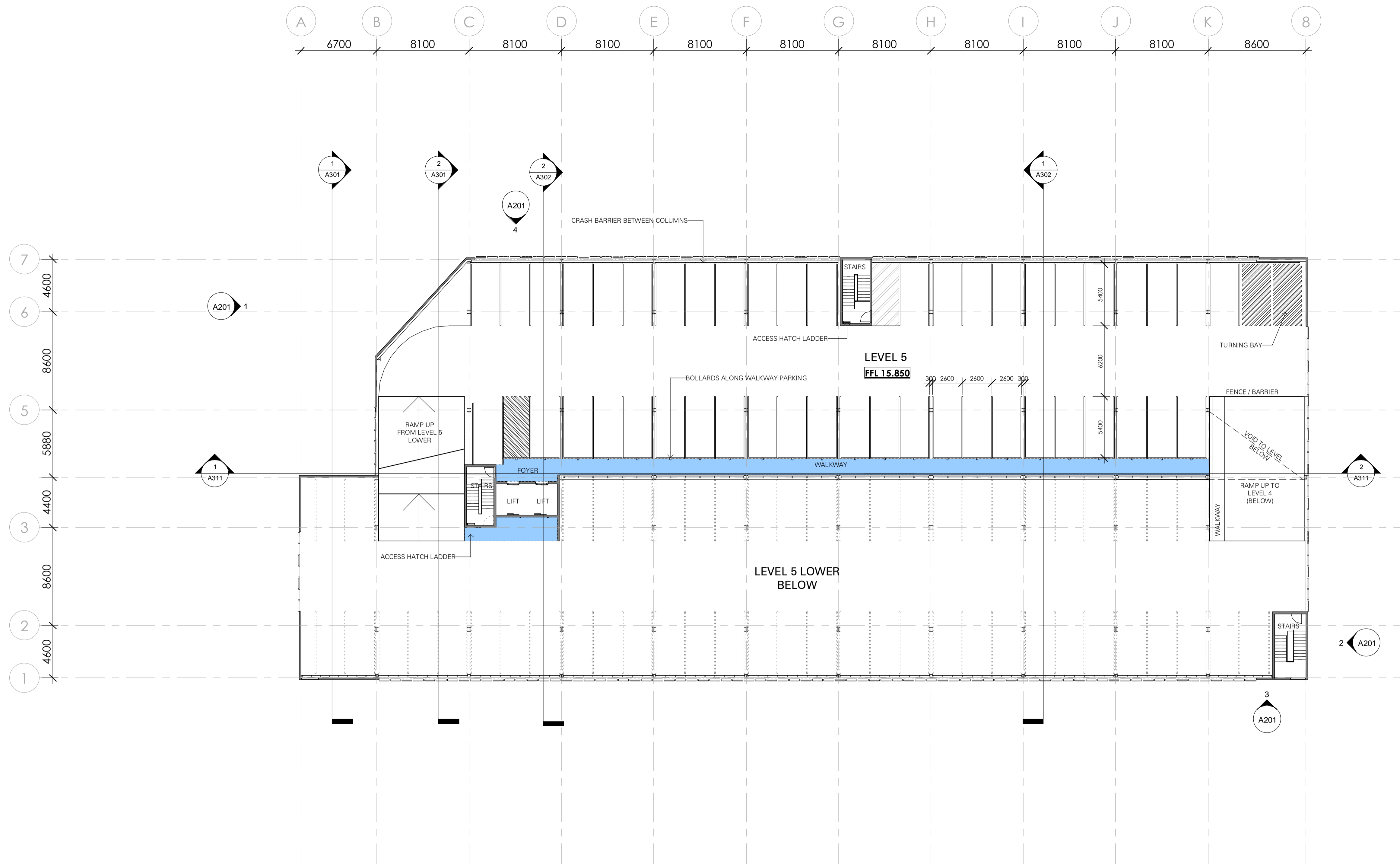
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FLOOR PLANS - LEVEL 4 & LOWER 5 LEVEL

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1 FLOOR PLAN - LEVEL 5
 A201 1 : 200
 0 2.0m 4.0m 6.0m 8.0m 10.0m
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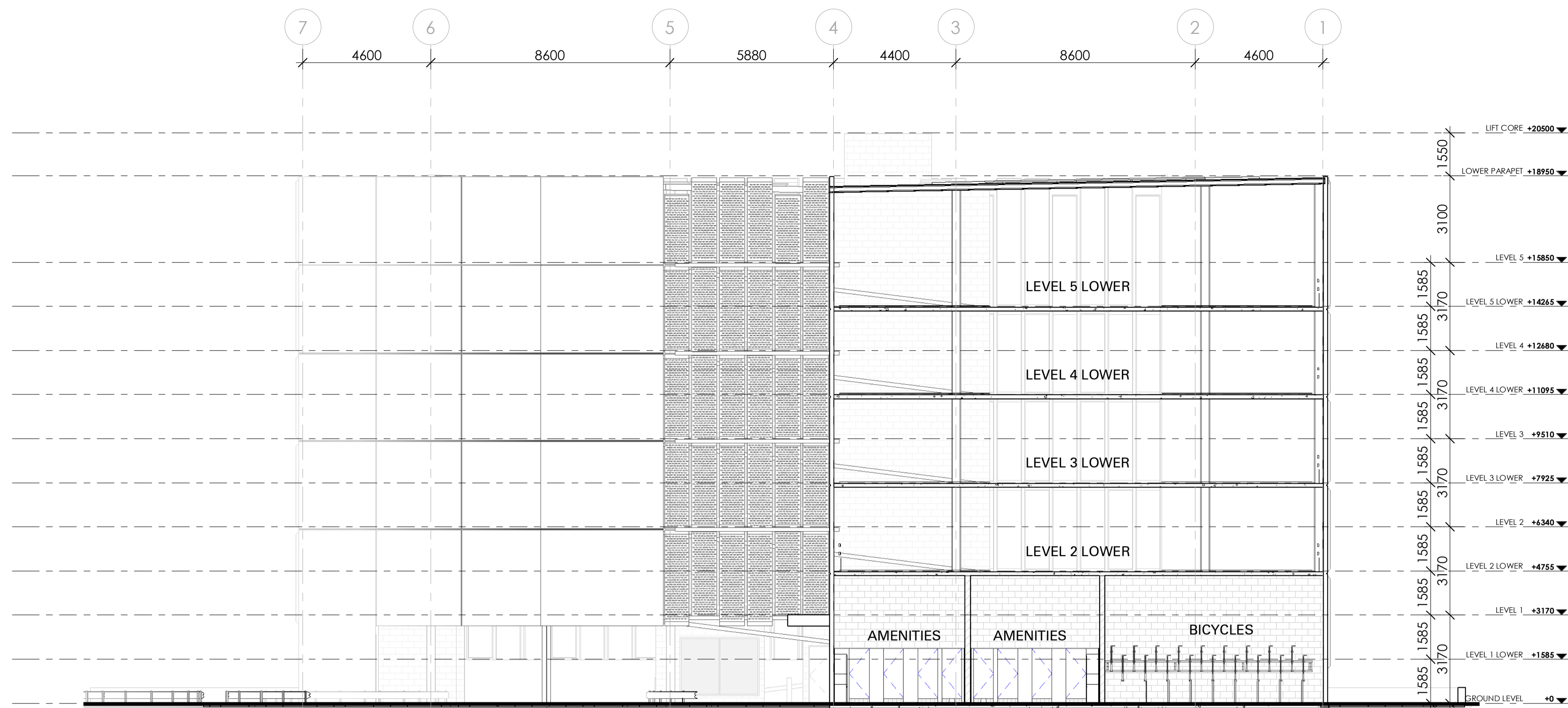
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TITLE
FLOOR PLANS - LEVEL 5

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1 SECTION AA
 A101 1:100
 0 1.0m 2.0m 3.0m 4.0m 5.0m
 1:100 @ A1, 1:200 @ A3



2 SECTION BB
 A101 1:100
 0 1.0m 2.0m 3.0m 4.0m 5.0m
 1:100 @ A1, 1:200 @ A3

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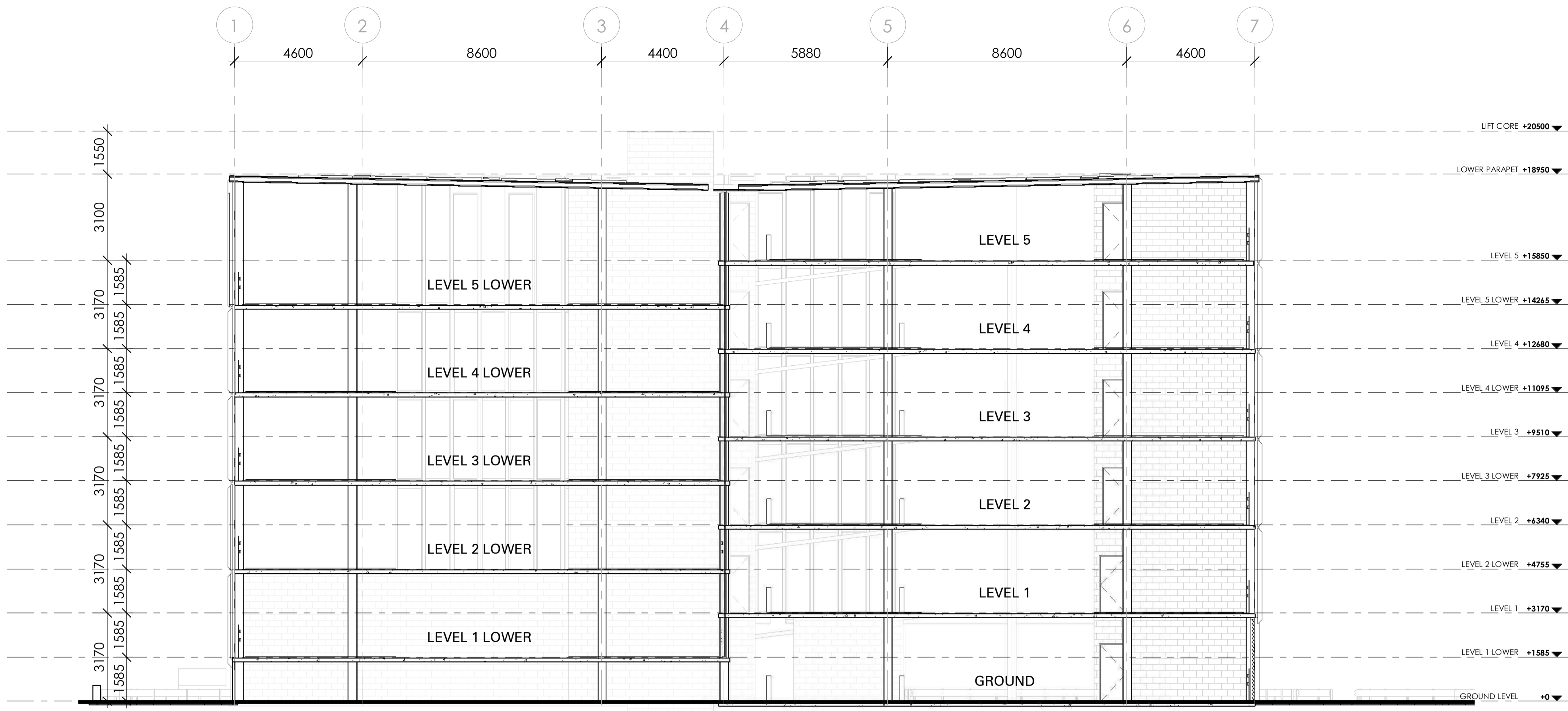
PROJECT
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TITLE
CROSS SECTIONS

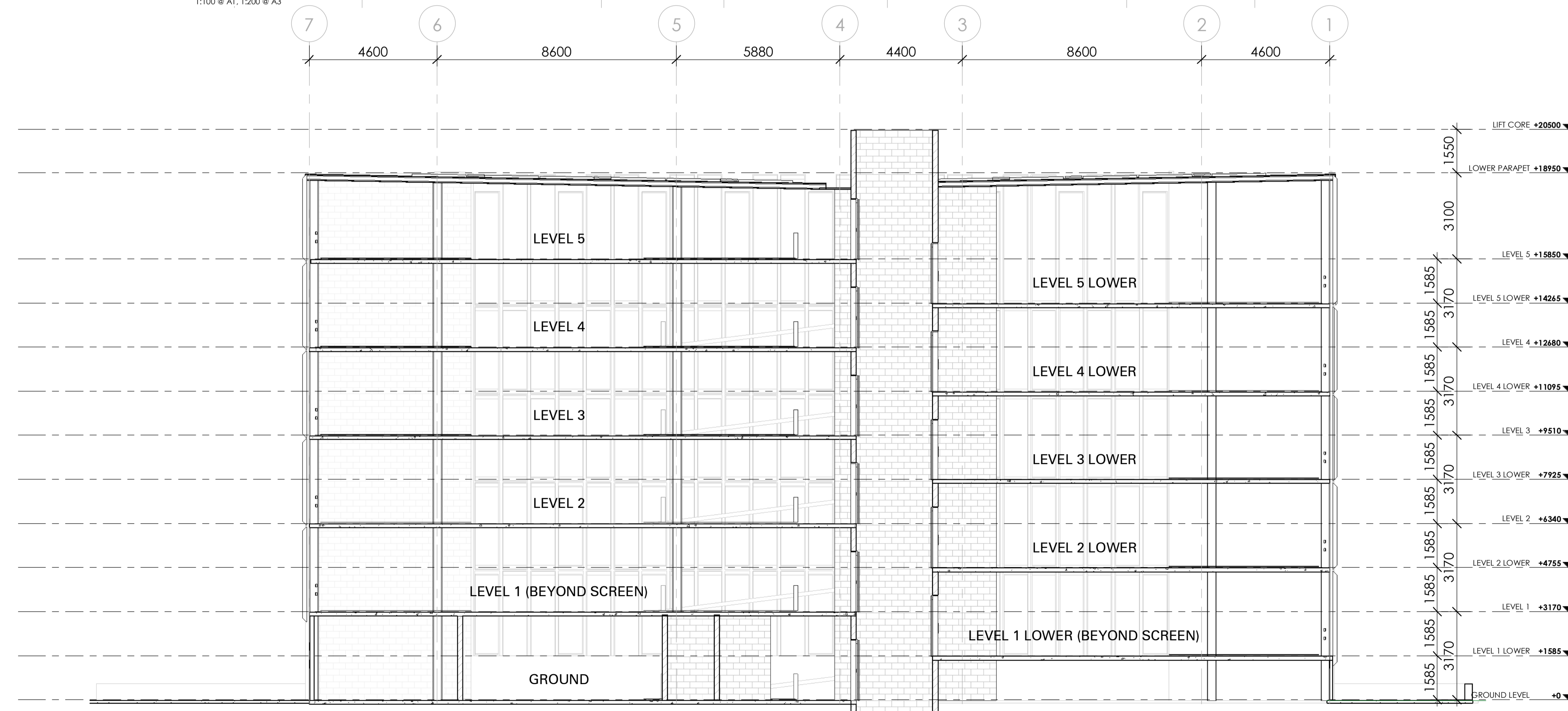
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1 SECTION CC
 A101 1:100 0 1.0m 2.0m 3.0m 4.0m 5.0m
 1:100 @ A1, 1:200 @ A3



2 SECTION DD
 A101 1:100 0 1.0m 2.0m 3.0m 4.0m 5.0m
 1:100 @ A1, 1:200 @ A3

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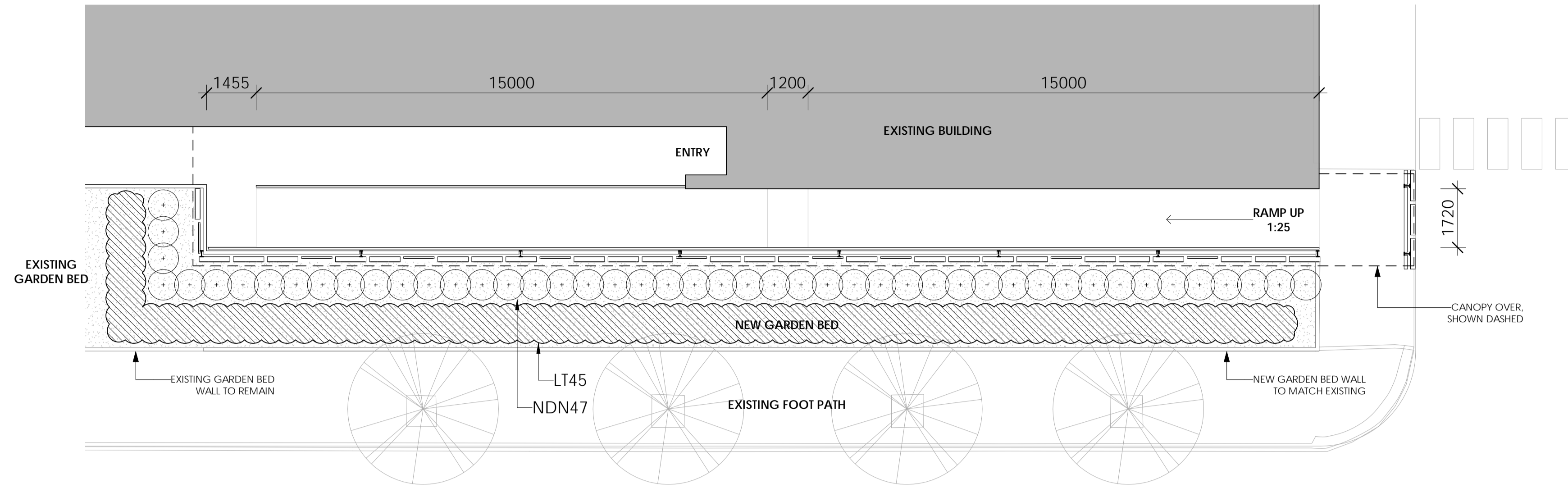
PROJECT
 THE QUEEN ELIZABETH
 HOSPITAL NEW CAR PARK
 ADDITION STAGE 3

TITLE
 CROSS SECTIONS

DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY			
FOR INFORMATION ONLY			
FOR D.A. APPROVAL	WS	WS	16.03.18
CONSTRUCTION CERTIFICATE			
FOR TENDERS			
FOR CONSTRUCTION			
AS BUILT DOCUMENT			

DRAWN	TN
SCALE @ A1	1:100
DATE	16.03.18

DRAWING NO.	REV.
1805-A302	A
ISSUE: DEVELOPMENT APPROVAL	ISSUED DATE: 16.03.18



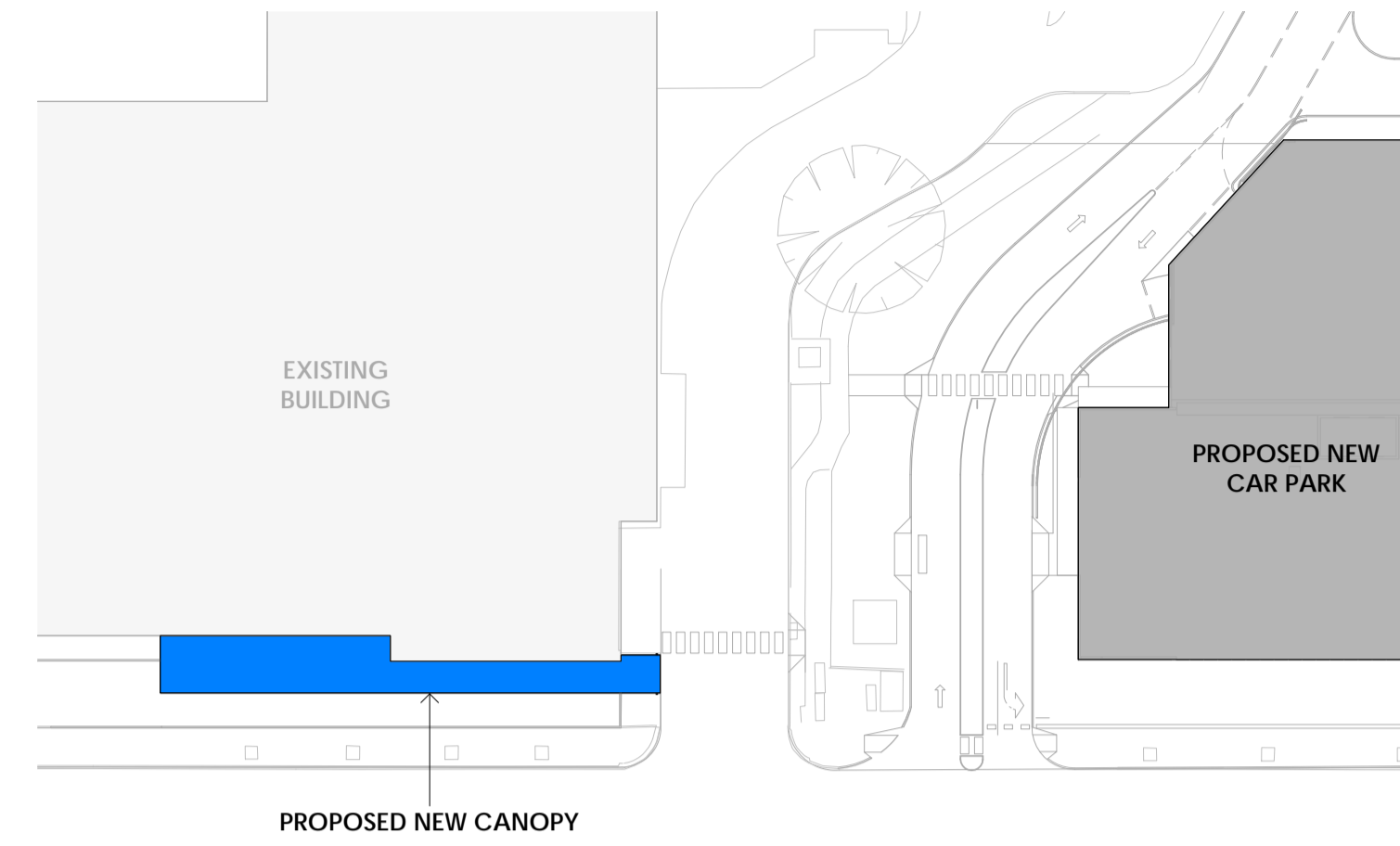
1 FLOOR PLAN - RAMP

A201 1:100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100 @ A1, 1:200 @ A3

PLANT SCHEDULE

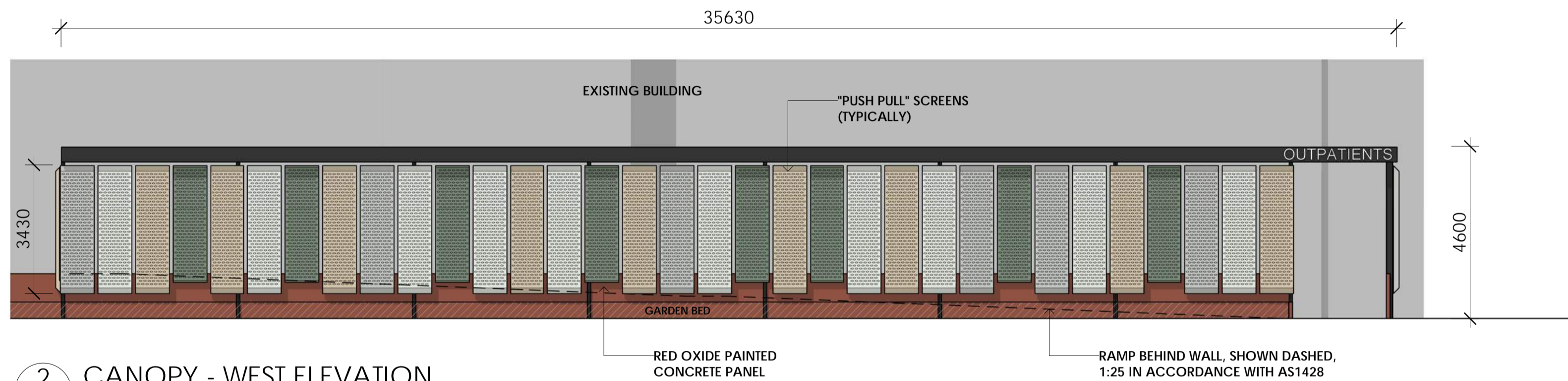
SYMBOL	BOTANICAL NAME	COMMON NAME	HEIGHT / POT SIZE	QTY
SHRUBS				
NDN47	NANDINA DOMESTICA NAN	DWARF NANDINA	200MM POTS	47
STRAPPY LEAF PLANTS				
LT45	LOMANDRA 'TANIKA'	FINE LEAF MAT RUSH	150MM POTS	45



5 CANOPY LOCATION

A201 1:500

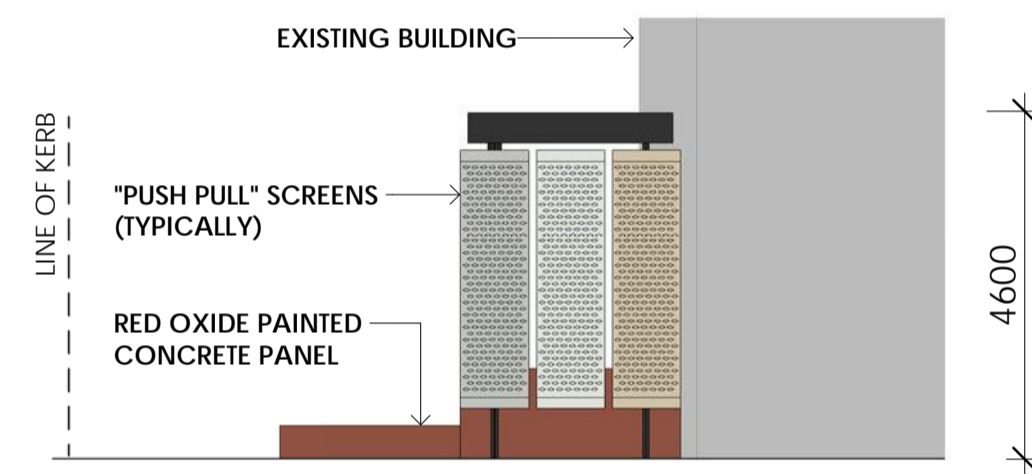
0 5m 10m 15m 20m 25m
1:500 @ A1, 1:1000 @ A3



2 CANOPY - WEST ELEVATION

1:100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100 @ A1, 1:200 @ A3



3 CANOPY - SOUTH ELEVATION

1:100

0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100 @ A1, 1:200 @ A3



4 CANOPY PERSPECTIVE

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Figured dimensions take preference to scale readings, verify all dimensions on site. Report any discrepancies to the Superintendent for decision before proceeding with the work.

No.	DATE	REVISIONS	BY
A	16.03.18	DEVELOPMENT APPROVAL	JC

LANDSCAPE ARCHITECT
BRUCE OSWALD LANDSCAPE ARCHITECT
19 MINNOW DRIVE
GLENNELBA SA 5051
0407 778 631 / bruce_oswald@bigpond.com

FIRE CONSULTANT

HYDRAULIC CONSULTANT

ELECTRICAL CONSULTANT

MECHANICAL CONSULTANT

STRUCTURAL CONSULTANT

CIVIL CONSULTANT

DesignInc
Architecture
Urban Design
Interiors
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ABN 77 007 805 692
Level 1, 151 Pirie Street
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reception@adelaide.designinc.com.au

J B G ARCHITECTS PTY LTD
38 MURRAY STREET
TANUNDA 5352
P. 08 8526 1133
E. admin@jbgarchitect.com

CLIENT

Ahrens Group Pty Ltd on behalf of SA Health
Wilhelm Road, Kingsford SA 5118
PO Box 2, Sheoak Log, SA 5371
Ph. 08 8521 0000 ahrens@ahrens.com.au

PROJECT **The Queen Elizabeth Hospital New Car Park Addition Stage 3**

TITLE **RAMP CANOPY**

DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY			
FOR INFORMATION ONLY			
FOR D.A. APPROVAL	PC	PC	16.03.18
CONSTRUCTION CERTIFICATE			
FOR TENDER			
FOR CONSTRUCTION			
AS BUILT DOCUMENT			

DRAWN	Author
SCALE @ A1	As indicated
DATE	16.03.18

DRAWING NO. **1805-A401** REV. **A**

ISSUE: **DEVELOPMENT APPROVAL** ISSUED DATE: **16.03.18**

Appendix B

Certificates of Title and the Deposited Plan

REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



Certificate of Title - Volume 5723 Folio 360

Parent Title(s) CT 1761/72
Creating Dealing(s) CONVERTED TITLE
Title Issued 10/01/2000 Edition 4 Edition Issued 25/06/2015

Estate Type

FEE SIMPLE

Registered Proprietor

MINISTER FOR HEALTH
OF ADELAIDE SA 5000

Description of Land

ALLOTMENT 71 DEPOSITED PLAN 3994
IN THE AREA NAMED WOODVILLE SOUTH
HUNDRED OF YATALA

Easements

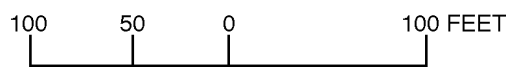
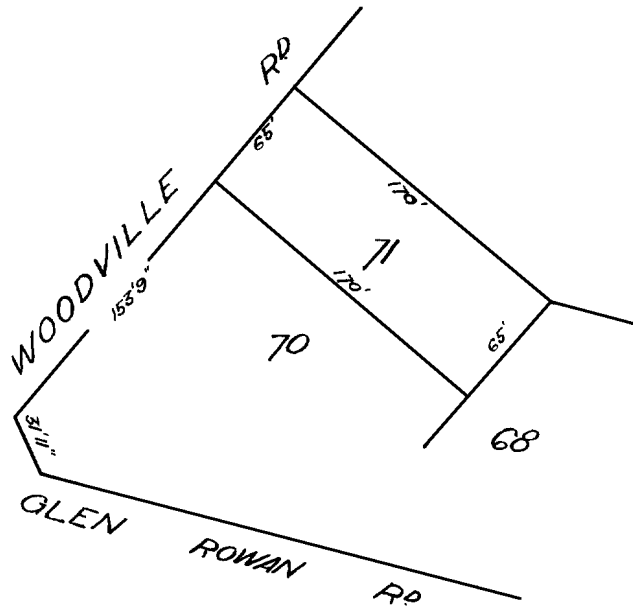
NIL

Schedule of Dealings

NIL

Notations

Dealings Affecting Title	NIL
Priority Notices	NIL
Notations on Plan	NIL
Registrar-General's Notes	NIL
Administrative Interests	NIL



**DISTANCES ARE IN FEET AND INCHES
 FOR METRIC CONVERSION**
 1 FOOT = 0.3048 METRES
 1 INCH = 0.0254 METRES

REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



Certificate of Title - Volume 5719 Folio 215

Parent Title(s) CT 1797/91
Creating Dealing(s) CONVERTED TITLE
Title Issued 14/12/1999 **Edition** 4 **Edition Issued** 25/06/2015

Estate Type

FEE SIMPLE

Registered Proprietor

MINISTER FOR HEALTH
OF ADELAIDE SA 5000

Description of Land

ALLOTMENT 70 DEPOSITED PLAN 3994
IN THE AREA NAMED WOODVILLE SOUTH
HUNDRED OF YATALA

Easements

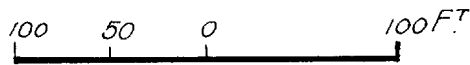
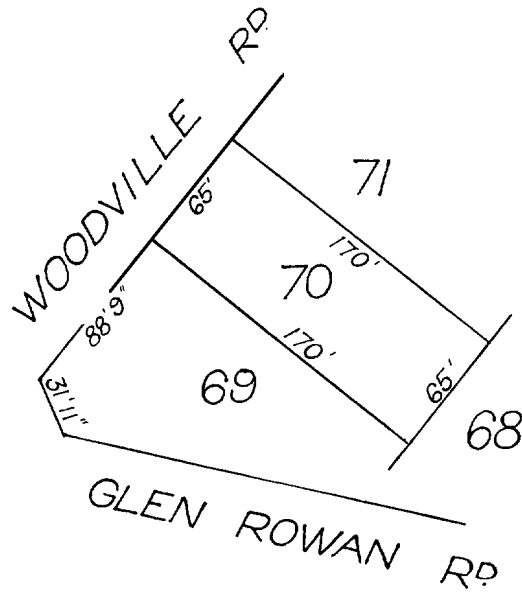
NIL

Schedule of Dealings

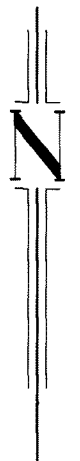
NIL

Notations

Dealings Affecting Title	NIL
Priority Notices	NIL
Notations on Plan	NIL
Registrar-General's Notes	NIL
Administrative Interests	NIL



DISTANCES ARE IN FEET AND INCHES
FOR METRIC CONVERSION
1 FOOT = 0.3048 METRES
1 INCH = 0.0254 METRES



PLAN NUMBER
DP 73137

THIS IS SHEET 1 OF 2 SHEETS

DEPOSITED 23/4/2007
ACCEPTED FOR FILING 13/04/2007
PRO REGISTRAR GENERAL

MAP REF. 6628-40-k DEV. No.

TITLE SYSTEM RPA

TITLE REFERENCE CT 5949/114 & PT CT 5128/240

O.B. / LAST PLAN REF. TOTAL AREA

DOCKET No.

FIELD BOOK No.

CLOSURE CHECKED	PLAN EXAMINED	PLAN APPROVED	P.M.S. APPROVED
SC	SR	J. Pooko 13/04/2007	13/04/2007

IRRIGATION AREA DIVISION
HUNDRED YATALA
AREA WOODVILLE SOUTH
COUNCIL CITY OF CHARLES STURT

PLAN OF DIVISION

ALLOTMENT 600 IN DP 67947
ALLOTMENT 1 IN FP 102012

SCALE 0 20 40 60 80 100 METRES

STATEMENTS CONCERNING EASEMENTS ANNOTATIONS AND AMENDMENTS

PORTION OF ALLOTMENT 602 MARKED A & B IS SUBJECT TO AN EASEMENT TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 8681223)

PORTION OF ALLOTMENT 602 MARKED C IS SUBJECT TO AN EASEMENT TO THE AUSTRALIAN & OVERSEAS TELECOMMUNICATIONS CORPORATION LTO (V 4909413)

PORTION OF ALLOTMENT 602 MARKED D IS SUBJECT TO AN EASEMENT TO THE MINISTER FOR INFRASTRUCTURE (V 4909413)

PORTION OF ALLOTMENT 602 MARKED E AND F ARE SUBJECT TO AN EASEMENT TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 10150208)

PORTION OF ALLOTMENT 602 MARKED G IS TO BE SUBJECT TO A SERVICE EASEMENT TO THE SOUTH AUSTRALIAN WATER CORPORATION FOR SEWERAGE PURPOSES

PORTION OF ALLOTMENT 602 MARKED G IS TO BE SUBJECT TO A SERVICE EASEMENT TO THE SOUTH AUSTRALIAN WATER CORPORATION FOR WATER SUPPLY PURPOSES

NO OCCUPATION ON SUBJECT PROPERTY UNLESS SHOWN OTHERWISE

ALL DISTANCES ARE GROUND DISTANCES

COMBINED SCALE FACTOR 1.00022 ZONE 54 . MGA 94
BEARING DATUM 32°57'50" DISTANCE 182.07
DERIVED FROM . P.S.M.S. 6628/8830 - 6628/8831

I, MICHAEL STUART GREAR
Licensed Surveyor of South Australia do hereby certify-

1) That this plan has been made from surveys carried out by me or under my personal supervision and in accordance with the Survey Act 1992

2) That the field work was completed on the 23rd day of NOVEMBER, 2006

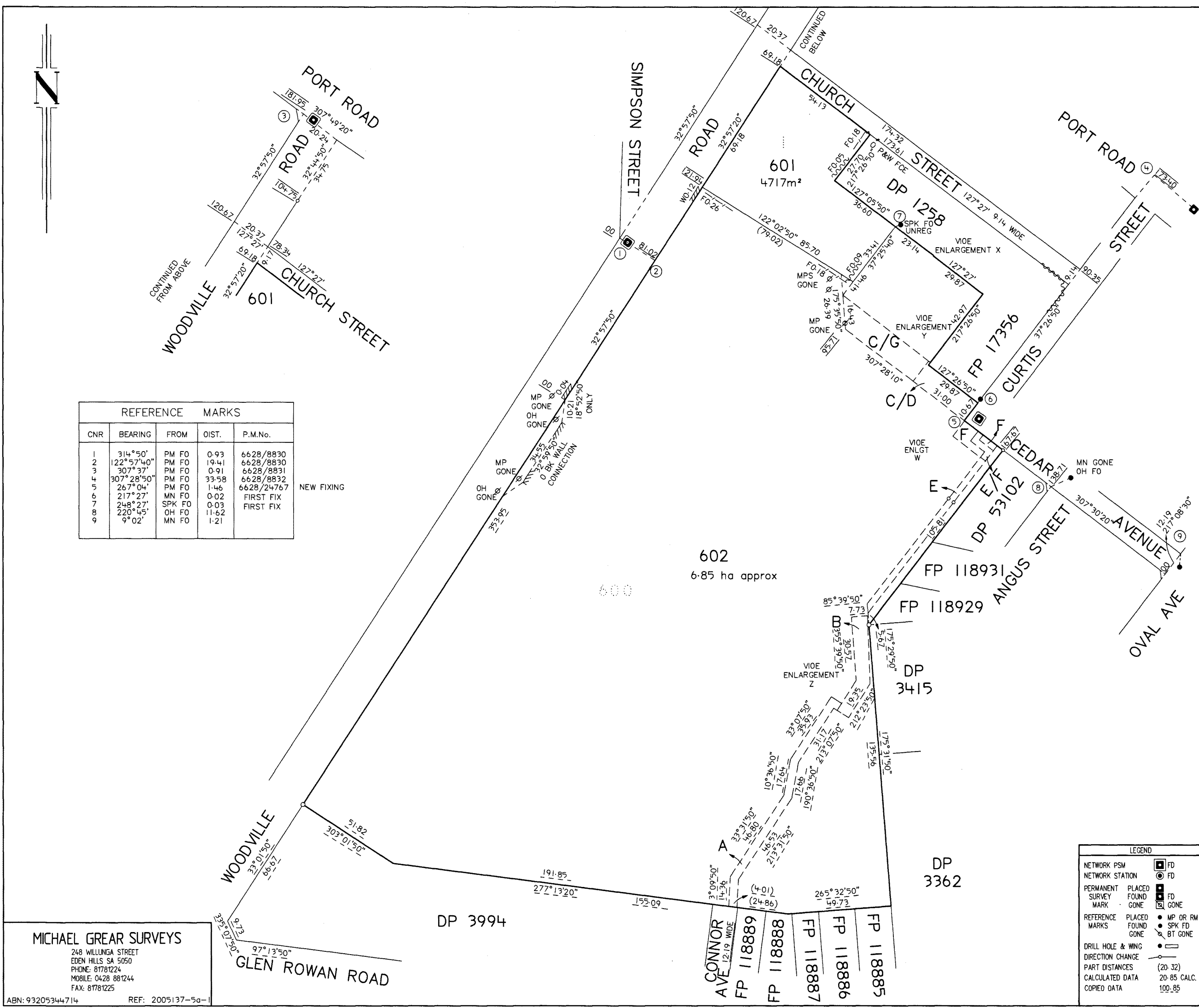
Date 4/4/07
Licensed Surveyor *M Grear*

CNR	BEARING	FROM	OIST.	P.M.No.
1	314°50'	PM FO	0.93	6628/8830
2	122°57'40"	PM FO	19.41	6628/8830
3	307°37'	PM FO	0.91	6628/8831
4	307°28'50"	PM FO	33.58	6628/8832
5	267°04'	PM FO	1.46	6628/24767
6	217°27'	MN FO	0.02	FIRST FIX
7	248°27'	SPK FO	0.03	FIRST FIX
8	220°45'	OH FO	11.62	
9	9°02'	MN FO	1.21	

NEW FIXING

MICHAEL GREAR SURVEYS
248 WILLINGA STREET
EDEN HILLS SA 5050
PHONE: 81781224
MOBILE: 0428 881244
FAX: 81781225
ABN: 93205344714 REF: 2005137-5a-1

LEGEND	
NETWORK PSM	FD
NETWORK STATION	FD
PERMANENT SURVEY MARK	FD FOUND FD GONE
REFERENCE MARKS	MP OR RM FOUND MP OR RM GONE SPK FD FOUND BT GONE
DRILL HOLE & WING	•
DIRECTION CHANGE	○
PART DISTANCES	(20-32)
CALCULATED DATA	20-85 CALC.
COPIED DATA	100-85



PLAN NUMBER
DP 73137

DEPOSITED 23/4/2007

ACCEPTED FOR FILING

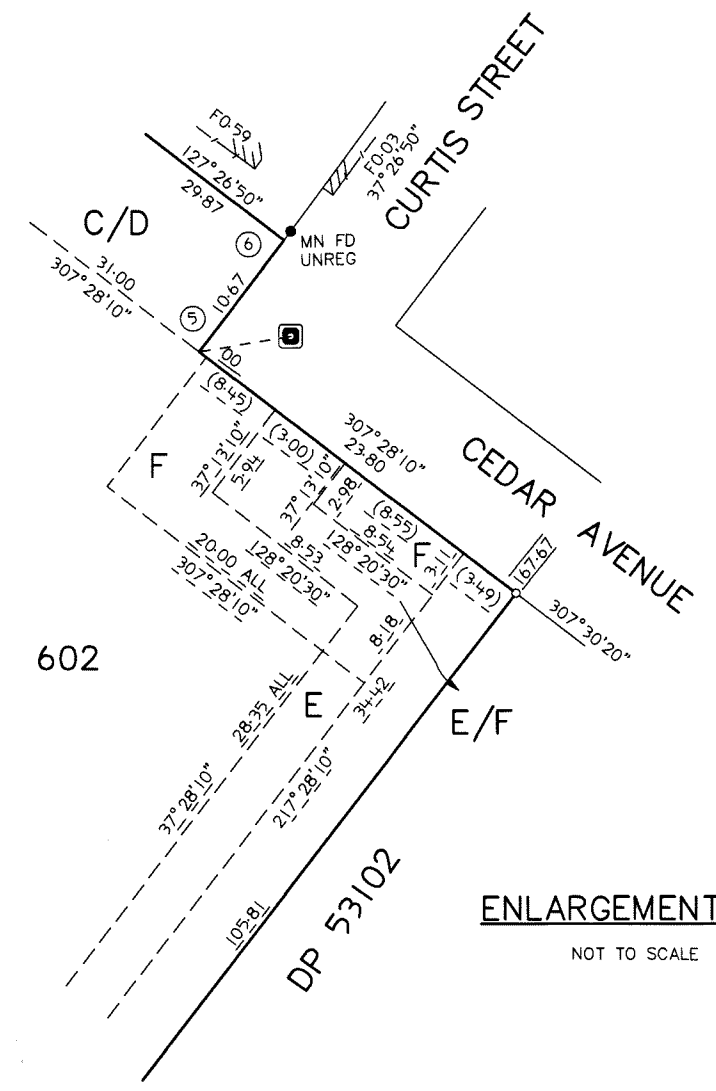
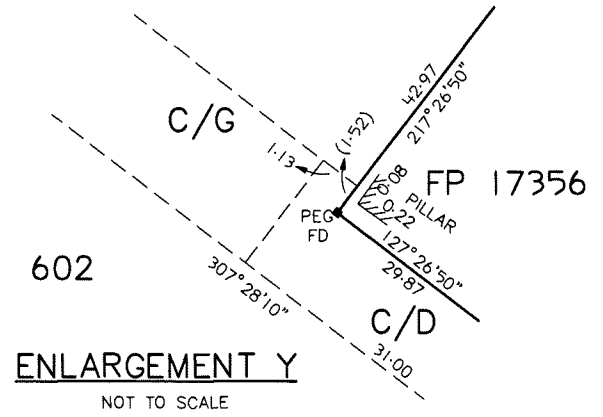
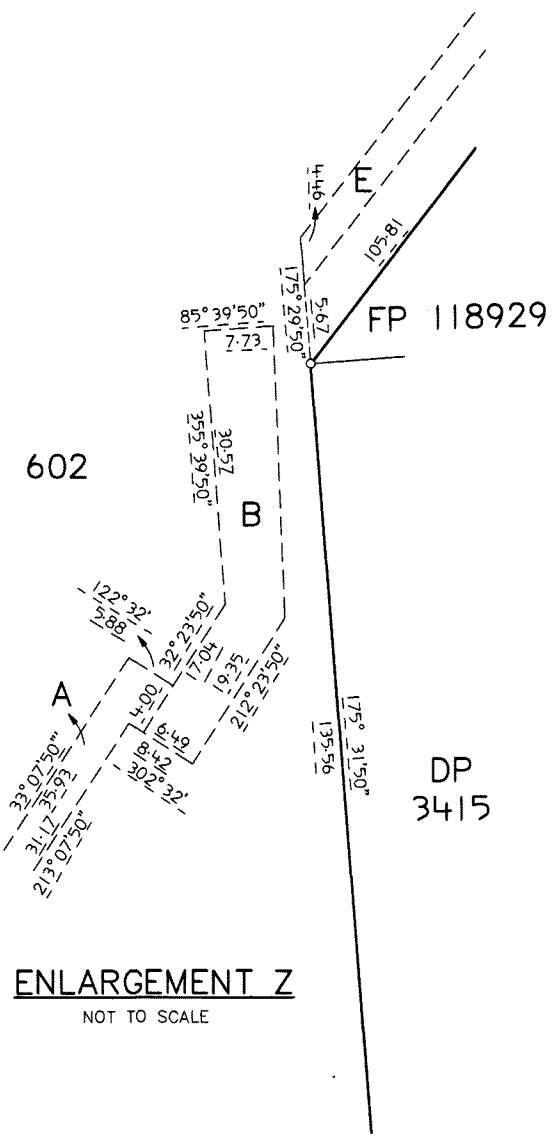
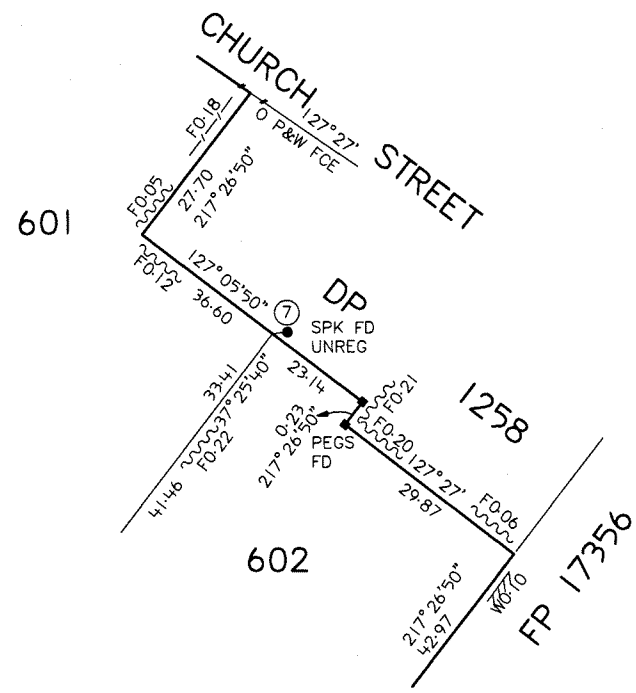
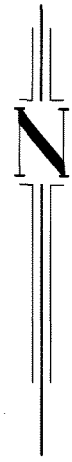
THIS IS SHEET 2 OF MY PLAN IN 2 SHEETS

DATED 4/4/2007

LICENSED SURVEYOR

SCALE NOT TO SCALE METRES

STATEMENTS CONCERNING EASEMENTS ANNOTATIONS AND AMENDMENTS



REFERENCE		MARKS		
CNR	BEARING	FROM	DIST.	P.M.No.
5	267°04'	PM FD	1.46	6628/24767
6	217°27'	MN FD	0.02	FIRST FIX
7	248°27'	SPK FD	0.03	FIRST FIX

NEW FIXING

MICHAEL GREAR SURVEYS
24B WILLUNGA STREET
EDEN HILLS SA 5050
PHONE: 81781224
MOBILE: 0428 881244
FAX: 81781225

REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



Certificate of Title - Volume 6184 Folio 480

Parent Title(s) CT 5707/629, CT 5988/587

Creating Dealing(s) VE 12570630

Title Issued 08/12/2016 **Edition** 2 **Edition Issued** 08/12/2016

Estate Type

FEE SIMPLE

Registered Proprietor

MINISTER FOR HEALTH
OF ADELAIDE SA 5000

Description of Land

ALLOTMENT 602 DEPOSITED PLAN 73137
IN THE AREA NAMED WOODVILLE SOUTH
HUNDRED OF YATALA

Easements

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED B ON F59498 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 8681223)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED C ON F59498 (V 4909413)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED D ON F59498 TO THE MINISTER FOR INFRASTRUCTURE (V 4909413)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED E AND F ON F59498 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 10150208)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED H ON F59498 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 8681223)

SUBJECT TO SERVICE EASEMENT(S) OVER THE LAND MARKED G ON F59498 FOR WATER SUPPLY PURPOSES TO SOUTH AUSTRALIAN WATER CORPORATION (223LG RPA)

SUBJECT TO SERVICE EASEMENT(S) OVER THE LAND MARKED G ON F59498 FOR SEWERAGE PURPOSES TO SOUTH AUSTRALIAN WATER CORPORATION (223LG RPA)

Schedule of Dealings

Dealing Number	Description
10745703	LEASE TO CENTRAL ADELAIDE LOCAL HEALTH NETWORK INC. COMMENCING ON 01/02/2006 AND EXPIRING ON 31/01/2027

Notations

Dealings Affecting Title NIL

Priority Notices NIL



Notations on Plan NIL
Registrar-General's Notes NIL
Administrative Interests NIL

Appendix C

Vegetation Survey prepared by the Department for
Environment Water and Natural Resources

VEGETATION SURVEY MAIN REPORT

2017/074

PROJECT:

Queen Elizabeth Hospital

Car Park

Nature of works Car park upgrade

1. GENERAL

The following report indicates the state of the existing vegetation as surveyed and its landscape and/or ecological significance. The survey was undertaken in accordance with Transport Services Division (TSD) Guideline, VE 101, Vegetation Survey Guidelines.

2. GENERAL SITE & PROJECT INFORMATION

2.1 Site location and description of works

The site is located within the Metropolitan area, northwest of the City of Adelaide and consist of the vegetation in the following locations:

- The road reserve along the west side of Woodville Road for approximately 160 metres northeast of Findon Road.
- The road reserve along the east side of Woodville Road for approximately 160 metres northeast of Glen Rowan Road.
- The car park at the southern end of the Queen Elizabeth Hospital.
- Vegetation in the grounds of numbers 6 and 8 Woodville Road.

2.2 Surrounding land use

The land surrounding the survey area is generally residential, including the Sutherland Court Retirement Village.

2.3 IBRA Region/Subregion.

IBRA Adelaide Region/ Subregion FLOB1 Mount Lofty Ranges

2.4 No DPTI RSSD (Roadside Significant Site Database) sites listed within and/or in close proximity to the works. Plant Association Descriptions

2.5 Plant Association Descriptions

Plant Association 1 – Mixed plantation of native and exotic trees and shrubs with the predominate species being:

- Woodville Road, west side – *Koelreuteria paniculata* (Golden Rain Tree) street trees.
- Woodville Road, east side – *Koeleuteria bipinnata* (Chinese flame Tree) street trees.
- Queen Elizabeth Hospital, southern car park. – *Corymbia citriodora* (Lemon-scented Gum), *Erythrina x sykesii* (Common Coral Tree) and *Lophoetemon confertus* (Brush Box).

- Southern boundary of car park – *Callistemon citrinus* (Crimson Bottlebrush).

3. DEVELOPMENT ACT, 1993

This site is located in the City of Charles Sturt. Current Development Act 1993 requirements in regard to 'Regulated/Regulated Significant Trees' for this council area are as follows:

- *Regulated Tree - Any tree with a trunk circumference of 2.0m or more – or, in the case of trees with multiple trunks, that have trunks with a total circumference of 2.0m or more and an average circumference of 625mm or more – measured at a point 1.0m above natural ground level; or
- *Regulated Significant Tree - Any tree with a trunk circumference of 3.0m or more – or, in the case of trees with multiple trunks, that have trunks with a total circumference of 3.0m or more and an average circumference of 625mm or more – measured at a point 1.0m above natural ground level; or
- Any tree identified as a significant tree in a Development Plan

* Excludes species which are exempt under the Development Act

4 trees surveyed met the requirements of the Act, and are classified as Regulated Trees, however based on the Concept only 3 trees may be impacted.

Two *Corymbia citriodora* (Lemon-scented Gum) and one *Erythrina x syksei* (Common Coral tree). Refer photos 18, 19 and 34.

A Development Application will need to be lodged for the above trees. Impacts may be reassessed once the design has been finalised.

4. NATIVE VEGETATION

The site is outside of the *Native Vegetation Act 1991* boundaries; as such the Principals of Clearance do not apply to this project.

5. OTHER INFORMATION

5.1 *Declared¹ and/or Environmental Weeds²*

The dominant declared and/or environmental weeds (see attached species list for complete list) noted within the survey site are as follows:

	Species	Common Name	Comments
+	<i>Fraxinus angustifolia</i>	Desert Ash	2 trees at rear of No 6 Woodville Rd
+	<i>Olea europaea</i>	Olive	3 plants in grounds of Nos 6 & 8 Woodville Rd
+	<i>Rhamnus alaternus</i>	Italian Boxthorn	15 plants at rear of No 6 Woodville Rd
+ Plants which are declared species under the Natural Resources Management Act 2004			
** Plants which are considered environmental weeds (TSD Environmental Weeds List)			

A reduction, using various control techniques, of these species within the remaining vegetation will provide a substantial benefit to both the under and middle storey stratum.

¹ Natural Resources Management Act 2004

² TSD Environmental Weeds List

5.2 *Phytophthora*

This site is located in Moderate Potential Threat *Phytophthora* area however has been assessed as **Low Risk** because of the following:

- it is located in a built-up area
- no susceptible species were recorded
- no indications of its presence were noted at the time of the survey

Therefore controls according to TSD Operational Instruction 21.3 [*Phytophthora* (Dieback) Control] will not be required.

6. **IMPACT OF WORKS**

6.1 *Direct Impacts*

The direct impacts of the project based on the current concept design will include the removal of 76 individual trees and 84m² of vegetation.

Development Act

Approval to remove 1 Regulated Trees (photo no. 34) is required from the Senior Environmental Advisor and Develop Assessment Commission.

Note: 2 other Regulated Trees (photo no.18 and 19) appear to be on the edge of the proposed works, however once the design has been finalised a Development Application may be required to either Major Prune or Remove these trees.

Amenity Vegetation

The removal of 50 individual amenity trees and shrubs and 72m² of amenity vegetation requires approval from the Senior Environmental Advisor.

Weed Species and Other

Approval to remove 5 Declared Plants or environmental weed that meets TSD size criteria is required by the Environmental Officer

No approval required for weed species that do not meet TSD size requirements.

See attached Datasheet, Impacts Table and Summary for details.

6.2 *Indirect Impacts*

The indirect impacts of the project may include:

- Potential damage to roots of trees and shrubs and compaction of soil at base of vegetation, by machinery during the construction;
- Increased spread of declared and environmental weed species.

7. **APPROVALS, SET ASIDES & RECOMMENDATIONS & COMMENTS**

Trees, not being removed as part of works, should be protected as much as possible during construction – refer AS4970/2009 *Protection of Trees on Development Sites*.

Any pruning work (including root pruning) should be carried out according to the *Australian Standard for Pruning of Amenity Trees AS4373/2007*.

Vegetative material removed from the site must be managed appropriately (i.e. any dumping should occur at a licensed waste facility);

Weed management strategies should be implemented to ensure that weed species are not introduced to or spread throughout the construction site.

Queen Elizabeth Hospital



Map data is compiled from a variety of sources and hence its accuracy is variable.

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DPTI VS 2017/074
QUEEN ELIZABETH HOSPITAL
Car Park



- DAC Regulated Tree
- Other Vegetation (including groups)



Compiled: 27-Oct-2017
 Generated at: www.naturemaps.sa.gov.au
 Datum: Geocentric Datum of Australia, 1994
 Projection: Web Mercator (Auxiliary Sphere)



Government of South Australia
 Department of Environment,
 Water and Natural Resources

Every effort should be made to minimise the overall disturbance to vegetation outside the extent of works.

Staff from Specialist Services are available for further assistance and advice if required.

Phil Wild

Horticulturist

15/11/2017

Checked by

Environmental Officer
PROJECT DELIVERY
/ /

DEPARTMENT OF PLANNING, TRANSPORT & INFRASTRUCTURE SAFETY & SERVICE DIVISION Revision - July 2017 VS 2017/074				Project/Road/Rail: Queen Elizabeth Hospital Road Number : Location : Car Park Surveyed By : PW Date : 8/11/2017 Checked By : ??? LOCAL GOVERNMENT COUNCIL(S) (LGC) 1 - City of Charles Sturt				IMPACT OR RECOMMENDED ACTION		TOTAL NVA AREA (HA) TOTAL OTHER AREA (HA) 0.000 0.013				TOTAL NUMBER OF INDIVIDUALS SURVEYED		WEED SPECIES & OTHERS (N, D, E, O, M)		TOTAL NVA AREA (HA)		TOTAL		NVA SEB for AREA (HA)		TOTAL		Calculator				
DATA SHEET - VE 105 File No : 2017/ PATCHS No :				IS THE SURVEY AREA COVERED BY EITHER OR BOTH OF THE FOLLOWING ACTS				REMOVAL		TOTAL NVA AREA (HA)				TOTAL		NVA SEB for AREA (HA)		TOTAL		NVA SEB for AREA (HA)		TOTAL		Calculator						
DEVELOPMENT ACT 1993? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				NATIVE VEGETATION ACT 1991? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				MAJOR PRUNE		TOTAL NVA AREA (HA)				TOTAL		NVA SEB for AREA (HA)		TOTAL		NVA SEB for AREA (HA)		TOTAL		Calculator						
LGC (ALLOCATED NUMBER)	PLAN REFERENCE OR MM LOCATION	PHOTO REFERENCE	SPECIES OR GROUP/AREA DESCRIPTION				REMARKS/NOTES				EASTING		NORTHING		NUMBER IN GROUP		WEED SPECIES & OTHERS (N, D, E, O, M)		TOTAL		NVA SEB for AREA (HA)		TOTAL		Calculator					
			WOODVILLE ROAD																											
			Road Reserve West Side																											
1	1	1	General view looking northeast from intersection with Findon Road								274397	6136910																		
1	2	2	<i>Koelreuteria paniculata</i>				N N N N				274444	6136982	1	N	Y	N	N	1	S	0.15			3	2	G	2.0	0.18	1.61		
1	3a	3a	<i>Koelreuteria paniculata</i>				2% dieback in canopy.				274455	6137002	1	N	Y	N	N	1	S	0.24			5	5	F	2.9	0.30	2.00		
1	3b	3b	<i>Koelreuteria paniculata</i>				30% dieback in canopy.				274460	6137008	1	N	Y	N	N	1	S	0.20			5	5	P/F	2.4	0.25	1.85		
1	3c	3c	<i>Koelreuteria paniculata</i>								274463	6137011	1	N	Y	N	N	1	S	0.20			4	3	F	2.4	0.25	1.85		
1	4	4	<i>Koelreuteria paniculata</i>				30% dieback in canopy.				274476	6137029	1	N	Y	N	N	1	S	0.30			6	5	P/F	3.6	0.36	2.15		
1	5	5	General view looking southwest at northern extent of survey area								274484	6137039																		
			Road Reserve East Side																											
1	6	6	General view looking southwest at northern extent of survey area								274496	6137034																		
1	7	7	<i>Koelreuteria bipinnata</i>				Deadwood in lower canopy.				274496	6137032	1	N	Y	N	N	1	S	0.28			7	7	F/G	3.4	0.33	2.08		
1	8	8	View of group looking southeast								274492	6137031																		
1	8	8	<i>Myoporum parvifolium</i>				N N N N				274492	6137031	1	N	Y	N	N			<0.10			0.2	2	G	#VALUE!				
1	9a	9a	<i>Koelreuteria bipinnata</i>				N N N N				274478	6137010	1	N	Y	N	N	1	S	0.34			6	6	G	4.1	0.41	2.28		
1	9b	9b	<i>Koelreuteria bipinnata</i>				N N N N				274477	6137007	1	N	Y	N	N	1	S	0.22			6	5	G	2.6	0.26	1.88		
1	10a	10a	<i>Koelreuteria bipinnata</i>				Dead lower branches. Potential REMOVAL for proposed car park entry.				274473	6137000	1	N	Y	N	N	1	S	0.21			6	5	F/G	2.5	0.26	1.88		
1	10b	10b	<i>Koelreuteria bipinnata</i>				Potential REMOVAL for proposed car park entry.				274469	6136991	1	N	Y	N	N	1	S	0.22			5	4	G	2.6	0.26	1.88		
1	11a	11a	<i>Koelreuteria bipinnata</i>				Potential REMOVAL for proposed car park entry.				274467	6136983	1	N	Y	N	N	1	S	0.23			5	4	G	2.8	0.28	1.94		
1	11b	11b	<i>Koelreuteria bipinnata</i>								274460	6136977	1	N	Y	N	N	1	S	0.26			6	6	G	3.1	0.32	2.05		
1	12	12	<i>Koelreuteria bipinnata</i>				Minor deadwood in canopy.				274443	6136953	1	N	Y	N	N	1	S	0.31			6	7	G	3.7	0.39	2.23		
1	13a	13a	<i>Koelreuteria bipinnata</i>				N N N N				274435	6136940	1	N	Y	N	N	1	S	0.31			6	6	G	3.7	0.38	2.20		
1	13b	13b	<i>Koelreuteria bipinnata</i>				N N N N				274431	6136937	1	N	Y	N	N	1	S	0.27			6	5	G	3.2	0.33	2.08		
1	13c	13c	<i>Koelreuteria bipinnata</i>				N N N N				274428	6136935	1	N	Y	N	N	1	S	0.27			6	6	G	3.2	0.32	2.05		
1	14a	14a	<i>Koelreuteria bipinnata</i>				2.0 metre long wound with decay on southern side of trunk.				274420	6136923	1	N	Y	N	N	1	S	0.29			6	6	F/G	3.5	0.34	2.10		
1	14b	14b	<i>Koelreuteria bipinnata</i>				N N N N				274418	6136917	1	N	Y	N	N	1	S	0.32			6	7	G	3.8	0.40	2.25		
1	15	15	General view looking northeast from intersection with Glen Rowan Road								274404	6136900																		
			QUEEN ELIZABETH HOSPITAL CAR PARK																											
1	16	16	<i>Lophostemon confertus</i>				Potential REMOVAL for construction of proposed car park.				274465	6136977	1	N	Y	N	N	1	S	0.28			6	5	G	3.4	0.36	2.15		
1	17a	17a	<i>Lophostemon confertus</i>				Potential REMOVAL for construction of proposed car park.				274474	6136995	1	N	Y	N	N	1	S	0.31			7	6	G	3.7	0.37	2.18		
1	17b	17b	<i>Lophostemon confertus</i>				15% dieback, particularly on western side of canopy. Potential REMOVAL for construction of proposed car park.				274475	6136999	1	N	Y	N	N	1	S	0.35			7	7	F	4.2	0.43	2.32		
1	18	18	<i>Corymbia citriodora</i>				Codominant stems at 3.0 metres high. Tree appears to be outside area of proposed car park, but TPZ may be impacted.				274519	6136995	1	N	Y	N	Y	R	1	S	0.78			2.45	22	16	G	9.4	0.90	3.17
1	19	19	<i>Corymbia citriodora</i>				Tree appears to be outside area of proposed car park, but TPZ may be impacted.				274515	6136994	1	N	Y	N	Y	R	1	S	0.69			2.17	22	11	G	8.3	0.86	3.11
1	20	20	<i>Corymbia citriodora</i>				Canopy growing to south, due to close proximity of tree 19. Tree appears to be outside area of proposed car park, but TPZ may be impacted.				274514	6136992	1	N	Y	N	N	1	S	0.58					18	10	G	7.0	0.76	2.95
1	21	21	<i>Lophostemon confertus</i>				REMOVAL required for construction of proposed car park.				274510	6136973	1	N	Y	N	N	1	S	0.36			8	6	G	4.3	0.41	2.28		

VS 2017/074

DATA SHEET - VE 105

File No : 2017/

PATCHS No :

Project/Road/Rail: Queen Elizabeth Hospital

Road Number :

Location : Car Park

Surveyed By : PW

Date : 8/11/2017

Checked By : ???

LOCAL GOVERNMENT COUNCIL(S) (LGC)

1 - City of Charles Sturt

IS THE SURVEY AREA COVERED BY EITHER OR BOTH OF THE FOLLOWING ACTS

DEVELOPMENT ACT 1993? YES NO

NATIVE VEGETATION ACT 1991? YES NO

IMPACT OR RECOMMENDED ACTION

REMOVAL MAJOR PRUNE MINOR PRUNE MONITOR

Off-set is Negated - eg DEAD vegetation with no habitat Veg is structurally unscathed within the Clearance Envelope REGULATION 5(1)(b) APPLIES Area reporting selected in lieu of individual reporting

AREA OF VEGETATION TO BE REMOVED (m²)

AREA TO BE REMOVED SUBJECT TO THE NVA (m²)

NVA SEB Multiplication Factor (Condition)

NVA SEB for AREA (HA) TOTAL 0.0000

Table with columns: COLUMN "A", COLUMN "B", COLUMN "C", COLUMN "D", COLUMN "E", COLUMN "F", TOTAL. Values: 25, 88, 0, 0, 4, 39.

WEED SPECIES & OTHERS (N: D: E: O: M) Amenity Planting or has Amenity Value NATIVE VEGETATION SUBJECT TO NATIVE VEGETATION ACT SUBJECT TO DEVELOPMENT ACT REGULATED (R) OR REGULATED SIGNIFICANT TREES (S) NO IN GROUP WITH BUTT DIA. 0.15+ OR MS 0.10+ TOTAL 39

SINGLE-STEMMED(S) OR MULTI-STEMMED(M) SPECIMEN

BUTT DIA (M) IN GROUP AND/OR MS SITUATIONS INSERT HIGHEST RANGE READING

BUTT DIA (M) ONLY USE THIS COLUMN IN A GROUP AND/OR MS SITUATION INSERT LOWEST RANGE

CIRCUMFERENCE (M) DEVELOPMENT ACT REQUIREMENT ONLY

HEIGHT (m) - In GROUP situations insert HIGHEST range reading.

HEIGHT (m) - In GROUP situations insert LOWEST range reading.

SPREAD (m) - In GROUP situations insert WIDEST range reading.

SPREAD (m) - In GROUP situations insert NARROWEST range reading.

HEALTH & CONDITION * G F P D

APPROXIMATE TREE PROTECTION ZONE (TPZ) BUTT DIA. @ 1.0m x 12

TRUNK DIA. JUST ABOVE TREE BASE (m)

STRUCTURAL ROOT ZONE (SRZ) RADIUS (m)

Calculator

Main data table with columns: LGC, PLAN REFERENCE OR MM LOCATION, PHOTO REFERENCE, SPECIES OR GROUP/AREA DESCRIPTION, REMARKS/NOTES, and various assessment columns (A-F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z).

Appendix D

Traffic Assessment prepared by Wallbridge Gilbert Aztec
Engineers

WGA

WALLBRIDGE GILBERT
AZTEC

Ahrens

The Queen Elizabeth Hospital Multi- Deck Car Park

TRAFFIC ASSESSMENT

Job No. 189218 / C
20 March 2018

WGA

Revision History

Rev	Date	Issue	Originator	Checker	Approver
A	15.03.18	Draft for Comment	SSS	HB	HB
B	16.03.18	Final	SSS	HB	HB
C	20.03.18	Final	SSS	HB	HB

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1 INTRODUCTION

1.1 GENERAL

Wallbridge Gilbert Aztec (WGA) has been engaged by Ahrens to undertake a Traffic Assessment for the proposed multi-deck car park development within The Queen Elizabeth Hospital (TQEH).

A locality plan of TQEH is illustrated in Figure 1 below and site plans are included in Appendix A.

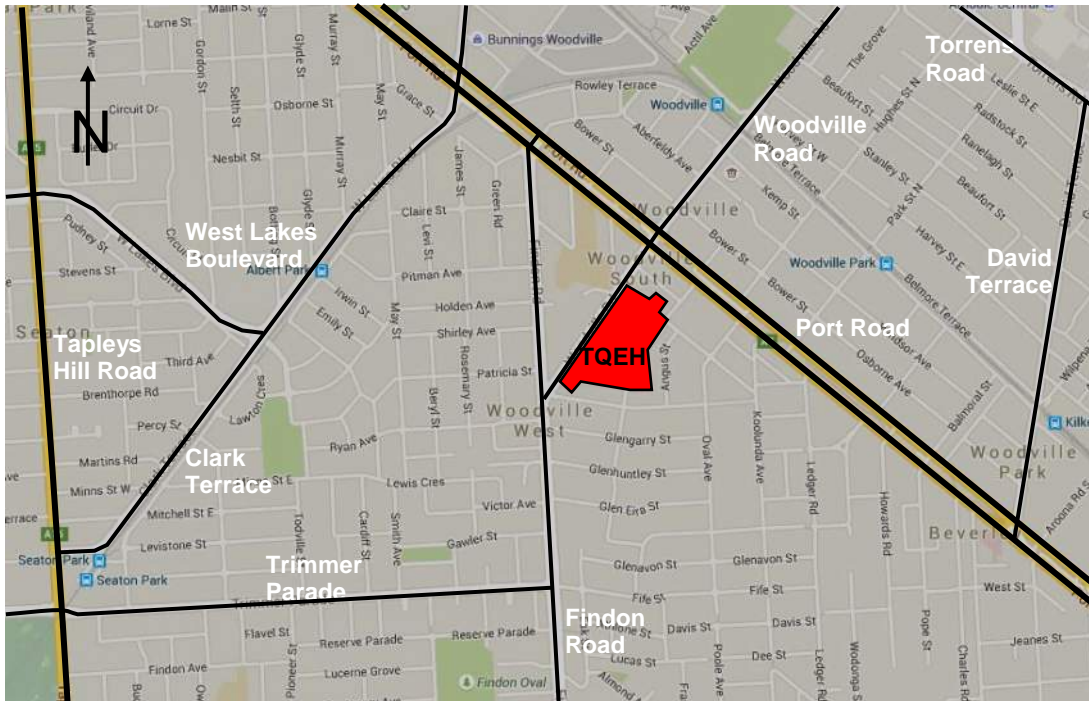


Figure 1 The Queen Elizabeth Hospital (TQEH), Locality Plan

1.2 PURPOSE OF ASSESSMENT

The purpose and key elements of the study are to review and assess:

- Existing traffic flow conditions on the main roads adjacent to the development
- Future background traffic conditions and any programmed roadway improvements
- The suitability of the proposed modified internal road layout for the development.
- Vehicle capacity, road safety, and / or traffic operational constraints to the proposal, as well as potential measures to mitigate such constraints, where appropriate.

The methodology used in this analysis has been based on the City of Charles Sturt Development Plan, relevant Australian Standards and Austroads guidelines.

2 PROPOSED DEVELOPMENT

The proposed development is to be located on the site of the existing TQEH and two former residences, as shown in Figure 2 below.

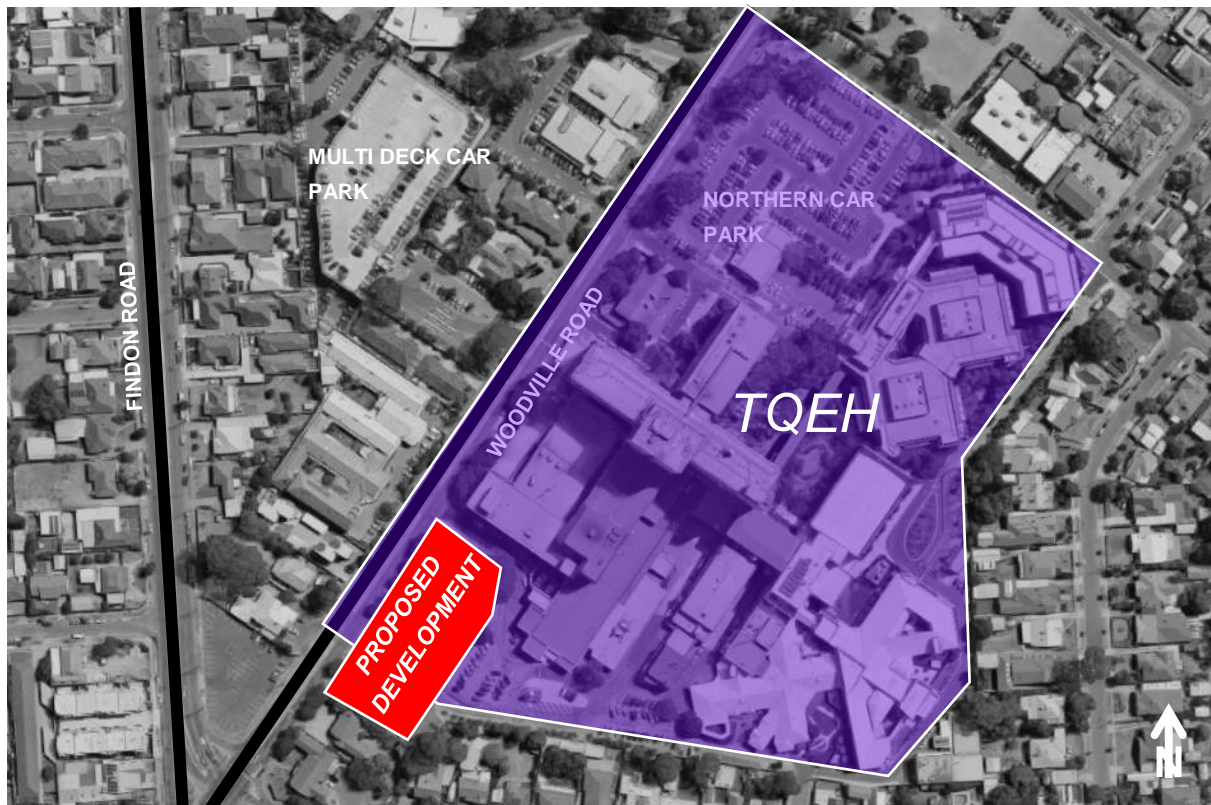


Figure 2 Proposed Location of Development (in red)

The proposed development is to comprise a new five level Multi Deck Car Park on an approximately 5,000 m² site, encompassing:

- 507 car park spaces with appropriate disabled car park and secure bicycle parking provisions;
- Access roadways via a modified and relocated existing site entry from Woodville Road;
- Car parking control devices (such as boom gates / ticket machines) to manage parking control; and
- Undercover linkage to the other new build elements and to the existing Hospital.

3

EXISTING CONDITIONS

3.1 CURRENT USE

The existing undeveloped site is shown in Figure 3 below and consists of the existing TQEH Southern Car Park area, as well as two private residences.



Figure 3 Current Site Use

The following parking provision is currently included at the TQEH site:

- Northern Car Park (Public)
 - 216 visitor parking bays
 - 26 disabled parking bays
 - 28 staff parking bays
 - 13 motorcycle parking bays
- Southern Car Park (Public)
 - 35 visitor parking bays
 - 14 disabled parking bays

- Multi-Deck Staff Car Park (Staff)
 - 566 staff parking bays

3.2 EXISTING ROAD NETWORK

Woodville Road in the vicinity of TQEH is a two-way, four lane divided arterial road under the care and control of the Department of Planning, Transport and Infrastructure (DPTI). Access to TQEH is provided at five points along the Woodville Road frontage. Access to the main public car park (the Northern Car Park) is via two access points: barrier-controlled entry / exit to the north and barrier-controlled entry only to the south.

A staff car park is provided opposite TQEH on the western side of Woodville Road, with a pedestrian actuated crossing provided to facilitate pedestrian movement between the staff car park and TQEH.

Annual Average Daily Traffic (AADT) volumes are in the order of 19,300 vehicles per day (vpd), with approximately 4% heavy vehicle traffic. The posted speed limit is 50 kph.

Parking is restricted along both the eastern and western side of the road and a public bus stop is located on the eastern side Woodville Road approximately 80 m to the north of the proposed access point to the development.

3.3 EMERGENCY DEPARTMENT ACCESS

The Emergency Department of TQEH is located on the southern side of the main building, as shown in Figure 4 below. Access to the department for ambulances is via a separate entrance on Woodville Road, not available to the public whilst access for the public is provided via the current access to the Southern Car Park.

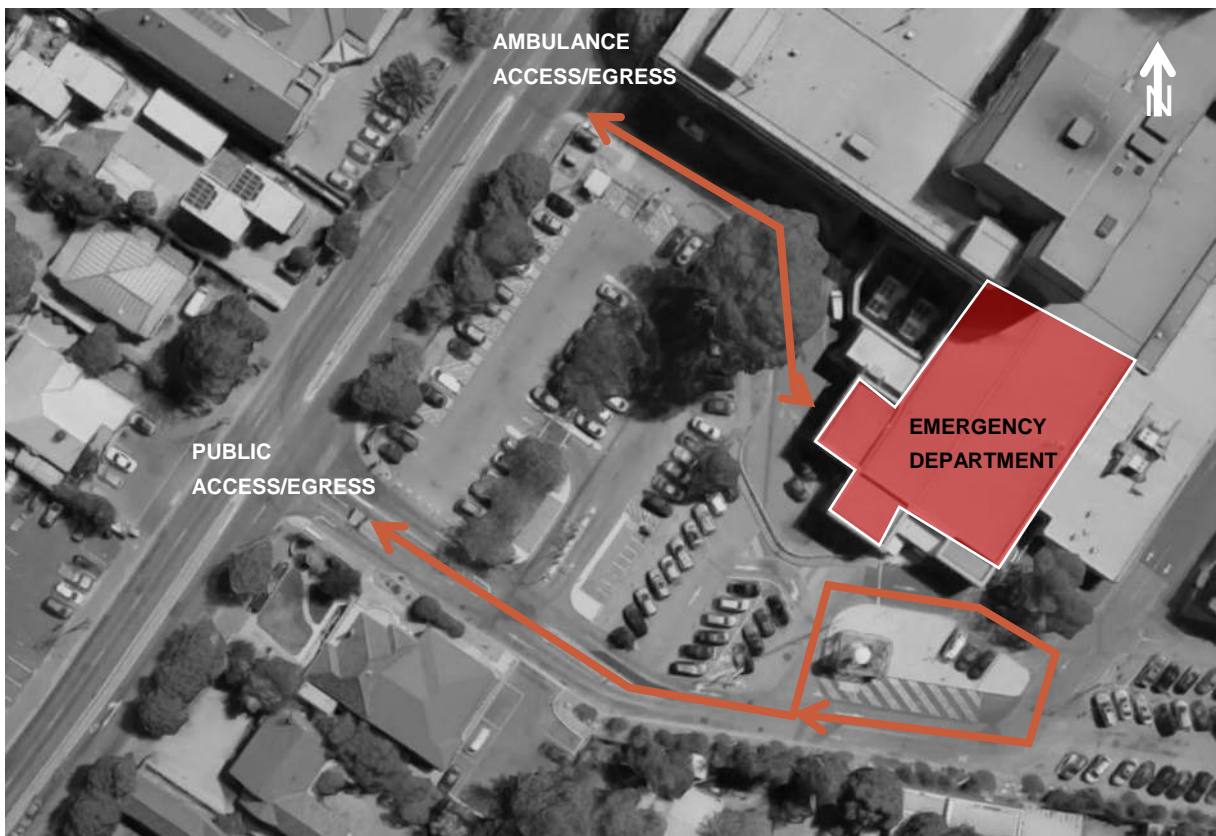


Figure 4 Emergency Department Location and Access

3.4 LOADING DOCK ACCESS

It is understood that the current main loading dock for TQEH is located to the rear of the emergency department, as shown in Figure 5 below. Access is provided via the current access point to the Southern Car Park.



3.5 FIGURE 5 LOADING DOCK LOCATION AND ACCESS PLANNED ROADWAY IMPROVEMENTS

WGA are not aware of any major road works planned on Woodville Road in the immediate vicinity of TQEH.

4

PARKING DEMAND AND SUPPLY

4.1 PARKING DEMAND

4.1.1 Existing Parking Demand

WGA undertook a number of onsite assessments of traffic and parking demand during the AM and PM peak periods on the 9/10th and 16/17th of November 2017, with findings documented in the Site Inspection Report included in Appendix B.

The site assessment focussed on the Northern Car Park and Southern Car Park of TQEH only and did not assess the use of the Multi-deck Staff Car Park. A summary of the parking occupancy rates of each car park observed is shown in Table 1 below. The site assessment showed that during both AM peaks the Northern Car Park was at or almost at full capacity and that during one PM peak hour, the Southern Car Park was at full capacity. When car parks were fully occupied, an illuminated sign was activated adjacent the boom gates indicating that the car park was full to passing motorists.

Table 1 Car Park Occupancy

Time of Assessment	Southern Car Park	Northern Car Park
9/11/17 PM Peak	Full	Not assessed
10/11/17 AM Peak	Had Capacity	Full
16/11/17 PM Peak	Had Capacity	Not assessed
17/11/17 AM Peak	Had Capacity	Almost Full

As part of a previous study undertaken in 2015, WGA assessed the parking demand of the Northern car park as well as the Multi-deck Car Park located on the opposite side of Woodville Road to TQEH. During this assessment, it was found that the Northern Car Park was at capacity during the peak periods observed, whilst the Multi-deck Car Park had in excess of 60 parking bays available at all times.

These results show that whilst the public parking areas appear to be reaching capacity during peak periods, the staff parking area likely has capacity at all times. It is understood that there are no planned developments within the immediate future at TQEH. Therefore, the parking demand is not expected to increase significantly from existing.

4.1.2 Disabled Parking

The City of Charles Sturt Development Plan does not specify disabled parking requirements for the proposed development type. However, the Building Code of Australia (BCA) requires one disabled

space per 100 spaces for non-outpatient hospital areas and 1 disabled space per 50 spaces for outpatient hospital areas.

4.1.3 Bicycle Parking

The City of Charles Sturt Development Plan states that secure bicycle parking facilities should be provided at a rate of 3 spaces per 50 employees. The staffing profile of the hospital is not known at the time of this report, however as the development is not expected to result in an increase in staffing levels, the demand for bicycle parking is expected to remain unchanged from existing.

4.2 PARKING SUPPLY

As discussed in Section 3.1, between the existing Northern Car Park, Southern Car Park and Multi-Deck Car Park there are a total of 898 parking spaces provided (including 13 motorbike parks). Table 2 below provides a summary of the parking spaces that are currently available, and the amount of spaces that will be provided post development.

Table 2 Parking Supply of TQEH

Type	Location	Number of Parks Supplied	
		Existing	Post Development
Visitor Parking	Northern Car Park	216	216
	Southern Car Park	35	431
	Multi-deck Car Park	0	0
	Sub-Total	251	647
Disabled Parking	Northern Car Park	26	26
	Southern Car Park	14	76
	Multi-deck Car Park	0	0
	Sub-Total	40	102
Staff Parking	Northern Car Park	28	28
	Southern Car Park	0	0
	Multi-deck Car Park	566	566
	Sub-Total	594	594
Motorcycle Parking	Northern Car Park	13	13
	Southern Car Park	0	0
	Multi-deck Car Park	0	0

Type	Location	Number of Parks Supplied	
		Existing	Post Development
Sub-Total		13	13
Total		898	1356
Total (exc. Motorbikes)		885	1343
Total (exc. Northern Carpark and Motorbikes)		-	1073

4.3 PARKING DEMAND VS PARKING SUPPLY

4.3.1 General

The City of Charles Sturt Development Plan does not include parking requirements for hospitals or medical centres. However, the Planning SA Planning Bulletin Parking Provisions for Selected Land Uses (Suburban Metropolitan Adelaide) recommends a parking rate for hospitals of 2.5 parking spaces per bed. This rate covers all parking, including staff, visitor and disabled.

It is understood that TQEH currently has 311 beds, which equates to a total of 778 parking spaces required based on the above rate. Both the existing and proposed parking supply rates therefore meet this requirement. Even with removal of the existing parking spaces provided in the Northern Car Park, there would still be 1073 spaces provided, which still exceeds the requirement for parking spaces by 295 parking spaces. This excess is equivalent to approximately 118 beds, which is expected to adequately cater for any future developments.

Although both staff numbers and visitor numbers are not expected to exceed current levels, there is currently a surplus of staff parking at TQEH whilst the visitor parking appears to be lacking based on site observations (as discussed in Section 4.1.1). The proposed development, by providing an additional 507 visitor parking spaces over existing, is expected to address this deficiency as well as allow for future expansions if required. Staff numbers are not expected to exceed current levels, but should this occur, there is sufficient surplus capacity within the staff car park to accommodate the additional demand.

4.3.2 Disabled Parking

Based on the requirements of the BCA, a total of 27 disabled parking bays should be provided (assuming that the proposed development is catering for the TQEH outpatient facility). The provision of 102 disabled parking bays exceeds this requirement, but is considered appropriate given that initial on-site observations indicated a high level of uptake for disabled parking, with all bays observed to be occupied during some periods.

4.3.3 Bicycle Parking

WGA understand that the proposed development will incorporate new bicycle storage facilities. It is assumed that the new facilities will provide the same (if not more) bicycle parking spaces than the existing facility and the new bicycle storage facilities are therefore expected to meet the employee demand for bicycle storage facilities.

5 TRAFFIC GENERATION AND ANALYSIS

5.1 TRIP GENERATION AND PEAK PERIOD

As discussed in Section 4.1.1, WGA undertook a number of onsite assessments of traffic and parking demand during the AM and PM peak periods on the 9/10th and 16/17th of November 2017, with findings documented in the Site Inspection Report included in Appendix B. During the site assessment, traffic counts were taken at the entrance and exit of the Northern Car Park and Southern Car Park to determine the volume of traffic entering the car park, as well as the turning movements at the entrance. The peak hour for both car parks was found to be in previous studies to be in the AM period, generally between 8 AM and 9 AM.

The proposed development will not result in a reduction in bed numbers. Consequently, trip rates at TQEH are anticipated to remain the same as existing following the proposed development. Given the location of the proposed development, it is expected to generate a similar amount of traffic as the existing Northern Car Park and Southern Car Park. Therefore, in order to calculate the expected trips generated by the proposed development, the traffic entering and exiting the existing car parks has been factored to the new number of parks to be provided.

The Northern Car Park rate was adopted over the Southern Car Park rate and applied to the new development, as the Southern Car Park access point also provides access to emergency facilities, which has likely resulted in the increased ratio when compared to the Northern Car Park.

The total trips generated by the existing car parks and the trips expected to be generated by the proposed development are summarised in Table 3 below.

Table 3 Peak Hour Trip Generation

Car Park	Total Supply of Car Parks*	Total Trips Generated	Ratio (Total Trips/Total Supply)
Northern Car Park (Existing)	217	183	0.84
Southern Car Park (Existing)	49	48	0.98
New Development (Calculated)	507	428	0.84

* The Total Supply of Car Parks is based only on the car parks that are accessed by the access point counted, rather than the whole car park

5.2 TURNING MOVEMENTS

The distribution of the direction of entering and exiting trips for the proposed development during the AM Peak has been based on the findings of the traffic count undertaken at the Northern Car Park. As no traffic count was undertaken at the Northern Car Park in the PM Peak, and the AM Peak values are not considered to provide an accurate estimate of the trip distributions in the PM Peak, the distributions observed at the Southern Car Park have instead been adopted for the PM Peak.

The assumed trip distributions adopted for modelling are summarised in Table 4 below. These values have been adopted on the basis that access to the proposed development will be by left turn in only and exiting vehicles will only be permitted to turn left.

Table 4 Anticipated Development Traffic Distribution (No Right Turns) – Peak Hours

Direction of Travel	Movement	AM Peak		PM Peak	
		% of Movements	Total Trips	% of Movements	Total Trips
Entering Car Park	Left In	73%	313	40%	169
	Right In	0%	0	0%	0
Exiting Car Park	Left Out	27%	114	60%	258
	Right Out	0%	0	0%	0
Total		100%	428	100%	428

5.3 IMPACT OF DEVELOPMENT GENERATED TRAFFIC ON LOCAL ROAD NETWORK

5.3.1 General

The performance of the proposed development access point and the nearby junction of Woodville Road/Findon Road/Glen Rowan Road have been assessed using SIDRA junction analysis software, Version 7. All modelling has been assessed on the assumption that 100% of the trips generated will utilise the Woodville Road access point (likely conservative if there is to be another egress point provided to the rear of the facility). All SIDRA results are included in Appendix D.

5.3.2 Assessment Criteria

Each intersection has been assessed against the below criteria.

Level of Service

Level of service is defined as a qualitative measure describing operating conditions within a traffic stream and the perception by motorists. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience and safety.

In general, there are six levels of service designated from A to F, with level of service A representing the best operating conditions (i.e. free flow) and level of service F the worst (i.e. forced or breakdown flow). Further definition of level of services designations is shown in Table 5 for signalised junctions.

Table 5 Intersection Level of Service

Level of Service	Description
A	Good operation
B	Good with acceptable delays and spare capacity
C	Satisfactory
D	Operating near capacity
E	At capacity, at signals incidents will cause excessive delays
F	Unsatisfactory and requires additional capacity, roundabouts require other control mode

Degree of Saturation

The degree of saturation is a ratio between the demand traffic flow and the capacity of an intersection. Degrees of saturation over 1.0 represent oversaturated conditions, and degrees of saturations below 1.0 represent unsaturated conditions. As a junction reaches a degree of saturation of 1.0, the operating conditions deteriorate and delays increase. A degree of saturation of between 0.9 and 1.0 is considered very poor.

5.3.3 Junction of Woodville Road/Findon Road/Glen Rowan Road

General

The junction of Woodville Road/Findon Road/Glen Rowan Road is located approximately 130m to the south west of the proposed development access point on Woodville Road. It is a signalised junction comprising four approaches – Findon Road to the north, Woodville Road to the north east, Glen Rowan Road to the east and Findon Road to the south, as shown in Figure 6 below.



Figure 6 Junction of Woodville Road/Findon Road/Glen Rowan Road

Inputs and Assumptions

Traffic volumes have been obtained from DPTI provided traffic count data (provided in Appendix C) to develop a base case in order to assess the impacts of the proposed development.

The following assumptions were applied to the SIDRA modelling:

- The modelling utilises 2013 background traffic volumes.
- The modelling assumes full completion of the proposed development and the traffic generation rates and movements calculated in Section 5.1 and Section 5.2.
- The PM peak hour only has been assessed, as this represents the worst case scenario with respect to the development generated traffic loading.
- An optimal cycle time has been adopted for modelling.

Results of Analysis

The existing operating performance of the junction has been assessed in order to provide a base case for assessment, as shown in Table 6 below. In addition, the operating performance of the junction with the addition of the development traffic has also been assessed, with the results shown in Table 7 below.

Table 6 Junction of Woodville Road/Findon Road/Glen Rowan Road Operating Performance – Base Case

Peak Hour	Traffic Movement	Maximum Queue Length (m)	Average Delay (sec)	Degree of Saturation	Level of Service
Weekday PM	Glen Rowan Road Approach	14	59	0.183	E
	Woodville Road Approach	220	42	0.820	D
	Findon Road (N) Approach	97	64	0.809	E
	Findon Road (S) Approach	136	57	0.839	E
	All Movements	220	51	0.839	D

Table 7 Junction of Woodville Road/Findon Road/Glen Rowan Road Operating Performance – Base Case + Development Traffic

Peak Hour	Traffic Movement	Maximum Queue Length (m)	Average Delay (sec)	Degree of Saturation	Level of Service
Weekday PM	Glen Rowan Road Approach	14	59	0.183	E
	Woodville Road Approach	267	47	0.873	D
	Findon Road (N) Approach	102	68	0.856	E
	Findon Road (S) Approach	143	62	0.878	E
	All Movements	267	55	0.878	E

Summary

The modelling shows that the existing junction has an overall LOS D (operating near capacity), mainly due to the Woodville Road Approach. The maximum queue length on Woodville Road during the PM Peak (without any development traffic) is 220m, which will likely extend past the proposed development access point. It should be noted however that this is the worst case scenario, with the average queue length in the peak hour only 77 m. The average queue length further decreases outside of the peak hours to approximately 56m.

As all traffic from the proposed development turns left and therefore utilises the junction of Woodville Road/Findon Road/Glen Rowan Road, the overall LOS of the junction would decrease to E (at capacity, at signals incidents will cause excessive delays). However, each individual leg would maintain the same LOS as existing and the increase in average delay of the overall junction is only four seconds when compared to the existing scenario.

5.3.4 Proposed Development Access Point

General

The layout of the new development driveway to the access road off Woodville Road is illustrated in Figure 7 below.

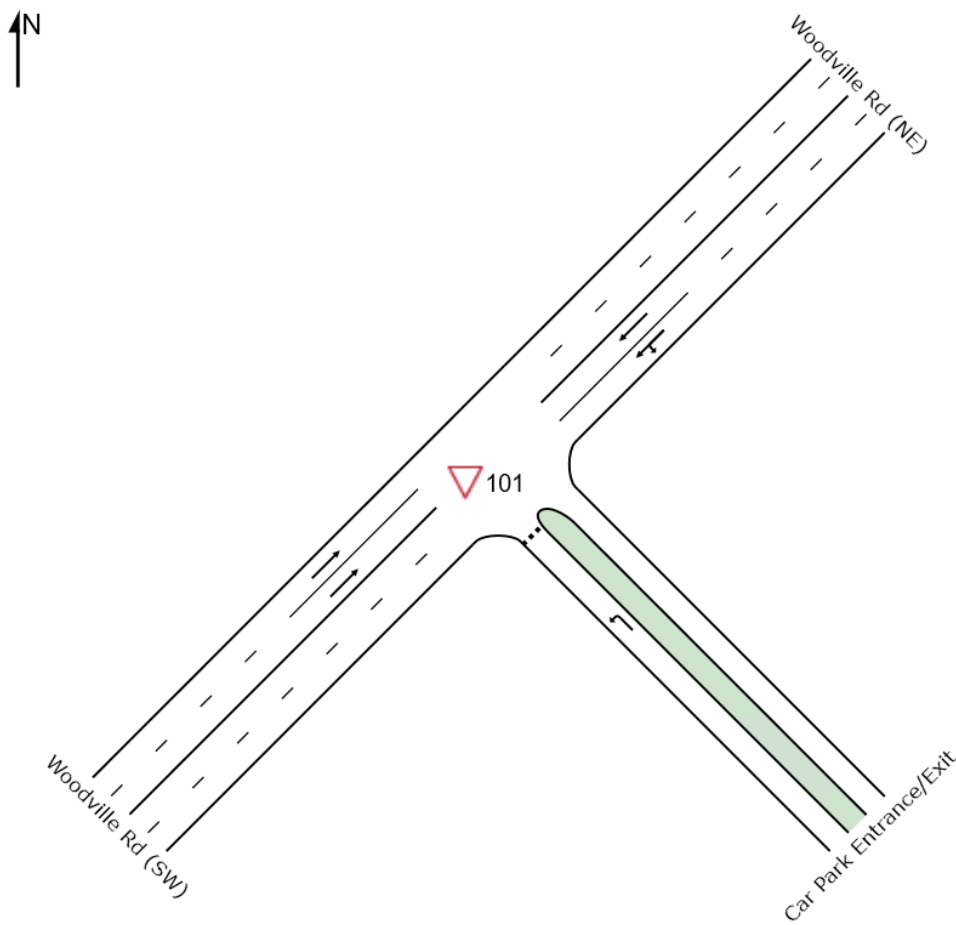


Figure 7 Layout of Proposed Development Scenarios (Update)

Input and Assumptions

The following assumptions and inputs were applied to the SIDRA modelling:

- Through traffic volumes for Woodville Road have been obtained from DPTI provided traffic count data (provided in Appendix C)
- The junction would be unsignalised
- The modelling assumes full completion of the proposed development and the traffic generation rates and movements calculated in Section 5.1 and Section 5.2.

Results of Analysis

The results of the analysis are shown in Table 8 below.

Table 8 Proposed Development Junction Operating Performance –Development Traffic

Peak Hour	Traffic Movement	Maximum Queue Length (m)	Average Delay (sec)	Degree of Saturation	Level of Service
Weekday AM	Car Park Entrance Left	3	6.1	0.10	A
	Woodville Road Left	0	5.6	0.25	A
	All Movements	3	1.2	0.29	NA
Weekday PM	Car Park Entrance Left	11	8.6	0.32	A
	Woodville Road Left	0	5.6	0.34	A
	All Movements	11	1.5	0.34	NA

Summary

The modelling shows that the proposed development access point junction will have a good level of service with acceptable delays and spare capacity during both the AM and PM weekday peak hours.

5.4 SUMMARY

The proposed development and access point arrangement would result in the overall LOS of the Woodville Road/Findon Road/Glen Rowan Road junction decreasing to a LOS E from a LOS D. However, although the LOS is decreasing, the increase in average delay of the overall junction is only four seconds when compared to the existing scenario. The proposed development access point junction will have a good level of service with acceptable delays and spare capacity during both the AM and PM weekday peak hours.

It should be noted that the assessment of the proposed development access point has been undertaken independently from the modelling of the nearby Woodville Road/Findon Road/Glen Rowan Road junction. As the modelling shows that the existing maximum queue length on Woodville Road during the PM Peak (without any development traffic) is 220m (refer to Section 5.3.3), this queue will likely extend past the proposed development access point and potentially impact on the efficiency of vehicles exiting the proposed development. However, this queue length is the worst case scenario and the average queue length of the PM peak is only 77 m (further decreasing to 56 m outside of the peak hours). Therefore, although the queue length on Woodville Road is not taken into account in the model results of the proposed development access point, it is not expected to result in a significant impact on the results.

6 DEVELOPMENT ACCESS AND LAYOUT

6.1 GENERAL

It is understood that the proposed development will be accessed via a new access road off of Woodville Road, with the new road also providing access to the remaining area of the Southern Car Park, the emergency department and the loading bay, as shown in Figure 8 below. The new road will replace the existing access point to the Southern Car Park whilst the existing emergency entry point adjacent the TQEH building will be retained.

Access to the upper levels of the Multi-deck Car Park are proposed to be via internal ramps and all entry and exit points to the car park will be controlled with boom gates. WGA have assessed the access provisions and layout of the proposed development with regard to requirements contained within Australian Standards, Austroads and the Building Code of Australia (BCA).

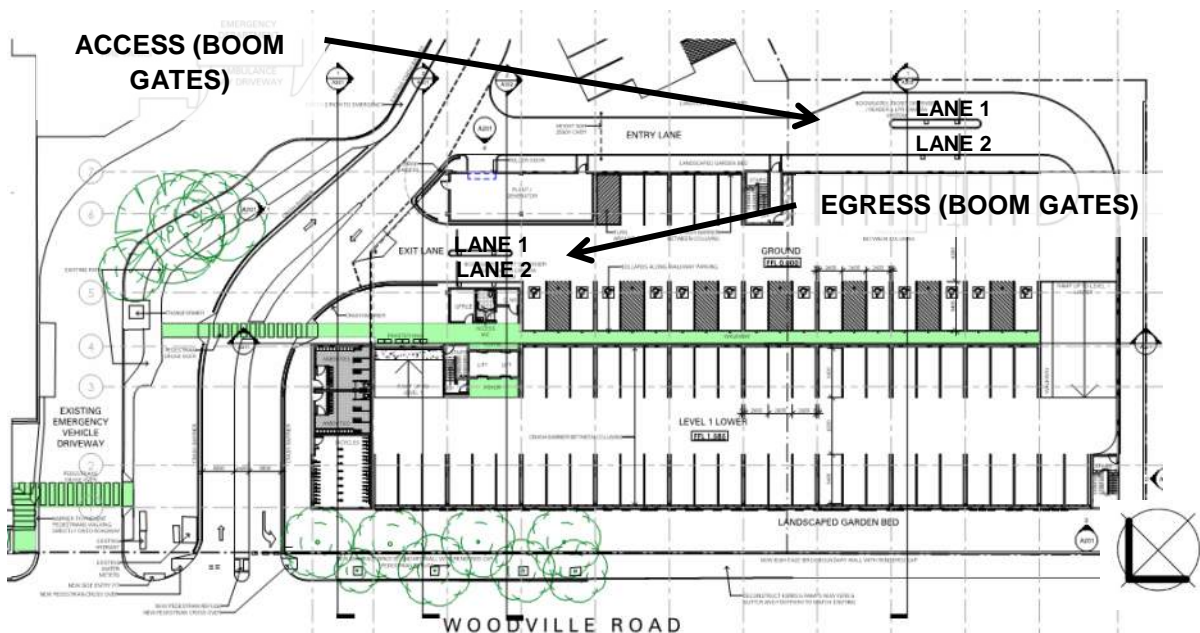


Figure 8 Proposed Access Points of Development

6.2 ENTRY AND EXIT POINTS

6.2.1 Access Driveway Movements

As previously discussed, the junction of the new access road and Woodville Road will cater for left in and left out movements only, as shown in Figure 9 below. It is understood that this access arrangement is preferred by DPTI (when compared to providing right turning movements) as it will

reduce the risk of rear end crashes on Woodville Road (caused by vehicles waiting to turn right blocking the through lane) resulting in increased safety to all motorists. The proposal will also ensure that motorists are not faced with significant queues exiting the facility in the PM peak and will still retain full access to the adjacent emergency department for emergency vehicles.

In order to ensure that motorists are not attempting to undertake right turning movements from Woodville Road to the proposed development using the gap provided in the median for the adjacent emergency access, it is recommended that no u-turn and no right turn signage (excluding emergency vehicles) is placed at the junction. To ensure the enforcement of these restrictions, it is recommended that additional monitoring and/or policing is provided in the early months of operation of the new development.

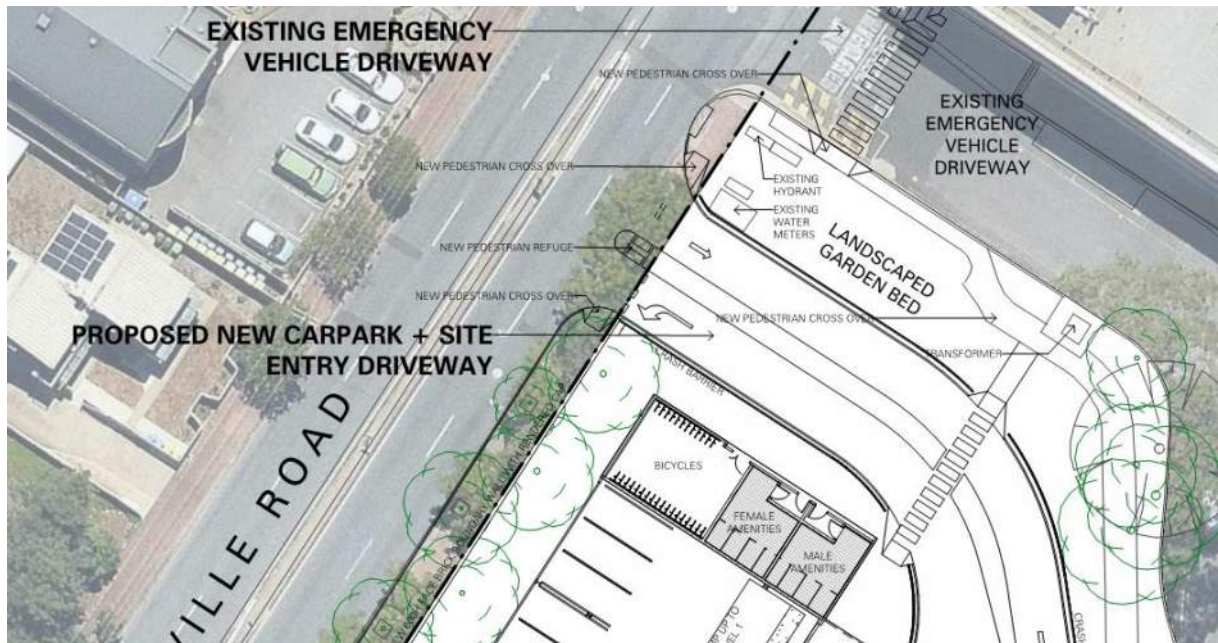


Figure 9 Woodville Road Access Driveway

A brief assessment has been undertaken of the alternative routes motorists could take if they are travelling in an eastern direction and need to access the proposed development. The identified routes are identified in Figure 12 below, and include utilising the nearby junction of Woodville Road/Findon Road/Glen Rowan Road to undertake right turns, or travelling to the rear of the hospital in order to utilise the right turn facilities at the junction of Cedar Avenue/Woodville Road.



Figure 10 Alternative Access/Egress Routes for Eastbound Traffic

6.2.2 Access Driveway Widths

In accordance with Table 3.2 of AS2890.1, the entry driveway of the facility should have a minimum width of 6 to 8 m and an exit width of 6 to 8 m, with a 1 m to 3 m separation between the two. The current layout appears to meet this requirement.

6.2.3 Queue Assessment

As controlled entry points are provided to the proposed development, the development must provide minimum queueing areas between the vehicular control point and the property boundary.

Assuming that the capacity of the proposed facility will be between 300 vehicles/hour/lane (Appendix D, AS 2890) and 400 vehicles/hour/lane (Clause 5.1.1, AGTM3), the minimum queue lengths to be provided in accordance with AGTM3 Equation 7 are stated in Table 9 below. In the absence of more detailed data, Table 3.3 of AS2890.1 also provides an indicative guide of the minimum queue length to be provided. However, as detailed information has been obtained from the WGA site assessment, the calculated values are considered to be representative of the likely queue lengths to be observed.

Table 9 Minimum Queue Lengths at Vehicular Control Points

Vehicular Control Point (refer to Figure 8)	Number of Car Parks Serviced (Approx.)	95th Percentile Queue Length (No. Cars)	
		AM Peak	PM Peak
Access Lane 1	253	3-4	1-2
Access Lane 2	253	3-4	1-2
Egress Lane 1	253	1	2-3
Egress Lane 2	253	1	2-3

The results show that the maximum 95th percentile entry queue length (i.e. 95% of the time, the queue length will be less than this) is reached in the AM peak, and is equivalent to 3 to 4 cars queuing at each of the access lanes. This equates to a queue length of between 18m and 24m to be provided for each lane.

As Access Lane 1 only provides a separate queuing area with a length of approximately 12 m (enough for two cars) before merging with Access Lane 2, the maximum queue length expected to be observed at Access Lane 2 would likely be in the order of 4 – 6 cars (24 m - 36m) during the AM peak period. The provided queuing area provided behind the access gate (54 m) is therefore expected to sufficiently contain this queue length without impacting on the new access road.

In the PM peak the maximum 95th percentile exit queue length is reached, and is equivalent to 2 to 3 cars queuing at each egress lane. This equates to a total queue length of between 12m and 18m to be provided behind the vehicular control point. Currently, this queue length will result in access to three of the disabled parking bays to be restricted. However, as this is only during the PM peak hour, it is not considered to present a significant impact to users of the car park.

An assessment has also been undertaken of the impact of one of the access or egress lanes being closed (for example, in the case of breakdown/maintenance) as a sensitivity analysis. The results are shown in Table 10 below, and show that the maximum queue length at the access lanes would be in the order of 12 cars or 72 m (in the AM peak). Although this queue length would be retained within the property boundary, there is considered a risk that queuing cars may block the new access road, and therefore access to the public emergency department and loading bays. It is therefore recommended that the vehicular control systems installed have an automatic gate open function in the case of breakdown or for when queues reach a specific length. The queue at the egress lanes (6 cars or 36 m in the PM peak), is not expected to introduce any significant issues.

Table 10 Minimum Queue Lengths at Vehicular Control Points – One Access/Egress Lane

Vehicular Control Point (refer to Figure 8)	Number of Car Parks Serviced (Approx)	95th Percentile Queue Length (No. Cars)	
		AM Peak	PM Peak
Access Lane 1	507	12	3
Access Lane 2	0	0	0

Vehicular Control Point (refer to Figure 8)	Number of Car Parks Serviced (Approx)	95th Percentile Queue Length (No. Cars)	
		AM Peak	PM Peak
Egress Lane 1	507	2	6
Egress Lane 2	0	0	0

6.2.4 Controlled Access Points

The provision of additional control points at the entry and exit (rather than single control points) will provide a redundancy in the AM and PM peaks in the case of boom gates malfunctioning or vehicles breaking down in front of the control point.

6.3 INTERNAL CIRCULATION AND LAYOUT

6.3.1 General

The current access arrangement of the proposed development is illustrated in Figure 8, with access to the upper levels of the Multi-deck Car Park currently proposed to be via internal ramps, with no conflicts between intersecting streams of traffic.

6.3.2 Ramps

WGA have undertaken an assessment of the geometry of the ramps provided within the current design against the requirements of AS2890.1. The current ramp grades, grade transitions and widths are less than the maximum allowable and meet the requirements.

The intersection of the parking aisle and straight ramp have been checked using swept paths for the case where a B99 vehicle and B85 vehicle pass one another, as shown in Figure 11 below. The review shows that the intersections have been designed so that both the approach roadway and the intersection area are wide enough to accommodate turning vehicles, with sufficient clearance provided.

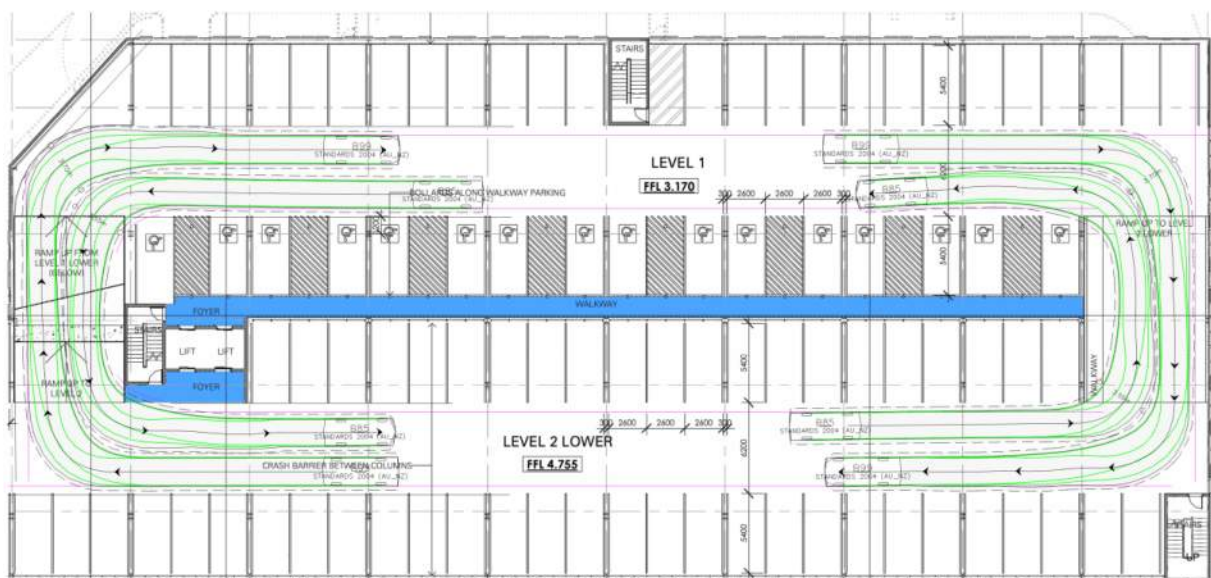


Figure 11 Vehicle Swept Path on Proposed Ramps

6.3.3 Parking Bays

In accordance with AS2890.1 for a Class 3 facility (hospital and medical centres), the size of the parking bays provided should be a minimum 2.6 m wide by 5.4 m long, separated by a 5.8 m aisle width (90 degree parking bays). The current design appears to meet these requirements.

6.3.4 Disabled Parking Bays

In accordance with AS2890.6, the disabled parking bays should be a minimum of 2.4 m wide by 5.4 m long with a 2.4 m wide clear zone provided adjacent each space. The current design appears to meet these requirements.

6.3.5 Bicycle Parking

The bicycle parking facility to be provided within the proposed development should meet the requirements of AS2890.3.

6.3.6 Pedestrians

AS2890.1 notes that for access driveways, kerbs and footpaths shall be continuous through the junction with the frontage road. The appearance and character of the driveway shall be such that it will be clear to vehicle drivers that pedestrians and frontage road traffic have priority of movement. The current design appears to meet these requirements.

AS2890.1 also notes that parking areas shall be designed so that through-traffic is excluded, and pedestrian entrances and exits are separate from vehicular entrances and exits. Where pedestrians must cross busy circulation roadways, they shall be guided to a safe crossing point which shall have adequate sight distance and shall be provided with appropriate signs and pavement markings. The current proposed layout provides pedestrian access from the hospital via signed pedestrian pathways, with pedestrians accessing the car park required to cross the new access road.

Consideration could also be given to providing pedestrian access between the hospital and the car park via a raised walkway rather than at ground level. This will allow for the removal of conflict between pedestrians and vehicles entering/exiting the emergency department and carpark, increasing safety.

Within the upper levels of the car park, pedestrian access is via a clearly defined walkway from the lift areas with a nominal width of 1.5m, meeting the minimum width requirements of AS1428.2.

6.4 EMERGENCY VEHICLES

Access to the site for emergency vehicles is currently via Woodville Road, with separate access points provided for ambulances and the public, as discussed in Section 3.3. Following the proposed development, the proposed access arrangements to the emergency department are as illustrated in Figure 12 below. Ambulance access is to be retained as existing, with public access proposed to be redirected via the new access road.

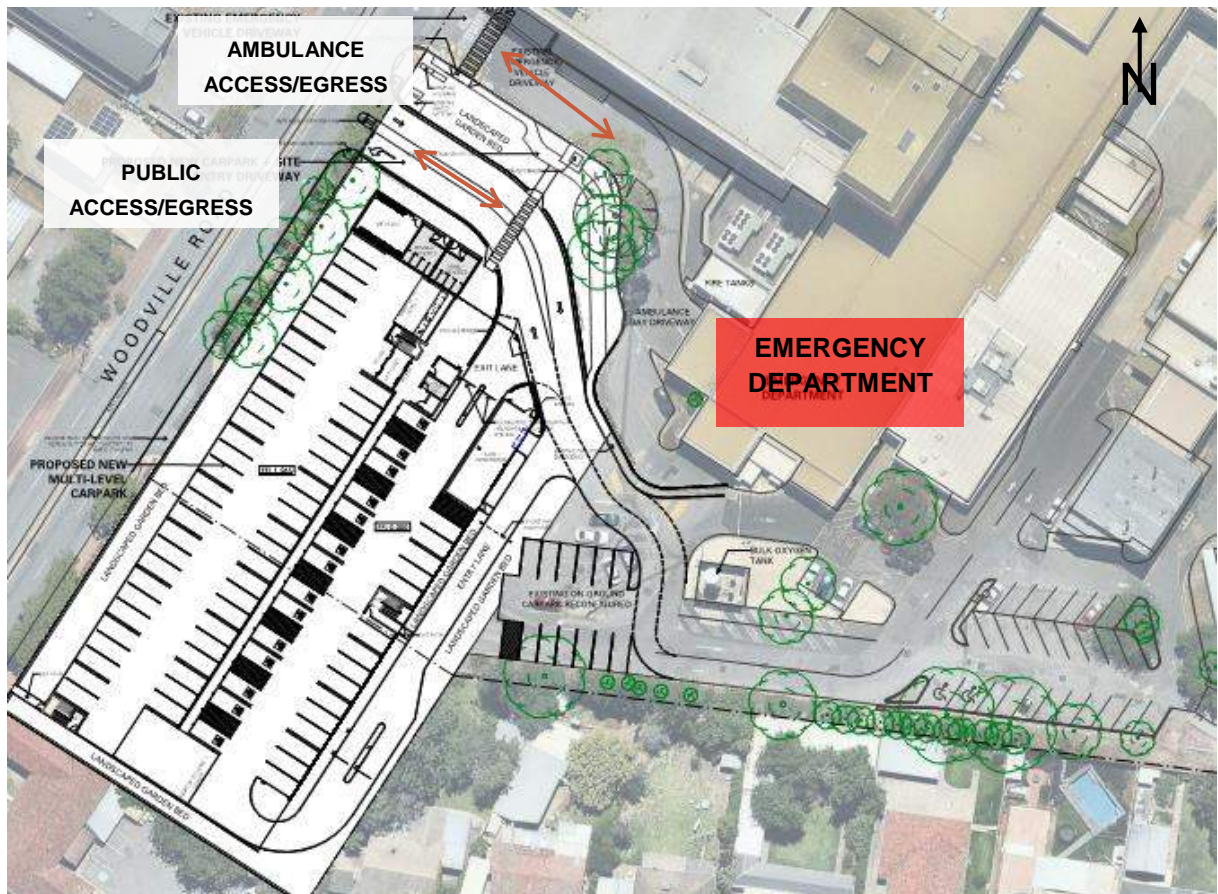


Figure 12 Proposed Emergency Department Access Arrangements

6.5 LOADING DOCK

Access to the loading dock is currently via the entrance to the Southern Car Park on Woodville Road, as discussed in Section 3.4. Following development, it is understood that access to the loading dock will remain as per the existing, with vehicles able to access the loading dock via the new access road rather than the previous Southern Car Park entrance.

6.6 SIGHT DISTANCE

6.6.1 Safe Intersection Sight Distance

A sight distance assessment has been undertaken of the proposed access point to be provided on Woodville Road based on sight distance requirements specified in AS2890.1, Section 3.2.4, as shown in Table 11 below.

Table 11 Access Point Sight Distance Assessment

Access Point	Required Sight Distance Along Frontage Road (50 km/hr)		Approximate Available Sight Distance	Required Sight Distance Achieved?
	Desirable (5 sec gap)	Minimum		
Woodville Road Access Point	69 m	45 m	240 m (North)	Yes (North)
			150 m (South)	Yes (South)

It can be seen in Table 11 above that the minimum sight distance is expected to be achieved at the Woodville Road Access Point. However, this should be further assessed in detailed design to ensure that existing and proposed vegetation is not impacting required sight lines.

6.6.2 Pedestrian Sight Distance

In order to achieve adequate sight lines for pedestrian safety, AS2890.1, Figure 3.3, recommends that 'sight triangles' are included at access driveways in order to maximise visibility. Figure 13 below illustrates the areas required to be kept clear of obstructions to visibility.

The current plans indicate that the sight triangles at the access driveway are not obstructed, in accordance with AS2890.1 recommendations.

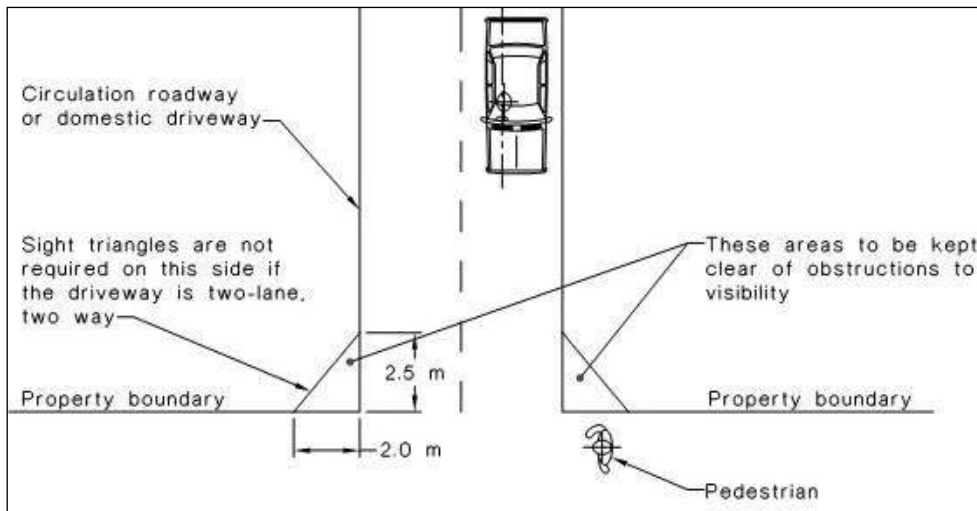


Figure 13 Minimum Sightlines for Pedestrian Safety

7 SUMMARY

7.1 GENERAL

WGA has been engaged by Ahrens to undertake a Traffic Assessment for the proposed multi-deck car park development within the TQEH. The proposed development is to comprise a new five level Multi Deck Car Park on an approximately 5,000m² site, encompassing 507 car park spaces with appropriate disabled car park / secure bicycle parking provisions

7.2 PARKING DEMAND AND SUPPLY

WGA undertook a number of onsite assessments of traffic and parking demand during the AM and PM peak periods on the 9/10th and 16/17th of November 2017, to determine the current level of parking demand within the site. As there are no planned developments within the immediate future at TQEH, the parking demand is not expected to increase significantly from existing.

From the site assessments, it was determined that there is currently a surplus of staff parking at TQEH whilst the visitor parking appears to be lacking (as discussed in Section 4.1.1). The proposed development, by providing an additional 507 visitor parking spaces is expected to address this deficiency as well as allow for future expansions if required. Following the development, a total of 102 disabled parking bays will be provided (which exceeds the requirements of the BCA) and the development will also provide new bicycle storage facilities.

7.3 TRAFFIC GENERATION AND ASSESSMENT

The performance of the proposed development access point and the nearby junction of Woodville Road/Findon Road/Glen Rowan Road have been assessed using SIDRA junction analysis software, Version 7. All modelling has been assessed on the assumption that 100% of the trips generated will utilise the Woodville Road access point (likely conservative if there is to be another egress point provided to the rear of the facility).

Following the development, the overall LOS of the Woodville Road/Findon Road/Glen Rowan Road junction is expected to decrease to a LOS E from a LOS D. Although the LOS is decreasing, the increase in average delay of the overall junction is only four seconds when compared to the existing scenario.

7.4 DEVELOPMENT ACCESS AND LAYOUT

WGA have assessed the access provisions and layout of the proposed development with regard to requirements contained within Australian Standards, Austroads and the Building Code of Australia (BCA). Following the assessment, the following items are recommended to be taken into account during design development of the facility:

- The junction of the new access road and Woodville Road will cater for left in and left out movements only. In order to ensure that motorists are not attempting to undertake right turning movements from Woodville Road to the proposed development using the gap provided in the median for the adjacent emergency access, it is recommended that no u-turn and no right turn signage (excluding emergency vehicles) is placed at the junction. To ensure the enforcement of

these restrictions, it is recommended that additional monitoring and/or policing is provided in the early months of operation of the new development.

- The current layout is considered to provide sufficient safety provisions to pedestrians. However, consideration could also be given to providing pedestrian access between the hospital and the car park via a raised walkway (i.e. at Level 1) rather than at ground level. This will allow for the removal of conflict between vehicles entering/exiting the emergency department and pedestrians, increasing safety at the site.
- The queuing area provided at the access point to the development is in excess of the length required for the estimated queues in peak hours. However, consideration should be given to installing vehicular control systems with an automatic gate open function (in the case of breakdown or for when queues reach a specific length) to ensure that access is retained to the public emergency department at all times.
- The minimum sight distance is expected to be achieved at the Woodville Road Access Point and at pedestrian crossings. However, this should be further assessed in detailed design to ensure that existing and proposed vegetation is not impacting required sight lines.



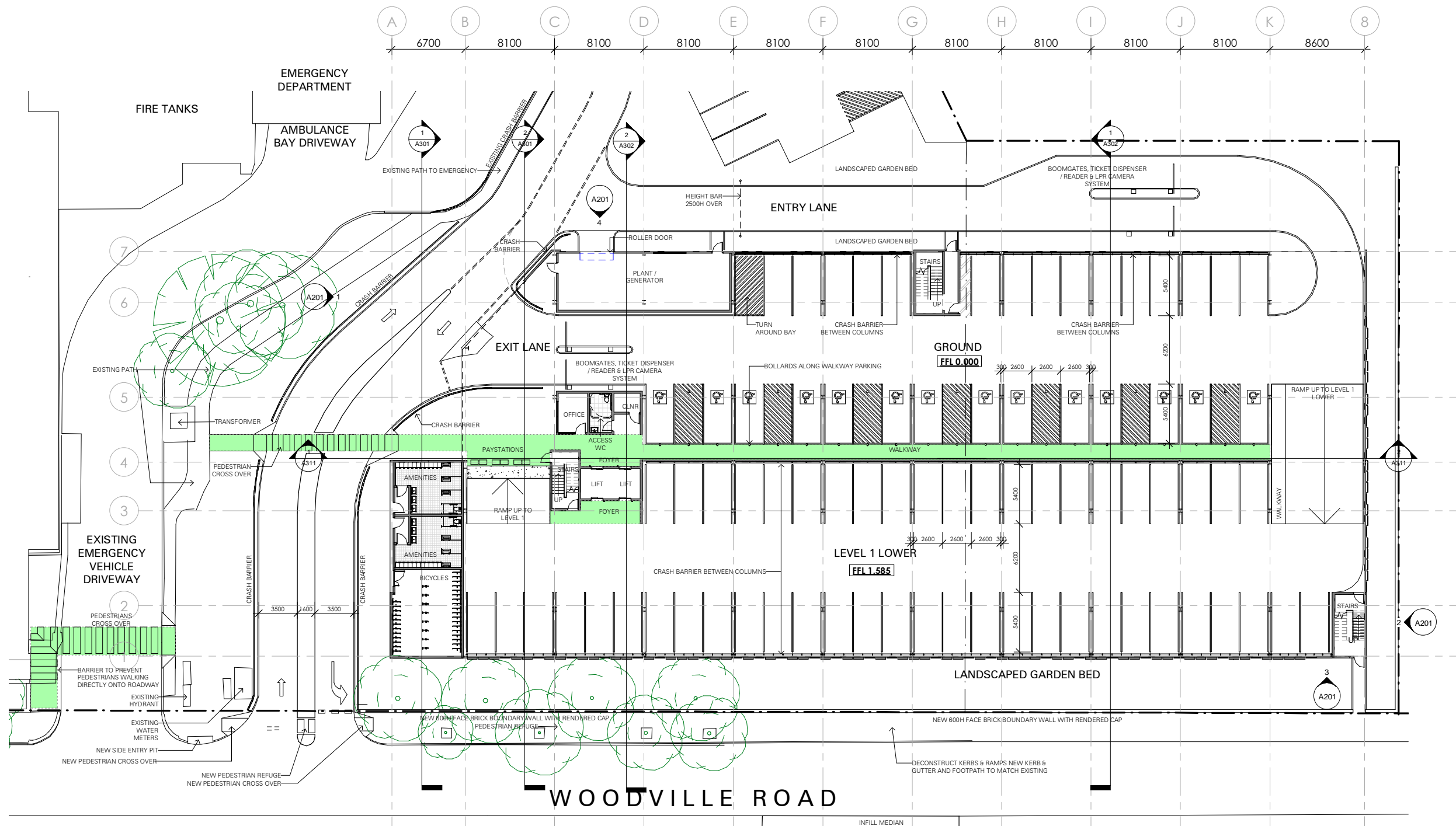
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REFERENCES

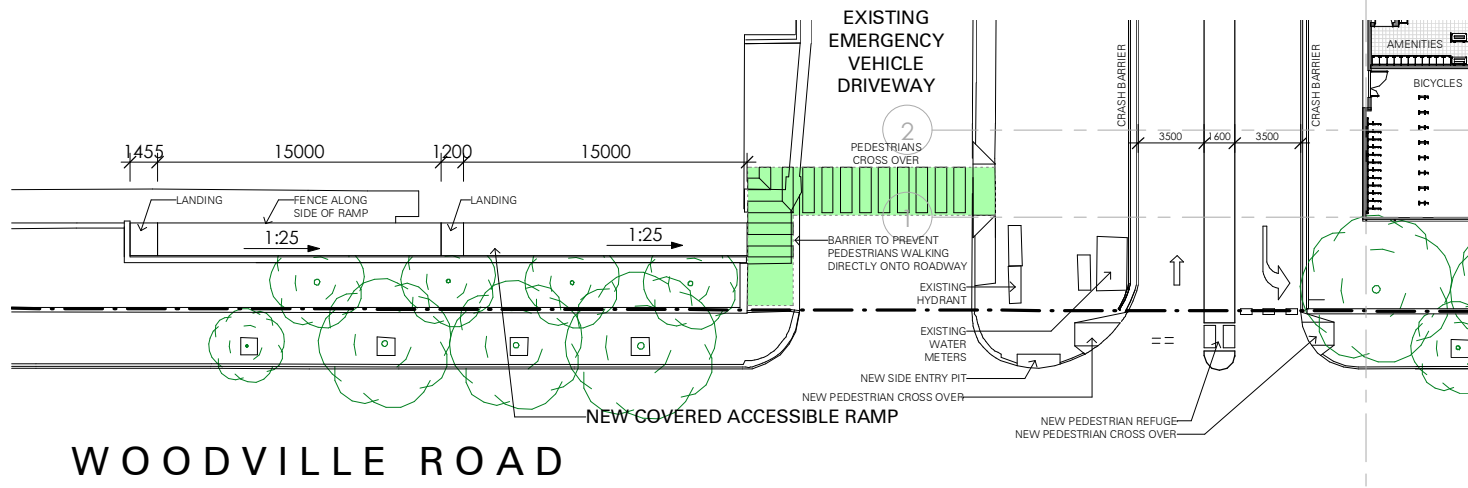
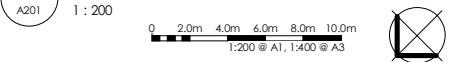
- Australian Standard 1428.2: Design for Access and Mobility, Enhanced and additional requirements – Buildings and facilities, 1992
- Australian Standard 2890.1: Off-Street Car Parking, 2004
- Australian Standard 2890.3: Bicycle Parking, 2015
- Australian Standard 2890.6: Off-Street Parking for People with Disabilities, 2009
- Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development
- Building Code of Australia (BCA), Class 2 to Class 9 Buildings, Volume One, National Construction Code, 2016
- Charles Sturt Council Development Plan, 31 October 2017

APPENDIX A

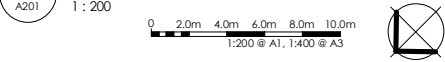
SITE PLANS



1 FLOOR PLAN - GROUND LEVEL & LOWER 1 LEVEL



3 ACCESS RAMPS



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PROJECT: **THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3**

TITLE: **FLOOR PLANS - GROUND & LEVEL 1 LOWER**

DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
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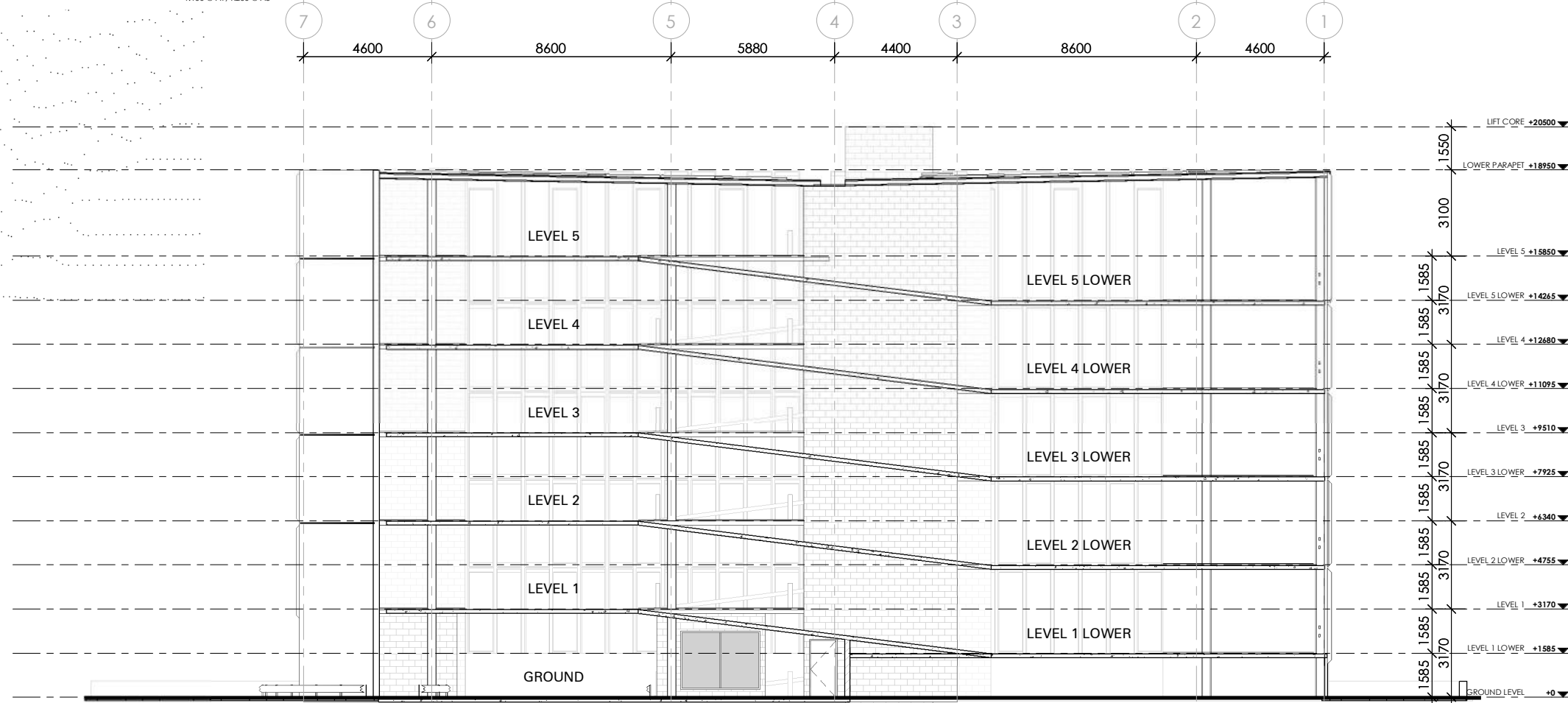
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DATE	16.03.18

DRAWING NO. **1805-A101** REV. **A**

ISSUE: **DEVELOPMENT APPROVAL** ISSUED DATE: **16.03.18**



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2 SECTION BB
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PROJECT THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE CROSS SECTIONS

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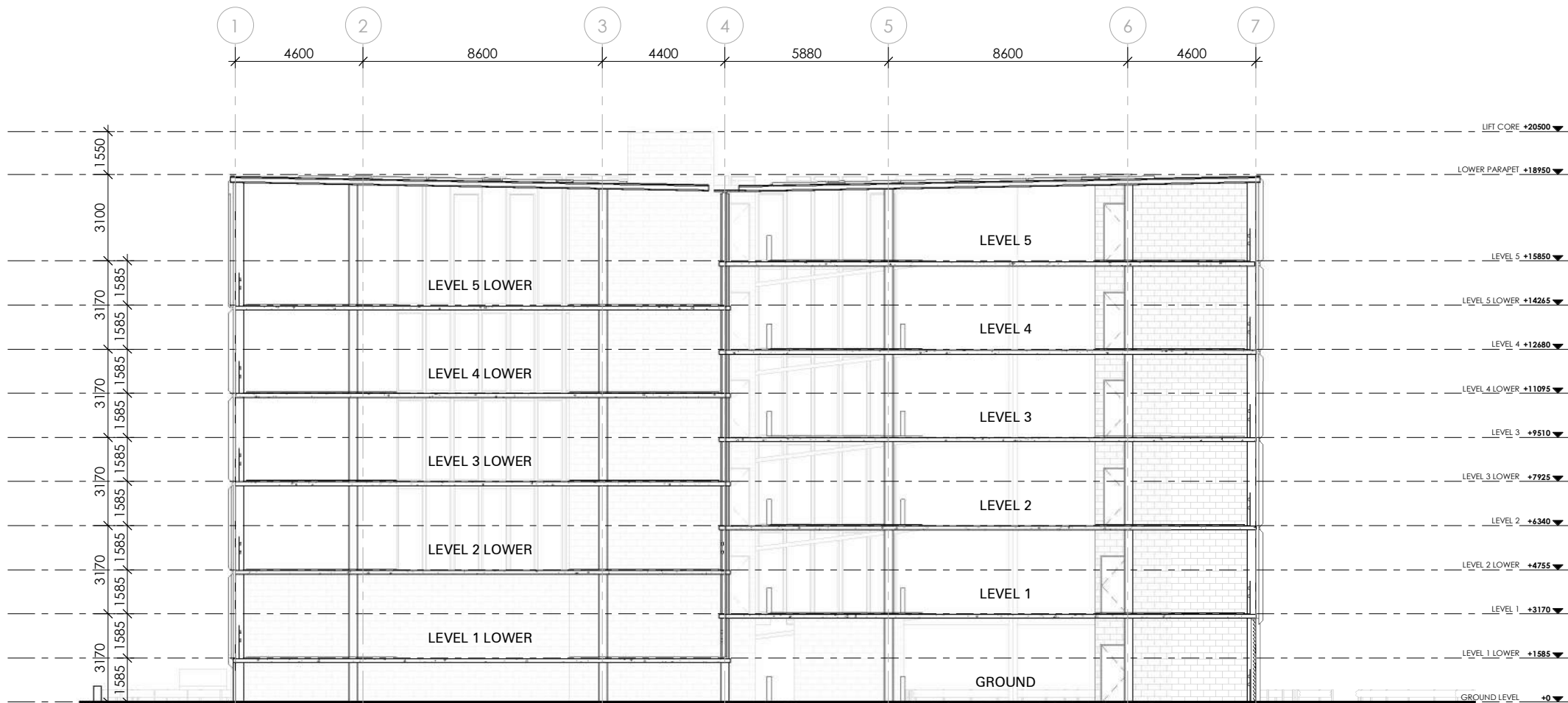
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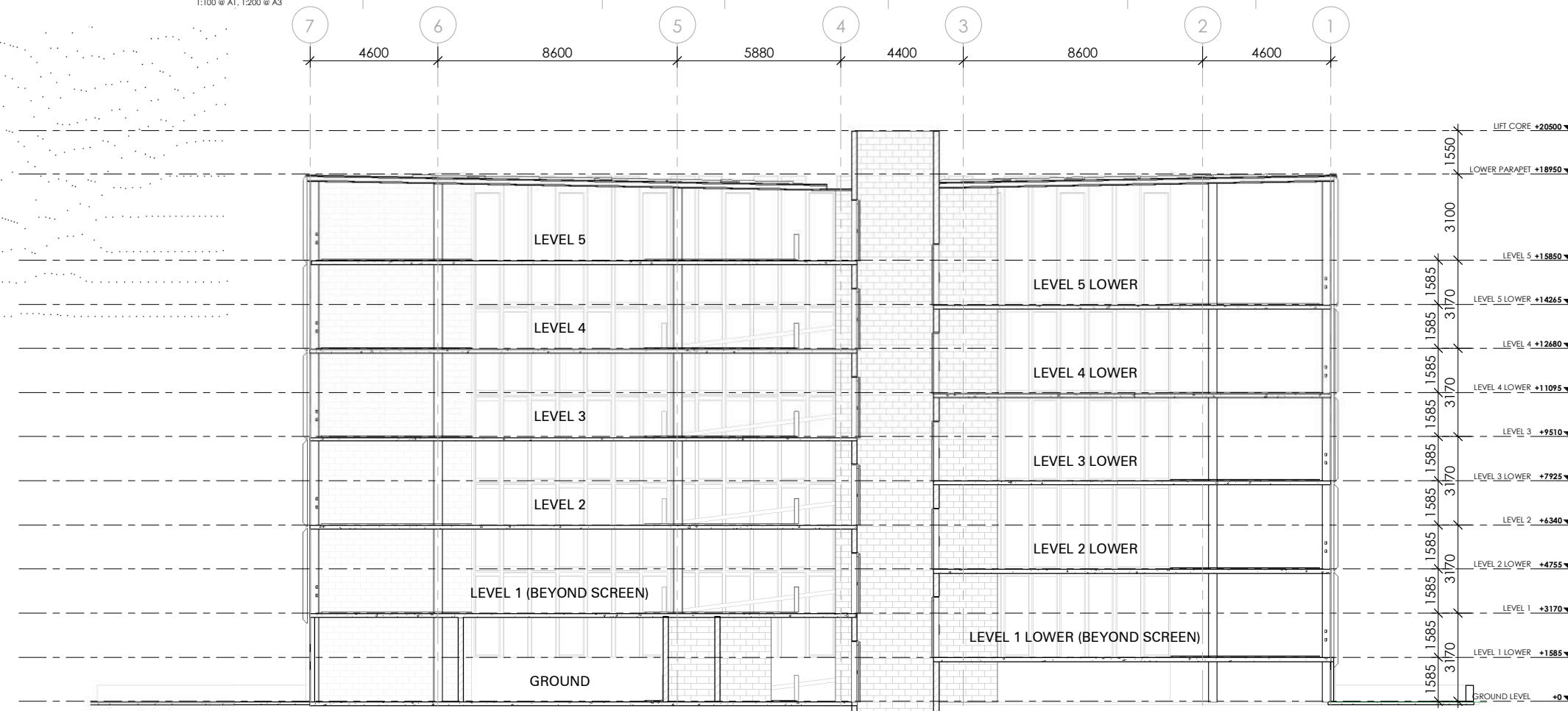
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ISSUE DEVELOPMENT APPROVAL **ISSUED DATE** 16.03.18



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2 SECTION DD
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A	16.03.18	DEVELOPMENT APPROVAL	TN

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PROJECT THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE CROSS SECTIONS

DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY FOR INFORMATION ONLY			
FOR D.A. APPROVAL	WS	WS	16.03.18

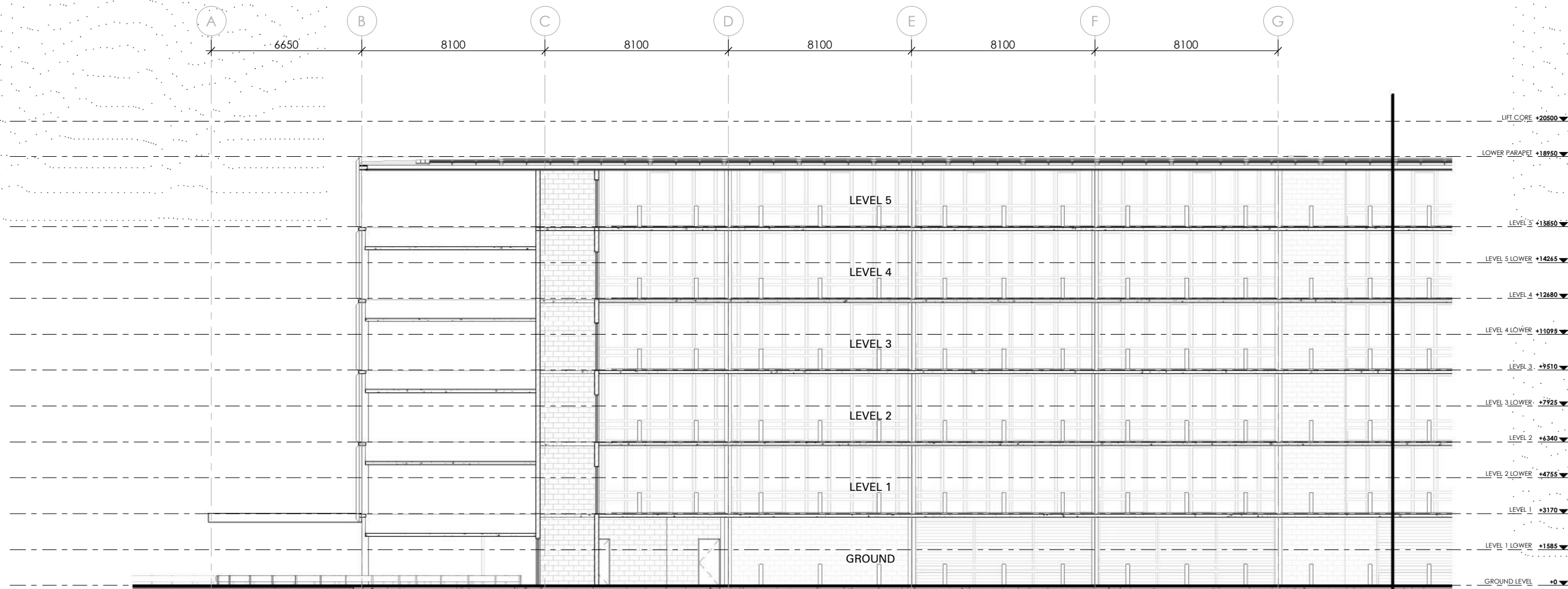
CONSTRUCTION CERTIFICATE

FOR CONSTRUCTION AS BUILT DOCUMENT

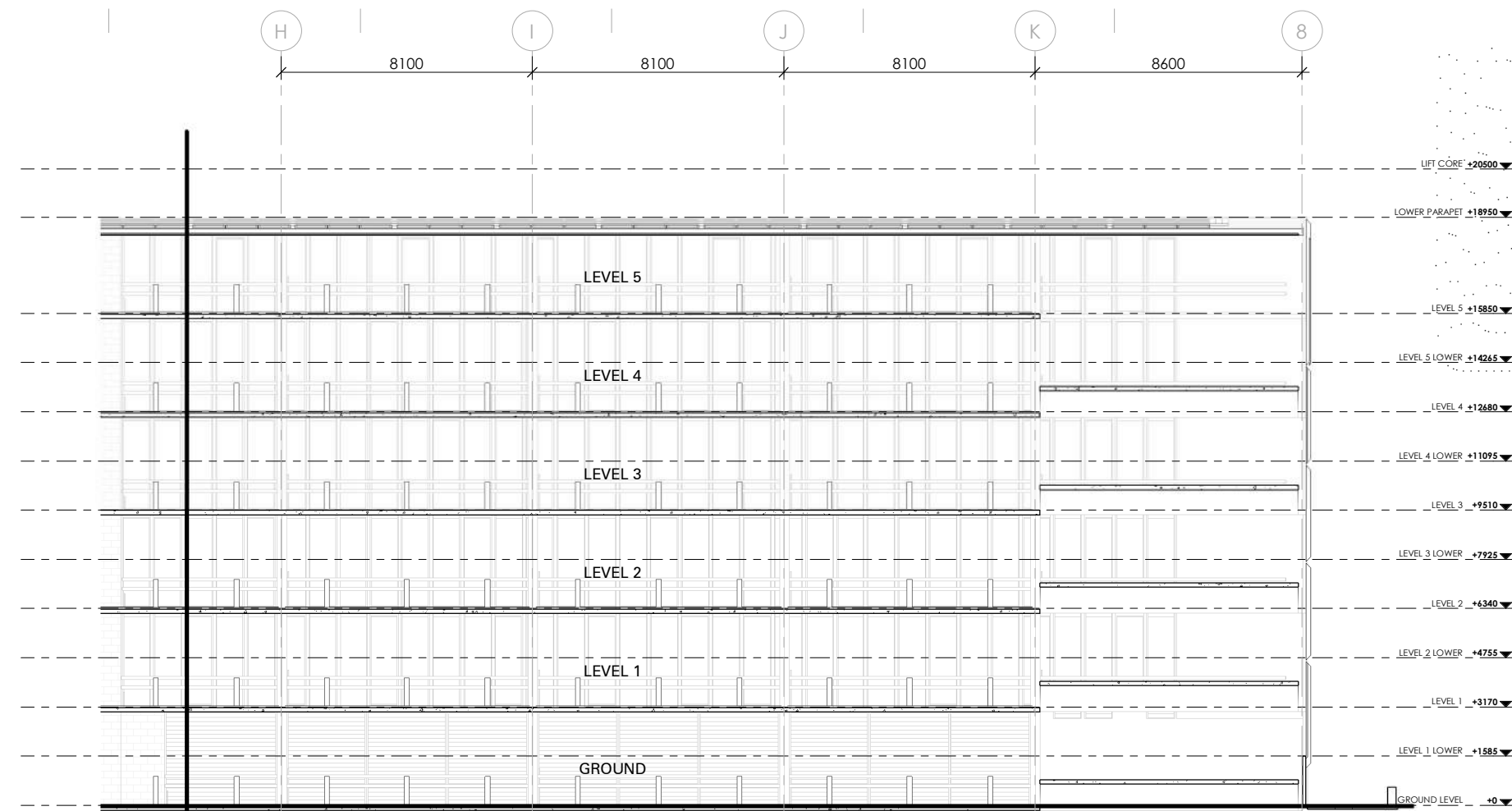
DRAWN	TN
SCALE @ A1	1:100
DATE	15.03.18

DRAWING NO.	REV.
1805-A302	A

ISSUE DEVELOPMENT APPROVAL
ISSUED DATE 16.03.18



1 SECTION EE
A101 1:100
0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100 @ A1, 1:200 @ A3



2 SECTION EE (CONT.)
A101 1:100
0 1.0m 2.0m 3.0m 4.0m 5.0m
1:100 @ A1, 1:200 @ A3

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A	16.03.18	DEVELOPMENT APPROVAL	TN

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PROJECT THE QUEEN ELIZABETH HOSPITAL NEW CAR PARK ADDITION STAGE 3

TITLE LONG SECTION

DRAWING STATUS	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY FOR INFORMATION ONLY			
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CONSTRUCTION CERTIFICATE			
FOR TENDER			
FOR CONSTRUCTION AS BUILT DOCUMENT			

DRAWN	TN
SCALE @ A1	1:100
DATE	16.03.18

DRAWING NO. 1805-A311 **REV.** A

ISSUE: DEVELOPMENT APPROVAL **ISSUED DATE:** 16.03.18

APPENDIX B

SITE INSPECTION REPORT

Project No: ADL 161312

Subject: Findon Road/ Woodville Rd/ Glen Rowan Rd Traffic Survey- AM/PM period

Traffic surveys conducted by: Huy Le

Location:

Findon Road/ Woodville Rd/ Glen Rowan Rd intersection- TS 044

Time of Traffic Surveys:

Thursday 09/11/2017 PM (5:00 PM – 6:00 PM), Friday 10/11/2017 AM (8:00 AM – 9:00 AM)

Thursday 16/11/2017 PM (4:00 PM – 5:00 PM), Friday 17/11/2017 AM (7:00 AM – 9:00 AM)

Weather:

09/11/2017 – PM period: ~24°, bright sky but cloudy, no rain during survey

10/11/2017 – AM period: ~30°, bright sky, quite cloudy, no rain during survey

16/11/2017 – PM period: ~17°, bright sky but cloudy, no rain during survey

17/11/2017 – AM period: ~15°, cloudy, shower during survey

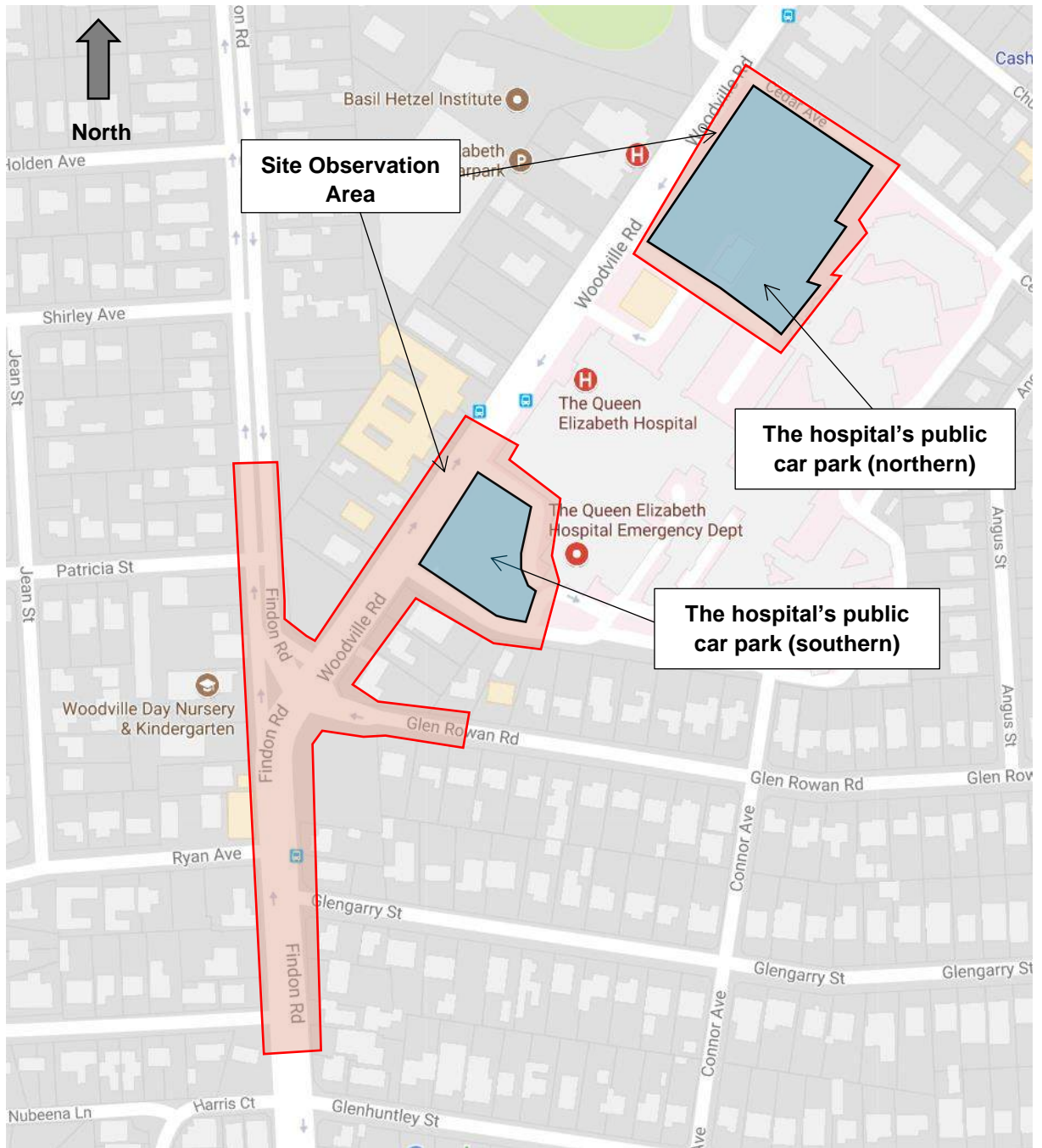


Figure 1: Locality Plan

INTERSECTION SITE LAYOUT

The intersection of Findon Road, Woodville Road and Glen Rowan Road is a signalised intersection currently operating an approach-split phasing configuration. The intersection is in close proximity to the Queen Elizabeth Hospital, a private kindergarten and a small-sized veterinary clinic, thus giving high level of traffic and pedestrian activity during peak hours. At the time of site observation Glen Rowan Road was under road works, therefore only local traffic was allowed to the road.



Figure 2: Intersection Layout- Findon Rd/ Woodville Rd/ Glen Rowan Rd Intersection

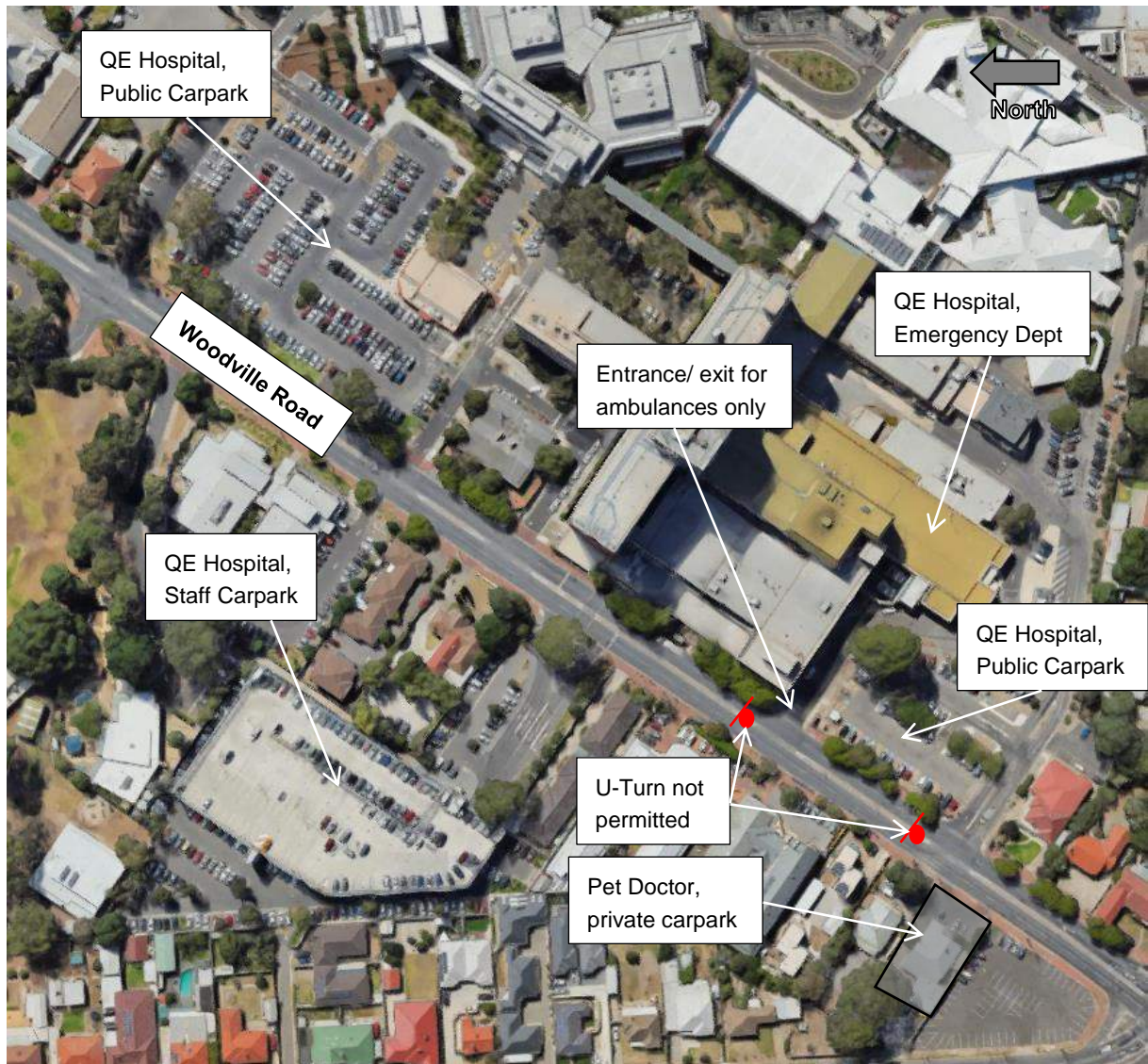


Figure 3: The Queen Elizabeth Hospital - Car Park layout

The Queen Elizabeth Hospital has two public car parks, one staff car park and an emergency department that are all located on Woodville Road. Access to the car parks is generally via median openings and motorists going in and out of the sites are required to give way to traffic on Woodville Road before undertaking manoeuvres. U-turn is strictly restricted for southbound motorists on Woodville Road.

OBSERVED TRAFFIC COUNTS

The numbers of vehicles going in and out of the two public car parks of the hospital were recorded.

Time	Left In	Right In	Left Out	Right Out	Total
Counts	104	30	23	26	183
Percentage	57%	16%	13%	14%	100%
	In = 73%		Out = 27%		

Table 1: Hourly counts of vehicles going in and out of the *northern* public car park during *AM* peak

Time	Left In	Right In	Left Out	Right Out	Total
Counts	12	7	17	12	48
Percentage	25%	15%	35%	25%	100%
	In = 40%		Out =60%		

Table 2: Hourly counts of vehicles going in and out of the *southern* public car park during *PM* peak

OBSERVED SIGNAL PHASING

The signal phasing information was obtained from a TS plan provided by DPTI. This was observed during the survey.

The Findon Rd/ Woodville Rd/ Glen Rowan Rd intersection phasing sequence was observed during the survey. This is shown in table 1.

Phase	Movement description	AM green time allocation (seconds)	PM green time allocation (seconds)
A	<ul style="list-style-type: none"> Woodville Road (NE) through movement Woodville Road (NE) right turn movement Pedestrian push-button crossing across Glen Rowan Rd (E) 	Average: 44s	Average: 48s
B	<ul style="list-style-type: none"> Findon Road (North) through movement Findon Road (North) right turn movement Pedestrian push-button crossing across Woodville Road (NE) 	Average: 20s	Average: 14s
D	<ul style="list-style-type: none"> Glen Rowan Rd through movement Glen Rowan Rd left turn movement Glen Rowan Rd right turn movement Pedestrian push-button crossing across Findon Rd (South) 	Average: 9s	Average: 7s
C	<ul style="list-style-type: none"> Findon Rd (South) through movement Findon Rd (South) right turn movement Pedestrian push-button crossing across Findon Rd (North) 	Average: 35s	Average: 33s
	<ul style="list-style-type: none"> Woodville Rd (NE) left turn movement filters all time Findon Rd (N) left turn movement filters all time Findon Rd (S) through movement to Findon Rd (N) runs in all phases, and controlled by push-button pedestrian crossing 		

Table 3: Phasing summary- TS 044

GENERAL OBSERVATIONS

The intersection of Findon Road, Glen Owan Road and Woodville Road

- At the time of site observation there was road works 100 m east of the intersection on Glen Rowan Rd, only local traffic was allowed to the road.
- Queuing vehicles on Woodville Road back to the hospital car park were observed to mostly leave gap at the hospital car park entrance/exit.
- U-turn is not permitted for southbound motorists throughout the subject section of Woodville Road.
- During both AM peak and PM peak, pedestrian activity was observed to be at moderate level (2 to 3 pedestrians every cycle). Pedestrians are required to perform staged-crossing.
- There is a kindergarten that is situated on Findon Road, west corner of the intersection. The dropping-off/ picking-up times of the kindergarten generally coincide with the peak hours (AM peak: 8:00 to 9:00, PM peak: 17:00 to 18:00). Parents to the kindergarten were observed to travel from Findon Road (S) and park the car along the school Kiss n Drop area without interfering traffic at the intersection.

AM Peak hour:

- Parents start to drop off kids to the kindergarten at 8:45 am in the morning.
- Local traffic from and to Glen Rowan Road were observed in the morning, averagely 1 car per cycle. Maximum queue length on Glen Rowan Road was 2 cars.

PM peak hour:

- Parents start to pick up kids from the kindergarten from 5:00 pm.
- Local traffic from and to Glen Rowan Road were observed in the afternoon, averagely 1 car per cycle. Maximum queue length on Glen Rowan Road was 2 cars.
- There were ambulances travelling across the intersection every 2 minutes.

The junction of Woodville Road and the hospital car park entrance/exit

There is a private veterinary clinic (Pet Doctor) located just in front of the junction. The clinic was observed to be busy during the AM peak with customers to the clinic interfering main traffic on Woodville Road when undertaking manoeuvres.

AM peak hour:

- In general, traffic at the junction during AM peak is busier than the PM peak.
- The Pet Doctor veterinary clinic was observed to be busy during the AM peak hour with customers going in/out every 4 minutes. A case was observed that a customer who wanted to turn right into the Pet Doctor car park via the median opening blocked 6 cars on Woodville Rd southbound. It is also noted that turning right into the car park from the median opening is not allowed as signed (refer to figure 12).

- It was observed that customers from Pet Doctor undertake U-turning at the median opening.
- It was observed that a customer who was turning right into the hospital's car park entrance/exit from the median opening blocked 7 cars on Woodville Road northbound.
- Maximum delay for cars turning out of the hospital's car park is about 1 minute.
- The hospital's car park in the morning was full quickly before 9.00.
- It was observed that there were a number of heavy vehicles going out from the hospital's car park during the AM peak.

PM peak hour

- The hospital's car park was only 30% filled during PM peak.
- Maximum delay for cars turning out of the hospital's car park is about 1 minute.

OBSERVED QUEUE LENGTHS

Approach	Maximum length	Time of occurrence
Woodville Road	140 m	8:41 AM
Glen Rowan Road	2 cars	N/A
Findon Road (N)	110 m	8:48 AM
Findon Road (S)	185 m	8:25 AM

Table 4: AM peak period- queue length Findon Road/ Woodville Road/ Glen Rowan Rd intersection

Approach	Maximum length	Time of occurrence
Woodville Road	175 m	4:40 PM
Glen Rowan Road	2 cars	N/A
Findon Road (N)	100 m	5:12 PM
Findon Road (S)	130 m	5:39 PM

Table 5: PM peak period- queue length- Findon Road/ Woodville Road/ Glen Rowan Rd intersection



Figure 4: Observed maximum queue lengths (AM & PM)



Figure 5: Queue length on Findon Road (S)



Figure 6: Queue length on Findon Road (N)



Figure 7: Queue length on Woodville Road



Figure 8: Glen Rowan Road closed due to road works



Figure 9: Queuing vehicles on Woodville Road leaving gap at the QE hospital's public carpark



Figure 10: The QE hospital's public car park was full during AM peak period



Figure 11: A heavy vehicle waiting to turn left out from the car park



Figure 12: Pet Doctor's car park

APPENDIX C

TRAFFIC COUNTS

Intersection of: FINDON RD / WOODVILLE RD / GLENROWAN RD

Locality: WOODVILLE SOUTH

AMG Reference: TG743367

Date of Count: 30/05/2013

Day: Thursday

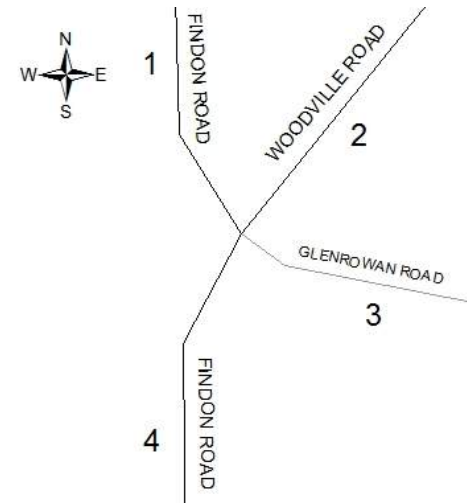
Weather: Dry

Control: SIGNALS

Survey Status:

Arm Road Number - Name

- 1 5845 - FINDON ROAD
- 2 5651 - WOODVILLE ROAD
- 3 GLENROWAN ROAD
- 4 5845 - FINDON ROAD



	Arm Exit Arm	1			2			3			4		
		2 (L)	3	4 (R)	3 (L)	4	1 (R)	4 (L)	1	2 (R)	1 (L)	2	3 (R)
11 hour totals	Cars	651	166	2649	152	6310	407	85	84	143	2834	5969	74
	CV	5	1	104	7	305	8	2	0	0	134	278	0
	Total	656	167	2753	159	6615	415	87	84	143	2968	6247	74
AM Peak hour (08:00)	Cars	172	29	311	15	491	36	13	11	37	349	822	6
	CV	0	0	17	1	34	0	1	0	0	19	28	0
	Total	172	29	328	16	525	36	14	11	37	368	850	6
PM Peak hour (16:15)	Cars	46	28	355	9	954	64	13	10	11	345	556	6
	CV	0	0	3	0	15	1	0	0	0	5	17	0
	Total	46	28	358	9	969	65	13	10	11	350	573	6

		1		2		3		4	
One-way Flows	11 Hour Totals	(IN) 3576	(OUT) 3467	(IN) 7189	(OUT) 7046	(IN) 314	(OUT) 400	(IN) 9289	(OUT) 9455
	AM Peak Hour	08:00 529	08:15 420	08:00 577	07:45 1089	07:45 71	08:15 54	08:00 1224	08:00 867
	PM Peak Hour	15:30 463	16:15 425	16:15 1043	15:30 682	16:30 39	15:15 51	16:00 950	16:15 1340
Two-way Flows	AM Peak Hour	08:00 944	07:45 1643	07:45 117	08:00 2091				
	PM Peak Hour	16:15 857	16:00 1688	15:15 80	16:15 2269				
All Vehicles	11 Hour Totals	7043	3.6% CV	14235	4.2% CV	714	1.4% CV	18744	4.4% CV
	Estimated AADT	8900 SF(1.00) ZF(1.27)	18100 SF(1.00) ZF(1.27)	900 SF(1.00) ZF(1.27)	23800 SF(1.00) ZF(1.27)				

AADT - Annual Average Daily Traffic SF - Seasonal Factor ZF - Zone Factor CV - Commercial Vehicle

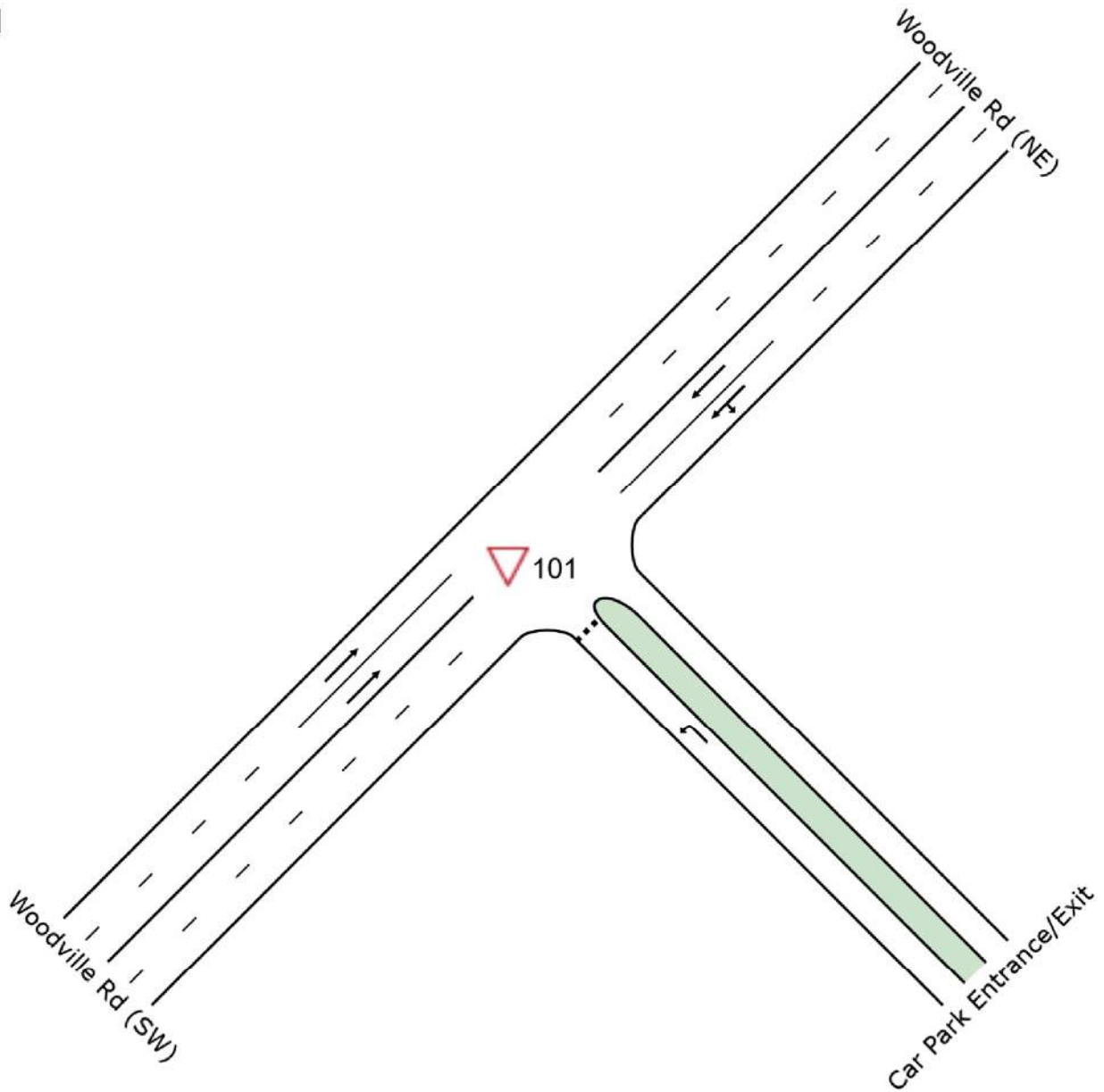
APPENDIX D

SIDRA OUTPUTS

SITE LAYOUT

▽ Site: 101 [QE car park- post dev- AM peak- Left only- One Left turn]

New Site
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [QE car park- post dev- AM peak- Left only- One Left turn]

New Site
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Car Park Entrance/Exit											
21	L2	120	0.0	0.102	6.1	LOS A	0.4	3.0	0.25	0.56	52.8
Approach		120	0.0	0.102	6.1	LOS A	0.4	3.0	0.25	0.56	52.8
NorthEast: Woodville Rd (NE)											
24	L2	329	0.0	0.254	5.6	LOS A	0.0	0.0	0.00	0.41	54.9
25	T1	607	6.1	0.254	0.0	LOS A	0.0	0.0	0.00	0.10	59.1
Approach		937	3.9	0.254	2.0	NA	0.0	0.0	0.00	0.21	57.5
SouthWest: Woodville Rd (SW)											
31	T1	1115	2.6	0.293	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1115	2.6	0.293	0.0	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		2172	3.1	0.293	1.2	NA	0.4	3.0	0.01	0.12	58.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\wg-fs01\admins\JOBS\2018\189201 - 189300\189218 - TQEH - Multistorey Carpark Updated Design Assessment\03 Design\07

Traffic\Car park Entrance_Updated.sip7

MOVEMENT SUMMARY

▽ Site: 101 [QE car park- post dev- PM peak- Left only - One Left turn]

New Site
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Car Park Entrance/Exit											
21	L2	272	0.0	0.319	8.6	LOS A	1.6	11.2	0.54	0.76	51.3
Approach		272	0.0	0.319	8.6	LOS A	1.6	11.2	0.54	0.76	51.3
NorthEast: Woodville Rd (NE)											
24	L2	178	0.0	0.341	5.6	LOS A	0.0	0.0	0.00	0.16	56.9
25	T1	1115	2.6	0.341	0.0	LOS A	0.0	0.0	0.00	0.07	59.3
Approach		1293	2.3	0.341	0.8	NA	0.0	0.0	0.00	0.08	58.9
SouthWest: Woodville Rd (SW)											
31	T1	663	2.7	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		663	2.7	0.175	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		2227	2.1	0.341	1.5	NA	1.6	11.2	0.07	0.14	58.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Traffic\Car park Entrance_Updated.sip7

MOVEMENT SUMMARY

 **Site: 101 [Woodville Road, Findon Road- PM - project case-Left Out Only from the Carpark]**

New Site

Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Glen Rowan Road											
4a	L1	14	0.0	0.183	58.4	LOS E	2.0	13.7	0.94	0.73	30.0
6a	R1	11	0.0	0.183	58.2	LOS E	2.0	13.7	0.94	0.73	30.2
6b	R3	12	0.0	0.183	60.0	LOS E	2.0	13.7	0.94	0.73	30.0
Approach		36	0.0	0.183	58.9	LOS E	2.0	13.7	0.94	0.73	30.1
NorthEast: Woodville Road											
24b	L3	11	0.0	0.873	53.6	LOS D	37.7	267.1	1.00	1.00	33.8
25	T1	1094	1.4	0.873	46.8	LOS D	37.7	267.1	1.00	1.00	33.7
26	R2	120	0.9	0.873	52.2	LOS D	37.4	265.1	1.00	0.99	33.1
Approach		1224	1.4	0.873	47.4	LOS D	37.7	267.1	1.00	1.00	33.7
NorthWest: Findon Road (N)											
27	L2	48	0.0	0.856	67.3	LOS E	14.4	101.5	1.00	0.96	28.4
27a	L1	29	0.0	0.856	66.1	LOS E	14.4	101.5	1.00	0.96	28.4
29	R2	377	0.8	0.856	68.1	LOS E	14.4	101.5	1.00	0.94	27.9
Approach		455	0.7	0.856	67.9	LOS E	14.4	101.5	1.00	0.95	28.0
SouthWest: Findon Road (S)											
31	T1	603	3.0	0.878	62.1	LOS E	19.9	142.5	1.00	1.02	29.7
32a	R1	6	0.0	0.878	66.5	LOS E	19.9	142.5	1.00	1.02	29.3
Approach		609	2.9	0.878	62.1	LOS E	19.9	142.5	1.00	1.02	29.7
All Vehicles		2324	1.6	0.878	55.4	LOS E	37.7	267.1	1.00	0.99	31.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68	
P6	NorthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P7	NorthWest Full Crossing	53	46.9	LOS E	0.2	0.2	0.89	0.89	
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		211	45.7	LOS E			0.87	0.87	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: 101 [Woodville Road, Findon Road- PM base -WGA]

New Site

Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Glen Rowan Road											
4a	L1	14	0.0	0.183	58.4	LOS E	2.0	13.7	0.94	0.73	30.0
6a	R1	11	0.0	0.183	58.2	LOS E	2.0	13.7	0.94	0.73	30.2
6b	R3	12	0.0	0.183	60.0	LOS E	2.0	13.7	0.94	0.73	30.0
Approach		36	0.0	0.183	58.9	LOS E	2.0	13.7	0.94	0.73	30.1
NorthEast: Woodville Road											
24b	L3	9	0.0	0.820	48.7	LOS D	31.0	220.2	0.98	0.93	35.4
25	T1	1020	1.5	0.820	41.9	LOS D	31.0	220.2	0.98	0.92	35.4
26	R2	68	1.5	0.820	47.4	LOS D	30.9	219.4	0.98	0.92	34.7
Approach		1098	1.5	0.820	42.3	LOS D	31.0	220.2	0.98	0.92	35.3
NorthWest: Findon Road (N)											
27	L2	48	0.0	0.809	63.0	LOS E	13.8	96.9	1.00	0.92	29.4
27a	L1	29	0.0	0.809	61.8	LOS E	13.8	96.9	1.00	0.92	29.4
29	R2	377	0.8	0.809	63.9	LOS E	13.8	96.9	1.00	0.91	28.8
Approach		455	0.7	0.809	63.6	LOS E	13.8	97.1	1.00	0.91	28.9
SouthWest: Findon Road (S)											
31	T1	603	3.0	0.839	57.3	LOS E	18.9	135.9	1.00	0.97	30.9
32a	R1	6	0.0	0.839	61.8	LOS E	18.9	135.9	1.00	0.97	30.5
Approach		609	2.9	0.839	57.4	LOS E	18.9	136.0	1.00	0.97	30.9
All Vehicles		2198	1.7	0.839	51.2	LOS D	31.0	220.2	0.99	0.93	32.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	28.8	LOS C	0.1	0.1	0.69	0.69	
P6	NorthEast Full Crossing	53	53.3	LOS E	0.2	0.2	0.94	0.94	
P7	NorthWest Full Crossing	53	46.0	LOS E	0.2	0.2	0.88	0.88	
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		211	45.6	LOS E			0.87	0.87	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



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Appendix E

Stormwater Management Plan prepared by Wallbridge
Gilbert Aztec Engineers

WGA

WALLBRIDGE GILBERT
AZTEC

Ahrens

The Queen

Elizabeth Hospital

Multi-Deck Car Park

**STORMWATER MANAGEMENT
PLAN**

Job No. ADL161312 / Rev B
09 March 2018

WGA

Revision History

Rev	Date	Issue	Originator	Checker	Approver
A	8 th Dec 2017	Issue for DPTI Approval	TP	CH	CH
B	9 th Mar 2018	Revised for Ahrens	TP	CH	CH

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Appendices

Appendix A PRELIMINARY SITE ARCHITECTURAL PLANS

Appendix B SITE SERVICE PLAN

Appendix C STORMWATER MANAGEMENT PLAN

1 OVERVIEW

1.1 BACKGROUND

Wallbridge Gilbert Aztec (WGA) was originally engaged by the Department of Planning, Transport and Infrastructure (DPTI) to prepare a Stormwater Management Plan (SMP) for a multi-deck car park in the southern corner of the Queen Elizabeth Hospital site, in Woodville South, Adelaide.

The car park project subsequently went out to tender as a design and construct project, and was awarded to Ahrens. Ahrens' consultant team have proposed for an alternate building layout that differs from the plan originally prepared by Cheeseman Architects. To address this change, Ahrens have engaged WGA to update the stormwater management to suit the new design.

This report is intended to conceptually outline the stormwater management design for the proposed development and detail the stormwater management methodology. A final detailed design should be carried out to provide construction documentation and incorporate the stormwater design principles outlined in this report. The final documentation is considered to be beyond the scope of this report.

The architectural design for the site, which was prepared by DesingInc and J B G Architects, is included in Appendix A.

1.2 SCOPE OF THE ASSESSMENT

The preparation of the plan comprises the scope of services listed below:

- Liaise with the City of Charles Sturt (Council) to clarify approval conditions and determine on-site stormwater management requirements.
- Prepare a Stormwater Management Plan detailing the proposed method of collection and the disposal of site generated stormwater runoff.
- Prepare a preliminary sketch plan showing possible site drainage infrastructure.

2 STORMWATER MANAGEMENT REPORT

2.1 DEVELOPMENT DESCRIPTION

The proposed development is located near the intersection of Woodville Road, Glen Rowan Road and Findon Road, in Woodville South, Adelaide.

The development involves the construction of a 5-storey car park building for the Queen Elizabeth Hospital, comprising of a total of approximately 494 parking spaces. The upper level of the building is proposed to be fully covered by a roof. The footprint area of the building is approximately 3,040 m².

2.2 EXISTING CATCHMENT DESCRIPTION

The site is currently occupied by an open ground level car park area, an internal roadway and two separate properties (which are both associated with the hospital). An aerial photo of the site is shown in Figure 2.1.



Figure 2.1 – Aerial Image of Existing Site

Adjacent to the site, Woodville Road falls with a very slight grade in a north-easterly direction towards Port Road. There are two drains, 675mm diameter pipe and a 900mm diameter pipe, running longitudinally along the eastern side of Woodville Road past the site. These drains run against the grade and convey flows in a south-westerly direction towards Findon Road. There are several double side entry pits (SEPs) along either side of Woodville Road near the site that connect into the drains.

The majority of the existing site is impervious, being either paved surfaces or roof, with a small fraction of landscaped area. Runoff collected in the southernmost allotment discharges into the eastern kerb and gutter on Woodville Road via a kerb outlet. Roof runoff from the adjacent property (the Diabetes Centre) discharges directly into the side of a grated inlet pit in the internal roadway of the hospital.

The existing hospital ground level car park has its own internal underground drainage system, comprising of numerous inlet pits and pipelines. The system conveys runoff generated within the site footprint of the proposed new multi-deck car park, as well as roadways and car park areas in the hospital to the east. The system also receives some roof runoff from the main hospital building. A service plan showing the details of the hospitals internal drainage system is included in Appendix B.

2.3 COUNCIL REQUIREMENTS

Mr Carmine D'Amico from Council was contacted regarding stormwater requirements for the site and it was confirmed that the following apply:

- Runoff generated on-site in a 5 year Average Recurrence Interval (ARI) storm event shall be discharged directly into the Council underground stormwater system.
- Discharge shall be via the two existing connection points.
- The existing connections need to be upgraded to current standards. The 300mm diameter connection must be increased to a 375mm diameter drain and new 600mm square junction boxes (JBs) need to be provided inside the property boundary for access to both connection points (if not already in place).
- On-site detention shall be provided to limit post development 100 year ARI flows to pre-development levels.

2.4 HYDROLOGIC ASSESSMENT

In order to determine on-site detention requirements for the site, a comparison was made between the land use in the site between pre and post development conditions. The assessment only considered the footprint area of the new car park development and not the remainder of the hospital catchment. Table 2.1 provides a summary of the comparison.

Table 2.1 – Pre and Post Development Land Comparison

Surface Type	Area, A (m ²)	Indicative Impervious %
Pre-Development		
Roof	534	100%
Paved	4,310	100%
Landscaping	1,025	10%
Overall	5,869	84.3%
Post-Development		
Roof	3,040	100%
Paved	1,693	100%
Landscaping	1,136	10%
Overall	5,869	80.7%

The comparison indicated that the development would result in a marginal reduction in impervious area compared to pre-development conditions. This is largely due to the proposed landscaped area that will surround the car park building.

As a result of the decrease in imperviousness, no on-site detention is required to meet Council's requirement of limiting post-development flows to pre-development levels.

2.5 EXTERNAL FLOOD RISKS & FINISHED FLOOR LEVELS

As part of the preparation of a Stormwater Management Plan for the City of Charles Sturt, a range of floodplain maps were prepared for various design storm events. The flood inundation map for the 1% Annual Exceedance Probability (AEP) event in the vicinity of the site is shown in Figure 2.2.



Figure 2.2 – 1% AEP Floodplain at Queen Elizabeth Hospital

From this map it is evident that the site is situated in a relatively flood prone area, with ponding depths of the order of 100 – 150mm present where the existing ground level car park is. In order to manage flood risk for the new car park, it is recommended that finished floor level of the carpark (or the lowest point in which stormwater could enter the building) be set up a minimum of 300mm above the existing flood level in the carpark. This corresponds to a FFL of approximately **7.40m AHD**.

2.6 STORMWATER MANAGEMENT METHODOLOGY

Based on the site stormwater requirements determined from discussions with Council, the following stormwater management methodology is proposed:

The southern existing connection point in the site will be upgraded to meet Council's requirements, with a 600mm square JB being installed inside the property boundary, and the existing 300mm drain connection being upsized to a 375mm diameter drain. The northern connection point already has a suitable JB in place so does not require modification.

Runoff from the roof of the car park building will be collected by a series of gutters and downpipes and conveyed down to a ground level system, which will connect into the southern connection point. Although no detention storage is required, the developer may consider incorporating an above ground retention tank at ground level to capture some of the roof runoff to reuse for irrigation of the surrounding landscaping. It is noted that this is not a Council requirement.

There is an existing 300mm diameter drain that currently runs underneath the site of the new building. This drain will need to be realigned to the north to pass around the building, and may either be connected into the system draining to the northern connection point, or into the southern connection point. The feasibility of connecting into the northern system will need to be confirmed at the detailed design stage by means of pit depthing.

While the internal levels within the car park building will not receive any direct rainfall, some minor drainage infrastructure will be required inside to manage any water from fire sprinklers and incidental runoff brought into the building by vehicles. This would likely consist of small trench grates or grated inlet pits, with car park levels being set to fall slightly towards the inlets. The grates or pits would connect in to downpipes that merge with the roof runoff.

Excess runoff from the ground level areas surrounding the building will be graded into existing inlet pits in the hospital's internal drainage system, or collected in new inlets.

The new development has a much larger roof area than the existing site, and a significantly decreased paved area receiving direct rainfall. Runoff from roof surfaces contains significantly lower concentrations of pollutants (suspended solids, hydrocarbons, gross pollutants etc.) than car park surface runoff, so the development will have an overall positive impact on the quality of stormwater being discharged from the site.

A stormwater management plan sketch, that demonstrates the principles discussed above, is included in Appendix C.

2.7 SUMMARY

This report has provided an overview of proposed stormwater management methodology for the Queen Elizabeth Hospital multi deck car park development.

The information contained in the report has been prepared as a means of demonstrating that stormwater will be able to be appropriately managed on the site to satisfy the requirements of Council. A detailed design will need to be undertaken prior to construction that incorporates the stormwater management infrastructure discussed in this report.

APPENDIX A

PRELIMINARY SITE ARCHITECTURAL PLANS

THE QUEEN ELIZABETH CARPARK NEW CARPRK DEVELOPMENT

ARCHITECTURAL DRAWING LIST

DWG No.	DWG CONTENT	ISSUE	DATE	ISSUED FOR	DWG No.	DWG CONTENT	ISSUE	DATE	ISSUED FOR
A000	COVER SHEET + BLOCK PLAN	A	28.02.18	CLIENT REVIEW	A111	ROOF PLAN	A	28.02.18	CLIENT REVIEW
A001	TRAFFIC FLOW	A	28.02.18	CLIENT REVIEW	A201	ELEVATIONS	A	28.02.18	CLIENT REVIEW
A101	FLOOR PLANS - GROUND & LEVEL 1 LOWER	A	28.02.18	CLIENT REVIEW	A301	CROSS SECTIONS	A	28.02.18	CLIENT REVIEW
A102	FLOOR PLANS - LEVEL 1 & LOWER 2 LEVEL	A	28.02.18	CLIENT REVIEW	A302	CROSS SECTIONS	A	28.02.18	CLIENT REVIEW
A103	FLOOR PLANS - LEVEL 2 & LOWER 3 LEVEL	A	28.02.18	CLIENT REVIEW	A311	LONG SECTION	A	28.02.18	CLIENT REVIEW
A104	FLOOR PLANS - LEVEL 3 & LOWER 4 LEVEL	A	28.02.18	CLIENT REVIEW	A901	3D VIEW	A	28.02.18	CLIENT REVIEW
A105	FLOOR PLANS - LEVEL 4 & LOWER 5 LEVEL	A	28.02.18	CLIENT REVIEW					
A106	FLOOR PLANS - LEVEL 5	A	28.02.18	CLIENT REVIEW					



1 BLOCK PLAN
A201 1:500

0 5m 10m 15m 20m 25m
1:500 @ A1, 1:1000 @ A3



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No	DAT	REVISIONS	BY
A	28.02.18	CLIENT REVIEW	WS

BUILDER

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ELECTRICAL CONSULTANT *****

MECHANICAL CONSULTANT *****

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PROJECT
TQEH CARPARK

TITLE
**COVER SHEET +
BLOCK PLAN**

DRAWING	REVIEWED BY	SIGNATURE	DATE
PRELIMINARY			
FOR INFORMATION			
FOR E.A. APPROVAL			
CONSTRUCTION			
FOR TENDER			
FOR CONSTRUCTION			
AS BUILT DOCUMENT			

DRAW	Author
SCALE @	1:500
AT	DATE
	28.02.18

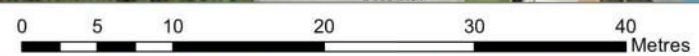
DRAWING NO.
P.A-TQEH-A000

ISSUE: **Project Type**
DATE: **28.02.18**

REV
A

APPENDIX B

SITE SERVICE PLAN



1:250

APPENDIX C

STORMWATER MANAGEMENT PLAN

TQEH MULTI-DECK CAR PARK

Stormwater Management Plan



Upgrade Existing 300 RCP Connection Pipe into Road Underground Drainage System to 375 RCP to Meet Council Standards

Existing 450 RCP Connection to Road Underground Drainage System

Confirm size of existing JB On-Site. Upsize to 600 SQ JB if Required

Outlet Pipes from Car Park Internal Drainage System. Location, Pipe Sizes and Number of Outlets to be Determined as Part of Detailed Design.

Existing Pits in This Area to be Removed, Provide New 600 SQ JB

Provide New 300 RCP to Divert Upstream System to Northern Connection Point. Levels to be Confirmed on Site, System to Connect in to Car Park Drainage System if Existing Downstream JB Invert Level is too High.

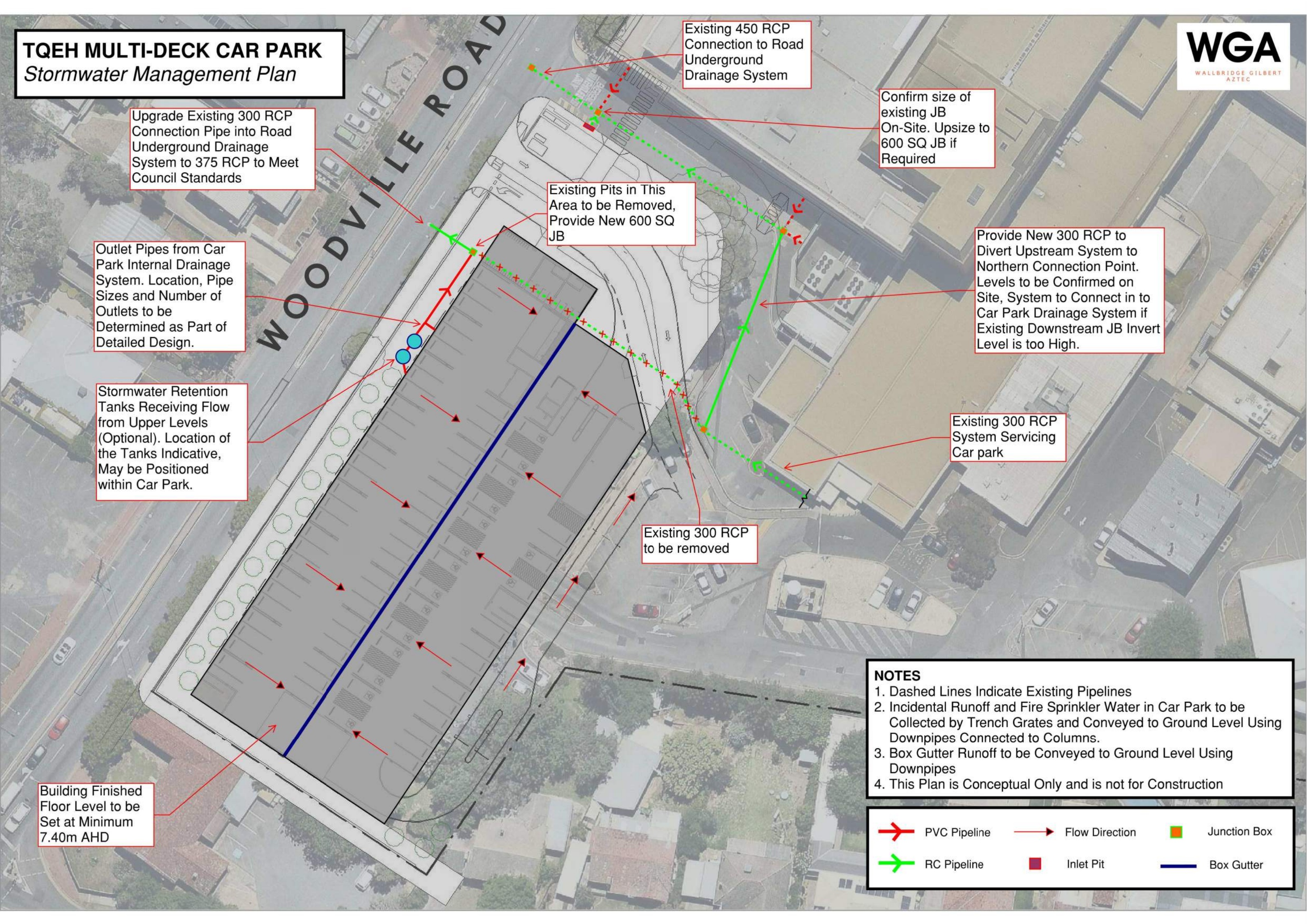
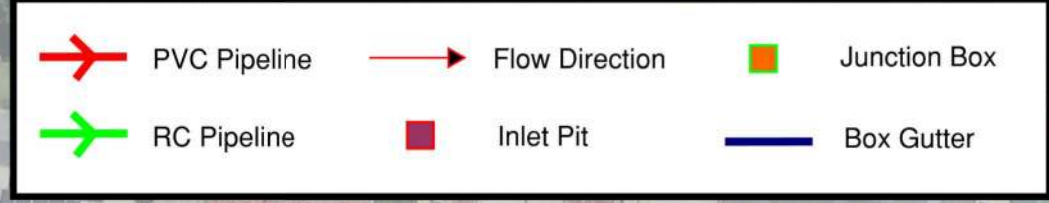
Stormwater Retention Tanks Receiving Flow from Upper Levels (Optional). Location of the Tanks Indicative, May be Positioned within Car Park.

Existing 300 RCP System Servicing Car park

Existing 300 RCP to be removed

Building Finished Floor Level to be Set at Minimum 7.40m AHD

- NOTES**
1. Dashed Lines Indicate Existing Pipelines
 2. Incidental Runoff and Fire Sprinkler Water in Car Park to be Collected by Trench Grates and Conveyed to Ground Level Using Downpipes Connected to Columns.
 3. Box Gutter Runoff to be Conveyed to Ground Level Using Downpipes
 4. This Plan is Conceptual Only and is not for Construction





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Appendix F

Carpark Noise Impact Assessment prepared by Resonate
Acoustics

Resonate


The Queen Elizabeth Hospital

Proposed Carpark Noise Impact Assessment

A180209RP1 Revision A

Wednesday, 21 March 18

Document Information

Project	New TQEH Carpark	
Client	AHRENS Group	
Report title	Environmental Noise Assessment	
Project Number	A180208	
Author	Carl Jungfer Acoustic Consultant p+61 8 8155 5888 m+61 416 338 397 carl.jungfer@resonate-consultants.com	
Reviewed by	Nick Henrys	

Revision Table

Report revision	Date	Comments
0	16 March 2018	First Issue
A	21 March 2018	Minor text change

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise EPP) to be fundamental to the nature and impact of the noise.
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise EPP
Day	Between 7 am and 10 pm as defined in the Noise EPP
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of loudness.
dB(A)	Units of the A-weighted sound level.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise EPP.
L ₉₀	Noise level exceeded for 90 % of the measurement time. The L ₉₀ level is commonly referred to as the background noise level.
L _{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L _{max}	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise EPP
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Quiet locality	A locality is a quiet locality if the Development Plan provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living;
R _w	Weighted Sound Reduction Index—A laboratory measured value of the acoustic separation provided by a single building element (such as a partition). The higher the R _w the better the noise isolation provided by a building element.
R _w + C _{tr}	A measure of the sound insulation performance of a building element with a C _{tr} spectrum adaptation term placing greater emphasis on the low frequency performance.

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1 Introduction

This report outlines the environmental noise assessment for the proposed new carpark at The Queen Elizabeth Hospital (TQEH) and has previously been assessed by Resonate, Report A17940RP1A, issued 11 December 2017. In this report, changes assessed include:

- location of the carpark with respect to the nearest sensitive receivers
- façade construction and location of open areas
- location of vehicle entry to the carpark

Noise from vehicles using the carpark is expected to be the controlling noise source, while vehicle access to the carpark at the east of the proposed building must also be assessed. This will consist primarily of patient and commuter parking. The closest noise affected receptors are located immediately adjacent the site at the south, south east and across Woodville Road to the west.

The potential noise emissions from the carpark have been assessed against the requirements of the South Australian environmental noise policy and the Charles Sturt Council Development Plan.

2 Proposed development

2.1 Location

The Site for the proposed carpark is at the south west corner of the current TQEH site and to the east of the intersection of Findon and Woodville Roads. The nearest sensitive receivers are located to the south of the proposed carpark. Figure 1 indicates the location of the proposed carpark and the nearest noise sensitive receivers considered in the assessment.



Figure 1 Location of the proposed carpark in relation to the nearest noise sensitive receivers

2.2 Operation

Table 1 shows estimated usage data which has been provided by Wallbridge Gilbert Aztec (WGA) on 27 November 2017.

Table 1 Peak flow in and out of the carpark during daytime hours

Time	Situation	In	Out	Total	Capacity
AM	15 min peak flow	116	39	155	494
PM	15 min peak flow	35	96	131	494

It has been assumed for this assessment that peak use time of the carpark will not occur during night-time hours i.e. between 7am and 10pm only.

2.3 Proposed construction

The proposed carpark construction considered in this assessment has been obtained from Drawing P.A-TQEH, Revision A, dated 28/02/2018, that is:

- Perforated “3D Mesh” panels
- Concrete panel (red oxide or painted surface)
- In situ concrete ramps and floors.

3 Development Plan

The proposed development is located within the Charles Sturt Council Area and as such must have regard to the Charles Sturt Council Development Plan

Principles of Development Control

The proposed development is within Mid Suburban Policy Area 16 and thus the following Principles of Development Control apply:

Interface between land uses

Noise Generating Activities

8 Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.

The proposed development is located within the City of Charles Sturt Council Area and the development should have regard to the Charles Sturt Development Plan. The site is to be located in the Woodville District Centre zone within the City of Charles Sturt Council Area. The Objectives for the District Centre Zone that are relevant for the development are outlined below:

District Centre Zone

Objectives:

1 A centre that accommodates a range of retail facilities, offices, consulting rooms, and cultural, community, public administration, entertainment, educational, religious and residential facilities to serve the community and visitors within the surrounding district distributed across five distinct centres within the following suburbs:

- Fulham Gardens
- Hindmarsh
- Kilkenny
- West Lakes
- Woodville.

2 Development of a visually and functionally cohesive and integrated district centre.

3 A centre accommodating medium to high-density residential development in conjunction with non-residential development.

The council wide Objectives and Principles of Development Control relevant for noise emission impacts are outlined below:

Interface between Land Uses

Objectives:

1 Development located and designed to prevent adverse impact and conflict between land uses.

2 Protect community health and amenity from adverse impacts of development.

3 Protect desired land uses from the encroachment of incompatible development.

Principles of Development Control

1 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:

- (a) the emission of effluent, odour, smoke, fumes, dust or other airborne pollutants
- (b) noise
- (c) vibration

(d) electrical interference

(e) light spill

(f) glare

(g) hours of operation

(h) traffic impacts.

2 Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality.

6 Non-residential development on land abutting a residential zone should be designed to minimise noise impacts to achieve adequate levels of compatibility between existing and proposed uses.

8 Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.

To demonstrate that the proposed development has been designed to minimise noise impacts on adjacent receptors and has considered the relevant provisions of the Development Plan outlined above, the potential environmental noise emissions are assessed in accordance with the *Environment Protection (Noise) Policy 2007* (Noise EPP).

4 Noise criteria

4.1 Environmental Protection (Noise) Policy

Part 4, Clause 18(1) of the *Environment Protection (Noise) Policy 2007* (Noise EPP) states that:

The general environmental duty under section 25 of the Act is satisfied in relation to noise from a noise source, insofar as the noise affects particular noise-affected premises, if the noise complies with the noise goals.

The noise goals in the Noise EPP are based on the zoning of the development and the closest noise affected premises in the relevant development plan. The land uses primarily promoted by the zones are used to determine the environmental noise criteria with the indicative noise factors shown in Table 2 and Table 3. Note that the indicative noise factors in Table 2 are used where the noise source and noise affected premises falls within the same land use category (being only General Industry and Special Industry). In all other cases the indicative noise factors in Table 3 are to be used.

Table 2 Excerpt from Noise EPP—Table 1(subclause(1)(a))

Land use category	Indicative noise factor dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
General industry	65	65
Special industry	70	60

Table 3 Excerpt from Noise EPP—Table 2(subclause(1)(b))

Land use category	Indicative noise factor dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Rural living	47	40
Residential	52	45
Rural industry	57	50
Light industry	57	50
Commercial	62	55
General industry	65	55
Special industry	70	60

As noted in Section 3, the development and the most affected noise sensitive premises are located in the District Centre and Mid Suburban Policy Zones for which Commercial and Residential land uses are primarily promoted respectively.

In accordance with Part 5 of the Noise EPP, the relevant criteria for this development will be the relevant indicative noise factors less 5 dB(A). The application of Part 5 results in the following environmental noise criteria:

- 52 dB(A) during the day, 7 am to 10 pm
- 45 dB(A) at night, 10 pm to 7 am.

Penalties can also be applied to a noise source for a variety of characteristics, such as impulsive, low frequency, modulating or tonal characters. For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact. Application of the characteristic penalty is discussed in the noise emission assessment.

We note that under Part 5, Clause 20(6) of the Noise EPP, exceedance of the recommended criterion does not necessarily mean action is required under the Noise EPP. Some of the following matters should be considered when considering action:

- the amount by which the criterion is exceeded (in dB(A))
- the frequency and duration for which the criterion is exceeded
- the ambient noise that has a noise level similar to the predicted noise level
- the times of occurrence of the noise source
- the number of persons likely to be adversely affected by the noise source and whether there is any special need for quiet.

5 Assessment

5.1 Noise modelling

5.1.1 Modelling parameters

Noise emissions from site have been modelled in SoundPLAN Environmental Software v7.4 program, using the general prediction method. The model has taken into consideration:

- noise source(s)
- noise sensitive receiver locations
- attenuation of noise source due to distance
- barrier effects from buildings, topography and the like
- air absorption
- ground effects
- neutral meteorological conditions (zero wind and temperature gradients).

5.2 Characteristic noise penalties

Penalties to the source level should be applied in accordance with the Noise EPP to recognise annoyance associated with noise that is dominated by tonal, modulating, low frequency, or impulsive characteristics. A 5 dB(A) penalty is applied for one characteristic, an 8 dB(A) penalty is applied for two characteristics, and a 10 dB(A) penalty is applied for three or more characteristics.

For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact.

Application of a characteristic penalty will depend on the received noise levels compared with the background noise levels to determine whether or not the character(s) are fundamental to the impact of the noise and dominate the overall noise impact.

In this case the modulating character of the noise emissions from the carpark and from vehicles entering the carpark attract a penalty of 5 dB. This is reflected in the predicted noise levels shown in Table 4.

5.3 Predicted noise levels

A summary of the predicted noise levels at the receptors is presented in Table 4, which represents the peak AM use of the carpark and worst-case noise emission.

Table 4 Predicted noise levels—day

Prediction location	Predicted noise level, L_{eq} dB(A)	Noise EPP day time criteria, dB(A)
QEH buildings	49	52
Woodville South Medical Centre	53	
38 Glen Rowan Road	53	
38 Glen Rowan Road (back yard)	54	
36 Glen Rowan Road	47	
47 Glen Rowan Road	46	
9 Woodville Road	45	

Prediction of noise levels from parking activities within the proposed carpark have been determined using the method adopted by the Bayerisches Landesamt für umwelt (Bavarian State Office for the Environment) which has been validated for use in Australian conditions.

The results indicate that the noise level at the nearest noise sensitive receiver (38 Glen Rowan Road) is in exceedance of the Criteria described in Section 4 of this report; however, the exceedance is by no more than two decibels and is predicted to occur during the 15 minutes of peak carpark movement in the daytime. The exceedance in this case is not sufficient to be easily discerned by the human ear and is considered negligible.

Night operations of the carpark have been excluded from this assessment as it is assumed that night use will be significantly less than during daytime peak. Assuming that the night time use of the carpark does not exceed 10% of the daytime peak the night time criteria will be met.

Considering the amount by which the predicted noise exceeds the criterion and the limited time during which that exceedance may occur, we believe that the noise emission from the proposed TQEH carpark complies with the requirements of the Noise EPP.

6 Conclusion

An environmental noise impact assessment has been undertaken for the proposed carpark as part of The Queen Elizabeth Hospital redevelopment.

This assessment has demonstrated that worst-case noise emissions from the operation of the proposed carpark will exceed the Noise EPP daytime noise limits at the three most affected noise sensitive receivers, by up to 2 dB. Compliance with the relevant Noise EPP criteria is expected for all other receivers and times.

When considering the small magnitude of the predicted exceedance, and considering the duration and time, we consider that noise emissions will comply with the requirements of the noise EPP.

Appendix G

Landscaping Plan prepared by Bruce Oswald for
DesignInc Architects

Appendix H

Shadow Casting Study prepared by DesignInc Architects

SUMMER SOLSTICE



1 SUMMER SOLSTICE - 9AM
A201 1:1000



2 SUMMER SOLSTICE - 12PM
A201 1:1000



3 SUMMER SOLSTICE - 3PM
A201 1:1000

AUT / SPR EQUINOX



4 EQUINOX - 9AM
A201 1:1000



5 EQUINOX - 12PM
A201 1:1000



6 EQUINOX - 3PM
A201 1:1000

WINTER SOLSTICE



7 WINTER SOLSTICE - 9AM
A201 1:1000



8 WINTER SOLSTICE - 12PM
A201 1:1000



9 WINTER SOLSTICE - 3PM
A201 1:1000

