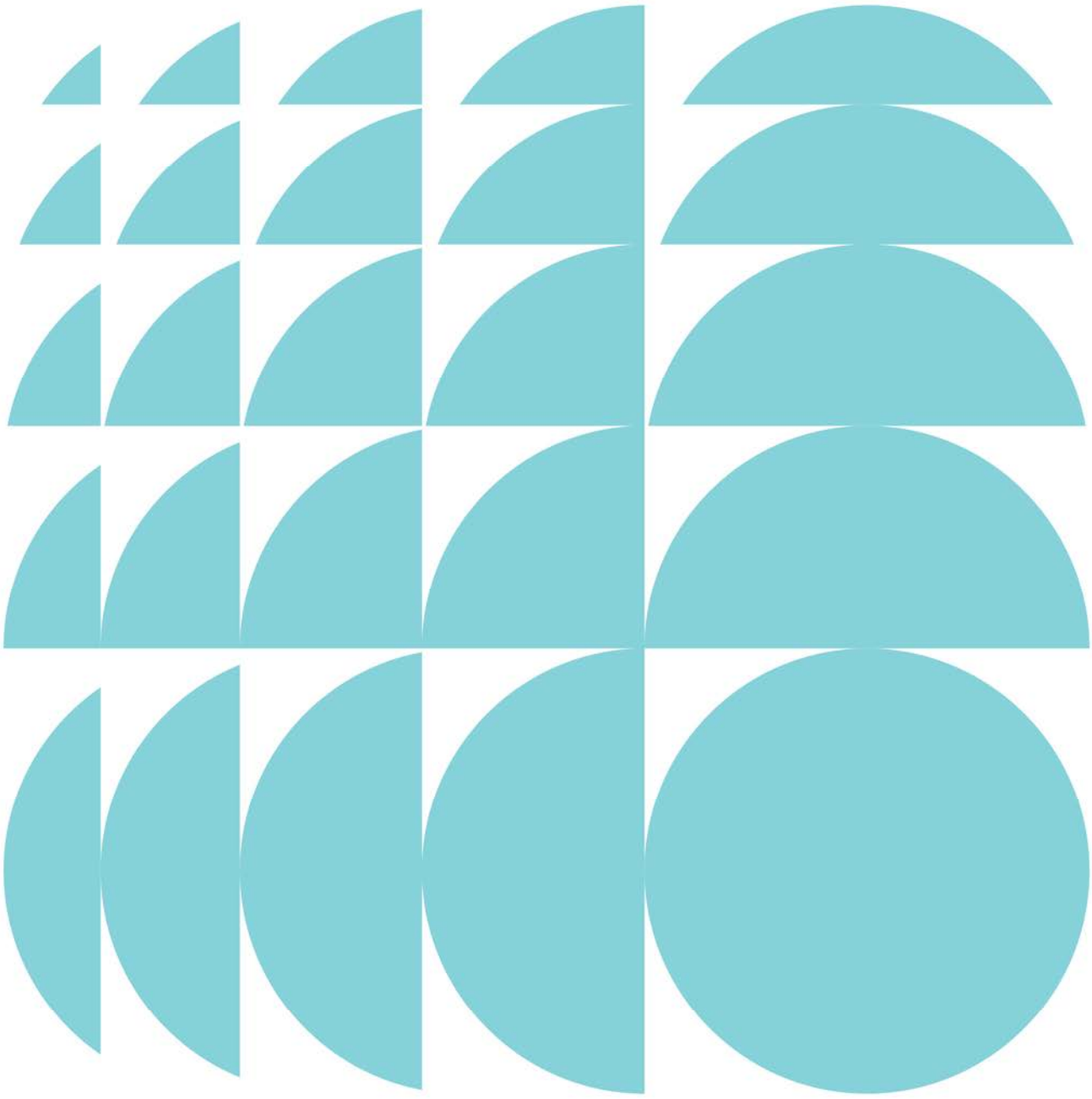
ETHOS URBAN

Environmental Impact Statement

Liverpool Hospital – Integrated Services Building and Refurbishment Works
Cnr Elizabeth Street and Goulburn Street, Liverpool

Submitted to Department of Planning, Industry and Environment

On behalf of Health Infrastructure NSW
08 May 2020 | 218684



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Statement of Validity

Development Application Details	
Applicant name	Health Administration Corporation
Applicant address	Level 14, 77 Pacific Highway, North Sydney, NSW 2060
Land to be developed	Liverpool Hospital, corner of Elizabeth and Goulburn Street, Liverpool
Proposed development	Construction and operation of a new Integrated Services Building and the refurbishment of certain existing hospital facilities.
Prepared by	
Name	Chris McGillick
Qualifications	BPlan (Hons) PIA
Address	173 Sussex Street, Sydney
In respect of	State Significant Development - Development Application
Certification	
	I certify that I have prepared the content of this EIS and to the best of my knowledge: it is in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000; • all available information that is relevant to the environmental assessment of the development to which the statement relates; and • the information contained in the statement is neither false nor misleading.
Signature	
Name	Chris McGillick
Date	7/05/2020

1.0 Executive Summary

Purpose of this Report

This submission to the Department of Planning, Industry and Environment (the Department) comprises an Environmental Impact Statement (EIS) for a Development Application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It relates to the construction and operation of a new multi storey Integrated Services Building (ISB) and refurbishment works to certain existing buildings and facilities at Liverpool Hospital.

The proposed development is identified as State Significant Development (SSD) in accordance with Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Development for hospitals with a capital investment value of more than $30 million is SSD for the purposes of the EP&A Act. As the proposed development has a capital investment value greater than $30 million it is SSD.

A request for the issue of Secretary's Environmental Assessment Requirements (SEARs) was sought on 28 October 2019. Accordingly, the SEARs were issued on 27 November 2019. This submission is in accordance with the Department's guidelines for SSD applications lodged under Part 4 of the EP&A Act, and addresses the issues raised in the SEARs.

Background to the Development

Liverpool has been identified by the Greater Sydney Commission as a designated 'Collaboration Area' to ensure continued growth in health, education, research and innovation. The centre of Liverpool is to be the foundation for growing a health and education precinct that will support the growing Western City over the next 20 years, centred around the NSW Government's investment in hospitals to facilitate the emergence of a health and education precinct.

In June 2018, the NSW Government announced $740 million of funding for the development of a world class health, research and academic precinct in Liverpool. The redevelopment will increase the inpatient bed numbers, as well as expanding tertiary and quaternary services.

Liverpool Hospital anchors the precinct as a health and research hub, with industry and academic partners providing world class translational research, health care and training. With 15,000 health and knowledge workers already in the Liverpool local government area, that number is set to more than double to over 30,000 workers by 2036.

Overview of the Proposed Development

The SSD Application seeks approval for the following development:

- Demolition and site preparation;
- Construction and operation of a new 6 storey ISB to provide:
  - Expanded Emergency Department;
  - New women's and paediatric services;
  - New cancer treatment centre;
  - New support services including pathology, satellite medical imaging and pharmacy;
  - New education and teaching spaces;
  - New retail facilities; and
  - New basement loading dock.
- Refurbishment of existing buildings to provide:
  - Expansion and reconfiguration of the existing Emergency Department;
  - Expansion of the Intensive Care Unit;
  - Reconfiguration of existing operating theatres and same day surgery; and

  - Repurpose Caroline Chisholm Building for office accommodation.
- New hospital entry and drop off;
- Construction of a skybridge link over Campbell Street to the Ingham Institute;
- Construction of new internal access roads and links;
- Expansion of Ambulance bays on Elizabeth Street;
- Creation of a shared zone on Campbell Street;
- Tree removal;
- Landscape works;
- Utilities services and amplification works; and
- Site preparation civil works.

The Site

The site is located in the western portion of the Liverpool Hospital Campus and is legally described as Lot 501 in DP 1165217. It is on the corner of Elizabeth Street and Goulburn Street within the Liverpool Central Business District (CBD), approximately 26 kilometres west of the Sydney CBD. It is within the Liverpool local government area (LGA).

Planning Context

Section 6.0 of the EIS considers all applicable legislation in detail. The proposal is consistent with the requirements of all relevant SEPPs. The site is zoned SP2 – Infrastructure (Health Services Facilities) under the *Liverpool Local Environmental Plan 2008* (LLEP 2008). The proposal is permissible with consent and meets the objectives of the zone.

Environmental Impacts and Mitigation Measures

This EIS provides an assessment of the environmental impacts of the project in accordance with the SEARs and sets out the undertakings made by Health Infrastructure NSW (Health Infrastructure) to manage and minimise potential impacts arising from the development.

Consultation

Section 5.0 of the EIS details the consultation that has been undertaken with various project stakeholders including Liverpool City Council, Government Architect NSW, Transport for NSW, user groups and the public. The outcomes of the consultation process have been considered in the design of the project.

Conclusion and Justification

The EIS addresses the SEARs, and the proposal provides for the construction and operation of a new ISB as well as the refurbishment and upgrade to certain other hospital buildings and facilities on the campus. The potential impacts of the development are acceptable and can be managed. Given the planning merits of the proposal, the proposed development warrants approval by the Minister for Planning and Public Spaces.

2.0 Introduction

This EIS is submitted to the Department pursuant to Part 4 of the EP&A Act in support of an application for the construction and operation of the new ISB and refurbishment of other certain hospital buildings and facilities on the campus.

Development for the purposes of a hospital with a capital investment value (CIV) of more than $30 million is identified in Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* and is therefore declared to be SSD for the purposes of the EP&A Act. A CIV Statement has been prepared by C2R Consulting that confirms the project has a CIV of greater than $30 million and is provided under a separate cover.

This report has been prepared by Ethos Urban on behalf of Health Infrastructure and is based on the architectural plans prepared by Fitzpatrick and Partners (see **Appendix B**) and other supporting technical information appended to the report (see Table of Contents).

The EIS has been prepared in accordance with the requirements of Part 4 of the EP&A Act, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and the SEARs for the preparation of the EIS, which are included in **Appendix A**. This EIS should be read in conjunction with the supporting information and plans appended to and accompanying this report.

2.1 Overview of the Proposed Development

The SSD application seeks approval for the following development:

- Demolition and site preparation;
- Construction and operation of a new 6 storey ISB to provide:
  - Expanded Emergency department;
  - New women's and paediatric services;
  - New cancer treatment centre;
  - New support services including pathology, satellite medical imaging and pharmacy;
  - New education and teaching spaces;
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- New hospital entry and drop off;
- Construction of a skybridge link over Campbell Street to the Ingham Institute;
- Construction of new internal access roads and links;
- Expansion of Ambulance bays on Elizabeth Street;
- Creation of a shared zone on Campbell Street;
- Tree removal;
- Landscape works;
- Utilities services and amplification works; and
- Site preparation civil works.

An artist impression of the proposed development is provided at **Figure 1**.

Figure 1 **Artist Impression of the proposed development viewed from Goulburn Street**

Source: *Fitzpatrick and Partners*

2.2 Background to the Development

Liverpool Hospital is the district hospital for the local catchments of Liverpool and Fairfield and is a tertiary referral hospital for all of South Western Sydney Local Health District (SWSLHD). Within NSW, Liverpool Hospital has the highest number of emergency department presentations, is one of seven major trauma units in NSW for adults and is one of three adult Brain Injury Rehabilitation Units in Sydney. It has tertiary affiliations with the University of NSW, University of Wollongong and Western Sydney University, and also provides practical education programs for medical practitioners, nurses and other health professionals.

In June 2018, the NSW Government announced $740 million of funding for the development of a world class health, research and academic precinct in Liverpool. The redevelopment will increase the inpatient bed numbers, as well as expanding tertiary and quaternary services.

2.2.1 Liverpool Innovation Precinct

Liverpool has been identified as a 'Collaboration Area' and a 'Health and Education Precinct' in the Greater Sydney Commission's South West District Plan. In 2016, the Liverpool Innovation Committee was formed comprising key stakeholders and decision makers with representatives across business, health, education, transport and local council. The purpose of the Liverpool Innovation Precinct (LIP) includes:

- Generate awareness of the work of the LIP amongst government, business, private investment and the general public;
- Change the nature of the CBD;
- Provide a catalyst to create jobs;
- Identify opportunities for sharing, collaboration and partnerships between precinct partners; and
- Influence future investment in infrastructure and social services.

A Liverpool Hospital Campus Masterplan was prepared by the LIP in 2018 which has taken into account the wider Liverpool precinct and the role of the Hospital into the future within the precinct. With the Liverpool Hospital Campus's proximity to the Liverpool CBD, major transport hubs and education facilities, the precinct surrounding the Hospital is strongly positioned to develop complimentary industries in health, education and research.

The development of the masterplan for the Liverpool Hospital Campus has also addressed the future development of the surrounding precinct, allowing new clinical and support services on the campus to better integrate with future education, research and commercial development within the Liverpool City CBD. The Liverpool Innovation Precinct Master Plan is shown in **Figure 2** below.

Figure 2 Liverpool Innovation Precinct Master Plan and Land Use Strategy (2018) as viewed from the north west to the south east

Source: Fitzpatrick and Partners

2.2.2 Multi-storey Car Park

On 28 October 2019 a request for SEARs was made to the Department for the construction of a multi-storey car park at Liverpool Hospital. The new car park will service the current and future parking demands for Liverpool Hospital, including the ISB that is the subject of this SSD application. The SEARs for the multi-storey car park were issued on 27 November 2019 and a separate SSD application will be submitted to the Department. A parking analysis is provided at **Section 6.7**. The relationship between the ISB and the multi-storey car park is shown at **Figure 3** and **Figure 4** below.

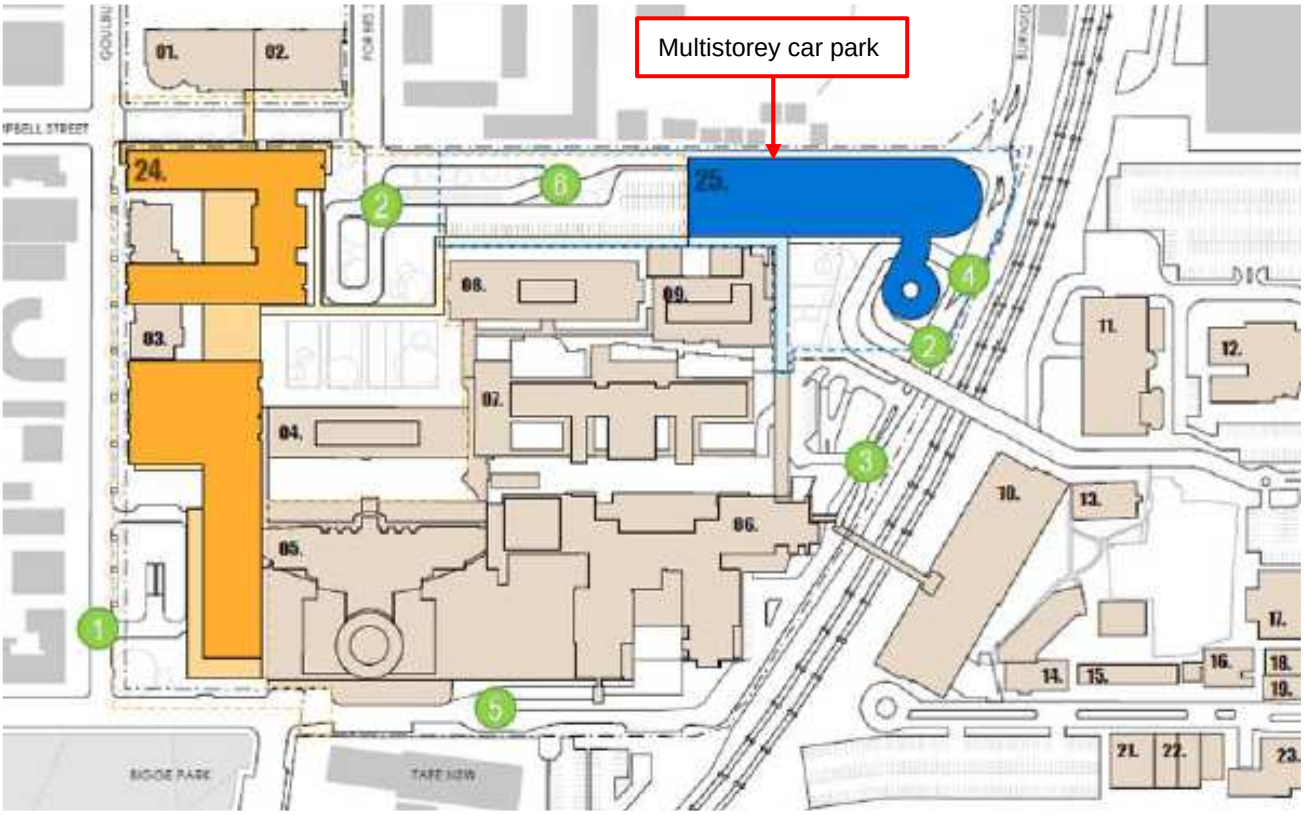

Figure 3 Location of proposed Multi-storey car park (subject to a SSD separate concurrent application)

Source: GTA

Figure 4 Aerial view - massing relationship of the ISB and Multi-storey car park (subject to a separate concurrent application)

Source: Fitzpatrick and Partners

2.2.3 Hospital Infrastructure Works

A range of infrastructure improvement works are occurring across the broader Hospital campus under a separate application via Part 5 of the EP&A Act and as Complying Development under *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP). The infrastructure improvement works are required to ensure the ongoing operation of the hospital and are separate to the subject SSD works, including:

- Demolition of buildings;
- Installation and augmentation of services;
- Alterations and additions to health service facilities;
- Tree removal;
- Realignment of internal roads;
- Relocation of short stay car parking; and
- Landscape works.

2.3 Objectives of the Development

The overall objective of the proposal is to develop a new ISB and undertake refurbishment works to existing certain hospital buildings and facilities. It is intended that this development will in turn:

- Expand the provision of services to meet the significant growth in population, age profile and complexity of disease and poor health;
- Improve service access and patient flows, providing the right care for the right people at the right location;
- Address high rates of preventable hospitalisation; and
- Improve the operational efficiency and functionality of the hospital to serve the South Western Sydney Local Health District.

2.4 Analysis of Alternatives

2.4.1 Strategic Need for the Proposal

Liverpool Hospital currently has 713 inpatient beds and provides a range of tertiary and quaternary services. The Liverpool Hospital Clinical Services Plan 2031 (CSP) predicts substantial growth in services demand to 2025/26 as a result of population increase, delivery of major infrastructure in South Western Sydney and the poor health status of people within the LGA and surrounding areas. These increases result in demand well beyond the hospital's present infrastructure capacities.

Population projections indicate that the population of the SWSLHD will increase from 966,450 people in 2016 to 1.285 million people in 2031. This is an increase of 33% over the fifteen years. The Liverpool LGA population will grow by 41% by 2031, with an additional 86,950 people, a growth rate twice that expected for the rest of NSW. The Hospital also plays a role as a tertiary referral hospital for all of SWSLHD. It provides critical care for rural retrieval catchments and regional catchment for quaternary services.

Accordingly, there is urgent need to upgrade and expand the existing service offering of Liverpool Hospital to better meet the needs of the South Western District and to address future demand for services from a growing and ageing population.

The CSP identifies future models of care to best meet the increasing and dynamic health care needs of the community. These new models of care will be provided via integrated services that allow staff efficiencies and optimal patient flows. The redevelopment of the Hospital to deliver an integrated services facility along with an expansion of facilities will ensure the hospital can increase the inpatient bed numbers, as well as expanding tertiary and quaternary services.

2.4.2 Alternative Options

Three options are available to HI in responding to the identified need for the redevelopment of Liverpool Hospital.

Option 1 - Do Nothing

Under the 'do nothing' scenario, the existing infrastructure at Liverpool Hospital and the local health district would need to continue to provide services to cater for the increasing health needs of the region. This would not adequately respond to strong population growth in the region and would potentially lead to a decline in health outcomes. Not undertaking the work would be an inappropriate outcome for a project of this nature, which will facilitate much needed health infrastructure in the region.

Option 2 – Alternative Designs

HI NSW have explored seven different options for the redevelopment of the site (Option 1 – Option 6B, refer to **Figure 5**). These options were explored through the master planning phase of the project with each being tested against the design principles and other criteria such as clinical considerations, construction cost, staging and programme implications, operational costs and efficiencies. Considering all of the analysis undertaken the preferred proposal is believed to have mitigated any associated implications that may arise under another redevelopment scenario, and the proposed development (i.e. Option 4) is the most effective proposal to meet the objectives of the project. A full analysis of the options is provided in the Design Report prepared by Fitzpatrick and Partners at **Appendix C**.

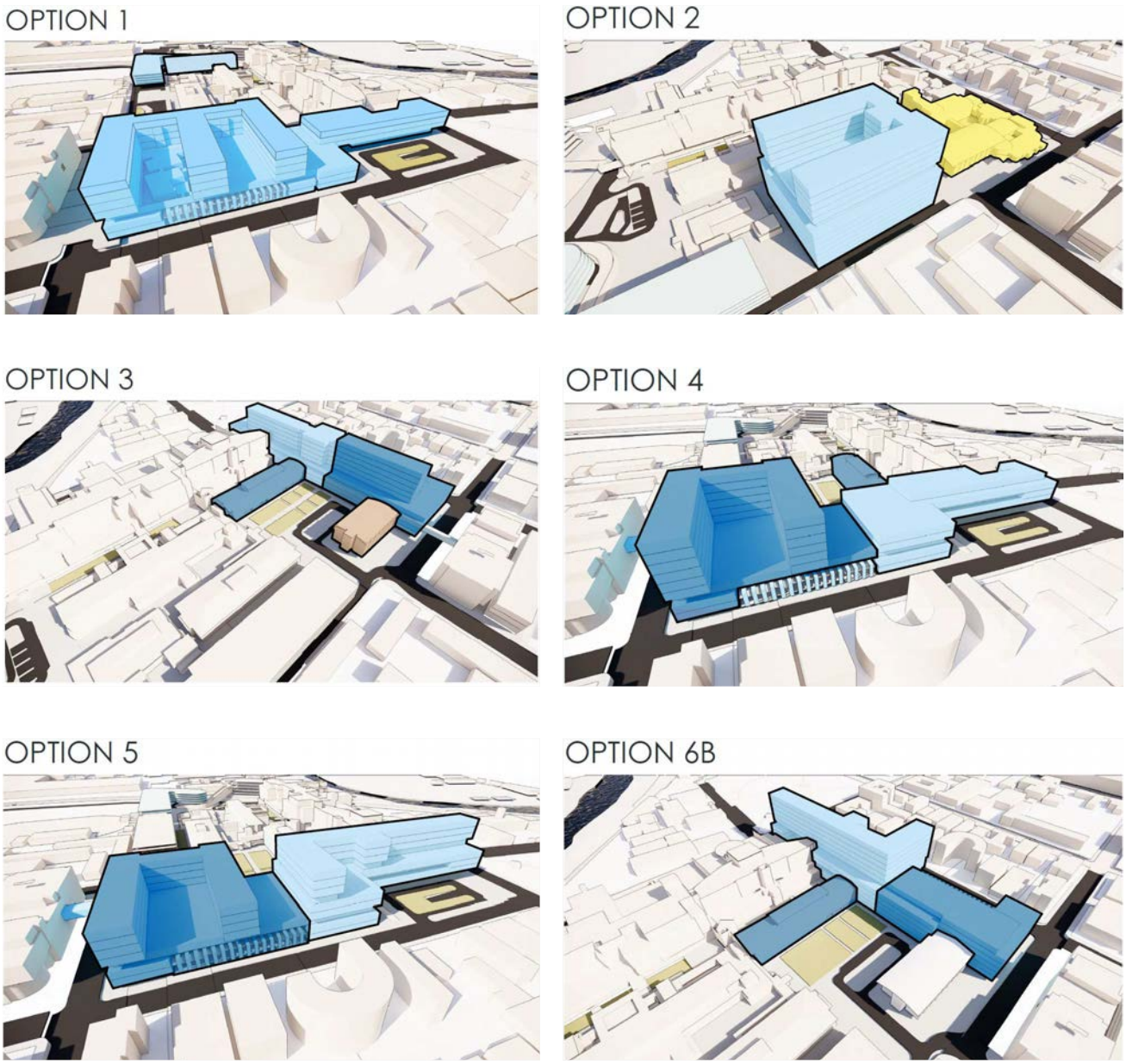

Figure 5 Options Analysis

Source: Fitzpatrick and Partners

Option 3 – The Proposal

The proposed design involves undertaking the proposed redevelopment as outlined in this SSD application (as described in **Section 4.0**). The SSD responds to the larger hospital layout, including integration with the hospital clinic and education facilities and the site's urban context. The proposal will facilitate the efficient construction of a high-quality design that responds to the strategic need identified above. Importantly, the proposal supports the growth and expansion of the hospital to 2026 and aligns with the NSW State Government budget allocation.

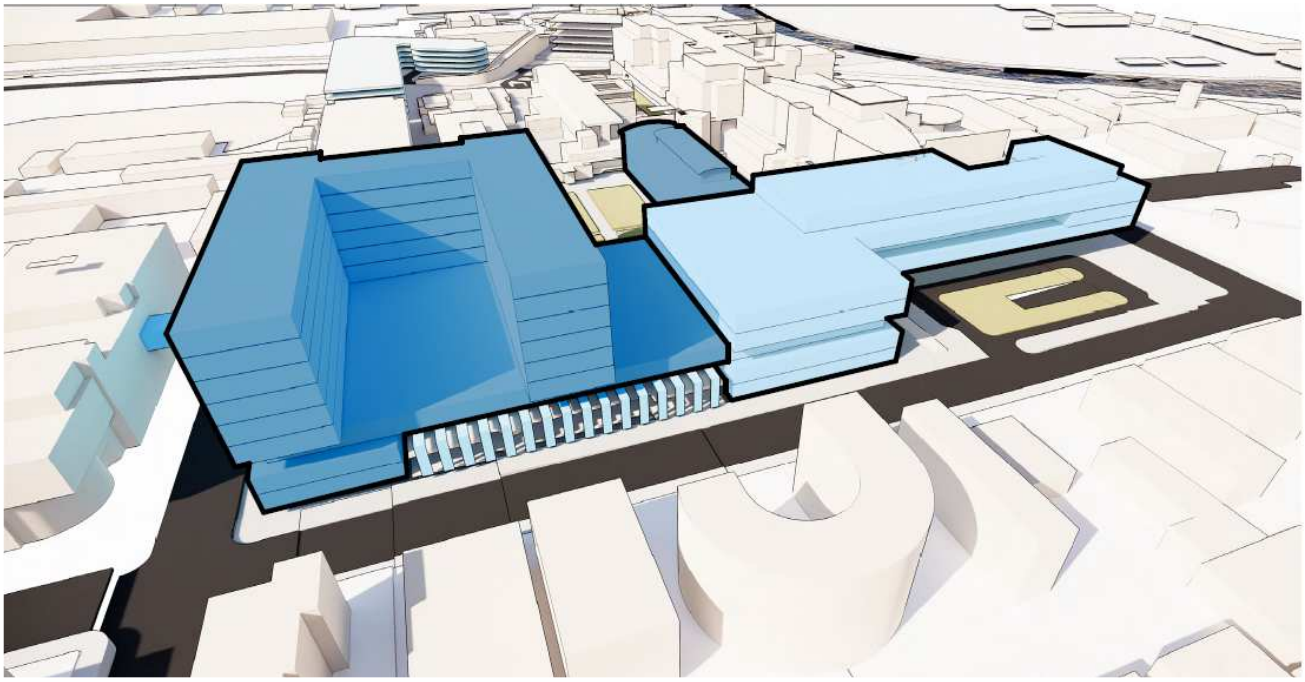

Figure 6 **Liverpool Hospital Main Works – massing diagram**

Source: *Fitzpatrick and Partners*

2.4.3 Future Expansion

The design has regard to planning for future expansion. The indicative future masterplan and expansion scenario is shown at **Figure 7** below. Notwithstanding, the ISB development has been designed to allow internal flexibility within the proposed building envelope.

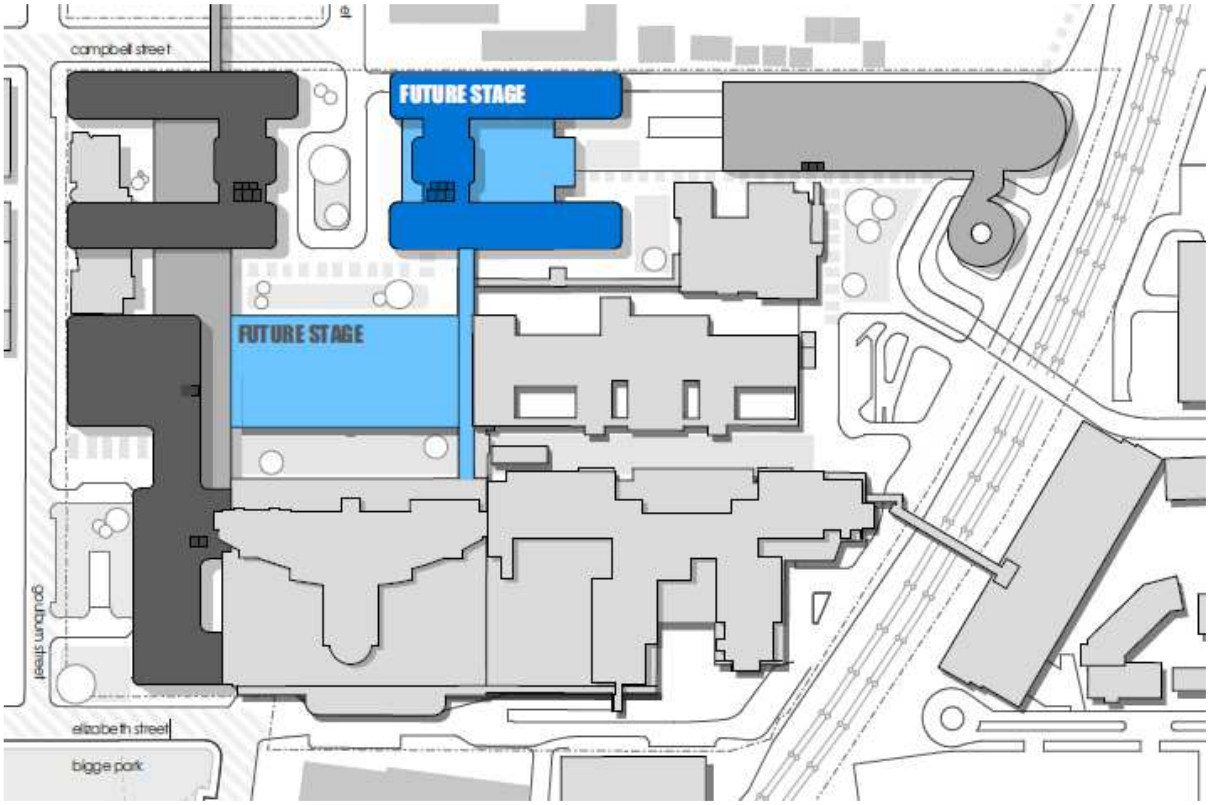

Figure 7 Future Expansion and Flexibility

Source: Fitzpatrick and Partners

2.5 Secretary's Requirements

In accordance with section 4.39 of the EP&A Act, the Secretary of the Department issued the requirements for the preparation of the EIS on 27 November 2019. A copy of the Secretary's Environmental Assessment Requirements (SEARs) is included at **Appendix A**.

Table 1 provides a detailed summary of the individual matters listed in the SEARs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 1 Secretary's Requirements

Requirement	Location in Environmental Assessment
General	
The Environmental Impact Statement (EIS) must address the *Environmental Planning and Assessment Act 1979* and meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 the Environmental Planning and Assessment Regulation 2000.	**Environmental Impact Statement**
Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development.	**Section 6.0**
Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include: • adequate baseline data; • consideration of potential cumulative impacts due to other development in the vicinity (completed, underway or proposed); and	**Section 7.0**

Requirement	Location in Environmental Assessment	
• measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment.		
The EIS must be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; • an estimate of the jobs that will be created by the future development during the construction and operational phases of the development; and • certification that the information provided is accurate at the date of preparation.	**Section 4.11**	
Key Issues	**Report / EIS**	**Technical Study**
The EIS must address the following specific matters:	**-**	**-**
1. Statutory and Strategic Context Address the statutory provisions contained in all relevant environmental planning instruments, including:	**-**	**-**
State Environmental Planning Policy (State & Regional Development) 2011	**Section 6.1**	-
State Environmental Planning Policy (Infrastructure 2007)	**Section 6.1**	-
State Environmental Planning Policy No. 64 – Advertising and Signage	**Section 6.1**	-
State Environmental Planning Policy No.55 – Remediation of Land	**Section 6.1** **Section 6.23**	**Appendix L**
Draft State Environmental Planning Policy (Remediation of Land)	**Section 6.1**	-
Draft State Environmental Planning Policy (Environment)	**Section 6.1**	-
Liverpool Local Environmental Plan 2008	**Section 6.1**	-
Permissibility Detail the nature and extent of any prohibitions that apply to the development.	**Section 6.1**	-
Development Standards Identify compliance with the development standards applying to the site and provide justification for any contravention of the development standards.	**Section 6.1**	-
Provisions Adequately demonstrate and document in the EIS how each of the provisions in the listed instruments are addressed, including reference to necessary technical documents.	**Section 6.1**	-
2. Policies Address the relevant planning provisions, goals and strategic planning objectives in the following:	**-**	**-**
NSW State Priorities	**Section 6.1**	-
The Greater Sydney Regional Plan, A Metropolis of three cities	**Section 6.1**	-
Future Transport Strategy 2056 and supporting plans	**Section 6.1**	-
State Infrastructure Strategy 2018 – 2038 Building the Momentum	**Section 6.1**	-
Sydney's Cycling Future 2013	**Section 6.1**	-
Sydney's Walking Future 2013	**Section 6.1**	**-**
Sydney's Bus Future 2013	**Section 6.1**	-
Crime Prevention Through Environmental Design (CPTED) Principles	**Section 6.1** **Section 6.6**	**Appendix C**
Better Placed: An integrated design policy for the built environment of New South Wales (Government Architect NSW (GANSW), 2017)	**Section 6.1**	**Appendix C**
Healthy Urban Development Checklist (NSW Health, 2009)	**Section 6.1**	-

Requirement	Location in Environmental Assessment	
Draft Greener Places Policy	**Section 6.1**	-
Western City District Plan	**Section 6.1**	-
Liverpool Development Control Plan 2008.	**Section 6.1**	-
3. Operation Provide details of the existing and proposed hospital operations.		
4. Built Form and Urban Design Address the height, density, bulk and scale, setbacks and interface of the proposal in relation to the surrounding development, topography, streetscape and any public open spaces.	**Section 4.1** **Section 4.4** **Section 4.7** **Section 6.2.1** **Section 6.2.2**	**Appendix B** **Appendix C** **Appendix D**
Address design quality and built form, with specific consideration of the overall site layout, streetscape, open spaces, façade, rooftop, massing, setbacks, building articulation, materials and colours.	**Section 4.1** **Section 4.4** **Section 4.7** **Section 6.2.1** **Section 6.2.2**	**Appendix B** **Appendix C** **Appendix D**
Provide details of any digital signage boards, including size, location and finishes.	**Section 6.1**	**Appendix B** **Appendix C**
Detail how services, including but not limited to waste management, loading zones, and mechanical plant are integrated into the design of the development.	**Section 6.7** **Section 6.9**	**Appendix B** **Appendix C** **Appendix E** **Appendix U** **Appendix V**
Provide detailed site and context analysis to justify the proposed site planning and design approach including massing options and preferred strategy for future development.	**Section 2.3** **Section 2.4**	**Appendix C**
Provide a detailed site-wide landscape strategy, including details of the number of trees to be removed and the number of trees to be planted on the site.	**Section 4.3** **Section 4.7** **Section 6.18** **Section 6.19**	**Appendix D** **Appendix R**
Provide a visual impact assessment that identifies any potential impacts on the surrounding built environment and landscape including views to and from the site and any adjoining heritage items.	**Section 6.4**	**Appendix C**
Address CPTED Principles.	**Section 6.1** **Section 6.6**	**Appendix C**
Demonstrate good environmental amenity including access to natural daylight and ventilation, acoustic separation, access to landscape and outdoor spaces and future flexibility.	**Section 6.3** **Section 6.8**	**Appendix B** **Appendix C** **Appendix D**
5. Environmental Amenity Assess amenity impacts on the surrounding locality, including solar access, visual privacy, visual amenity, overshadowing and acoustic impacts.	**Section 6.3.1** **Section 6.4** **Section 6.8**	**Appendix B** **Appendix C** **Appendix D** **Appendix K**
Conduct a view analysis to the site from key vantage points and streetscape locations (photomontages or perspectives should be provided showing the building and likely future development).	**Section 6.4.1**	**Appendix C**
Include a lighting strategy and measures to reduce spill into the surrounding sensitive receivers.	**Section 4.8** **Section 6.5**	**Appendix C**
Detail amenity impacts including solar access, acoustic impacts, visual privacy, view loss, overshadowing and wind impacts. A high level of environmental amenity for any surrounding residential land uses must be demonstrated.	**Section 6.3.1** **Section 6.4.1** **Section 6.4.2**	**Appendix C** **Appendix H** **Appendix K**
6. Staging Provide details regarding the staging of the proposed development (if any).	**Section 4.12**	**Appendix C** **Appendix E** **Appendix F**
7. Transport and Accessibility Include a transport and accessibility impact assessment, which details, but not limited to the following:	**Section 6.7**	**Appendix E**
Accurate details of the current daily and peak hour vehicle, existing and future		

Requirement	Location in Environmental Assessment	
public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development.		
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips.		
The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development.		
Measures to integrate the development with the existing/future public transport network.		
The impact of trips generated by the development on the following intersections, including consideration of the cumulative impacts from other approved or proposed developments in the vicinity (including SSD10389 Liverpool Hospital Redevelopment), with full counts including pedestrian (at minimum) and number of buses: – Burnside Drive / Campbell Street – Campbell Street / Bigge Street – Elizabeth Street / Bigge Street – Elizabeth Street / Goulburn Street – Elizabeth Street / Moore Street – Moore Street / Bigge Street – Remembrance Avenue / Hume Highway – Bigge Street / Hume Highway – Newbridge Road / Speed Street – Campbell Street / Goulburn Street		
The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development.		
Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site.		
The proposed walking and cycling access arrangements and connections to public transport services.		
The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.		
Proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance.		
Proposed number of on-site car parking spaces for staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site.		
An assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development.		
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED		
Emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times).		
The preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:		

Requirement	Location in Environmental Assessment	
– assessment of cumulative impacts associated with other construction activities (if any). – an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity. – details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process. – details of anticipated peak hour and daily construction vehicle movements to and from the site. – details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle. – details of temporary cycling and pedestrian access during construction.		
Relevant Policies and Guidelines: Guide to Traffic Generating Developments (Roads and Maritime Services, 2002)		
EIS Guidelines - Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996)		
Cycling Aspects of Austroads Guides		
NSW Planning Guidelines for Walking and Cycling (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2004)		
Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development		
Standards Australia AS2890.3 (Bicycle Parking Facilities)		
8. Ecologically Sustainable Development (ESD) Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) will be incorporated in the design and ongoing operation phases of the development.	**Section 4.9** **Section 6.24**	**Appendix G**
Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy.		
Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance.		
Include an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.		
Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically: – hotter days and more frequent heatwave events – extended drought periods – more extreme rainfall events – gustier wind conditions – how these will inform landscape design, material selection and social equity aspects (respite/shelter areas).		
Relevant Policies and Guidelines: NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections.		
9. Heritage and Archaeology The EIS must include a Statement of Heritage Impact (SOHI) prepared by a suitable qualified heritage consultant in accordance with the guidelines in the NSW Heritage Manual. The SOHI is to address the impacts that the proposal will have on the heritage significance of the site and adjacent areas. It is to identify the following:	**Section 3.3.4** **Section 6.10**	**Appendix I**

Requirement	Location in Environmental Assessment	
– all heritage items (state and local) within the vicinity of the site including built heritage, landscapes and archaeology, detailed mapping of these items and an assessment of why the items and site(s) are of heritage significance; – compliance with the relevant Conservation Management Plan; – the impacts of the proposal on heritage item(s) including visual impacts, required BCA and DDA works, new fixtures, fittings and finishes and any modified services; – the attempts to avoid and/or mitigate the impact on the heritage significance or cultural heritage values of the site and the surrounding heritage items; and – justification for any changes to the heritage fabric or landscape elements including any options analysis.		
A historical and/or maritime archaeological assessment should be prepared by a suitably qualified archaeologist in accordance with the heritage guidelines 'Archaeological Assessment' 1996 and 'Assessing Significance for Historical Archaeological Sites and Relics' 2009. This assessment should identify what relics, if any, are likely to be present, assess their significance and consider the impacts from the proposal on this potential archaeological resource. Where harm is likely to occur, it is recommended that the significance of the relics be considered in determining an appropriate mitigation strategy. If harm cannot be avoided in whole or part, an appropriate Research Design and Excavation Methodology should also be prepared to guide any proposed excavations or salvage programme.		
10. Aboriginal Heritage Identify and describe the Aboriginal cultural heritage values that exist across the site and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation.	**Section 6.11**	**Appendix J** **Appendix AA**
Identify and address the Aboriginal cultural heritage values in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (Office of Environment and Heritage (OEH), 2011) and Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH, 2010).		
Undertake consultation with Aboriginal people and document in accordance with Aboriginal cultural heritage consultation requirements for proponents 2010 (Department of Environment, Climate Change and Water). The significance of cultural heritage values of Aboriginal people who have a cultural association with the land are to be documented in the ACHAR.		
Identify, assess and document all impacts on the Aboriginal cultural heritage values in the ACHAR.		
The EIS and the supporting ACHAR must demonstrate attempts to avoid any impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR and EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to the Environment, Energy and Science Group of the Department of Planning, Industry and Environment.		
11. Noise and Vibration Identify and provide a quantitative assessment of the main noise and vibration generating sources during demolition, site preparation, bulk excavation, construction. Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.	**Section 6.8**	**Appendix K**
Identify and provide a quantitative assessment of the potential noise and vibration impacts on the identified sensitive receivers due to the operations of the hospital, including any proposed helicopter landing site (HLS) within the development.		
Relevant Policies and Guidelines: NSW Noise Policy for Industry 2017 (NSW Environment Protection Authority (EPA)		
Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)		
Assessing Vibration: A Technical Guideline 2006 (Department of Environment and Conservation, 2006)		
Development Near Rail Corridors and Busy Roads - Interim Guideline		

Requirement	Location in Environmental Assessment	
(Department of Planning, 2008)		
Australian Standard 2363:1999 Acoustics - Measurement of noise from helicopter operations.		
12. Contamination Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.	**Section 3.3.8 Section 6.1 Section 6.23**	**Appendix L**
Undertake a hazardous materials survey of all existing structures and infrastructure prior to any demolition or site preparation works.		
Relevant Policies and Guidelines: Managing Land Contamination: Planning Guidelines - SEPP 55 Remediation of Land (DUAP, 1998)		
Sampling Design Guidelines (EPA, 1995)		
Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011)		
National Environment Protection (Assessment of Site Contamination) Measure (National Environment Protection Council, as amended 2013)		
13. Utilities Prepare an Infrastructure Management Plan in consultation with relevant agencies, which details information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure.	**Section 4.10**	**Appendix N**
Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.	**Section 4.10 Section 6.16**	**Appendix O**
14. Contributions Address Council's 'Section 7.12 Contribution Plan' Liverpool Contributions Plan 2018 – Liverpool City Centre and/or details of any Voluntary Planning Agreement, which may be required to be amended because of the proposed development.	**Section 6.26**	**-**
15. Drainage Detail measures to minimise operational water quality impacts on surface waters and groundwater.	**Section 6.16**	**Appendix P**
Stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties.		
Relevant Policies and Guidelines: Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013).		
16. Flooding Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (DIPNR, 2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include design solutions for mitigation.	**Section 6.15**	**Appendix P**
17. Bushfire Address bushfire hazard and, if relevant, prepare a report that addresses the requirements for Special Fire Protection Purpose Development as detailed in Planning for Bush Fire Protection 2006 (NSW RFS).	**Section 3.3.6**	**-**
18. Biodiversity Assessment Biodiversity impacts related to the proposed development (SSD-10389) are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.	**Section 6.19**	**Appendix S**
The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.		
The BDAR must include details of the measures proposed to address the offset obligation as follows:		

Requirement	Location in Environmental Assessment	
– the total number and classes of biodiversity credits required to be retired for the development/project – the number and classes of like-for-like biodiversity credits proposed to be retired – the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules – any proposal to fund a biodiversity conservation action – any proposal to make a payment to the Biodiversity Conservation Fund.		
If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.		
The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM.		
The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.		
Where a Biodiversity Assessment Report is not required, engage a suitably qualified person to assess and document the flora and fauna impacts related to the proposal. *Note: Notwithstanding these requirements, the Biodiversity Conservation Act 2016 requires that State Significant Development Applications b e accompanied b y a Biodiversity Development Assessment Report unless otherwise specified under the Act.*		
19. Sediment, Erosion and Dust Controls Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles.	**Section 6.17**	**Appendix P**
Relevant Policies and Guidelines: Managing Urban Stormwater - Soils & Construction Volume 1 2004 (Landcom)		
Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)		
Guidelines for development adjoining land managed by the Office of Environment and Heritage (OEH, 2013)		
20. Aviation Provide a report prepared by a suitably qualified Aviation expert that: – identifies whether the proposed hospital is located within any of the following Australian Noise Exposure Forecast (ANEF) contours as specified in Table 2.1 of AS 2021-2015 Acoustics - Aircraft Noise Intrusions - Building Siting and Construction: < 20; Between 20 - 25; or > 25. Note: A hospital is not allowed on a site where the ANEF contour is >25. – provides details of any flight paths that may be impacted by the proposed development (if applicable). – identifies and assesses the potential impacts of the future development on the aviation operations of any nearby airports and affected flight paths of any existing on shore HLS in accordance with the relevant sections of the National Airports Safeguarding Framework (NASF).	**Section 6.1**	**Appendix T**
Relevant Policies and Guidelines: Draft Guidelines for the establishment and operation of onshore Helicopter Landing Sites available at: https://www.casa.gov.au/files/caap-92-2-2pdf.		
21. Waste Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.	**Section 6.12** **Section 6.13**	**Appendix U** **Appendix V**
Relevant Policies and Guidelines: Waste Classification Guidelines (EPA, 2014)		
22. Hazards and Risks	**Section 6.9**	**Appendix Q**

Requirement	Location in Environmental Assessment	
Provide a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the development is "potentially hazardous," a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).		
23. Construction Hours Identify proposed construction hours and provide details of the instances where it is expected that works will be required to be carried out outside the standard construction hours.	**Section 4.12** **Section 6.8**	**Appendix F** **Appendix K**
Plans and Documents	**Report**	**Technical Study**
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these as part of the EIS rather than as separate documents.	**-**	**-**
In addition, the EIS must include the following: A section 10.7(2) and (5) Planning Certificates (previously Section 149(2) and (5) Planning Certificate)	**-**	**Appendix Z**
Architectural drawings showing key dimensions, RLs, scale bar and north point, including: – plans, sections and elevation of the proposal at no less than 1:200 – illustrated materials schedule including physical or digital samples board with correct proportional representation of materials, nominated colours and finishes – details of proposed signage, including size, location and finishes – detailed annotated wall sections at 1:20 scale that demonstrate typical cladding, window and floor details, including materials and general construction quality – site plans and operations statement	**-**	**Appendix B**
Site Survey Plan, showing existing levels, location and height of existing and adjacent structures / buildings and site boundaries	**-**	**Appendix B**
Site Analysis and Context Plans, including: – any future development and expansion zones – open space network – active transport linkages with existing, proposed and potential footpaths and bicycle paths and public transport links	**-**	**Appendix B** **Appendix C**
Sediment and Erosion Control Plan	**-**	**Appendix P**
Shadow Diagrams	-	**Appendix C**
View analysis, photomontages and architectural renders, including from those from public vantage points	**Section 6.4**	**Appendix C**
Landscape architectural drawings showing key dimensions, RLs, scale bar and north point, including: – integrated landscape plans at appropriate scale, with detail of new and retained planting, shade structures, materials and finishes proposed – plan identifying significant trees, trees to be removed and trees to be retained or transplanted	**-**	**Appendix D**
Design report to demonstrate how design quality will be achieved in accordance with the above Key Issues including: – architectural design statement – diagrams, structure plan, illustrations and drawings to clarify the design intent of the proposal – detailed site and context analysis – analysis of options considered to justify the proposed site planning and design approach – demonstration that Aboriginal culture and heritage is considered and incorporated holistically in the design	-	**Appendix C**

Requirement	Location in Environmental Assessment	
– a precinct scale masterplan showing relationship of the proposal to any proposed development on surrounding land – visual impact assessment identifying potential impacts on the surrounding built environment and adjoining heritage items – summary of feedback provided by GANSW and NSW State Design Review Panel (SDRP) and responses to this advice – summary report of consultation with the community and response to any feedback provided		
Geotechnical and Structural Report	-	**Appendix X** **Appendix Y**
Accessibility Report	-	**Appendix W**
Arborist Report	-	**Appendix R**
Schedule of materials and finishes	-	**Appendix B**
Consultation		
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups, special interest groups, including local Aboriginal land councils and registered Aboriginal stakeholders, and affected landowners. In particular, you must consult with: – Liverpool City Council – Government Architect NSW (through the NSW SDRP process) (GA NSW) – Transport for NSW (TfNSW) – Transport for NSW (Roads and Maritime Services) (TfNSW RMS). Consultation with GA NSW, TfNSW and TfNSW (RMS) should commence as soon as practicable to agree the scope of investigation. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	**Section 5.0**	**Appendix AA**

3.0 Site Analysis

3.1 Site Location and Context

Liverpool Hospital is located within the Liverpool Central Business District (CBD), on the corner of Elizabeth Street and Goulburn Street, Liverpool, within the Liverpool LGA. The hospital site is approximately 27km south west of the Sydney CBD and has an area of approximately 14.5ha, including land east and west of the Main Southern Railway, which divides the hospital into an eastern and western campus.

Liverpool Hospital is within proximity of transport services and key road links including Liverpool Train Station approximately 700m to the south, the Hume Highway to the north and the M5 South Western Motorway to the south. It is located opposite Bigge Park, which is a large public park and is adjacent to Liverpool Girls High School to the north and Liverpool TAFE to the south.

The hospital is located in a cluster of health and education uses within the north-east of the Liverpool CBD. It comprises a number of buildings associated with the hospital campus situated around an internal road network. The hospital currently has 713 beds, 23 operating rooms, 60 critical care beds and provides a range of state-wide services in areas such as critical care and trauma, neonatal intensive care and brain injury rehabilitation.

The hospital's locational context is shown at **Figure 8** and an aerial of the existing hospital campus is shown at **Figure 10**.

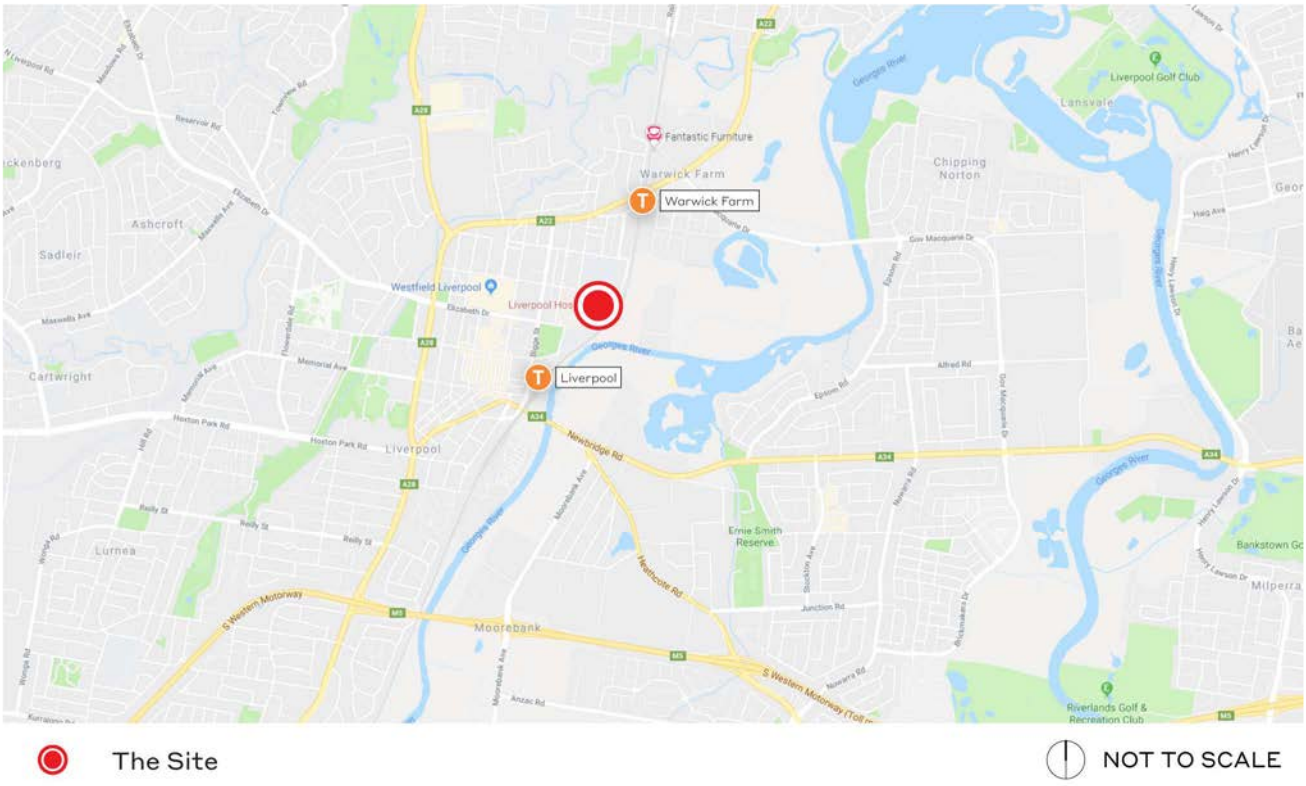

Figure 8 **Locational context**

Source: *Nearmap / Ethos Urban*

3.2 Land Ownership

The site is irregular in shape and is legally described as Lot 501 in DP1165217. The land is owned by NSW Health Administration Corporation.

3.3 Liverpool Hospital Campus

The proposed works are located in the far western portion of the western hospital campus and also connects to the northern campus (see **Figure 9**). The new ISB will be located on the western hospital campus and is generally bound by Elizabeth Street to the south, Campbell Street to the north and Goulburn Street to the west. The pedestrian bridge link will connect to the Ingham Institute in the northern hospital campus.

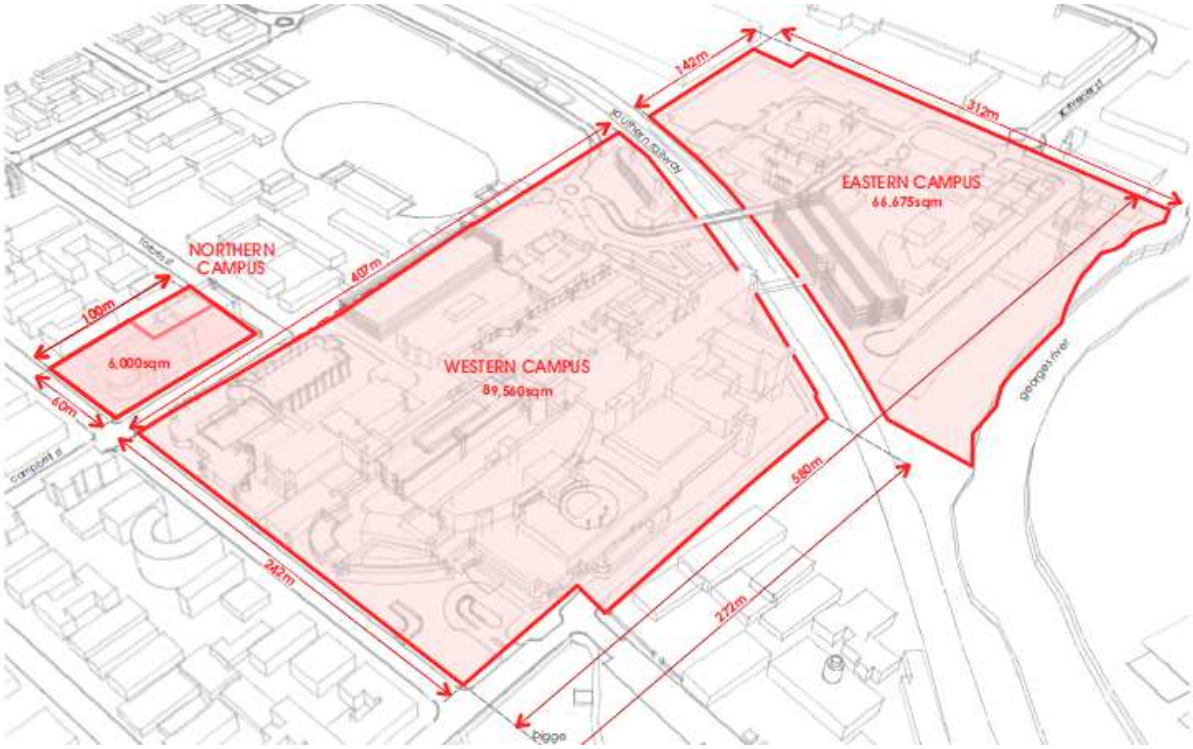

Figure 9 **Liverpool Hospital Campus Arrangement**

Source: *Fitzpatrick and Partners*

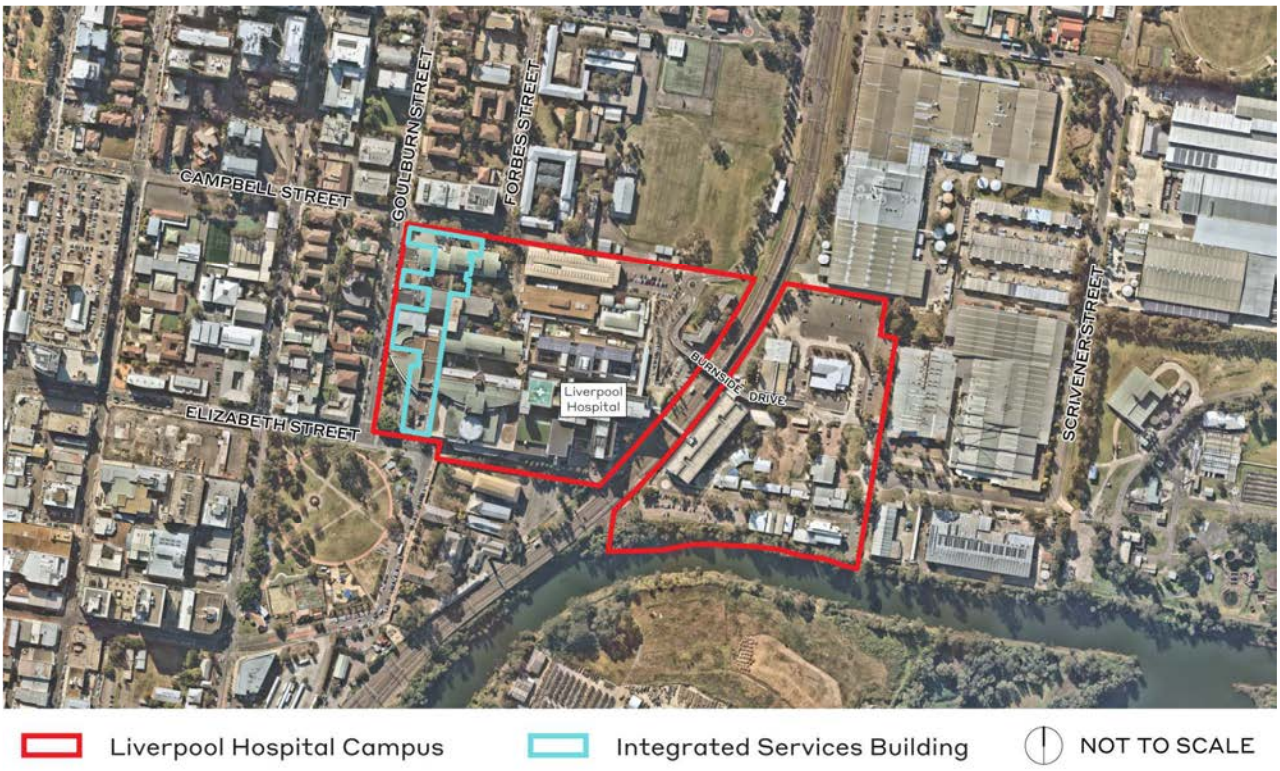

Figure 10 **Aerial photo of Liverpool Hospital Campus**

Source: *Nearmap / Ethos Urban*

3.3.1 Existing Development

The existing hospital campus comprises mostly 2-3 and 6-7 storey buildings of concrete and brick construction. These include the original Clinical Services Building, new Clinical Services Building, Cancer Building, Alex Grimson Building, Caroline Chisolm Building and Pathology Building. These buildings provide a range of medical, surgical, intensive care and other health services to the district. They also comprise various smaller retail shops and outlets. The specialist research institute, known as the Ingham Institute, is located on the northern campus across Campbell Street.

These buildings are surrounded by an internal road network, Landscape works and pedestrianised spaces that provide access to each building. A general arrangement plan of the existing northern and western hospital campus is shown in **Figure 11** and photos of the existing development are shown in **Figure 12** to **Figure 15**.

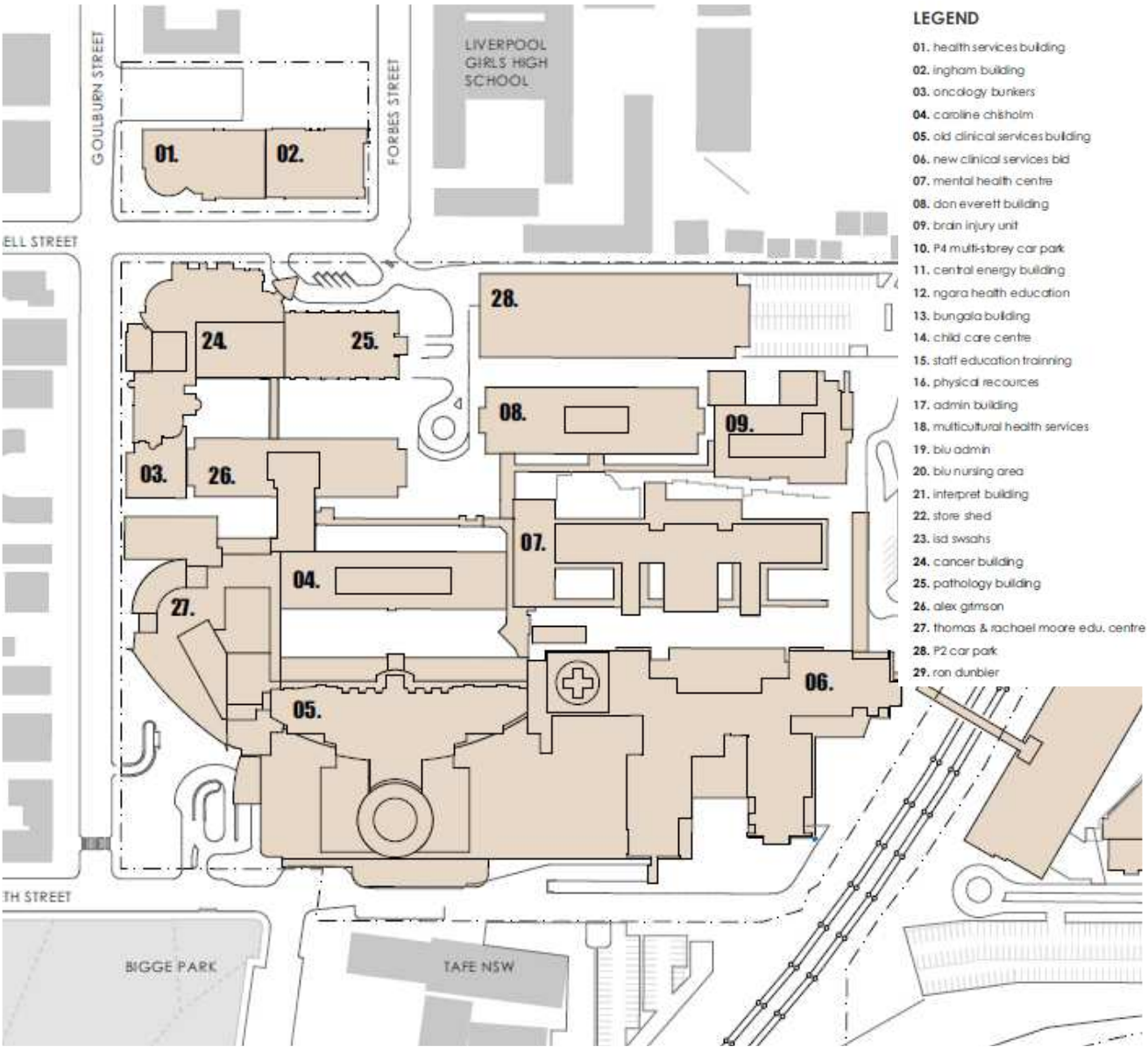

Figure 11 **Existing northern and western hospital campus**

Source: *Fitzpatrick and Partners*

Figure 12 Hospital entrance viewed from Elizabeth Street

Source: Ethos Urban

Figure 13 Main hospital entrance

Source: Ethos Urban

Figure 14 Ingham Institute as viewed from Goulburn Street

Source: Ethos Urban

Figure 15 Pathology – Cancer Therapy Centre as viewed from Campbell Street

Source: Ethos Urban

3.3.2 Topography

The site is generally level and is graded to accommodate the functional needs of the existing hospital campus. Elizabeth Street has a shallow fall towards the east. The campus has site levels varying from approximately RL8.5m (AHD) in parts of the eastern campus through to approximately RL12m in parts of the western campus.

3.3.3 Vegetation

There is formal landscaping on the site, located in limited patches at several locations on the boundaries of the hospital campus. The existing vegetation primarily comprises scattered native and exotic trees, and low lying gardens and lawn areas.

3.3.4 Heritage

The Liverpool Hospital campus is not identified as an item of heritage significance; however, it is partially located within the Bigge Park Heritage Conservation Area. The site is also located in close proximity to a number of other local heritages items, including:

- Bigge Park and Conservation Area;
- The local street network identified as 'Plan of the Town of Liverpool';
- Liverpool TAFE; and
- Section 170 Heritage and Conservation Register Avenue Planting on Elizabeth Street.

3.3.5 Flooding

The hospital campus is affected by mainstream flooding from Georges River to the south east of the site and localised overland flow from the Liverpool CBD catchment to the south and west of the site. The natural topography of the local catchment falls directly toward the low point in Goulburn Street, to the west of the hospital site. The campus is not within the 1 in 100-year flood level, however, is identified as being flood prone under LLEP 2008. An assessment of flooding is provided at **Section 6.12**.

3.3.6 Bushfire

The site is not identified as being located on land that is bushfire prone.

3.3.7 Geotechnical

Based on the results of previous site investigations, the ground conditions on the western campus generally comprise fill overlying alluvial soils on the majority of the site, with residual soils in the north western corner and shale bedrock at varying depths. The fill comprises compacted clay and sand to a maximum depth of 3.5m and alluvial soils are predominantly silty clays, of medium to high plasticity. Rock levels vary in the north western corner from 2m to 13m over the site.

Groundwater was encountered during the previous borehole investigations, with observations made between RL0m and RL 9.1m.

3.3.8 Contamination

As part of this application, a contamination assessment has been carried out to ensure the site can be made suitable for the proposed development. Refer to the Contamination Assessment at **Appendix L** and **Section 6.19** below.

3.3.9 Helipad

There are two existing helicopter landing pads located on the old and new Clinical Services Buildings.

3.3.10 Road Network, Accessibility and Parking

The hospital campus is bound by Elizabeth Street to the south, Goulburn Street to the west, Campbell Street to the north and the main southern railway to the east. Burnside Drive runs adjacent to the railway corridor and provides a key route from the Hume Highway via Remembrance Avenue and Hart Street for staff accessing the existing multistorey car park (CP2), as well as access to visitor car parking on the site. The Hume Highway is aligned to the north and west of Liverpool which provides connections to south western Sydney and towards the north east.

There are currently a number of staff and visitor car parks across the campus with a total of 2,295 car spaces distributed as outlined in **Table 2** and in **Figure 16** below.

Table 2 Carparking supply

Location	Staff and Fleet	Public	Total
CP1	0	143	143
CP2	358	239	597
CP3	85	56	141
CP4	780	0	780
CP5	575	0	575
Health Services Building	35	0	35
Western Campus Fleet Vehicles Carpark	24	0	24
Total	**1,857**	**438**	**2,295**

Liverpool Hospital is also well serviced by pedestrian infrastructure, with footpaths provided on surrounding streets. Campbell Street, Goulburn Street and Elizabeth Street currently act as a key pedestrian route surrounding the campus. They also provide a safe pedestrian network for staff and visitors accessing the hospital.

Figure 16 Existing car parking locations across the Hospital campus

Source: GTA Consultants

3.3.11 Public Transport

The hospital campus is well serviced by public transport, with an extensive bus network providing bus stops on Elizabeth Street. These bus stops provide services to Liverpool Westfield, Westfield Burwood and Liverpool / Fairfield / Holsworthy Stations. Liverpool and Warwick Farm Stations are also located within walking distance of the hospital providing services to the Inner West and Leppington Line, T3 Bankstown Line and T5 Cumberland Line.

3.3.12 Surrounding Development

The hospital campus is located in a cluster of health and education uses, within the north east of the Liverpool CBD. Specifically, the northern and western hospital campuses are surrounded by the following development:

- To the north is the Liverpool Girls High School and Liverpool Boys High School and grounds extending from the railway, with a mixture of medium density residential housing and buildings for medical uses, including the Sydney Southwest Private Hospital;
- To the east of the hospital campus are warehouses and business uses and the railway station. Further east is the Liverpool Water Recycling Plant;
- To the west is medium density residential dwellings, ranging from 4-5 storeys in height. Liverpool CBD and Westfield Shopping Centre are located further west; and
- To the south is Bigge Park, a large public park and Liverpool TAFE. The Georges River lies further south.

The surrounding development is shown in **Figure 17** to **Figure 20**.

Figure 17 Bigge Park

Source: Ethos Urban

Figure 18 Existing residential dwellings on Goulburn Street

Source: Ethos Urban

Figure 19 Liverpool Girls High School

Source: Ethos Urban

Figure 20 Liverpool TAFE as viewed from Bigge Park

Source: Ethos Urban

4.0 Description of the Development

This chapter of the report provides a detailed description of the proposed development. Architectural drawings are included at **Appendix B**.

The SSD Application seeks approval for the following development:

- Demolition and site preparation;
- Construction and operation of a new 6 storey ISB to provide:
  - Expanded Emergency department;
  - New women's and paediatric services;
  - New cancer treatment centre;
  - New support services including pathology, satellite medical imaging and pharmacy;
  - New education and teaching spaces;
  - New retail facilities; and
  - New basement loading dock.
- Refurbishment of existing buildings to provide:
  - Expansion and reconfiguration of the existing Emergency Department;
  - Expansion of the Intensive Care Unit;
  - Reconfiguration of existing operating theatres and same day surgery; and
  - Repurpose Caroline Chisholm Building for office accommodation.
- New hospital entry and drop off;
- Construction of a skybridge link over Campbell Street to the Ingham Institute;
- Construction of new internal access roads and links;
- Expansion of Ambulance bays on Elizabeth Street;
- Creation of a shared zone on Campbell Street;
- Tree removal;
- Landscape works;
- Utilities services and amplification works; and
- Site preparation civil works.

A photomontage of the proposed development is shown at **Figure 21** and **Figure 22**.

Figure 21 Photomontage of the proposed development (corner of Goulburn Street and Campbell Street)

Source: Fitzpatrick and Partners

Figure 22 Photomontage of the proposal (internal view)

Source: Fitzpatrick and Partners

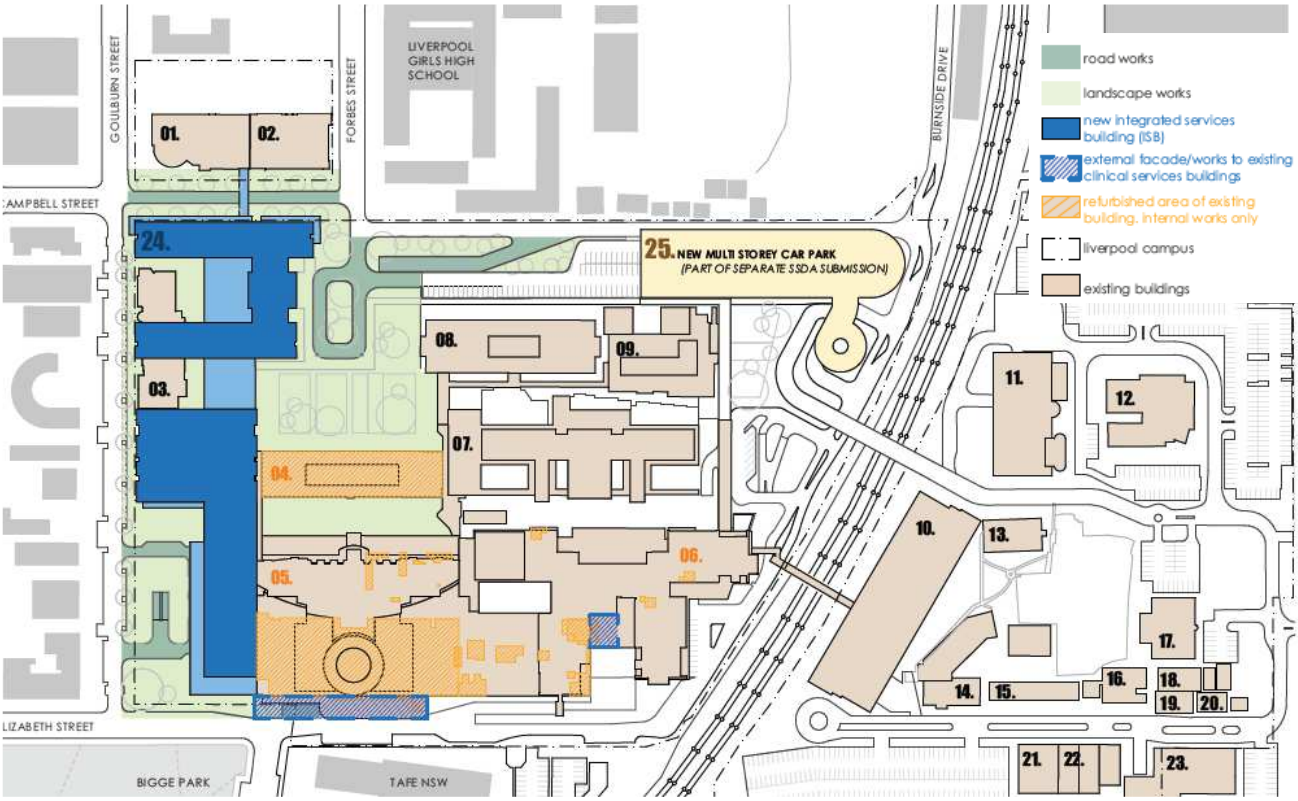

Figure 23 Liverpool Main Works – Site Plan

Source: Fitzpatrick and Partners

4.1 Design Principles

The following Design principles have been developed to outline the objectives and vision for the project:

- Enhance the amenity, treatment and overall experience for patients and visitors;
- Establish a centre of innovation for treatment, translational research, health technology and cancer;
- Outline a strategy for the long term expansion of the hospital beyond 2026;
- Facilitate collaboration, knowledge & resource sharing and a seamless transition of health services;
- Lay the foundation for the Liverpool Innovation Precinct to build upon;
- Enable innovation and collaboration across precinct partners & the community;
- Dissolve the boundaries of the hospital to enable integration with precinct partners, the CBD & the community;
- Minimise where possible staging & decanting during construction to avoid disruption to existing services & minimise cost;
- Improve connectivity to core clinical services;
- Reduce congestion, improve campus connectivity and wayfinding for vehicles and pedestrians;
- Provide for efficiencies and flexibility for operation, function and longer-term expansion; and
- Maximise return on investment through efficiency in design and clear prioritisation of project objectives.

4.1.1 Numerical Overview

The key numeric development information is summarised in **Table 3**.

Table 3 Key development information

Component	Proposal
Campus area	156,235m^2 (east and west campus)
GFA	• Existing 117,045m^2 • Proposed increase: 23,005m^2
FSR	• Existing - 0.75:1 • Proposed – 0.90:1
Maximum Height	RL 45.1m (32.9 metres including plant)
Staff	418 (Full time equivalent)
Car spaces	No car parking spaces are proposed as part of this development. The provision of car parking forms part of a separate concurrent development application.
Loading spaces	5

4.2 Site Preparation and Demolition

The proposal includes demolition of existing structures, including the following buildings:

- Cancer building;
- Pathology building;
- Alex Grimson building; and
- Thomas and Rachael Moore Education Centre.

A demolition plan is provided at **Appendix B** and the extent of demolition works are shown in **Figure 24** below.

The site will also be excavated in part to accommodate a basement floor beneath the new ISB at RL 7.9m.

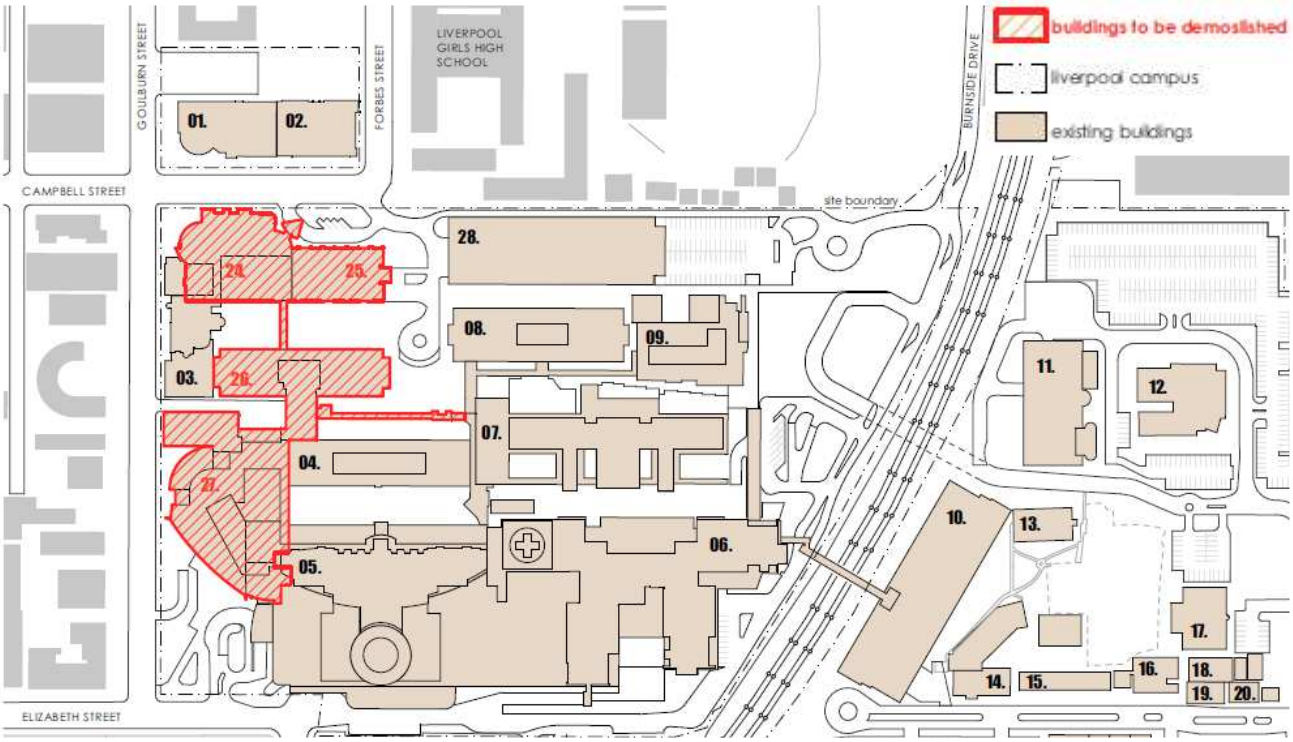

Figure 24 Building demolition plan

Source: Fitzpatrick and Partners

4.3 Tree Removal and Planting

To accommodate the proposed work the proposal seeks approval for the removal of 68 trees. 150 Trees are proposed to be planted.

An assessment of biodiversity and tree removal is provided at **Section 6.15** and **Section 6.16** respectively.

4.4 New Integrated Services Building

Operating Hours

- General Hospital Access – 6:00am – 8:00pm daily
- Hospital Distribution Centre – 7:00am – 3:30pm (Monday – Friday)
- Hospital Dock Gate – 5:00am – 10:00pm daily

Shift change

Shift change generally occurs between 7:00am-8:00am, 1:30pm-2:30pm and 9:0pm-10:00pm.

Building Height and Massing

The new ISB is located over 6 storeys, situated on the western edge of the campus and will be fully integrated with the existing hospital campus and adjacent clinical buildings. The ISB will have a maximum height of RL45.1 (32.9m) when measured from ground (including plant). The height reflects that of the new Clinical Services Building which was completed in 2015. The building comprises a podium and tower form. The towers incorporate vertical slots that intersect the podium to present as a series of separate towers, reducing the perceived visual bulk and scale.

The podium component will be 3storeys (12m) running north-south. It connects to the existing east-west circulation spine, as well as the Ingham Institute in the northern campus (on the opposite side of Campbell Street) via a bridge at Level 2.

The towers and podium are merged by 'infill' elements that house clinical areas, roof plant and building services. The building will have a total GFA of 23,005m^2, resulting in a total GFA of 144,775m^2 inclusive of the existing hospital campus.

The built form elements of the new ISB are shown in the massing diagrams prepare by Fitzpatrick and Partners at **Figure 25** and **Appendix C**.

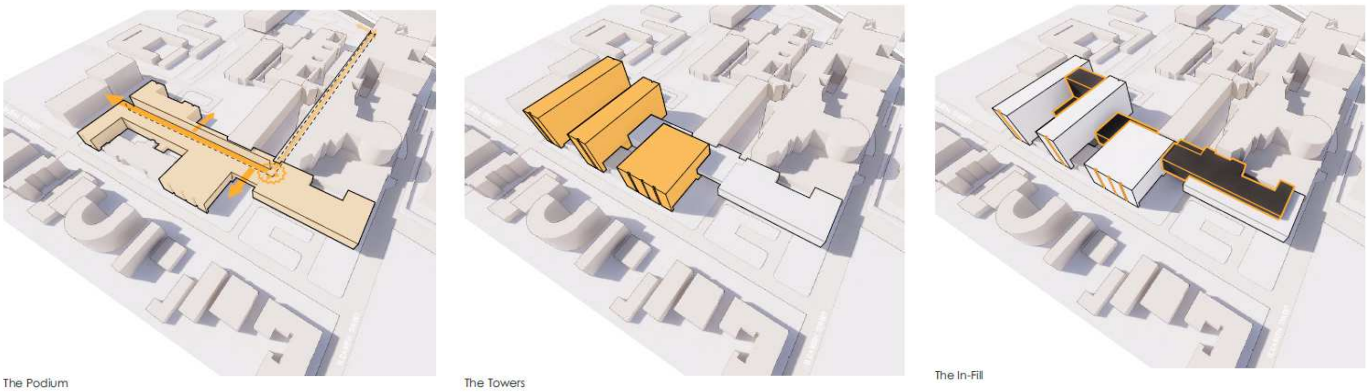

Figure 25 Massing elements of the new ISB

Source: Fitzpatrick and Partners

Main Entrance and Drop Off

The main entrance to the hospital will be relocated from Elizabeth Street to Goulburn Street. This area will also provide a public drop off point. From the main entry, staff and the public can access the new ISB from ground level.

The dedicated emergency access point will remain on Elizabeth Street and will be clearly delineated to restrict access for emergency vehicles only. A second drop off is provided from Forbes Street.

Hospital Spine

A north-south 'hospital spine' will provide an integrated connection between the existing Clinical Services Building to the south east and the new ISB. The spine will connect to the Ingham Institute to the north of Campbell Street on Level 2, providing direct and separate access to the hospital's northern campus (see **Figure 27** and **Figure 28**).

Retail

Five retail spaces are proposed within the ISB on the ground Level. Three are located to face and activate the new 'hospital spine'. One retail space is located on the corner of Campbell Street and Goulburn Street while another is located adjacent to the main hospital entry on Goulburn Street.

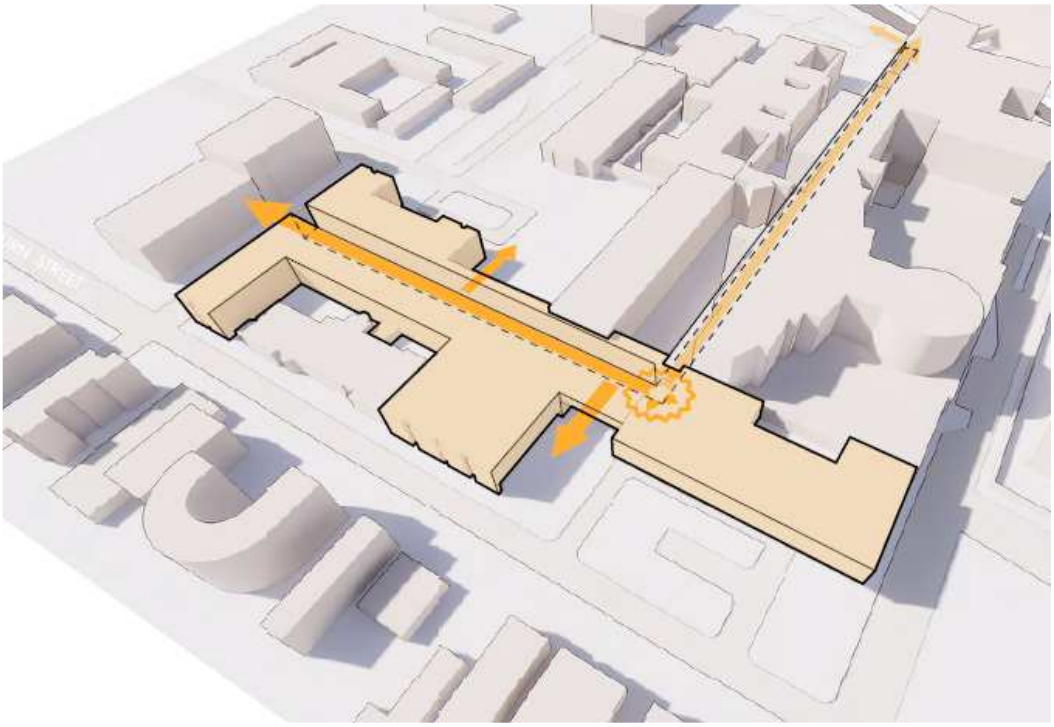

Figure 26 Hospital spine connecting to the existing east-west circulation spin and the Ingham Institute via a new bridge

Source: Fitzpatrick and Partners

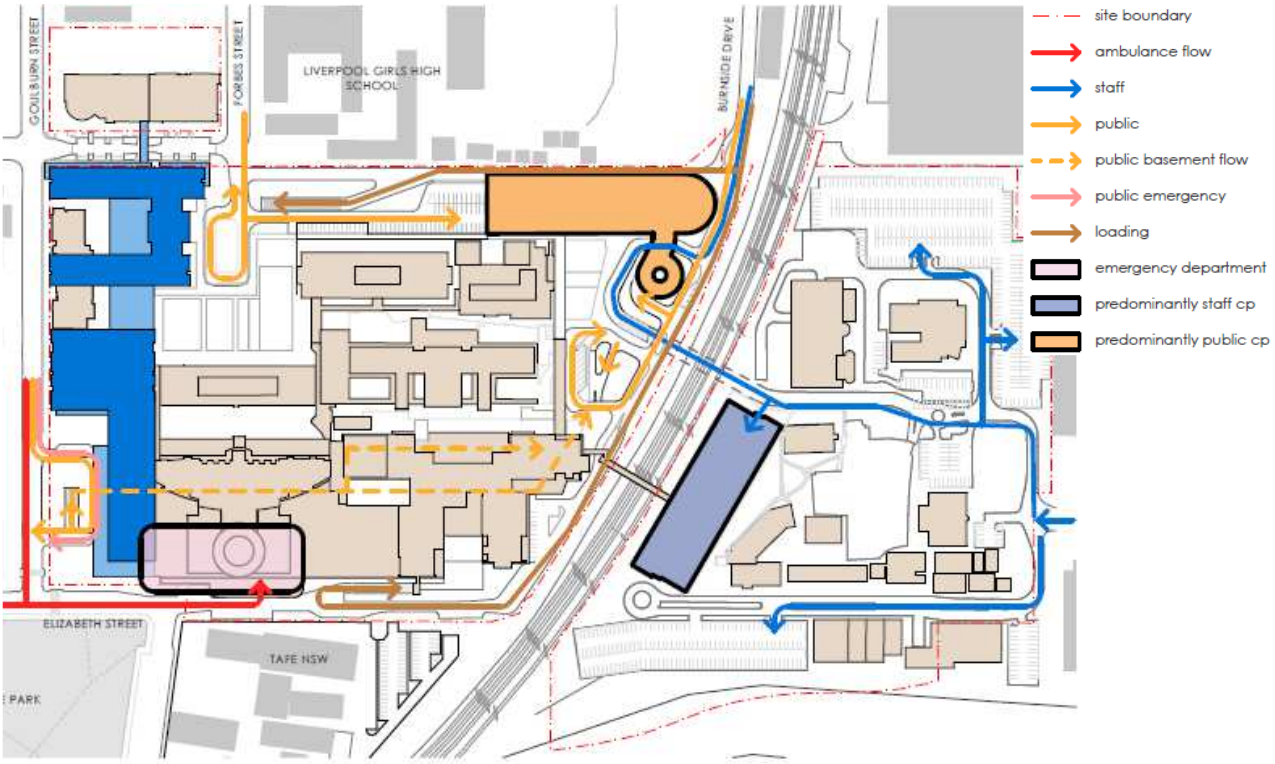

Figure 27 **Access and entry points**

Source: *Fitzpatrick and Partners*

Pedestrian Sky Bridge

A new pedestrian bridge link is proposed to connect the new ISB and the Ingham Institute across Campbell Street. This will be located on Level 2 of the ISB, which will provide a north-south connection along the site and to the existing east-west circulation spine. The skybridge will connect to the Ingham Institute at RL 20.6 (Level 2) and have a height of RL 20.1 above Campbell Street. The proposed development seeks consent from Liverpool City Council for the installation of supporting structures on the road reserve of the Campbell Street shared zone.

Figure 28 **Proposed pedestrian sky bridge over Campbell Street**

Source: *Fitzpatrick and Partners*

4.5 Refurbishment Works

Internal refurbishments of existing clinical and administration spaces within the Chisholm Building and the old and new Clinical Services Buildings. The works will involve internal works only to re-purpose these spaces in line with the hospital's clinical, services and administrational needs. Areas to be refurbished are identified within the Architectural Plans at **Appendix B** and as shown at **Figure 29**.

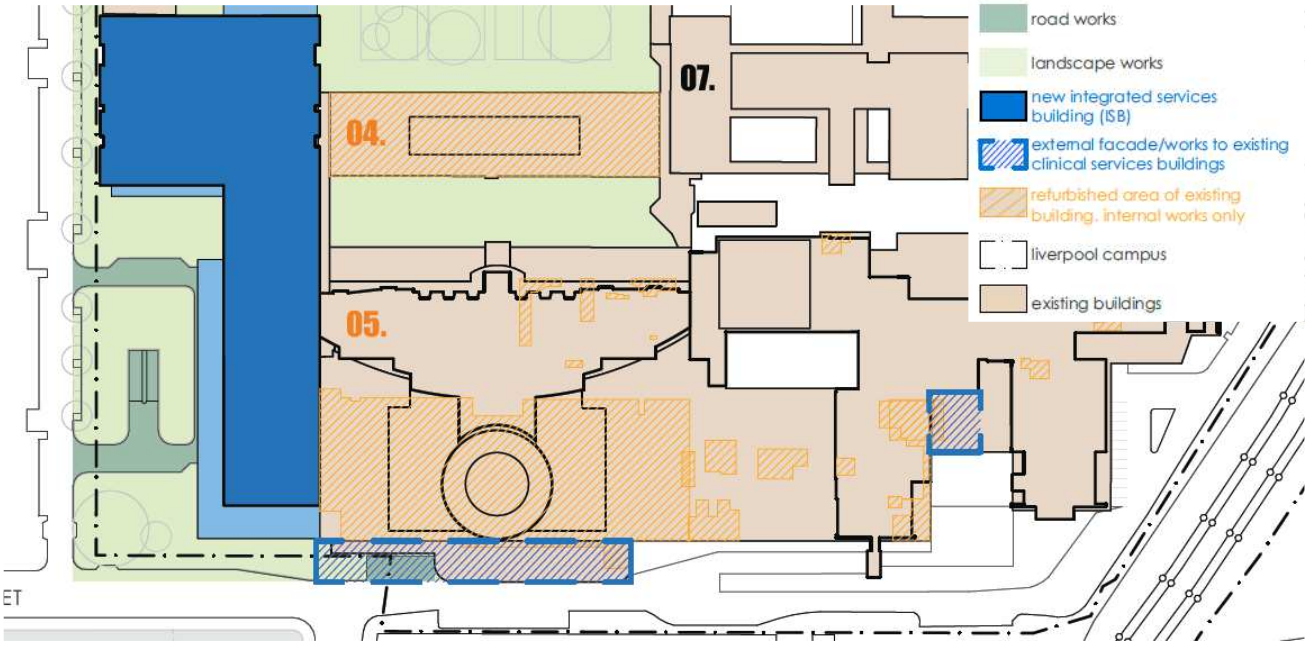

Figure 29 Location of refurbishment works

Source: Fitzpatrick and Partners

4.5.1 Façade Works

Minor additional floor space is proposed on the Ground Level of the Emergency Department fronting Elizabeth Street. The extension will regularise the façade which will enable a more efficient Emergency Department.

An additional extension is proposed on Level 2 of the new Clinical Services Building that will create new floorspace for clinical needs. The location of the façade works are shown at **Figure 30** and are identified in the Architectural Plans at **Appendix B**.

Figure 30 Proposed façade works

Source: Fitzpatrick and Partners

Materials and Finishes

Fitzpatrick and Partners have selected a range of materials and finishes that reflect the existing hospital campus, while providing a façade that accentuates the vertical form of the towers. The podium components comprise red brick work, glazing panels and horizontal louvres while the tower components comprise grey fibre cement panels, glazing and perforated aluminium.

The podium materiality has been selected to respond to the streetscape scale and to complement the existing residential development in the locality which is typically red brick. Whereas the tower materiality will provide a fresh and clear backdrop that represents the future of the Liverpool Health and Education Precinct.

The materials and finishes are shown in **Figure 31** and **Figure 32**.

Figure 31 Proposed schedule of materials and finishes

Source: Fitzpatrick and Partners

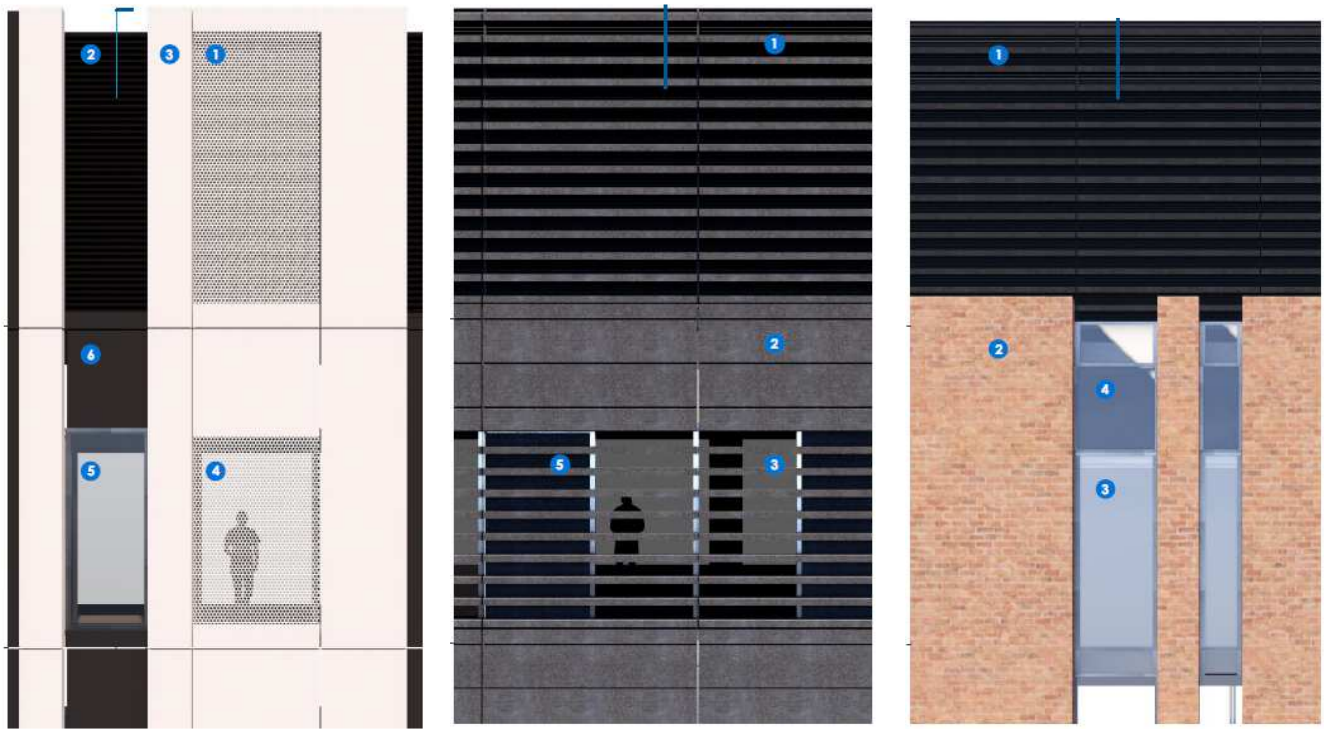

Figure 32 Façade Material Character Types

Source: Fitzpatrick and Partners

4.6 Car Parking and Access

4.6.1 Vehicle Access

This application seeks approval for improvements to the vehicle access arrangements, including:

- A new main vehicle entry on Goulburn Street;
- A new pick up and drop off loop on the northern side of the campus near Campbell Street; and
- A new shared zone on Campbell Street, between Goulburn Street and Forbes Street.

The main public emergency entry and public car parking entry will be provided off Goulburn Street and the existing emergency vehicle entry will remain on Elizabeth Street (refer to **Section 4.6.4** below). At the main entrance, drivers will be able to continue into the CP1 car park, while drivers at the northern and eastern campus pick up / drop off areas are able to easily enter the new multi storey car park or CP3 via Burnside Drive (subject to a separate concurrent SSD application).

Service vehicles will access the site primarily from Burnside Drive, with only service vehicles larger than 12.5 metre HRVs entering and/or exiting via the southern internal road which connects with Elizabeth Drive. As discussed in **Section 2.2.2** above, new access arrangements to the multi storey car park will be provided via Burnside Drive. These have been assessed and considered in the Transport and Accessibility Impact Assessment prepared by GTA Consultants (**Appendix E**) and form part of a separate concurrent SSD application for the new multi-storey car park.

A 6.4m fuel delivery truck to service the back-up generator diesel tank will access the site from the southern side of the new main entrance off Goulburn Street.

4.6.2 Car Parking

As discussed in **Section 2.2.2**, as part of the broader Liverpool Hospital redevelopment a new multi storey car park is proposed under a separate SSD application. This will replace the existing CP2 building and include approximately 1,097 spaces delivered at-grade and within a new multi-storey car park building. The cumulative increase in car parking across the campus will result in a nett increase of 408 spaces. A summary of car parking requirements and provision is provided at **Section 6.7**.

4.6.3 Loading Facilities

A new loading dock is proposed in Basement Level 1. Access to the loading dock will be provided from the internal road along the northern boundary of the site. The new loading dock will accommodate five service vehicles bays including two 6.4m SRVs and three 12.5m HRVs.

4.6.4 Emergency Vehicles

Ambulance access will be maintained via the western end of Elizabeth Street. Access restrictions via Elizabeth Street will be imposed through boom gate control at the eastern end of the ambulance area and line marking and signage will be implemented to clearly define this area as emergency vehicles only.

4.6.5 Pedestrian Access

The proposed development will establish an improved hierarchy of pedestrian entry points and circulation routes throughout the campus. The key main pedestrian points and paths of travel are shown in **Figure 33** below, with the key main entry points located at the following street frontages:

- Goulburn Street entrance;
- Forbes Street entrance; and
- Burnside Drive entrance.

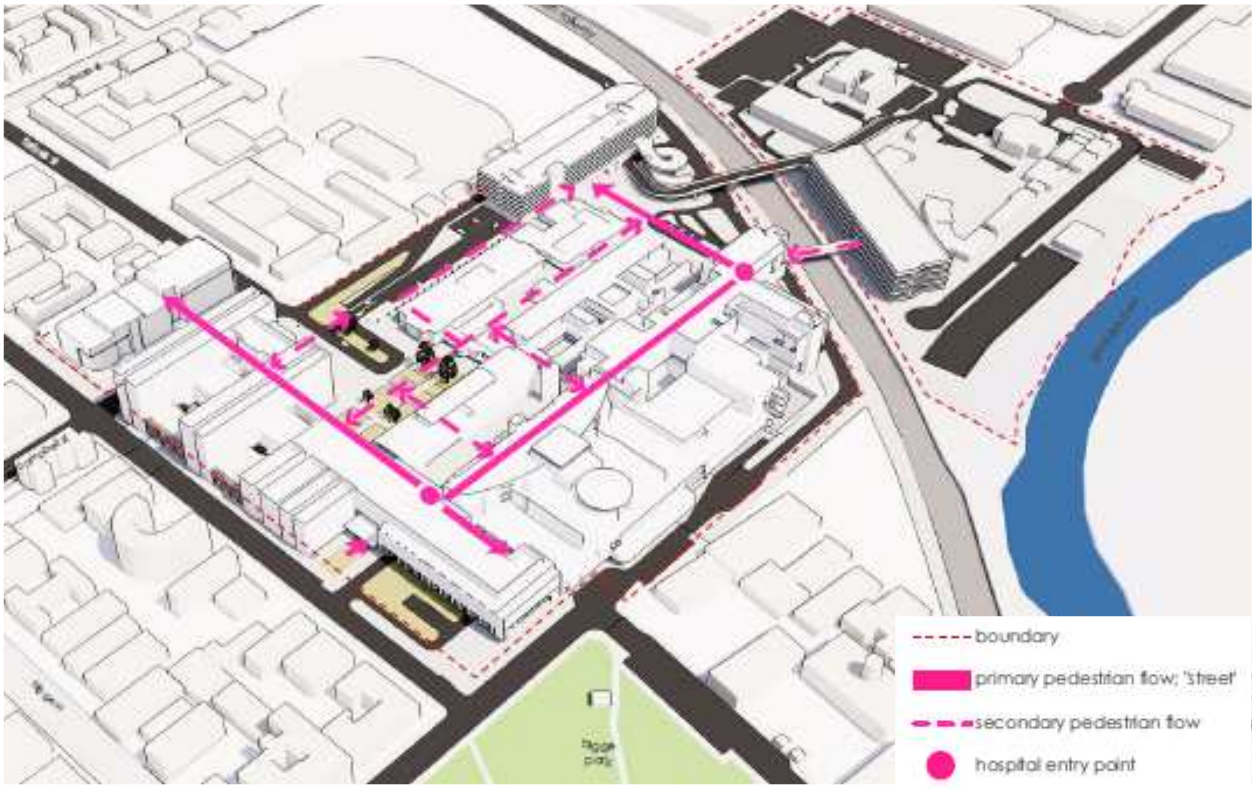

Figure 33 Proposed pedestrian entries and circulation

Source: Fitzpatrick and Partners

4.6.6 Shared Zone

A 10km/h shared zone is proposed on Campbell Street between Forbes Street and Goulburn Street. The shared zone will be designed with a one lane, two-way slow point. The shared zone will be approximately 100m.

4.7 Landscape works and Public Domain

Landscape drawings have been prepared by Clouston Associates and are included in **Appendix D**. The ground plane landscape works incorporates elements that provide an indoor-outdoor connection to link the hospital buildings together. Specifically, the proposed landscape works include a number of courtyards which will each function separately. The key elements of each courtyard are described below.

- **Goulburn Street Forecourt** – This forecourt will remain the hospitals main entry point. It will provide an undercover area for drop off and pick up and a shaded waiting area. The shaded waiting area will include pavement tiles and loose furniture. The large Ficus Hilli and Washintonia Palms will be retained, while a new Eucalypt canopy will be incorporated around the underground carpark entry / exit to create a natural setting and outlook.
- **Campbell Street Shared Zone** – The Campbell Street shared zone will link the main hospital campus with the Ingham Institute. The existing Pyrus will be retained along the northern frontage and new tall canopy trees is proposed to provide a green outlook for patients.
- **Forbes Street Forecourt** – This forecourt comprises the plaza entry drop off space that will include a canopy tree gateway and a covered vehicle drop off zone. Raised lawn terraces will also be provided for patients, staff and visitors including the retention of two large existing eucalypts and a fig tree, new deciduous trees and loose furniture.
- **Caroline Chisholm Courtyard** – This courtyard will provide an additional tree canopy and loose furniture.
- **Bunker Courtyards** – The northern bunker courtyard will incorporate a eucalypt canopy with ferns on the ground level and the southern courtyard is proposed to have palms and ferns.
- **Central Roof Terraces** – The central roof terraces will incorporate roof gardens.

- **Maternity Courtyard –** This courtyard will include a raised planter and a 2 storey green wall. It will include separate spaces to sit and gather as well as a circulation / walking path.

The proposed landscape works are shown in **Figure 34** below.

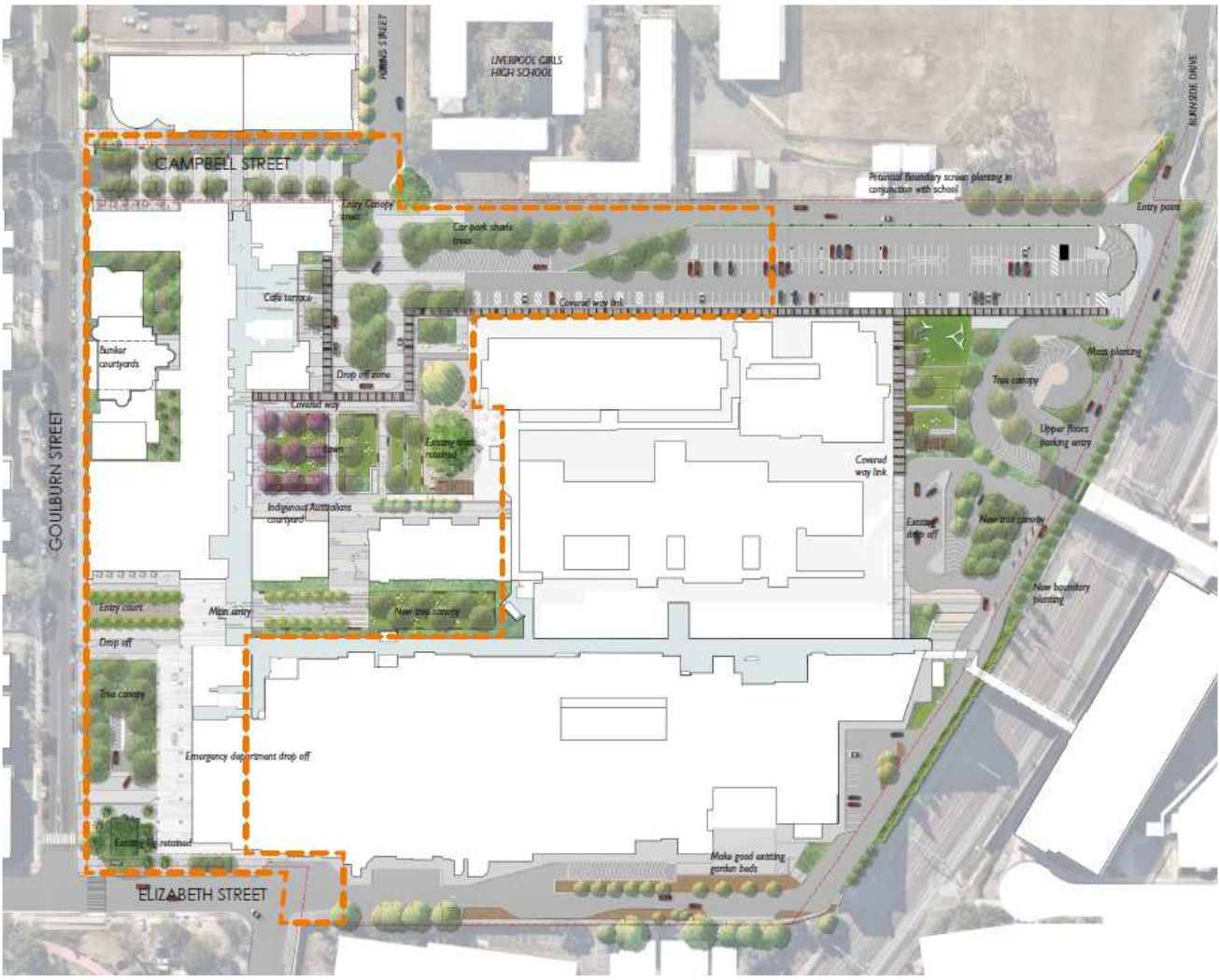

Figure 34 Ground level landscape plan

Source: Clouston Associates

4.8 Lighting Strategy

All lighting will be designed and documented in accordance with AS/NZ standards 1680 and 4282-1997 Control of the obtrusive effects of outdoor lighting.

4.9 Environmentally Sustainable Development

The proposed development will incorporate Environmentally Sustainable Development (ESD) strategies and principles. The project is targeting an equivalent/self-certified 5 Star Green Star rating utilising the Green Building Council of Australia's Design and As-built rating tool. In particular, the following initiatives will be incorporated into the proposed development:

- Passive building design to reduce / dampen the effects of increasing temperatures, such as solar shading and solar control glazing;
- Consideration of native low water landscaping to reduce potable water consumption;
- Consideration of rainwater harvesting for passive irrigation and low flow fixtures and fittings;
- Design of windows and openings with control to limit the impact of gustier wind conditions for internal spaces;

- Use of durable façade materials and materials to improve building thermal performance such as insulation and consideration of exposed thermal mass; and
- Covered / shaded outdoor respite areas.

4.10 Services and Utilities

4.10.1 Electricity

Jacobs has confirmed the electrical supply requirements for the proposal at **Appendix N**. In consultation with Endeavour Energy, the proposed development will incorporate a new high voltage ring main from two metering cubicles located in the south western corner of the campus near Goulburn Street and in the northern end of the campus at the intersection of Campbell and Forbes Streets. In addition, two new substations will be established including:

- Substation consisting of 4 x transformers (15000kVA each); and
- Substation consisting of 2 x transformers (1500kVA each).

Adjacent to these two substations will be a new low voltage Main Switch Room which will reticulate all low voltage sub mains for each tower's electrical supplies.

The telecommunications infrastructure will consist of a new "lead in" service carrier located on Level 6 of the proposed development.

4.10.2 Water and Sewer

The proposed development will be connected to the existing water main located on Elizabeth Street and the existing sewer adjacent to the railway corridor. It is noted that there is an existing Sydney Water sewer main which traverses the site and the project team are currently coordinating the diversion of these two sewer mains in consultation with Sydney Water. Further discussion is provided at **Appendix O**.

4.10.3 Gas

The existing gas supply system will be utilised where possible however, a new connection will be made to the 200mm 1050kPa natural gas main located on Campbell Street. Further discussion is provided in **Appendix O**.

4.11 Job Creation

The proposed development will generate approximately 232 jobs during the construction phase and approximately 418 FTE (full time equivalent) jobs will be created at the completion of the project during the operational phase.

4.12 Construction

Hours

The proposed general hours of construction are as follows:

- Monday to Friday 7:00am to 6:00pm;
- Saturday 8:00am to 3:00pm; and
- No work on Sundays and Public Holidays.

The general construction hours are proposed to be extended from 1.00pm – 3.00pm on Saturdays.

Special construction hours will be required to for the construction of the project on selected evenings and weekends so as to maintain operation of the existing hospital and in consideration of Council restricted hours of operation on Campbell street during weekdays. The weekends and timings are as follows:

- Monday to Friday: 6:00pm to 7:30pm (ability to finalise large concrete curing activities including wetting, levelling).
- Friday: 6:00 pm to 10:00 pm (limited to site establishment activities in preparation for weekend works).

- Saturday: 5:00 pm to 10:00 pm (general construction activities **excluding** excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like).
- Sunday: 8:00 am to 5:00 pm (general construction activities **including** excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like).
- Sunday: 5:00 pm to 10:00 pm (general construction activities **excluding** excavation, sawing of rock, jack hammers, pile drivers, vibratory rollers/compactors of the like).

Acoustic assessment and noise mitigation are detailed at **Section 6.8**.

Staging

The application does not seek approval for staging. Works are anticipated to commence in January 2021 and complete in June 2026. An indicative construction program is outlined at **Appendix F** and is anticipated to occur as below:

- ISB Stage 1
  - Demolition of existing Education, SIM, Retail and Kitchen
  - Stage 1 ISB Construction
  - Decant of Alex Grimson, Oncology and Pathology to new Stage 1 ISB.
  - Part refurbishment of Caroline Chisholm
  - Refurbishment of Emergency Department
- ISB Stage 2
  - Demolition of Pathology; Alex Grimson and Cancer
  - Stage 2 ISB construction
  - Decant to new Stage 2 ISB
  - Complete refurbishment of Caroline Chisholm
  - Refurbishment of various departments within the CSB
  - Construction of a shared zone on Campbell Street

5.0 Consultation

In accordance with the SEARs issued for this project, consultation was undertaken with the following stakeholders:

- Government Architect NSW:
- Liverpool City Council;
- Transport for NSW (TfNSW):
- Roads and Maritime Services (RMS);
- Sydney Water;
- Local Aboriginal Land Council;
- Fire and Rescue;
- Liverpool Innovation Precinct;
- School Infrastructure NSW;
- Hospital User Groups; and
- The local community.

A summary of the consultation undertaken to-date with Council, the community and relevant agencies is provided below and is outlined at **Appendix AA**. Several consultants have undertaken additional consultation with relevant parties during the preparation of their reports.

NSW Government Architect

Representatives from HI NSW and Fitzpatrick and Partners met with the Office of the Government Architect NSW on 4 September 2019, 23 October 2019 and 4 December 2019 to review the design of the proposed development in line with 'Better Placed – An integrated design policy for the built environment of NSW 2017.' The meeting minutes are provided at **Appendix AA** and a summary of the key topics discussed during these meetings are provided in **Table 4**.

Table 4 NSW Government Architect comments

Comment
Meeting 1 – 4 September 2019
The design and approach of the LHAP Master Plan was well received and supported, in particular: • The concept and staging Master Plan • The clarity of the movement diagram and connections to the surrounding context • The integration of wayfinding and landscape works
Meeting 2 – 23 October 2019
The Master Plan analysis and rationale of the project were generally supported, in particular: • The creation of public landscaped open spaces including retention of existing significant trees • The creation of the internal street as the principal organising element of the new ISB • Improvements to vehicle circulation and wayfinding, including traffic calming strategies
Response: Following commentary provided, the following items were developed and incorporated into the design: • Reinforcing the idea of the landscape as a driver of the Master Plan by giving prominence to and privileging the proposed open spaces • Further developing the open space to the north of the Caroline Chisholm building to minimise hard paving and create more areas of soft landscape works • Further developing the landscaped walkway between the hospital entry and the visitor carpark structure to prioritise pedestrian amenity • Introducing permeability and more transparency to the northern tower facade in particular and further developing sun shading and façade treatment to respond to orientation

Comment
Meeting 3 – 4 December 2019
The project team's response to the previous meeting was generally supported including the façade and landscape design. The commentary from the government architect has been incorporated into the final design as follows: Further refinement of the tower facade to introduce further permeability, transparency and more detail around sunshading and facade treatment • Further refinement of the podium to clearly differentiate its scale, materiality and articulation from the tower elements • The introduction of horizontal elements at podium level to provide relief from the vertical treatment of tower facades • Further refinement of the 'pop-outs' along the northern elevation to provide deeper reveals and appropriate shading to glazed areas • Further refinement of the brickwork on the podium to better integrate with the overall architectural expression of the buildings (the use of brickwork for the podium was supported)

Agency and Council Consultation

HI NSW has undertaken ongoing consultation with relevant agencies and Council regarding the proposed development and other works currently being carried out on the hospital campus.

Table 5 below provides a summary of the meetings held with Liverpool City Council.

Table 5 Liverpool City Council comments

Council Comments	Outcome
Meeting 1 – 30 April 2019	
An overview of the draft Liverpool Council Public Domain Masterplan was presented. Feedback received was generally supportive.	The project continued to develop the design in consultation with Council.
Meeting 2 – 18 October 2019	
A presentation of the main works proposal was provided. The feedback received from Council is summarised below: • Council was generally supportive of the redevelopment • Council requested the project to review the impact on trees on Campbell Street and palms at the main entrance • Council requested a separate meeting to discuss their public domain and interface with the hospital landscaping • A separate meeting to be organised to discuss traffic and shared zones on Campbell Street • Council requires more details on the shared zone for the drop off area in Stage 2	Impact on vegetation has been reduced as much as possible in balance of the demand for clinical space within a constrained site. The project has managed to retain Palm trees at the main entrance on Goulburn Street. A separate meeting was held to present and discuss public domain and landscaping on 6 December 2019.
Meeting 3 – 6 December 2019	
Meeting held to address public domain and landscaping. Council requested to review the tree removal plans and more information on traffic studies.	Project reviewed the possibility to remove the gum trees, however it was not possible due to the clinical space required within the ISB. Presented in the follow up council meeting on 05/03/20.
Meeting 4 – 5 March 2020	
Meeting held to present the latest Traffic and Public Domain Design.	Agreement on tree removal. Feedback has informed the design of the Shared zone and public domain.
Meeting 5 – 9 March 2020	
Meeting held to present the design to LCC councillors.	Councillors were generally supportive, and no further actions were required.

The project team have met with service providers including Endeavour Energy and Sydney Water to discuss the requirements of the proposed development and the capacity and loads required. A meeting was held with NSW Fire and Rescue on 25 September 2019 and 3 March 2019 to discuss the impact of the works on the current certifications.

HI NSW and the project team provided a project update to the Liverpool Innovation Precinct on 14 August 2019.

The outcomes of these meetings have been considered in the construction and operation of the proposed development. A summary of meeting minutes and meeting details are provided in **Appendix AA**.

Local Aboriginal Land Council

The project team held meetings with the Gandangara Local Aboriginal Land Council (Gandangara LALC) on 14 June 2019 and 27 November 2018. A brief outlining the LHAP redevelopment progress was also issued to Gandangara LALC in February 2019. The project team held an archaeological survey of the LHAP project area with the Gandangara LALC (on 25 November 2019).

As part of the Aboriginal Cultural Heritage Assessment (ACHAR) process, Aboriginal stakeholders were provided with information about the proposal and the cultural heritage assessment process, including the methodology for collecting information on cultural heritage significance.

Responses were received from Murra Bidgee Mullangari Aboriginal Corporation, A1 Indigenous Services, Gandangara LALC, Darug Custodian Aboriginal Corporation, Kamilaroi Yankuntjatjara Working Group (Phil Khan), Darug Aboriginal Land Care (Des Dyer), and Kawul Cultural Services. All responses received were supportive of the proposed ACHAR methodology.

Schools Infrastructure NSW

A number of consultation sessions have been undertaken with Schools Infrastructure NSW in relation to the proposed development and the Liverpool Education Precinct Projects. Consultation has also been undertaken with Liverpool Girls and Liverpool Boys High Schools which are adjacent to the hospital campus. The table below provides a summary of meetings held and feedback received. Further discussion is also provided in **Appendix AA**.

Table 6 School Infrastructure NSW comments

School Infrastructure NSW comments	Outcome
Meeting 1 – 19 September 2019	
Meeting held with Liverpool Education precinct. A summary, overview and indicative timing were provided to School Infrastructure NSW representatives. The meeting discussed opportunities to collaborate in relation to infrastructure and services and the feedback was generally positive.	These discussions have informed the services strategy for the site.
Meeting 2 – 30 October 2019	
Meeting held with Schools Infrastructure NSW. The meeting was held to discuss masterplans, highlight any overlapping concerns regarding traffic flow and potential closure of Campbell Street. It was advised that the closure of Campbell Street be further considered.	These discussions have informed the proposed shared zone proposal.
Meeting 3 – 25 November 2019	
Meeting with Schools Infrastructure NSW and Transport for NSW to discuss future masterplanning opportunities for the precincts and a reviewed scope beyond the current project scope. Both parties agreed that the masterplan would be beneficial on future Liverpool Health and Academic Precinct and Liverpool Education Precinct collaboration.	The masterplan is outside the scope of this SSD and will be part of ongoing discussions with SINSW.
Meeting 4 – 6 November 2019	
Consultation held with Liverpool Boys High School to provide a general project overview. The feedback received was generally positive.	No action required.
Meeting 5 – 15 November 2019	
Consultation held with Liverpool Girls High School to provide a general project overview. The feedback received was generally positive.	No action required.

Hospital User Groups

The Project Team has completed an average of three rounds of Feasibility Project User Groups (PUGs), covering Models of Care and producing Schedules of Accommodation. This was followed by a further 3 rounds of Schematic Design PUG consultation. Meetings focus on the individual needs of specific departments such as Emergency and Inpatient Units and are supported by broader consultation groups which focus on Overarching Principles, Engineering Services and Back of House servicing.

The PUGs were held between July 2018 and February 2020. PUG attendees included clinical and support staff, as well as community advocates to establish a broad range of experiences and viewpoints into the development of the Schematic Design.

Community Consultation

HI NSW has undertaken ongoing consultation and engagement with the relevant stakeholders during the design development phase of the project. A number of meeting and stalls were held during the initial phases of the project and additional consultation sessions are intended to be held during the assessment and exhibition of the SSDA. These sessions are intended to provide project updates and news on the redevelopment as well as providing avenues to receive ongoing information. A summary of issues and responses is provided below.

Issue	Response
Building size and scale in relation to nearby residential properties	The location of the ISB extension was selected to reduce impact of additional massing on nearby residents, while locating facilities in a part of the campus that is in need of renewal. The overall building massing for the ISB was also reduced to the south to mitigate potential solar access impacts that may result from the proposal on Bigge Park.
Cancer services and needs	Consultation revealed that there is a different client group whose needs had to be considered in the provision of waiting areas. This is reflected in the design.
Design of education spaces	Following consultation, the location of education facilities has been revised including a more focused, centralised conference centre rather than a more dispersed arrangement.
Design of paediatric spaces	As a result of consultation, the inclusion of low-sensory spaces for children with those special needs has been included.
Car parking walkability and access	Review of connections between carpark and entries has resulted in the inclusion of undercover walkways with rest points.
Concerns with paid parking	Paid parking is part of the NSW Health policy, implemented state-wide with concessions available.
Carparking proximity to residential areas	Light pollution controls will be provided, and the works will be undertaken to minimise disruption to residents.
Cancer therapy – dedicated and convenient parking is required	There is a dedicated carpark for cancer. It is part of the operational policy to maintain dedicated cancer parking.

The community consultation strategy sessions comprised of:

- Open day stalls for the community and Liverpool Hospital Staff;
- Attendance at the National Health Innovation Precinct Conference for health industry stakeholders;
- Open community meetings;
- Hospital Information stands;
- Attendance at library information week;
- Monthly newsletters;
- Media releases and social media updates; and
- Neighbour notifications.

Further discussion on the meetings held and outcomes is provided in **Appendix AA**.

The proposed development will be placed on public exhibition in accordance with clause 83 of the *Environmental Planning and Assessment Regulation 2000*. During the public exhibition period Council, State agencies and the public will have an opportunity to make submissions on the project.

6.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the proposed SSI application. It addresses the matters for consideration set out in the SEARs (see **Section 2.5**). The Mitigation Measures at **Section 8.0** complement the findings of this section.

6.1 Relevant EPIs, Policies and Guidelines

The relevant strategies, environmental planning instruments, policies and guidelines as set out in the SEARs are addressed in **Table 7**.

Table 7 Summary of consistency with relevant Strategies, EPIs, Policies and Guidelines

Instrument/Strategy	Comments
Strategic Plans	
NSW State Priorities	The NSW State Priorities are twelve high-level priorities for the State, being: • Creating jobs; • Delivering infrastructure; • Driving public sector diversity; • Improving education results; • Improving government services; • Improving service levels for hospitals; • Keeping our environment clean; • Making houses more affordable; • Protecting our kids; • Reducing domestic violence reoffending; • Reducing youth homelessness; and • Tackling childhood obesity. The proposal seeks to redevelop an existing hospital to improve service levels for health. The proposal will therefore meet a number of the key NSW priorities, whilst also creating jobs and delivering infrastructure in the South District.
Greater Sydney Region Plan	The Greater Sydney Regional Plan (the Regional Plan) is the overarching strategic plan that seeks to shape future development for the Sydney metropolitan area over the next 40 years. Under the Regional Plan, Sydney will be made of three cities, with Liverpool forming part of the Western Parkland City along with Greater Penrith and Campbelltown-Macarthur. Liverpool is designated as part of the 'Metropolitan' cluster (centre) of the Western City in the centres hierarchy. The centre of Liverpool is to be the foundation for growing a health and education precinct that will support the growing Western City over the next 20 years. The Plan seeks to anchor university presence in Liverpool around the Government's investment in hospitals to facilitate the emergence of a health and education precinct. Liverpool is to be better connected to the rail network to help drive the education and commercial strengths of the CBD. Of relevance to the proposed SSD application is Objective 21 which contemplates the development of health, education, research and innovation precincts. Specifically, the proposal will: • Provide an improved service offering on an existing hospital campus, that will increase capacity, improve waiting times and allow for greater integration of services; • Create greater efficiencies by incorporating state of the art facilities and equipment; • Create employment opportunities in the short to long term; and • Strengthen the local economy in terms of attracting new potential businesses to the health and education precinct. Importantly, Liverpool is identified as a health and education precinct within the Regional Plan, which symbolises the importance and necessity for development that can support projected growth in the wider area.
Western City District Plan	The Western City District Plan sets out the planning priorities and actions to manage growth and change in the Western City District. It is a guide for implementing the Region Plan, at a district level, and is a bridge between regional and local planning. The District Plan informs local strategic planning statements, preparation of Local Environmental Plans and assessment of Planning Proposals, community strategic plans and policies. Planning Priority W9 specifically refers to the growth and strengthening of the Liverpool 'Metropolitan Cluster'. Liverpool is identified as a 'Collaboration Area' where the key aims include developing smart jobs around the health and education precinct.

Instrument/Strategy	Comments
Growing Liverpool 2023	Growing Liverpool 2023 is Liverpool's 10-year community strategic plan. It is based on a set of principles that guide delivery of the vision for Liverpool and aligns with the Government's strategic policy directions. The strategic plan is somewhat out of date and responds to the strategic plans that have been superseded by the Regional and District Plans. It is expected that the Growing Liverpool 2023 will be updated in the coming years to align with the actions and priorities in the Regional and District Plan.
Liverpool Collaboration Area Place Strategy	The Liverpool Collaboration Area Place Strategy was prepared by the Greater Sydney Commission to establish a vision and set out actions and priorities for the Collaboration Area. The Place Strategy recognises the Liverpool Health and Academic Precinct and the importance of the upgrades to Liverpool Hospital to establish it as the destination hospital for the South Western Sydney Local Health District. Accordingly, the proposed development will directly align with: • ***Planning Priority P6 – Support the growth of critical employment hubs in the Collaboration Area; and*** • ***Action 16 - Leverage the Investment Attraction Fund where appropriate to support the growth of Liverpool*** As it will establish the initial phases in the development of the new health and academic precinct in accordance with the future directions for the area. The proposed development will directly support the growth of employment in the district and contribute to the metropolitan economy.
Draft Liverpool City Centre Public Domain Masterplan	The proposal is consistent with the Draft Public Domain Masterplan, which identified Liverpool Hospital as a major landmark that is proposed to be upgraded. The Masterplan identifies Goulburn Street to achieve high quality pedestrian focused public realm for healthcare and innovation precinct proposed within the city centre. While the landscape treatment of Goulburn Street is being undertaken by a separate application to the SSD (see **Section 2.2.3**), the design intent and outcome is consistent with the Masterplan, with Goulburn Street featuring public realm that is appropriate for health care and those accessing the Hospital from the public domain. The proposal is also consistent with the following projects: • Elizabeth Street East - Hospital Precinct - Goulbourn Street South Streetscape upgrade and strengthening hospital forecourt; and • Streetscape upgrade and forecourt redevelopment along Campbell Street East - Ingham Institute Precinct. The project seeks to introduce a shared pedestrian zone in Campbell Street, which is not identified by the Masterplan, however the shared zone is consistent with the vision, which seeks to improve streets with considered high quality treatment including landscaping and streetscape infrastructure.
Georges River Precinct Plan	The Plan aims to extend the Liverpool City Centre to create better connections to and through the river and aims to make Liverpool into a 'true river city'. The Plan outlines a high-level vision for the potential regeneration of the Moorebank Precinct, opposite the Liverpool CBD. The Plan does not introduce any planning controls and rather provides a framework for future planning guidance. The proposal does not prevent the aims and objectives of the Precinct Plan to be realised.
Future Transport Strategy 2056 and supporting documents	The Future Transport Strategy 2056 sets the 40-year vision, directions and outcomes framework for customer mobility in NSW, which will guide future transport investment over the long term. The supporting plans provide further detail on customer outcomes or place-based planning documents to guide the Strategy's implementation. The proposal includes improvements to the internal road system of the hospital that will incorporate adequate accessibility to reduce vehicular congestion at critical areas and the pedestrianisation of certain internal roads and streets, in particular the introduction of a shared zone along Campbell Street. These changes will facilitate and encourage safe, convenient access for all. A review of the proposed improvements to transport infrastructure near Liverpool Hospital indicates that there will be no adverse implications from the proposed development. The most significant nearby project is the development of the Western Sydney Aerotropolis and the introduction of rapid bus services for Western Sydney in 2026.
Draft Greener Places Policy	The draft Greener Places Policy has been prepared by the GANSW to guide the design, planning and delivery of green infrastructure across NSW. The aim is to create healthier and more liveable cities and towns by improving community access to recreation and exercise, walking and cycling connections and the resilience of urban areas. The proposed development directly aligns with the aims of the draft Greener Places Policy through the introduction of green space and extensive tree planting throughout the hospital campus to create a healthier urban environment. It also aims to establish improved pedestrian and cycling connections to and from the hospital campus.

Instrument/Strategy	Comments	
State Infrastructure Strategy 2018	The proposal is consistent with the State Infrastructure Strategy by: • Delivering hospital infrastructure to respond to existing capacity constraints and expected population growth; and • Providing state of the art facilities to create greater efficiencies and improved operation. Importantly, the proposal forms part of a coordinated investment in the growth of the Liverpool Health and Education Precinct, to support population growth and change.	
Sydney's Walking / Cycling and Bus Future	The proposed development aligns with Sydney's Walking / Cycling and Bus Future strategies in that it will improve pedestrian and cycling facilities on site. The proposal seeks to lay the foundation for improved connectivity between the hospital campus and surrounding transport nodes, in particular the Liverpool and Warwick Farm Train Stations. This has specifically been addressed through the layout of the site and relocation of the main entry to Goulburn Street as well as a rear entry off Burnside Drive.	
Healthy Urban Development Checklist	The Healthy Urban Development Checklist has been prepared by NSW Health to assist professional in the industry in providing advice on urban development and ensure that considerations are made with regard to health effects of urban development on policies and proposal and how they can be improved to provide better health outcomes. The proposed development will include new pedestrian circulation routes, open space and substantial tree planting. These elements will allow for an improved public domain and urban form, making it more accessible for pedestrians and cyclists. The proposed development will provide a state-of-the-art facility that allows for an improved urban design outcome.	
Crime Prevention through Environmental Design (CPTED) Principles	Refer to **Section 6.6**.	
Better Placed NSW 2017	The Better Placed Policy includes seven key objectives in the design of the built environment prepared by the Government Architect. A review of the proposal's consistency with the principles of Better Placed is provided below.	
	Objective 1. Better Fit – contextual, local and of its place	The proposed development responds to the surrounding context and its prominent location within the Liverpool city centre. It provides an appropriate scale, responding to the existing built form and its local context surrounded by TAFE, Liverpool Girls High School and residential development. The new ISB has been designed to provide a transition in built form along the streetscape, incorporating tower elements that transition down to a smaller fine-grain pattern through lower scale components that connect the three towers.
	Objective 2. Better Performance – sustainable, adaptable and durable	NSW Health Infrastructure has taken a responsible approach to ensuring the principles of ESD are incorporated into the CSB ensuring effective and environmentally responsive ESD initiatives including: • The proposed development will be required to deliver a 10% improvement on National Construction Code (NCC) for energy efficiency in building fabric and building services / systems through JV3 modelling; • Target certified 5 star self-certified equivalency rating against the Green Building Council of Australia (GBCA) Design and As-Built version 1.3 rating tool; and • Propose strategies in response to the CSIRO projected impacts of climate change. Further discussion is provided in **Section 6.24**.
	Objective 3. Better for Community – inclusive, connected and diverse	The proposed development incorporates accessible access to cater to the varying needs of the public who will use the facilities. The site will have pedestrian paths that connect to the surrounding streetscape allowing access by public transport to ensure suitable access arrangements for all members of the community. The hospital will offer improved services and capacity to support the needs of the district.
	Objective 4. Better for People – safe, comfortable and liveable	The proposed development has sought to balance the operational needs of the hospital while providing a fit for purpose building that incorporates high quality design features to make patients and staff feel comfortable. The proposed development will also include secured open space and outdoor seating areas, to enhance passive surveillance to public and private areas. The CPTED principles are discussed in **Section 6.6**.
	Objective 5. Better Working – functional,	The proposed development seeks to integrate and link in with the existing hospital campus to provide a facility that will improve the operational efficiency and meet the health care needs of the growing population.

<table>
<tr><th>Instrument/Strategy</th><th colspan="2">Comments</th></tr>
<tr><td></td><td>efficient and fit for purpose</td><td></td></tr>
<tr><td></td><td>Objective 6. Better Value – creating and adding value</td><td>The proposed development will cater for the increased health demands of the community, whilst meeting the NSW Government's budget for the works.</td></tr>
<tr><td></td><td>Objective 7. Better Look and Feel – engaging, inviting and attractive</td><td>These design principles have informed the proposed development and are illustrated in the Design Statement prepared by Fitzpatrick and Partners and included in Appendix C.</td></tr>
<tr><td colspan="3">State Legislation</td></tr>
<tr><td>EP&A Act</td><td colspan="2">The proposed development is consistent with the objects of the EP&A Act for the following reasons:
It allows for the orderly economic development of the land for a public use and provides improved health care infrastructure that is able to implement contemporary models of care;
It allows for additional employment opportunities throughout the construction and operation phases;
It will facilitate ecologically sustainable development;
It achieves a high-quality design outcome that will benefit patients, staff and visitors; and
It is a development for public purposes and will facilitate the delivery of community spaces.
The proposed development is consistent with Division 4.7 of the EP&A Act, particularly for the following reasons:
The development has been declared to be State significant development;
The development is not prohibited by an environmental planning instrument; and
The development has been evaluated and assessed against the relevant heads of consideration under section 4.15(1).</td></tr>
<tr><td>EP&A Regulations</td><td colspan="2">The EIS has addressed the specification criteria within clause 6 and clause 7 of Schedule 2 of the EP&A Regulation. Similarly, the EIS has addressed the principles of ecologically sustainable development through the precautionary principle (and other considerations), which assesses the threats of any serious or irreversible environmental damage (see Section 6.24).

As required by clause 7(1)(d)(v) of Schedule 2, the following additional approvals will be required in order to permit the proposed development to occur.
<table>
<tr><th>Act</th><th>Approval Required</th></tr>
<tr><td colspan="2">Legislation that does not apply to State Significant Infrastructure</td></tr>
<tr><td>Fisheries Management Act 1994</td><td>N/A</td></tr>
<tr><td>Heritage Act 1977</td><td>N/A</td></tr>
<tr><td>National Parks and Wildlife Act 1974</td><td>N/A</td></tr>
<tr><td>Rural Fires Act 1997</td><td>N/A</td></tr>
<tr><td>Water Management Act 2000</td><td>N/A</td></tr>
<tr><td colspan="2">Legislation that must be applied consistently</td></tr>
<tr><td>Fisheries Management Act 1994</td><td>No</td></tr>
<tr><td>Mine Subsidence Compensation Act 1961</td><td>No</td></tr>
<tr><td>Mining Act 1992</td><td>No</td></tr>
<tr><td>Petroleum (Onshore) Act 1991</td><td>No</td></tr>
<tr><td>Protection of the Environment Operations Act 1997</td><td>No</td></tr>
<tr><td>Roads Act 1993</td><td>Yes</td></tr>
<tr><td>Pipelines Act 1967</td><td>No</td></tr>
</table></td></tr>
<tr><td>Biodiversity Conservation Act</td><td colspan="2">An assessment of biodiversity impacts is provided in Section 6.19. A Biodiversity Development Application Report is provided in Appendix S.</td></tr>
<tr><td>SEPP (Infrastructure)</td><td colspan="2">The aim of this SEPP is to facilitate the effective delivery of infrastructure across the State, including providing for consultation with relevant public authorities about certain development during the assessment process.

Schedule 3 of the SEPP states the threshold for traffic generating development that is to be referred to RMS. This threshold is 100 or more beds for sites with access to a classified road, or 200 or more beds for sites with access to any road. The proposed development is expected to add an additional 187</td></tr>
</table>

Instrument/Strategy	Comments	
	inpatient beds from the existing 713 beds. Therefore, the proposed development will require referral to the RMS.	
SEPP (State and Regional Development)	The aim of this policy is to identify development that is SSD. Pursuant to the SEPP SRD a project will be SSD if it falls into one of the classes of development listed in Schedule 1 of the SEPP. 'Hospitals, medical centres and health research facilities' with a CIV of $30 million or more are identified as SSD and are considered to be development of State significance. The proposed development has a CIV of greater than $30 million and so qualifies as SSD. A CIV Statement has been prepared by C2R Consulting and is included under a separate cover.	
SEPP 19 (Bushland in Urban Areas)	Clause 9 of SEPP 19 – Bushland in Urban Areas, applies to land which adjoins bushland zoned or reserved for public open space purposes. As the Subject Land is not situated adjacent to bushland zoned or reserved for public open space purposes, SEPP 19 does not apply.	
SEPP 33 Hazardous Development	A Preliminary Hazards Analysis has been undertaken by JK Environment and is included at **Appendix Q**. Hazards and risks are further discussed at **Section 6.9**.	
SEPP 44 (Koala Protection)	SEPP 44 applies to all local government areas listed on Schedule 1 of the policy. The identification of an area of land as SEPP 44 is determined by the presence of Koala feed tree species listed in Schedule 2 of the policy, which constitutes at least 15% of the total number of trees in the upper or lower strata. The subject site contains 1 feed tree species known as *Eucalyptus microcorys.* This species however, does not comprise at least 15% of the total number of trees in the upper or lower strata and therefore the site does not constitute a Potential Koala Habitat. Further discussion is provided in the Biodiversity Development Assessment Report at **Appendix S**.	
SEPP (Koala Habitat Protection) 2019	An assessment of the Koala Habitat Protection SEPP has been undertaken by Narla at **Appendix S**. As the Hospital land does not occur within an area of contiguous habitat or between areas of habitat with connectivity and is located in a highly fragmented landscape, the site therefore does not meet the definition of 'core koala habitat' and no further assessment under the SEPP is required.	
SEPP 55	JK Environments have completed a contamination assessment, which is available at **Appendix L**. The report concludes that the potential for contamination constraints at the site with respect to the proposed development is considered to be low and the site is suitable from a contamination perspective for the proposed development. Further information regarding contamination is provided at **Appendix L**.	
SEPP 64 (Advertising and Signage)	This application does not seek approval for signage.	
Draft SEPP (Remediation of Land)	An ongoing review of SEPPs by the Department has resulted in the proposed repeal of SEPP 55, retaining some of its elements and adding new provisions to establish a modern approach to the management of contaminated land. In addition to the provisions addressed in SEPP 55 above, new provisions will be added in the new SEPP to: • Require all remediation work that is to be carried out without development consent to be reviewed and certified by a certified contaminated land consultant; • Categorise remediation work based on the scale, risk and complexity of the work; and • Require environmental management plans relating to post-remediation management of sites or ongoing operation, maintenance and management of on-site remediation measures (such as a containment cell) to be provided to Council. The Contamination Assessment provided at **Appendix L**, confirms the site can be made suitable for the proposed development.	
Draft SEPP (Environment)	The site is not identified as being subject to the provisions for waterways, catchments, world heritage and urban bushland under the draft Environment SEPP.	
Local Planning Instruments and Controls		
Liverpool Local Environmental Plan 2008	Clause 2.1 – Zone	The site is zoned SP2 Infrastructure – Health Services Facility and Educational Establishment. Development of a Hospital is permissible with development consent.
	Objectives of SP1 Zone	The proposal is consistent with the SP2 zone objectives as: • It provides health infrastructure that is a specific use supported by the Zone. • The proposed development is compatible with Liverpool Hospital, being a health services facility; and • Does not prevent the use of the land for provision of further infrastructure as required within the site.

Instrument/Strategy	Comments	
	Clause 4.3 – Height of Buildings	The maximum building height on the site is 35m. The proposed maximum building height is 32.9m (RL12.2 from ground to RL 45.1 to rooftop plant). The proposed development complies with the height control.
	Clause 4.4 – Floor Space Ratio	The maximum FSR on the site is 2.5:1. The current hospital FSR is approximately 0.75:1 inclusive of all buildings on the eastern and western campus. The proposed development will result in the hospital having an overall FSR of 0.90:1. The proposed development therefore complies with the FSR control.
	Clause 5.10 – Heritage	Whilst the Hospital site itself is not identified as an item of heritage significance it is partially located within the Bigge Park Conservation Area on the Heritage map. The site is located close to a number of local heritage items in the area, including: • The local street network identified as 'Plan of Town of Liverpool (early town centre street layout–Hoddle 1827)'; • Liverpool College (TAFE) site, including Blocks A–G, chimneystack, fences, gatehouses and archaeological features (formerly Liverpool Hospital and Benevolent Asylum); • Bigge Park; and • Cast-iron letterbox (close to the corner of College and Elizabeth St). A Heritage Impact Statement has been prepared by RPS and is included in **Appendix I**. Further discussion is provided in **Section 6.10**.
	Key Sites	The site is identified by the Key Sites map which seeks to protect the Hospital helicopter airspace by restricting development that intrudes into the Hospital OIS contour - 42.71. An Aviation Statement has been prepared by AviPro and is included in **Appendix T** which confirms that the proposed development is well below the OLS and PANS OPS level for airport operations (Sydney (Mascot), Western Sydney Aerotropolis and Bankstown). Appropriate mitigation measures will be put in place for the formal construction phase when cranes will operate.
	Land Reservation Acquisition	The site is not identified on the land reservation acquisition map.
	Foreshore Building Line	The Liverpool Hospital eastern campus is partially identified on the Foreshore Building Line Map. Given that the proposed development is located wholly within the western portion of the western campus there will be no impact on the nature foreshore processes, nor will it affect the significance or amenity of the area.
	Environmentally Sensitive Land	The Liverpool Hospital eastern campus is partially identified on the Environmentally Sensitive Land Map. Given that the proposed development is located wholly within the western portion of the western campus, there will be no impact on wetlands, bushland or wildlife corridors.
	Clause 7.2 – Sun access in Liverpool City Centre	Sun access to Bigge Park is protected by the following clause: *Land within 9m of the public right of way on the northern side of Elizabeth Street, opposite Bigge Park, between Bigge Street and College Street is limited by a maximum height of 20 metres.* As shown in the Architectural Design Report included in **Appendix C**, the proposed development has been setback 9m at the 20m height limit stipulated in clause 7.2. While the proposal will involve a minor increase to overshadowing on Bigge Park during the winter solstice, this is predominantly during the morning period where it effects the north eastern corner of the park. Further discussion is provided in **Section 6.2.2**.
	Clause 7.7 – Acid Sulfate Soils	The site is identified as being located on land with Class 5 Acid Sulfate Soil. In accordance with Clause 7.7(4) a detailed site investigation has been prepared that confirms an acid sulfate soils management plan is not required. See **Section 6.23**.
	Clause 7.8 – Flood planning	The western campus is identified as being Flood Prone however it is not identified as being within a flood planning area. Further discussion is provided at **Section 6.15** and at **Appendix P**.
	Clause 7.5 - Design excellence in Liverpool City Centre	Development involving the construction of a new building or external alterations to an existing building in the Liverpool City Centre is to exhibit design excellence, in consideration of Clause 7.5, the proposal exhibits design excellence as:

Instrument/Strategy	Comments	
		• Is of a high standard of architectural design, with materials, detailing and articulation that are appropriate to the building type and location. The materials and the treatment of the ISB will contribute towards enhancing the character of the hospital campus and reaffirming the prominence of the Liverpool Hospital Precinct. • The ISB is provided at a scale consistent with the surrounding built form and in keeping with the hospital. In particular, the building responds to the CSB. The materiality of the building will continue to build a distinct transformative identity for the hospital and enhance its relationship with the community. • Offers a modern solution with hints of the character of the local landscape and place in the community through careful use of colour. • Has a form and external appearance that will significantly improve the quality and amenity of the public domain by: – Creating a series of unique landscaped spaces; – Providing areas of open lawn, raised planter beds and seating; and – Landscaping of the entry forecourt with feature tree planting. • Does not detrimentally impact on identified view corridors. The proposal enhances the western hospital campus and provides a new high quality building which enhances the setting of surrounding buildings. • Provides a built form that will contribute to the interest and vibrancy of the health precinct, while respecting Biggs Park with an appropriate scale and setback. • Has an appropriate bulk and form. • Is capable of addressing potential environmental impacts, such as sustainable design, overshadowing, visual and acoustic privacy and noise. Detailed consideration of the design response and rationale is provided by Fitzpatrick and Partners at **Appendix C**. The proposed development has undergone a number of design iterations and consultation has been undertaken with the GA NSW to ensure the proposal meets the requirements of Better Placed NSW and to ensure design excellence is achieved.
	Clause 7.17 Airspace Operations	The site is identified by the Key Sites map which seeks to protect the Hospital helicopter airspace by restricting development that intrudes into the Hospital OIS contour - 42.71. An Aviation Statement has been prepared by AviPro and is included in **Appendix T** which confirms that the proposed development is well below the OLS and PANS OPS level for airport operations (Sydney (Mascot), Western Sydney Aerotropolis and Bankstown). Appropriate mitigation measures will be put in place for the formal construction phase when cranes will operate.
	Clause 7.17A Hospital Helicopter Airspace	
Liverpool Development Control Plan 2008	It is noted that development control plans are not a matter for consideration in the assessment of SSDAs by virtue of Clause 11 of SEPP SRD, which states that '*Development Control plans… do not apply to… State significant development*'. Notwithstanding this, the Liverpool DCP provides guidance for development. This guidance has been considered by the relevant consultants, where relevant (for example stormwater engineering requirements).	

6.2 Built Form and Urban Design

6.2.1 Bulk, Scale and Urban Design

The proposed built form and massing is a result of extensive design analysis undertaken by Fitzpatrick and Partners aimed at achieving an optimum urban design outcome for the existing hospital campus and its local context.

The proposed building is 6 storeys in height (32.9m), with three tower elements that are connected by a 3 storey (12m) podium running north-south. This presents the building as a series of distinct separate built forms, to help reduce the perceived bulk and scale from Bigge Park and surrounding residential development to the west.

Importantly, the massing has been focused towards Campbell Street with the tower elements stepping down towards Bigge Park.

Where the northern tower comes to ground level on Campbell Street, the human scale has been considered through a series of 'pop outs' for balconies and large glass components that promote human interaction as well as casual surveillance. The incorporation of these elements contributes to an appropriate sense of scale and a good urban design outcome in that it accentuates an appropriate transition from the tower component to a smaller, fine-grain pattern along Campbell Street and Goulburn Street.

Where the building adjoins the existing hospital development it provides appropriate connectivity, open space and form that allows for efficient functionality and use of space. In particular, the proposed building layout and massing is commensurate with the existing hospital campus and the density of the proposed building is reflective of the future health and education precinct.

6.2.2 Setbacks

The proposed development is located on the far western portion of the hospital campus and includes appropriate setbacks to the surrounding local context, including Bigge Park. The following setbacks have been incorporated:

- The podium level is aligned with the existing Clinical Services Building with a setback of 4.5m from the Elizabeth Street boundary;
- The ISB is setback 25.5m from the Goulburn Street boundary;
- The plant level is setback at the 20m height limit by 9m from the Elizabeth Street boundary line in accordance with clause 7.2 of the Liverpool LEP; and
- The tower elements at the northern end of Goulburn Street and Campbell Street adopt a 0m setback.

These setbacks have had regard to the relevant controls, local context and the existing hospital campus and result in a suitably scaled development. While the siting and orientation of the proposal differs from that which currently exists, it is considered that this built form provides an improved urban design outcome and recognises the scale of other surrounding development.

6.3 Environmental Amenity

6.3.1 Solar Access and Overshadowing

Shadow diagrams are included in **Appendix B** illustrating the extent of overshadowing generated by the proposed development. The diagrams show the greatest impact of overshadowing throughout the year, being the winter solstice on June 21 at 9am, 12pm and 3pm.

The shadow diagrams show that the proposed development will result in minor shadowing the far north-eastern corner of Bigge Park and residential dwellings opposite Goulburn Street (to the west) during the early morning period (9am). These shadows are limited to the early morning period and these spaces will enjoy sunlight across the remainder of the day. Residential dwellings will maintain greater than 3 hours of sunlight mid-winter which is appropriate.

Within the hospital campus, the diagrams show that there is additional overshadowing than currently exists. Notwithstanding, the design and orientation of the ISB has ensured that the new open space landscaped areas will enjoy sunlight in either the morning or afternoon, ensuring that the proposed development will provide a variety of new open spaces for patients, staff and visitors.

The design of these spaces ensures access to sunlight as well as shade across the year. **Figure 35** - **Figure 37** illustrates the existing overshadowing and additional shadows as a result of the proposed development.

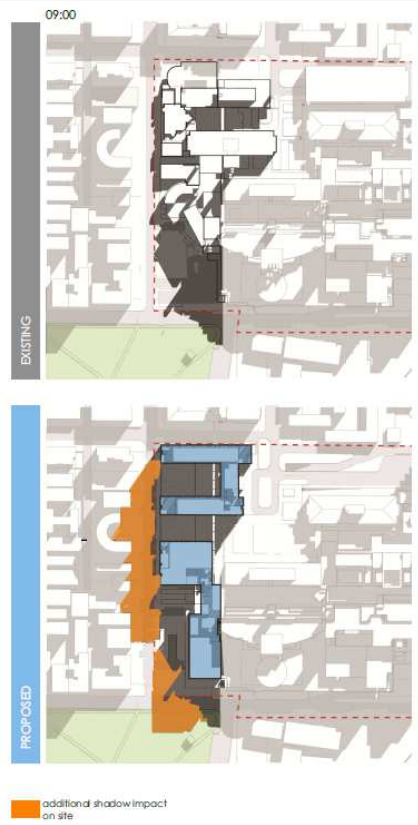

Figure 35 9:00am (21 June)

Source: Fitzpatrick and Partners

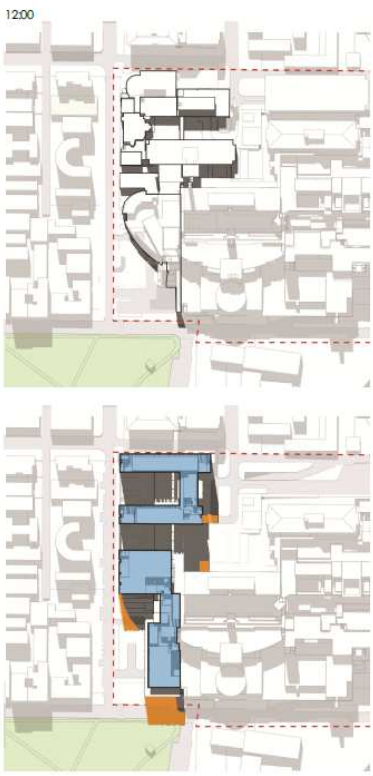

Figure 36 12:00pm (21 June)

Source: Fitzpatrick and Partners

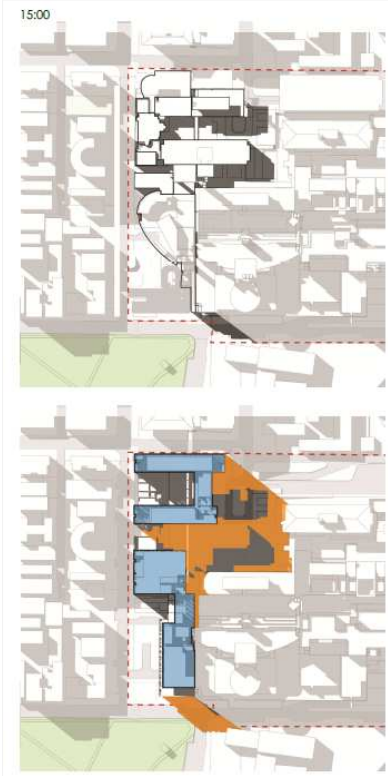

Figure 37 3:00pm (21 June)

Source: Fitzpatrick and Partners

6.4 Visual Privacy

The proposed development is located within a historic and well-established health and education precinct within the context of Liverpool CBD. The new ISB is located wholly within the existing hospital campus and has been designed to provide appropriate setbacks to the boundary and surrounding development context.

The setback to residential dwellings to the west is generally 26 metres or greater, providing sufficient setback to maintain privacy for residents. To further mitigate privacy concerns, the proposal incorporates louvres and directional screening to the windows of the new ISB and in some locations vegetation will ensure visual privacy to and from the site.

6.4.1 View Impacts

Consideration has been given to the impact of the proposed development on existing views from the surrounding area. Three viewpoints were selected for the view impact assessment that are publicly accessible locations from the corner of Campbell Street and Goulburn Street, Bigge Park and Campbell Street and Forbes Street. These locations have been chosen to illustrate the visual impact of the proposed development from the public domain.

Photomontages of the proposal have been prepared by Fitzpatrick and Partners and are shown in **Figure 38-Figure 40** and at **Appendix C** (note Figure 39 - fig and palms are retained – removed from render for visual clarity).

Figure 38 Campbell Street and Goulburn Street

Source: Fitzpatrick and Partners

Figure 39 Bigge Park

Source: Fitzpatrick and Partners

Figure 40 Campbell Street

Source: Fitzpatrick and Partners

While the proposal will change the view of the hospital from the public domain, the changes proposed are considered to provide an improved urban design outcome and are consistent with the evolution of the existing hospital campus and surrounding context. Through incorporating a setback from Elizabeth Street and Goulburn Street, the proposal recognises its significance in the local context and incorporates appropriate landscape elements to complement its existing character. Further, it is considered that existing view corridors are not of high significance whereby their retention should be required. Rather the proposal provides for a more inviting built form, recognising the human scale without interrupting any significant regional views.

6.4.2 Wind Impacts

An Environmental Wind Assessment has been prepared by Windtech and is included at **Appendix H**. The Assessment has assessed the local wind environmental at outdoor areas within and around the site. The results of the assessment indicate that the proposed development is relatively exposed to four prevailing winds from the Bankstown region; namely the north-easterly, southerly to south easterly and westerly winds. As a result, there is a possible slight impact on the wind comfort within certain areas of the development.

The Assessment states that the wind effects identified can be ameliorated with the consideration of the following treatments and strategies:

- The retention of existing and proposed tree planting along Campbell and Elizabeth Street;
- Extension of the proposed awnings along the northern facades of the Cancer Clinic and Conference Centre and retention of the proposed awning over the western entrance;
- The inclusion of densely foliating tree planting beneath any discontinuities in the proposed northern awnings;
- Retention of all proposed end-screen elements for awnings within the development;
- The inclusion of additional densely foliating vegetation to the south of the Emergency Department and to the west of the new reception area along Goulburn Street;
- Retention of the proposed tree planting to the north and south of the Emergency Drop Off zone and to the west of the Emergency Department;
- Retention of the proposed tree planting throughout the Forbes Street forecourt; and
- Retention of the recessed western ground floor façade at the entry to the new Emergency Department.

These amelioration measures have been adopted and incorporated into the design of the building and landscape.

6.5 Lighting Impacts

Due to the 24-hour nature of the hospital use, lighting will be required throughout the night. The primary sources of light spill from the building will come from areas of higher glazing and building entrances. Due to the location of the new entrances (surround by existing development and landscaped areas), 24-hour illumination of these areas will not have a significant impact on surrounding residential development.

6.6 Crime Prevention through Environmental Design

The development implements the principles of Crime Prevention through Environmental Design (CPTED), as identified in the Department of Planning's guidelines titled Crime Prevention and the Assessment of Development Applications 2001 are discussed below and in the Design Report at **Appendix C**.

Principle 1 – Natural Surveillance

Good surveillance means that people can see what others are doing. People feel safe in public spaces when they can easily see and interact with others. Would-be offenders are often deterred from committing crime in areas with high levels of surveillance. The development provides adequate natural surveillance in accordance with this principle.

The development has been designed to incorporate natural surveillance through the incorporation of design features that maximise visibility of people using public spaces. This will promote the reality and / or perception that open spaces are under casual surveillance during both the day and night. The well-lit nature of the hospital environment will also enhance passive and provide continuous activation throughout the site.

The following principles and strategies will be adopted to enhance natural surveillance, including:

- Promotion of passive surveillance by activating spaces for longer periods;
- Providing unrestricted sightlines between spaces and avoiding blind spots;
- Providing lighting to ensure safe use and effective surveillance of the space after hours; and
- Connection of spaces to promote pedestrian movement.

Principle 2 – Access Control

Access controls use physical and symbolic barriers to attract, channel or restrict the movement of pedestrians. As noted in Crime Prevention and the Assessment of Development Applications, effective access controls make it clear where people are permitted to go or not go and makes it difficult for potential offenders to reach and victimise people and damage property.

The development has been designed to incorporate natural barriers such as roadways and landscape, electronic and physical barriers through the use of the following:

- Limiting the number of public entries into the hospital and securing these after hours;
- Provision of CCTV monitoring of public areas to the hospital linked backed to a security monitored point;
- Providing 24 hour security station at the Emergency Department that can respond to other parts of the hospital during occasions of duress;
- Providing electronic access points of entry and intercoms;
- Providing access control to clinical departments after hours; and
- Providing 24-hour access control to engineering service areas and other sensitive sections of the hospital.

Principle 3 – Territorial Reinforcement

Territorial reinforcement refers to the clear identification of public spaces, and the creation of a sense of community ownership over such spaces. As noted in the Crime Prevention and the Assessment of Development Applications, people feel comfortable in, and are most likely to visit places which feel owned and cared for. Well used places also reduce opportunities for crime and increase risk to criminals.

Through the definition of space, territorial reinforcement provides social regulation. The proposed development has been designed with the integration of the following principles:

- Clearly defining spaces into public and back of house through physical barriers or appropriate directional means;
- Not mixing public, patient and back of house activity in the same space and therefore causing confusion in the diverse users of the spaces;
- Clearly identifying control points to clinical areas;
- Ensuring that circulation patterns are unambiguous and do not create confusion in offering too many options for travel;
- Reinforcing public areas by introducing amenities such as seating to attract desired users of the space and therefore deter undesirable activity; and
- Clearly defining zones for public lifts and non-public (clinical) lifts to allow staff secure movement without the need to cross non-secure public zones.

Principle 4 – Space Management

Space management refers to providing attractive, well maintained and well used spaces. As noted in Crime Prevention and the Assessment of Development Applications, space management strategies include site cleanliness, rapid repair of vandalism and graffiti and the removal of damaged physical elements.

To achieve effective place management and maintenance, the proposed development will incorporate the following:

- Increased balustrade heights or fully enclosing mesh to provide fall protection;
- Designing external spaces with robust finishes that require minimal maintenance;
- Ensuring clear observation lines to open areas that would be of high risk to the public such as loading docks and staff parking zones; and
- Restricting access to sensitive areas such as goods lifts.

6.7 Traffic, Access and Parking

A Transport and Accessibility Impact Assessment has been prepared by GTA Consultants and is included at **Appendix E**. The assessment includes details around traffic movements, carparking and access arrangements. Further, the report outlines the existing surrounding road network arrangements and conditions and provides an assessment of the traffic and parking impacts associated with the proposed development.

As discussed in **Section 2.2.2** and **Section 4.6**, a separate SSD application has been prepared for the construction of a new multi storey car park in the north eastern portion of the western campus that will service the new ISB and broader hospital campus. Therefore, this assessment considers other works occurring within the hospital, as relevant.

6.7.1 Operational Parking

Car Parking

A parking demand study (PTC 31 January 2019) was prepared in 2019 to forecast future parking demand. Based on existing parking demand, travel characteristics and forecast increase in staff and patient activity, this modelling identified that an additional 469 spaces would be required by 2025/26 assuming no change in travel mode share; or an additional 268 parking spaces if assuming a reduction of 10 per cent driving mode share.

The hospital is targeting a minimum five per cent reduction in driving mode share through implementation of travel planning initiatives which results in a nett increase parking requirement of 368 parking spaces to meet demand in 2025/26.

The existing hospital campus currently provides 2,295 car parking spaces for staff and visitors. As discussed in **Section 2.2.2** and **Section 4.6**, a separate application will be submitted to the Department for the construction of a new multi storey car park and at-grade parking in the north eastern portion of the western campus. These works will service the broader hospital campus, including the new ISB and the MSCP will be operational prior to the proposed ISB development is completed.

Overall, works at Liverpool Hospital will deliver a nett increase of 386 additional car parking spaces, representing an increased total of 2,681 parking spaces on the campus (see **Table 8**) that will satisfy parking demand for the new ISB to 2025/2026.

Table 8 Change in car parking supply

Building location	Existing	Future	Change
CP1	143	109	-34*
CP2	597	1,097	+500
CP3	141	79	-56*
CP4	780	780	0
CP5	575	575	0
Health Services Building	35	35	0
Western Campus Fleet Vehicles Carpark	24	0	-24*
Total	**2,295**	**2,681**	**+386**

**The removal of these spaces form part of separate applications*

Figure 41 Future car parking locations

Source: GTA Consultants

6.7.2 Traffic Generation

As discussed in the Transport and Traffic Impact Assessment at **Appendix E**, the traffic generation for hospitals is influenced by the car parking supply.

To understand the traffic generation of the hospital GTA, has assessed the traffic generated from the existing CP2 multi storey and at-grade car park (which will be replaced by the new multi storey car park under a separate application). They found that it generates approximately 320 and 225 trips in the AM and PM peak hours respectively. Based on 597 car parking spaces in the existing CP2 car park, this would result in a traffic generation rate of 0.54 and 0.38 trips per car space in the AM and PM peak hours respectively.

Accordingly, these rates have been adopted for the proposed redevelopment in determining traffic generation by the new multi storey and at-grade car park development, which will result in a net increase in parking of 500 spaces in CP2. **Table 9** below provides the estimated traffic generation.

Table 9 Post development traffic generation rates

Peak Hour	Net increase in parking	Traffic generation rate (trips / hour)	Traffic generation estimates (trips/hour)		
			In	Out	Total
AM	500 spaces	0.54	243	27	270
PM		0.38	38	152	190

Source: GTA Consultants

Table 9 illustrate that the site will generate an additional 270 and 190 vehicle trips in the AM and PM peak hours respectively.

It is noted that proposed development at Westfield Liverpool and 26 Elizabeth Street will have an impact on traffic generation in the Hospital locality. GTA has outlined the operation of key intersections as a result of these developments at Table 9.3 of the Traffic Assessment at **Appendix E**.

Intersection Performance

The additional traffic generated by the Hospital redevelopment has been modelled in SIDRA. **Table 10** below presents the existing operational performance and the proposed operational performance of key intersections inclusive of cumulative development at Westfield and 26 Elizabeth Street. This assessment does not include introduction of the Campbell Street share way, which is presented at **Table 10** below. Based on the trip generation rates, cumulative development and trip distribution analysis, the hospital campus will continue to operate satisfactorily in the AM and PM peak periods, with minor increases to delays and queues. Importantly, the new hospital main entry on Goulburn Street is expected to operate satisfactorily, with minimal queuing when vehicles are waiting to turn right into the site.

Table 10 Post development operating conditions

Intersection	Peak	Degree of Saturation		Average Delay		Queue (m)		Level of Service	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Lachlan Street/ Hart Street	AM	0.24	0.36	9	7	10	17	A	A
	PM	0.32	0.4	9	9	14	20	A	A
Forbes Street / Campbell Street Hospital Access	AM	0.30	0.16	4	6	9	7	A	A
	PM	0.10	0.11	4	7	4	4	A	A
Goulburn Street / Hospital Access	AM		0.12		7		0		A
	PM		0.19		7		0		A
Hume Highway / Bigge Street	AM	0.68	0.93	20	31	79	106	B	C
	PM	0.75	0.81	19	20	99	113	B	B
Burnside Drive / Northern Access Road	AM		0.01		12		1		A
	PM		0.01		9		1		A
Burnside Drive / Burnside Drive Bridge	AM		0.02		11		1		A
	PM		0.25		1		8		A
Burnside Drive / Multi storey car park access	AM	0.03	0.02	9	6	1	0	A	A
	PM	0.06	0.03	10	6	2	0	A	A
Bigge Street / Campbell Street	AM	0.68	0.70	13	14	68	74	A	A
	PM	0.47	0.40	15	15	47	52	A	B
Bigge Street / Elizabeth Street	AM	0.55	0.61	19	19	101	110	B	B
	PM	0.52	0.52	16	16	65	65	B	B
Campbell Street / Goulburn Street	AM	0.47	0.40	16	16	46	35	B	B
	PM	0.24	0.20	15	14	25	22	B	A
Elizabeth Street / Goulburn Street	AM	0.20	0.21	6	6	6	6	A	A
	PM	0.32	0.33	6	6	9	10	A	A
Hume Highway / Remembrance Avenue	AM	0.94	0.96	24	27	189	244	B	B
	PM	0.82	0.83	26	27	182	187	B	B
Elizabeth Street / College Street	AM	0.12	0.11	4	4	1	5	A	A
	PM	0.16	0.16	4	4	6	6	A	A
Bigge Street / Moore Street	AM	0.68	0.69	22	22	146	150	B	B
	PM	0.53	0.54	23	23	126	127	B	B
Speed Street / Newbridge Road	AM	0.80	0.68	22	16	286	211	B	B
	PM	0.8286	0.82	24	21	362	318	B	B

Source: GTA Consultants

Table 10 shows that the key intersections surrounding the hospital will continue to operate satisfactorily in the AM and PM peak periods, with minor increases to delays and queues.

It is noted that the Hume Highway / Bigge Street intersection currently experiences significant queuing in the AM and PM peak periods and during the post development scenario, this is expected to experience a very minor increase in the average queuing of approximately 12m (equivalent to 2 cars), and a minor increase in average delay of up to four seconds compared to SIDRA results assessing the Westfield and 26 Elizabeth Street development (see Table 9.3 of **Appendix E**). Overall, the intersection will operate at level of service B and C.

The new intersection on Burnside Drive (subject to a separate concurrent SSD application, refer to **Section 2.2.2**) which provides access to the northern link road, Burnside Drive bridge and multistorey car park are also expected to operate efficiently with minimal delays and queues overall. The queues for the right turns are expected to be accommodated in the provided turning bays.

As shown in **Table 10**, the modelling indicates that all intersections will operate at a satisfactory LOS being mostly Level A, B or C in the post development scenario.

Future Council Works

It is understood that Council is investigating the opportunity to improve the operation of the Bigge Street/ Elizabeth Street intersection through implementation of right turn traffic signal arrows on the Bigge Street approaches and the addition of a dedicated right turn phase. It is noted that the anticipated increase in traffic at this location from the Hospital redevelopment itself is considered minor in comparison to the traffic generated by the surrounding proposed developments. Notwithstanding, SIDRA modelling indicates that the additional traffic generated by the Hospital redevelopment and surrounding developments could be accommodated at the intersection under its current arrangement. Further to this, preliminary modelling indicates that the additional phase would not improve the intersection operation from its current arrangement. It is recommended that TfNSW advise further on any potential upgrades to this intersection.

Overall, SIDRA modelling considering the surrounding developments and the Hospital redevelopment indicates that the anticipated increase in traffic can be accommodated on the surrounding road network, with minor increases to average delay and queuing expected at the key intersections.

6.7.3 Campbell Street Shared Zone

A shared zone is proposed along Campbell Street between Forbes Street and Goulburn Street to completement the strong pedestrian activity between the Ingham Institute on the northern side of Campbell Street and the main hospital campus on the southern side of Campbell Street. The shared zone will be designed with a one lane, two-way slow point and will run for approximately 100m.

Given the historical use of Campbell Street to support access to the hospital and facilitate pick-up and drop-off on Forbes Street related to the schools (and associated existing traffic volumes), several measures are proposed to reduce traffic volumes along Campbell Street. These include the following:

- A self-enforcing a 10km/h speed limit for the extent of the shared zone, with audio-tactile entry treatments;
- Implementation of a one-lane, two-way slow point within the shared zone to increase travel times through the street and therefore divert traffic to alternate routes including Forbes Street and Burnside Drive; and
- Modifications to the median at the hospital access to limit access to left -in only, requiring vehicles entering the hospital access to approach from Forbes Street or Burnside Drive.

In addition, traffic volumes could be further reduced through the implementation of additional measures, if required, including:

- Provide appropriate directional signage to encourage visitors to use the main entrance on Goulburn Street. Should CP1 be fully occupied, drivers can continue through the internal connection to CP3 or the new multi-storey car park.
- Encourage staff to access the staff car parks from Burnside Drive rather than cutting through the link road to the north of the new multi-storey car park.

- Review directional signage to the hospital and modify in order to encourage more traffic to use Burnside Drive via Bigge Street or Remembrance Avenue from the Hume Highway.
- Consult with Liverpool Girls and Boys High School to relocate the school pick-up and drop-off area onto Lachlan Street and re-route buses via the link road and Burnside Drive.

A potential improved directional signage strategy to encourage more hospital traffic to utilise Burnside Drive via Remembrance Avenue/ Hart Street or Bigge Street/ Lachlan Street is shown indicatively in **Figure 42**. If sought., this would be developed further in consultation with TfNSW and Council.

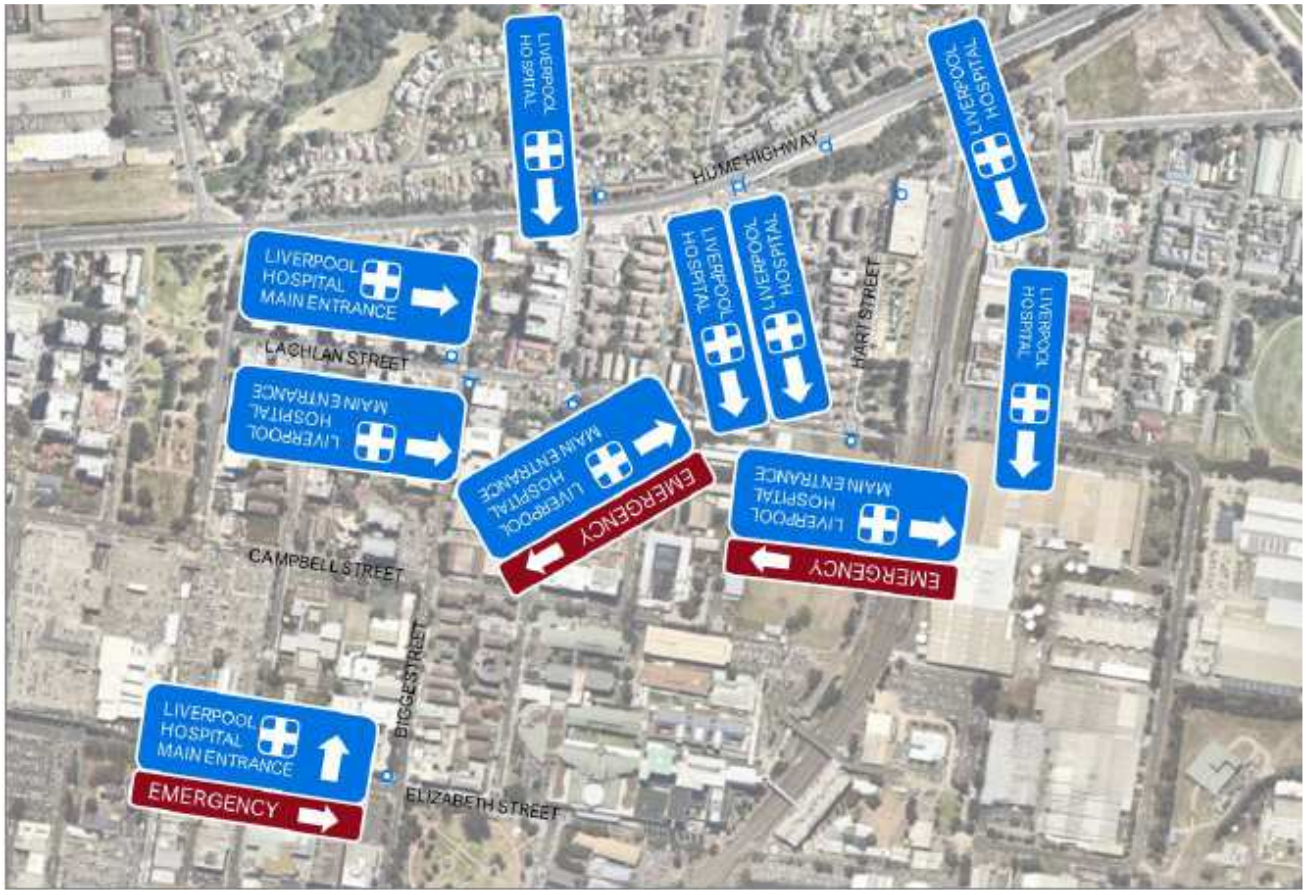

Figure 42 Improved wayfinding to encourage more hospital traffic to use Burnside Drive

Source: GTA

An assessment of the TfNSW shared zone criteria is provided at **Table 11** below which shows the proposed conversion of Campbell Street between Forbes Street and Goulburn Street would meet the intent of the Transport for NSW requirements.

Table 11 Campbell Street compliance with shared zone criteria

Features	Shared zone criteria	Compliance
Current traffic flows	≤ 100 vehicles per hour and ≤ 1,000 vehicles per day	Two-way flow is approximately 700 and 450 vehicles in the AM and PM peak hours respectively. The proposed shared zone will be designed with a one lane, two-way slow point to discourage drivers from using this section of Campbell Street. As a shared zone, Campbell Street will have a 10km/h speed limit which, in conjunction with the slow point, will increase travel times and divert traffic to alternative routes. The central median at the hospital access will also restrict vehicles to left-in only,

Features	Shared zone criteria	Compliance
		requiring any vehicles entering at this access to approach via Forbes Street. These measures will reduce the traffic volumes along this section of Campbell Street significantly closer to the typical shared zone requirements.
Current speed limit	≤ 50 km/h	Yes, speed limit is currently 40 km/h
Length of proposed Shared Zone	≤ 400 metres	Yes, length is approximately 100 metres
Current speed limit of adjoining roads	≤ 50 km/h	Yes, speed limit of adjoining roads is currently 40 km/h
Current carriageway width	Minimum trafficable width of 2.8 metres	Yes, two-way width is currently approximately 7 metres wide
Route access	Must not be located along bus routes or heavy vehicle routes except delivery or garbage trucks	This section of Campbell Street is currently a bus route for Liverpool Girls and Boys High School, as well as public buses. The proposed shared zone has been designed to accommodate 14.5m buses. Consultation with TfNSW is required to potentially re-route these buses to Goulburn Street, however the limited number of services could be accommodated safely within the shared zone.
Streets with narrow or no footpaths	Where pedestrians are forced to use the road	The anticipated volume of pedestrian crossing movement at various locations along the street are considered sufficient to justify the shared zone, with no need to force longitudinal movements into the carriageway area.
Kerbs	Kerbs must be removed unless excepted by Roads and Maritime Services	Yes, could be incorporated into the design

Source: GTA Consultants

Intersection Performance as a result of Shared Zone

Traffic analysis has been completed to assess the impact on the surrounding road network as a result of the redistribution of traffic away from Campbell Street. The results indicate that all key intersections are expected to continue operating satisfactorily, subject to minor modifications at the Lachlan Street/ Forbes Street intersection.

Table 12 Intersection performance – Campbell Street shared zone

Intersection	Peak	Degree of Saturation		Average Delay		Average Queue (m)		Level of Service	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Lachlan Street/ Burnside Drive/ Hart Street	AM	0.24	0.25	9	9	4	4	A	A
	PM	0.46	0.46	8	8	9	9	A	A
Lachlan Street/ Forbes Street	AM	0.93	0.42	30	26	78	5	C	B
	PM	0.32	0.15	19	15	4	2	B	B
Lachlan Street/ Goulburn Street	AM	0.13	0.12	15	15	2	2	A	A
	PM	0.23	0.23	11	11	4	4	A	A
	AM	0.16	0.16	14	14	9	9	A	A

Intersection	Peak	Degree of Saturation		Average Delay		Average Queue (m)		Level of Service	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Campbell Street/ Goulburn Street	PM	0.12	0.12	14	14	6	6	A	A

Table 12 shows that SIDRA results indicate that with the increased traffic volumes on Lachlan Street following redistribution from Campbell Street, all intersections are expected to operate at satisfactory levels with the redistributed traffic.

The Lachlan Street/ Forbes Street intersection is expected to operate close to capacity as indicated by the degree of saturation of 0.93, with an average queue length of approximately 80 metres on the west approach during the AM peak hour. As such, any further increase in traffic could result in significant delays and queues, which in-turn may impact the adjacent Lachlan Street/ Goulburn Street intersection operation.

Potential mitigation measures were investigated to improve the operation of the Lachlan Street/ Forbes Street with the additional traffic on Lachlan Street. As though traffic volumes on Lachlan Street would be higher than though traffic volumes on Forbes Street under future arrangements, intersection performance was tested with reversed priority (making Lachlan Street the continuous road and installing stop signs on Forbes Street, as shown in **Figure 43**).

As noted above, the Lachlan Street/ Goulburn Street roundabout would be impacted by queuing from the Lachlan Street/ Forbes Street, so addressing Lachlan Street/ Forbes Street also resolves any potential issues at the Lachlan Street/ Goulburn Street intersection.

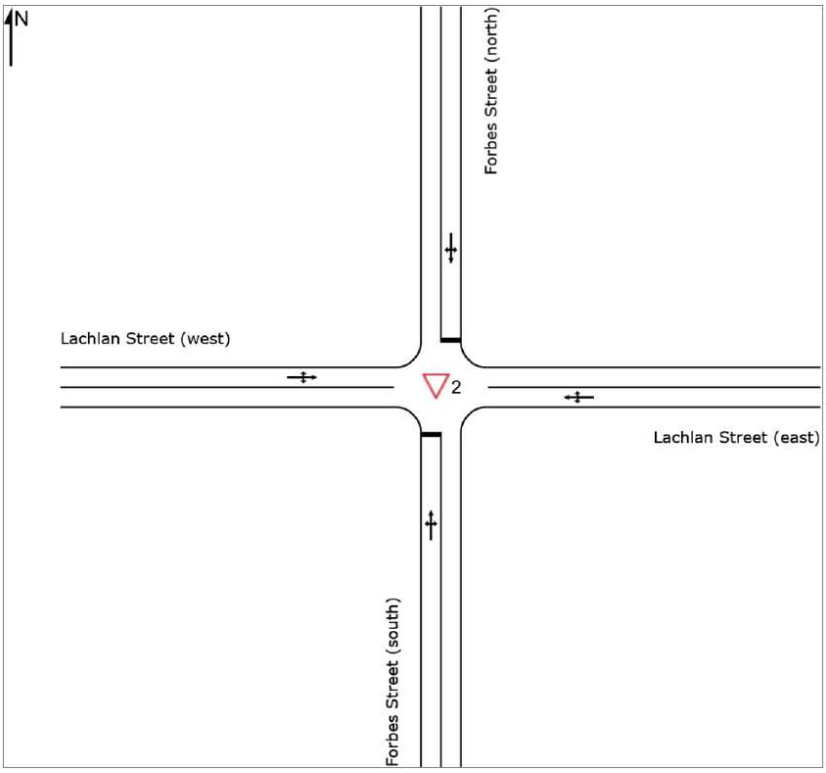

Figure 43 Proposed Lachlan Street/ Forbes Street intersection (alternate layout)

Source: GTA

SIDRA results at **Table 12** indicate that with the proposed mitigation measures, the redistributed traffic following implementation of the proposed shared zone treatment in Campbell Street can be accommodated by the surrounding road network.

6.7.4 Accessible Parking

The new multi storey car park will provide a total of 1,097 new car parking spaces and 22 accessible car parking spaces. This complies with the BCA requirements of one space per 50 car parking spaces for the first 1,000 spaces and 1 space per 100 car parking spaces and 1 space per 100 car parking spaces or part thereof in excess of 1,000 car parking spaces.

6.7.5 Motorcycle Parking

The new multi storey car park will provide a total of 55 motorcycle spaces, consistent with Liverpool DCP rate of 1 per 20 car spaces.

6.7.6 Bicycle Parking

Provision of bicycle parking is provided with reference the Planning Guidelines for Walking and Cycling (Department of Planning, 2004). The guidelines suggest the following bicycle parking provisions for a hospital:

- Staff (long-term use) – rate of five to 10 per cent of staff.
- Visitor (short-term use) – rate of five to 10 per cent of staff.

Given the location of the hospital and the limited surrounding cycling infrastructure, GTA recommend that a bicycle parking rate of five per cent of staff is adopted for both staff and visitor provisions, which represents around 24-26 cycling trips per day by staff. The following bicycle parking is proposed:

  - 25 bicycle spaces for staff in the basement of the CP1 car park
  - 25 spaces for visitors in the public domain

6.7.7 End of Trip facilities

It is noted that many Hospital departments contain shower facilities for staff. Notwithstanding, End-of-trip facilities will be provided. The location of these facilities will be resolved during the detailed design of this project.

6.7.8 Emergency Services

As discussed, the relocation of the main hospital entrance from Elizabeth Street to Goulburn Street will reduce the volume of traffic directly adjacent to the ambulance access at the eastern end of Elizabeth Street. This will improve response times / reliability for emergency vehicles and conflicts around this intersection.

Access restrictions on Elizabeth Street will be imposed through boom gate control at the eastern end of the ambulance area and line marking and signage will be implemented to clearly identify this area as an emergency vehicle area, with access to authorised vehicles only.

6.7.9 Loading Facilities

As discussed in **Appendix E**, the proposed development is expected to increase service vehicle demand by approximately 25%, requiring at least 10 loading bays. Accordingly, in addition to the existing 5 bays in the southern loading dock (basement of the existing Alex Grimson building), 5 new bays will located within a new loading dock in the north-western corner of the campus at Basement Level 1 and will accommodate all HRV and MRV deliveries. This loading dock will be accessed via a ramp from the northern link road.

6.7.10 Vehicular Access

As discussed in **Section 4.6**, the main vehicular entrance is currently on Elizabeth Street and is proposed to be relocated onto Goulburn Street to reduce the number of turning movements near the emergency entrance on Elizabeth Street. The proposed development includes the following vehicular access points:

- Goulburn Street main entrance;
- Forbes Street drop off and pick up loop; and
- Burnside Drive (subject to a separate concurrent application, refer to **Section 2.2.2**).

Each of these areas has been designed to allow visitors to drop passengers off at the hospital and easily access the adjacent carpark. At the main entrance, drivers will be able to continue into the CP1 car park via a ramp off Goulburn Street, while drivers at the northern and eastern campus pick up / drop off areas are able to easily enter the new multi storey car park or CP3 via Burnside Drive.

Further, under the proposed development, service vehicle drivers will be directed to arrive and depart via Burnside Drive to minimise conflicts with ambulances. Access restrictions via Elizabeth Street will be imposed through boom gate control at the eastern end of the ambulance area and line marking and signage will be implemented.

6.7.11 Pedestrian Access

The primary pedestrian entrance to the hospital will be located on Goulburn Street, with several other accesses provided from Elizabeth Street, Burnside Drive and Campbell Street. This will ensure that pedestrian activity is evenly distributed across the site in several locations.

6.7.12 Public Transport

As discussed in the Transport Impact Assessment (**Appendix E**), there is currently around 3% of staff travelling to the hospital by bus and 9% of staff travel by train. Based on the anticipated increase of approximately 510 staff, this will equate to 15 additional bus trips in a peak hour (30 per day) or up to 46 trains in a peak hour (92 per day). In the context of the development and its location, this is considered minor and can be accommodated by the existing public transport network.

Further, it is noted that Campbell Street is currently used by school buses for the surrounding high schools, as well as local bus routes. Accordingly, a swept path analysis for a 14.5m bus has been completed to ensure these routes are able to be maintained. Further discussion is provided in **Appendix E**.

6.7.13 Green Travel Plan

A Green Travel Plan (GTP) has been prepared by GTA Consultants and is included at **Appendix E**. The GTP provides various measures with the aim to promote sustainable transportation. The GTP will be finalised in consultation with hospital user groups and through a Travel Plan Coordinator. The following measures and initiatives to encourage more sustainable modes have been established in **Appendix E**, as follows:

- Provide high quality and prominent bicycle parking and shower and changeroom facilities;
- Provide clear pedestrian and cyclist wayfinding;
- Provide shelters along walkways or near bus stops and street lighting;
- Encourage cultural change through:
  - Creating a bike user group (targeting staff living within 5km of the hospital);
  - Events such as ‘annual ride to work’ day;
  - Providing information detailing opportunities and facilities available to staff. This may include providing maps of the available cycling routes to and within the hospital;
- Provide prioritised carpool parking spaces on-site, including consideration for incentives such as prices, location and proximity to services;
- Encouraging staff that drive to work and park on surrounding roads to carpool through creation of a carpooling club or registry/ forum;
- Provide a Travel Access Guide (TAG) which would be provided to all staff and publicly available to all visitors. The document would be based on facilities available at the site and include detail on the surrounding public transport services and active transport initiatives. The TAG would be updated as the surrounding transport environment changes; and
- Providing public transport information boards/ apps to inform staff and visitors of alternative transport options (the format of such information boards would be based upon the TAG).

6.7.14 Construction Traffic

It is expected that peak vehicle activity will occur between January 2021 and December 2021 during construction of both the multi-storey car park and new ISB, with up to 100 vehicles per day or approximately 10 vehicles per hour between the two work areas. The location and separation of these work areas across the hospital will allow distribution of construction traffic between surrounding roads near the hospital, with vehicles associated with the MSCP approaching via Burnside Drive and exiting via either Burnside Drive or Forbes Street while the ISB traffic will approach via Goulburn Street (north) and existing via Goulburn Street (south). As such, the construction program and strategy will ensure construction traffic impact on the operation of the surrounding road network is minimised as much as possible. A preliminary Construction Traffic Management Plan has been prepared by GTA and is provided at **Appendix E**.

All construction vehicles will be restricted to the State and Regional Road network where practicable. Construction vehicles will generally approach from the Hume Highway and use local roads to access the hospital as shown at **Figure 44**.

Any construction worker arrivals and departures by vehicle would typically be outside of road network peak hours and as such is unlikely to impact the surrounding road network.

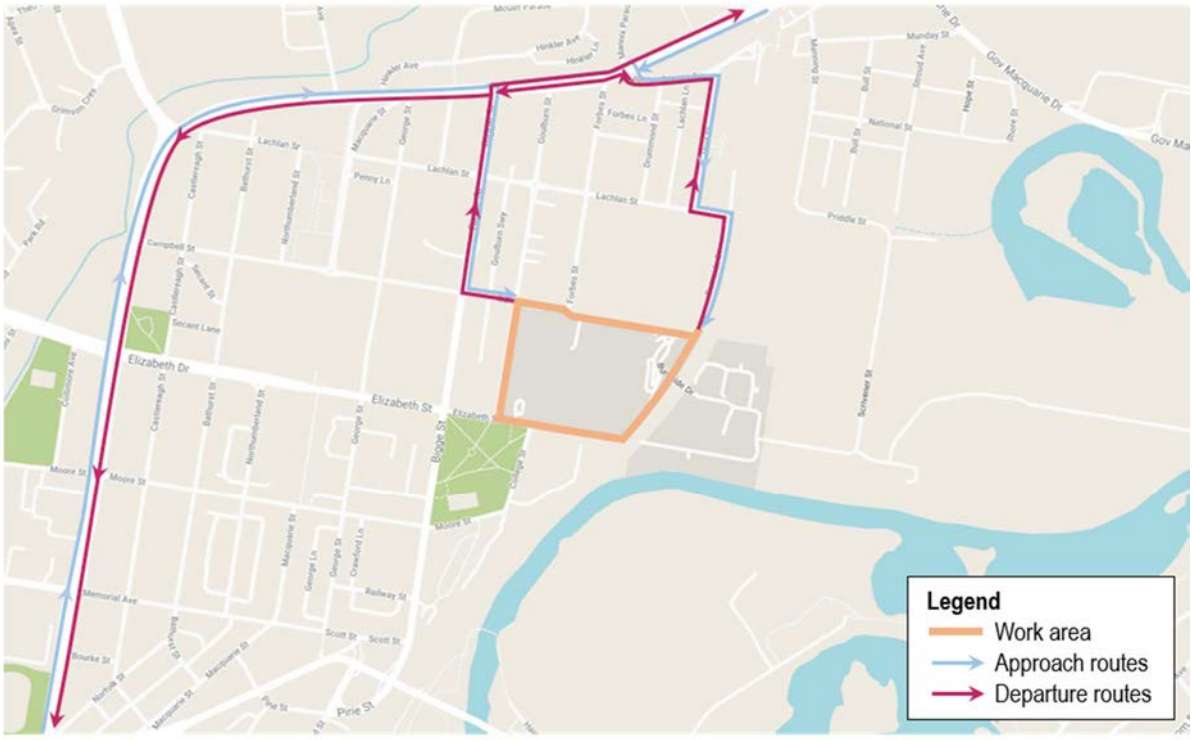

Figure 44 **Construction vehicle approach and departure routes**

Source: *GTA Consultants*

6.7.15 Construction Parking

Liverpool Hospital is highly constrained with limited space to provide on-site parking for all construction workers and construction worker vehicles will not be permitted to park on local streets. Health Infrastructure is exploring options to enable workers to park in a location that is accessible to the works site. A Construction Worker Transport Parking Management Plan will be developed with partners during design development that will outline worker parking arrangements during construction.

6.8 Noise and Vibration

An Acoustic Assessment has been prepared by Acoustic Logic and is included at **Appendix K**. The report includes an assessment of the potential noise and vibration impacts during the redevelopment and construction of the new ISB and the proposed operation of the building.

The surrounding land uses include the existing hospital campus, residential, commercial and educational receivers. The site monitoring and receiver locations are shown in **Figure 45** below.

Figure 45 Noise monitor locations

Source: Acoustic Logic

Acoustic Logic has assessed construction noise and vibration impacts in accordance with the following plans and policies:

- Liverpool Development Control Plan 2008;
- Australian and New Zealand AS/NZS 2107:2016 'Recommended design sound levels and reverberation times for building interiors';
- NSW Government, Health Infrastructure 'Engineering Services Guidelines' 2017;
- NSW Environmental Protection Authority 'Noise Policy for Industry' 2017;
- NSW Environmental Protection Authority, '*Interim Construction Noise Guideline'*;
- Australian Standards AS2436:2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- NSW Environmental Protection Authority, '*Assessing Vibration: A technical Guideline'*;
- DIN 4150, '*Vibration in Buildings (1999-02)*'; and
- ASHRAE Handbook 2007.

Construction Hours

The "recommended standard hours" for "normal construction", as proposed in the Interim Construction Noise Guideline (ICNG), are:

- *Monday to Friday 7:00am to 6:00pm;*

- *Saturday 8:00am to 1:00pm; and*
- *No work on Sundays and Public Holidays.*

Section 4.12 outlines the proposed general hours of work for construction and the special construction hours required on selected weekends. The reasons for the extended general construction hours on Saturday afternoons, plus the additional selected "weekend work" outside of the "recommended standard hours", are to ensure continuity of excellence in the provision of health services and patient care in accordance with the requirements of Liverpool Hospital. Currently Liverpool City Council impose restricted hours of operation on Campbell Street during weekdays to reduce impacts to the adjacent high schools and therefore the additional hours allow for health services and patient care to continue during weekday periods.

Having regard to the above, it is considered that the proposed hours of work are a "reasonable" variation or departure from the "recommended standard hours". The basis for this conclusion is to be found in:

- the definition of "reasonable" in the ICNG having regard to the nature and purpose of the proposed development.
- the analysis of the source/type of construction work noise likely to be generated by the ISB.
- the proposed construction management and recommended mitigation measures.

6.8.1 Construction Noise

EPA Guidelines adopt different strategies for noise control depending on the predicated noise levels at the nearest residences. For the nearest sensitive receivers, the noise effected levels occur when the construction noise exceeds ambient noise levels by:

- More than 10dB($L_{eq(15min)}$ for work during standard construction hours; and
- More than 75dB(a)$L_{eq(15min)}$ at nearby residences.

A summary of the noise emission management levels for the proposed hours of construction are detailed in **Table 13** below.

Table 13 Construction noise management levels

Location	Management Level – dB(A) $L_{eq(15min)}$
Residential receivers	"Standard Hours - Noise Affected" Level – 52 "Outside Standard Hours - Noise Affected" Level – 47 "Highly Noise Affected" Level - 75
Educational receivers	45
Hospital Wards and operating theatres	
Consulting Rooms	
Treatment Rooms	
Office Areas	
Operating Theatres	
X-Ray Areas	50

Source: Acoustic Logic

Intrusive noise emissions are associated with equipment typically having sound levels of approximately 95 to 120 dB(A). However, the level of construction noise will depend on the construction activity and where the activity is taking place. Noise from the loudest typical construction activities have been predicted to the nearest most affected sensitive receivers and are identified by Acoustic Logic in the Acoustic Impact Assessment at **Appendix K** and is summarised below at **Table 14**.

Table 14 Predicted noise generation to surrounding sensitive receivers

Activity	Receiver 1- Liverpool Hospital wards and consulting rooms	Receiver 2 - Goulburn Street residences	Receiver 3 - Consulting rooms/treatment rooms/office areas	Receiver 4 - Health Hub / Ingham Institute	Receiver 5 - Liverpool Girls High School	Receiver 6 - Liverpool TAFE NSW
External noise goal dB(A) $L_{eq\ (15min)}$ - Criteria	**45dB(A) (rooms) 50dB(A) (x-ray areas)**	**Standard Hours 52dB(A) Outside Standard Hours 47dB(A)**	**45dB(A)**	**45dB(A)**	**45dB(A)**	**45dB(A)**
Handheld jackhammer	35-56	65-85	36-53	33-57	23-43	23-47
Excavator with bucket	20-41	50-70	21-38	18-42	8-28	8-32
Excavator with hydraulic hammer	33-54	63-83	34-51	31-55	21-41	21-45
Semi-trailer	20-41	50-70	21-38	18-42	8-28	8-32
Demolition saw	28-49	58-78	29-46	26-50	16-36	16-40
Bobcat	20-41	50-70	21-38	18-42	8-28	8-32
Concrete pump	20-41	50-70	21-38	18-42	8-28	8-32
Cement mixing truck	20-41	50-70	21-38	18-42	8-28	8-32
Powered hand tools	10-31	40-60	11-28	8-32	0-18	0-22
Electric tower crane	11-32	41-61	12-29	9-33	0-19	0-23
Mobile crane	20-41	50-70	21-38	18-42	8-28	8-32
CFA Piling	18-39	48-68	19-36	16-40	6-26	6-30

Source: Acoustic Logic

As outlined at **Table 14**, while exceedances may occur and in particular to the Receiver 2 location, due to the nature of the construction activities it is expected that the period of exceedance will be intermittent. Further, the assessment confirms that the predicted construction noise levels are variable in nature and take into account the change in noise impact depending on where on the site work is being undertaken.

The assessment confirms that noise impacts from special construction hours largely comply with noise management levels, however some works would exceed the NML trigger of 47dB(A) for receivers on Goulburn Street. Accordingly, noise controls such as respite hours for noisy works and consultation with the nearest receivers are recommended. It is noted that the special construction hours are only required on selected weekends to facilitate the works program and would not occur every weekend.

As discussed in **Appendix K** appropriate amelioration methods and recommendations are to be adopted during the construction phase, which are outlined below.

Construction Vibration

The proposed activities that have the potential to produce significant ground vibration include demolition work and excavation works. Construction vibration has been assessed based on the following standards:

- German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*; and
- EPA *"Assessing Vibration: A technical guideline";* and
- ASHRAE Handbook 2007.

The vibration impacts are expected to be variable in nature and the acoustic report will be updated and reviewed once the construction methodology is finalised. Acoustic Logic has provided appropriate mitigation measures to ameliorate vibration impacts on surrounding receivers, as outlined below.

Construction Mitigation Measures

The assessment has made a number of recommendations to mitigate acoustic and vibration impacts. These measures can manage noise impacts to prevent any adverse impacts on residential receivers, including:

- Installation of barriers or screens at the source or receiver;
- Silencing devices in the form of engine shrouding or special industrial silencers fitted to exhausts;
- Installation of rubber matting over material handling areas to reduce the sound of impacts due to materials being dropped;
- Respite hours for noise activities, including consultation with affected neighbours;
- Sound treatment of specific equipment to reduce sound levels emitted;
- Establishment of site practices including fixed plant items as far as possible from residents and construction vehicles not queuing in residential streets;
- Sample testing of vibration impacts from any demolition or excavation works to sensitive receiving spaces prior to commencement; and
- Fortnightly reports detailing any vibration exceedances.

These recommendations have been adopted and form part of the mitigation measures at **Section 8.0**.

6.8.2 Operational Impacts

Acoustic Logic have identified that the major noise sources generated by the operation of the project site is the mechanical plant servicing the new ISB. However, Acosutic Logic provides that the mechanical plant and equipment will be required to satisfy the noise emission requirements detailed in the Noise Assessment Report at **Appendix K** and the selection of plant will be identified during the detailed design phase.

Operational Noise

The noise sensitive receivers surrounding the project site have been identified as being residential, commercial, Liverpool Girls High School and the existing hospital campus. The noise emissions from the plant servicing the project building have been assessed in accordance with the following plans and policies:

- Liverpool Development Control Plan 2008; and
- NSW Environmental Protection Authority 'Noise Policy for Industry' 2017.

Accordingly, pursuant to the relevant plans and policies, the project amenity noise level from all noise sources that is consistent with the general environment has been assessed and a summary is provided in **Table 15** below.

Table 15 Project amenity noise level criteria

Type of Receiver	Time of day	Recommended amenity noise level dB(A)L_{eq}	Project amenity noise level dB(A)$L_{eq,15min}$
Residential	Day (7am-6pm)	53	51
	Evening (6pm-10pm)	43	43
	Night (10pm-7am)	38	38
Commercial	When in use	63	
School classroom (internal)	Noisiest 1-hour period when in use	35	
Hospital Ward	Noisiest 1-hour period (internal)	35	
	Noisiest 1-hour period (external)	50	

Source: Acoustic Logic

At this early stage the selection of plant for the proposal has not been finalised and accordingly detailed acoustic design assessment cannot be undertaken. However, an indicative assessment of primary plant items has been undertaken.

In general, plant will be acoustically treated to prevent noise emissions from adversely impacting the surrounding properties. This may include selecting the quietest plant practicable, or treating the plant with enclosures, barriers, duct lining and silencers as required to comply with noise criteria. The main operational noise sources associated with the development are expected to be:

- Cooling towers;
- Air handling plant (air handling units, supply/exhaust/outside air fans); and
- Chillers.

Acoustic Logic confirm that the proposed new ISB and mechanical plant selected to service the project is capable of being acoustically treated to prevent noise emissions from adversely impacting surrounding sensitive receivers. This may include treating plant with enclosures, barriers, duct lining and silencers to comply with the sound level requirements. Further discussion is provided in **Appendix K**.

6.9 Hazards and Risks

State Environmental Planning Policy Number 33 - Hazard and Offensive Development (SEPP 33) establishes a protocol for planning for development that can be categorised as Potentially Hazardous or Potentially Offensive Development. The Department of Planning's SEPP 33 Guidelines (2011) establish screening thresholds for Dangerous Goods stored on site.

The Preliminary Hazard Analysis was undertaken by JK Environments (**Appendix Q**) to identify existing hazardous materials (e.g. radioactive, hazardous chemicals and dangerous goods) and risks associated with the use of such materials in the hospital for health services including pathology and radiation oncology. The proposed ISB development will include similar health services to the existing Hospital and therefore is expected to utilise similar hazardous materials.

A preliminary hazard risk analysis is provided at Table 6.1 of the PHA at **Appendix Q**. It is noted that while exposure to radioisotopes is considered rare, the initial risk rating in the PHA is considered 'High' and accordingly the ISB development could be considered a potentially hazardous industry.

JK confirm that analysis shows that the current controls, storage and transport implemented for the hazardous materials are sufficient to reduce the potential public exposure of hazardous materials to a low level. The controls will be similar to the existing framework at Liverpool Hospital, including storage and transport procedures for hazardous materials are to be implemented for the ISB once constructed and operational.

The following recommendations are proposed:

- Develop a formal methodology for the transport of the hazardous materials from their existing storage locations to the new ISB storage locations. The methodology should include controls and indecent response and should be reviewed by third party experts.
- The NSW EPA and SafeWork NSW should be contacted and advised of the proposed relocation of hazardous materials which relate to the relevant licences, prior to development of the formal methodology for transport of hazardous materials to the new ISB.
- Undertake regular audits of the hospital processes and procedures to assess if current best practice hazardous waste controls are in place.

6.10 Heritage

A Statement of Heritage Impact has been prepared by RPS and has been prepared in accordance with the NSW Heritage Manual and the Burra Charter. The Statement has assessed the proposed development's impact on surrounding heritage items including the:

- Bigge Park Heritage Conservation Area;

- Plan of the Town of Liverpool (item no. 89);
- Section 170 Heritage and Conservation Register Avenue Planting on Elizabeth Street; and
- Liverpool TAFE (item no. 80).

The Statement confirms that the proposal will not affect the significance of the Bigge Park Conservation Area or the Plan of the Town of Liverpool and it would not adversely affect the significance of Liverpool TAFE. While there is moderate potential for the Avenue Planting to be impacted as part of the proposed works due to the removal of some trees that are considered to be of local significance, appropriate mitigation measures including archival recording will be put in place. RPS confirm that the removal of the s170 Avenue Planting will not result in any significant heritage impacts.

Further, given the results of the archaeological testing and monitoring associated with the 2009 hospital redevelopment, the archaeological potential of the project area is assessed as low to nil. Therefore, the Statement provides the following conclusions:

- The proposal would not affect an item or area of local or State significance. The proposal should proceed with caution;
- Archival recording should take place to mitigate the loss of any s170 Avenue Planting;
- If a stone capped, brick or other drain is encountered, all work should cease in the affected area, the area cordoned off and an archaeologist contacted to record (photographic and scale drawn record) of the drain; and
- In the event that unexpected archaeological resources are identified in the course of the proposal, all work in the affected area should cease, the area should be cordoned off and Heritage NSW notified in accordance with Section 146 of the *Heritage Act 1977*. Further discussion is provided in **Appendix I**.

6.11 Aboriginal Heritage

An Aboriginal Heritage Cultural Heritage Assessment Report has been prepared by RPS and is included in **Appendix J** in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH [now DPIE] 2011), the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice) (DECCW [now DPIE] 2010) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (the Consultation Requirements) (DECCW [now DPIE] 2010).

A search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted by on 24 June 2019. The search identified six registered Aboriginal objects within the searched area. There are no registered Aboriginal objects located within the Project Area or within 500 metres of the Project Area.

An archaeological survey was undertaken by RPS and a representative of the Gandangara Local Aboriginal land Council (Gandangara LALC) on 25 November 2019. The survey determined that large portions of the Project Area are highly disturbed. No registered Aboriginal sites, unrecorded Aboriginal sites or areas of archaeological potential were identified. No additional cultural heritage values were identified by Gandangara LALC.
The following recommendations are made by RPS for the proposal:

- As no Aboriginal objects or areas of archaeological potential have been identified, the proposal may proceed with caution.
- Personnel, contractors and subcontractors should be made aware of all statutory obligations for Aboriginal cultural heritage under the National Parks and Wildlife Act 1974 and the Heritage Act 1977. This should be in the form of an induction prior to the commencement of work.
- If changes are made to the Proposal and work activities that are assessed in this report, further archaeological and / or cultural heritage assessment may be required.
- If suspected Aboriginal objects are identified during construction, work should cease immediately and the area cordoned off. Health Infrastructure must be notified, and an archaeologist engaged to assess and record the Aboriginal object, and formulate an archaeological or cultural heritage management plan. The plan must be implemented prior to work recommencing.
- In the unlikely event that human remains are identified within the Project Area, all work in the area must cease and the area cordoned off. The proponent must contact the local police. If the remains are thought to be Aboriginal, Heritage NSW must be notified on Enviroline (131 555). If Heritage NSW confirm that the remains

are Aboriginal, a management plan developed in consultation with the local Aboriginal community. Work must not recommence without approval from Heritage NSW.

These mitigation measures have been adopted and are included at **Section 8.0**.

6.12 Construction Waste Management

The Construction Waste Management Plan (**Appendix U**) has been prepared to assess the volumes and management of waste during the construction phase in accordance with the *Protection of the Environment Operations Act 1997* and the NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste.*

The Plan details the type, volume and disposal methods for all waste material during the construction phase. The WMP details the responsibilities of the principal contractor to lawfully dispose of waste and ensure that reports on the management and capacity of facilities to receive waste are recorded. Records will be kept of all wastes and recyclables generated and either used on the site or transported off-site during the demolition. Further discussion is provided in **Appendix U**.

6.13 Operational Waste Management

The Operational Waste Management Plan prepared by Waste Audit and included in **Appendix V**, addresses the appropriate segregation, containment and disposal of waste. The following table details the main waste streams that would be expected during the operational phase.

The total estimated waste generation during the operational phase is 2,945 litres (3m^3) of waste and recyclables per day and approximately 17,670 litres (17.7m^3) per week[1]. It is noted that the proposed waste management systems and practices will be integrated with the current waste management arrangements to ensure sufficient capacity across the site.

It is noted that the waste management systems and practices will be integrated with the current waste management arrangements. Waste and recycling bins will be located in dirty utility rooms, offices spaces, cleaner's rooms and patient areas as required for activities. Waste and recycling will be disposed of in the following bins:

- General Waste bin 660 litre (green);
- Clinical waste bin 120 litre (yellow);
- Recycling bin 660 litre (blue); and
- Cytotoxic waste in appropriate bags / sharps units (purple).

The bins will be collected by the hospital's general service staff and transported to the central waste storage areas as appropriate. These areas include:

- Basement in the new / old Clinical Building;
- Basement in the Grimson Building loading dock;
- Pathology loading dock; and
- HealthShare dock for HealthShare food waste.

Private contractors will provide collection and treatment / disposal of services, including:

- Veolia for cardboard / paper / recyclables;
- Shred X for security paper; and
- Redlam Waste Services (now Daniels) for Clinical Waste.

General waste will be stored in the on-site compactor and recyclables stored on the loading dock in bins while awaiting collection. The waste contractor will provide signage for bins and walls in waste storage rooms, and will only be accessible by hospital staff.

[1] These estimates are based on a '6 day' week for the provision of patient services.

The Operational WMP addresses the effective waste and recycling management in accordance with minimising waste reduction, impact to local residents and to reduce the amount landfilled and overall quantity that is generated. Further discussion is provided in **Appendix V**.

6.14 Hazardous Waste

Hazardous waste will be managed and disposed of as per the Safety Data Sheet requirements and Environmental Protection (Controlled Waste) Regulations 2004. A site-specific Contamination Management Plan will be developed and methods for the containment of airborne fibre emissions will be included in the plan.

All hazardous waste will be disposed of at approved waste facilities, in accordance with the requirements of the relevant legislation.

NSW Health operates under existing waste disposal guidelines for collection, control, storage and transport of clinical wastes that accord to NSW Health, NSW EPA, Safework NSW, relevant Australian Standards and industry best-practice guidelines.

6.15 Flooding

TTW has investigated the potential flood impact on the proposal (**Appendix P**) in accordance with the relevant provisions of the NSW Floodplain Development Manual (DIPNR, 2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity.

The Liverpool Hospital campus is affected by mainstream flooding and local overland flooding. Mainstream flooding is from Georges River to the south east of the site and the overland flooding is from the CBD catchment to the south and west of the site. The natural topography of the local catchment falls directly toward the low point in Goulburn Street, to the west of the hospital site. The combined extent of Council's mainstream flood modelling is shown in **Figure 46** below.

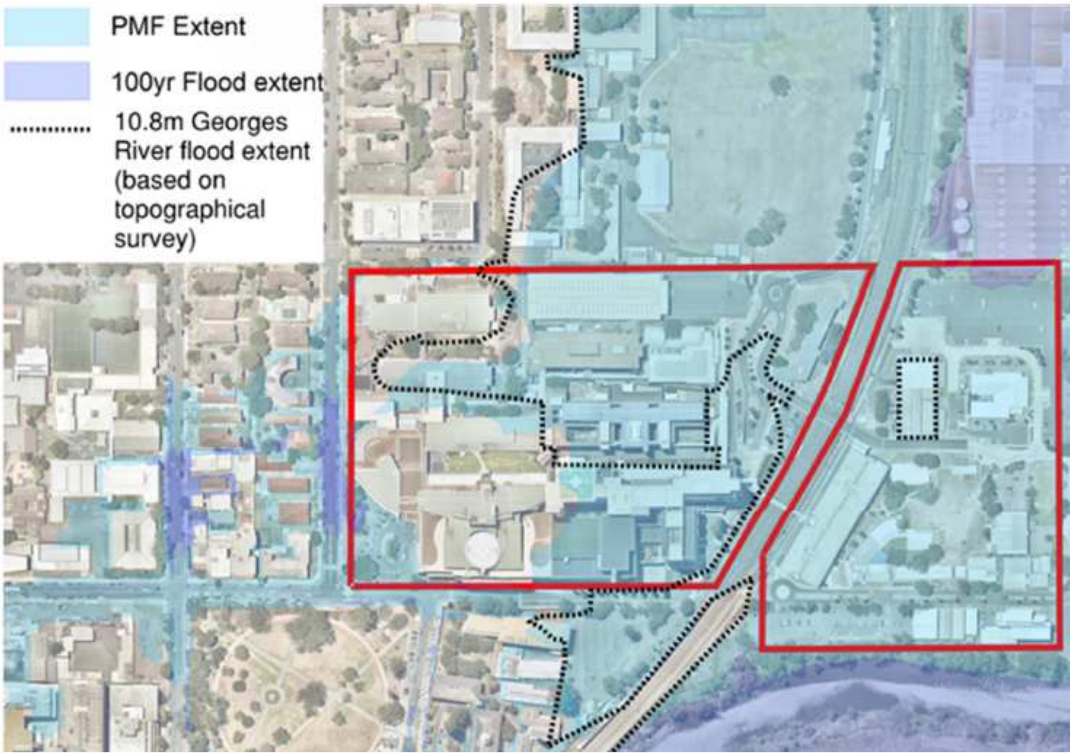

Figure 46 Flood extent for mainstream and overland flooding (hospital campus shown red)

Source: TTW; Georges River Floodplain Risk Management Study & Plan; Liverpool City Centre Overland Flow Path Mapping

It is noted that flood mitigation works in Goulburn Street and Campbell Street have already been approved under a separate application (refer to **Section 2.2**), with additional inlet pits and a new 900mm pipe collecting flows from the low point on Goulburn Street. This runs north then east along Campbell Street and connects to an existing 1200mm diameter pipe located adjacent to the north east corner of the existing P2 car park.

Floor levels for critical use and facilities would normally need to be no lower than the Probable Maximum Flood (PMF). However, this is not practicable for the proposal due to the need to to align with the existing hospital buildings which is required to allow the hospital to functionally operate.
Floor levels have been set as high as practical and are above the 1% AEP flood level plus 500mm freeboard. The proposed development will provide flood protection measures up to the PMF, including a combination flood barriers and doors that will protect thresholds to the ground floor and basement parking and loading areas. These areas are indicatively shown in **Figure 47** and are outlined further by TTW at **Appendix P**.

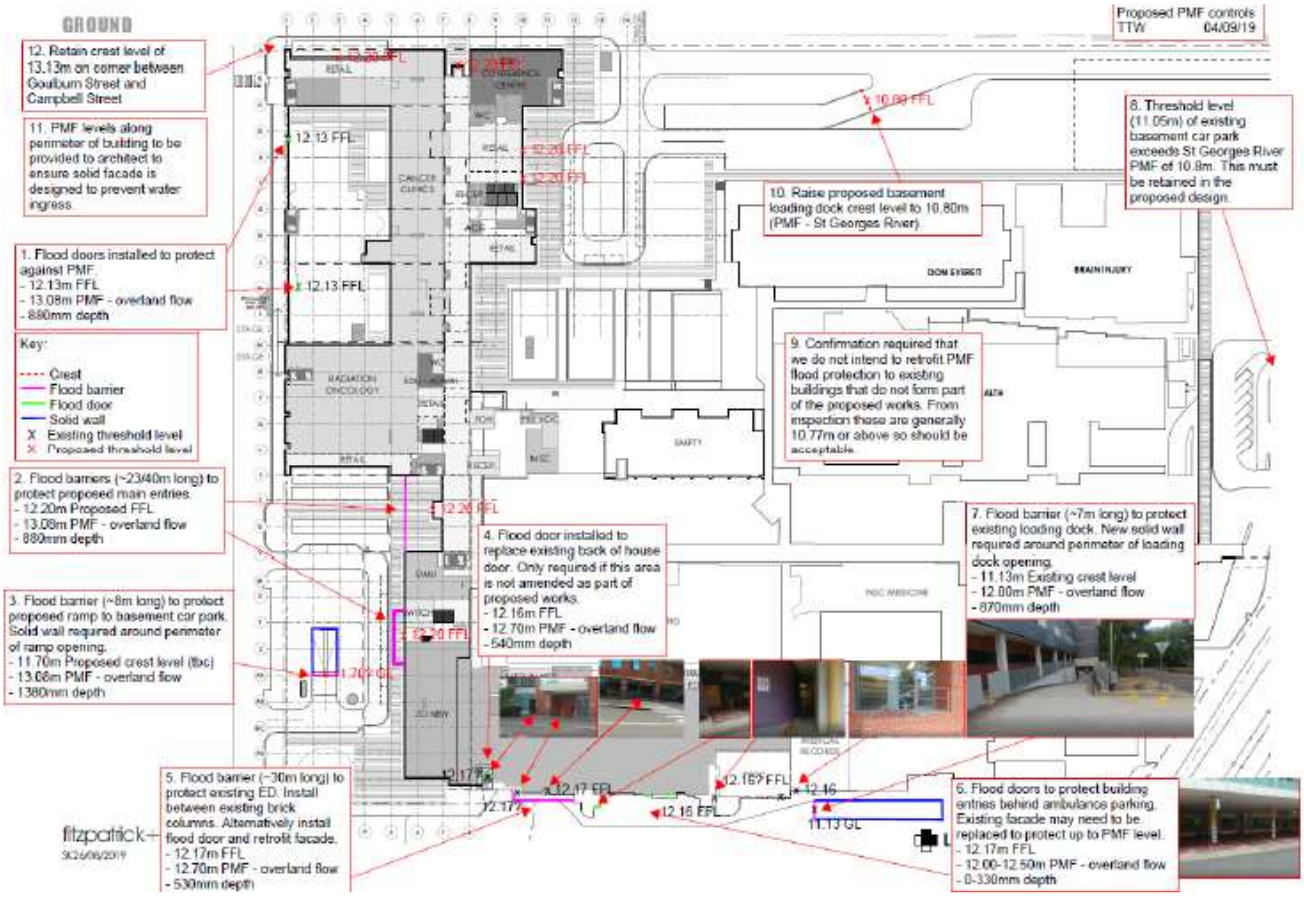

Figure 47 **Proposed PMF flood protection**

Source: *TTW*

6.16 Water Cycle Management

6.16.1 Stormwater

TTW has assessed stormwater management and water quality targets for the proposed development (refer **Appendix P**). The site is split into three catchments, with each catchment draining into a bio-retention treatment system located within the proposed soft landscape. These catchments have been modelled in MUSIC modelling to ensure the pollutant reduction targets are met.

As per the Liverpool DCP, the post development water quality shall be reduced to the following targets when compared to the pre development water quality:

- 45% reduction in the mean annual load of total nitrogen;
- 45% reduction in the mean annual lodge of total phosphorous; and

- 80% reduction in the mean annual load of total suspended solids.

The results are summarised in **Table 16** below.

Table 16 Catchment MUSIC results

MUSIC Modelling Results	Reduction
Southern catchment (outlined green)	
Total nitrogen (kg/yr)	54%
Total phosphorous (kg/yr)	55.6%
Total suspended soils (kg/yr)	80.3%
Northern catchment (outlined orange)	
Total nitrogen (kg/yr)	64%
Total phosphorous (kg/yr)	54.5%
Total suspended soils (kg/yr)	80.4%
Eastern Catchment (outlined yellow)	
Total nitrogen (kg/yr)	51.6%
Total phosphorous (kg/yr)	57.9%
Total suspended soils (kg/yr)	84.6%

As shown in **Table 16**, the post development water quality will meet or exceed reduction in the water quality targets specified by the Liverpool DCP. Further discussion is provided in **Appendix P**.

Further, TTW have stated that as the site is fully developed, and the impervious area is not increasing there will be no increase in discharge. Further given that the proposed development is limited to access roads and landscape within the hospital site, there will be no direct connections to Council's kerb and gutter system. Accordingly, TTW confirm that based on the extent of the proposed development and its proximity to Georges River, on-site detention tanks are not proposed.

6.16.2 Water Sensitive Urban Design

A review of the Water Sensitive Urban Design (WSUD) measures has been undertaken by TTW (**Appendix P**). It is proposed that WSUD principles will be applied where possible across the site through the use of passive irrigation and water quality treatment. Passive irrigation will direct runoff from roofs or hard standing to soft landscape areas. This will both reduce the potable water demand for irrigation and reduce the volume of water leaving the site. WSUD will also be utilised in the water quality treatment with the inclusion of bio-retention treatment as per the MUSIC modelling. All WSUD proposals are subject to detailed design and coordination.

6.16.3 Water and Wastewater Management

As identified in the Integrated Water Management Plan prepared by WSP and included at **Appendix O**, in order to reduce the demand on local water and wastewater infrastructure, the design of the proposed development will consider the following potable water demand reduction strategies, where possible:

- Provision of low flow taps and sanitary fixtures;
- Provision of water metres to monitor water demand and leaks; and
- Extension of the Sydney Water Rainwater Reuse main approximately 650m to serve the irrigation and cool towers on the site.

6.17 Sediment and Erosion Control

TTW has identified a number of erosion and sediment control measures at **Appendix P**. These will be put in place during construction to ensure that stormwater runoff will be collected and diverted around the site with sediments removed prior to discharge to the existing stormwater system. The proposed controls will include:

- Silt fences at the downstream boundary of the construction zone;

- Wash down and diversions at temporary vehicle entrances / exists to the construction zone;
- Sedimentation trap / basin with outlet control and overflow;
- Diversions to prevent upstream runoff entering the construction zone; and
- Sandbag sediment traps and geotextile filters to protect existing stormwater pits and inlets.

Where required, the erosion and sediment collection devices will need to be modified and adjusted by the contractor to suit building work stages and programs as the project progresses. All erosion and sediment control measures will be constructed in accordance with "Managing Urban Stormwater – Soils and Construction Volume 1 2004 (Landcom)" and "Approved Methods for the Modelling and Assessment of air pollutants in NSW (EPA)." Further discussion is provided in **Appendix P**.

6.18 Tree Removal

Existing trees on the site are proposed to be retained where possible. An Arboricultural Impact Assessment has been prepared by Tree IQ and is included at **Appendix R**. A total of 97 trees were investigated as part of the assessment, comprising both Australian native and exotic species. The proposed development requires the removal of 68 trees. Of the trees proposed to be removed, 46 are either of low landscape significance or are relatively small in size (being 10m or less in height).

To offset the removal of these trees, the proposed development will include the provision of 150 new trees. This will replace the loss of amenity and canopy cover resultant from the tree removal and will be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

Tree IQ outline mitigation measures to reduce impact to trees that are to be retained including tree protection zones (TPZs) that are required to be implemented.

These recommendations form mitigation measures that are included at **Section 8.0**.

6.19 Biodiversity

A Biodiversity Development Assessment Report (BDAR) has been prepared by Narla Environmental who are accredited assessors and is included in **Appendix S**. The BDAR has been prepared in accordance with the Biodiversity Assessment Method (BAM) and includes an identification of the potential impacts of the proposed development on biodiversity within the subject site.

Narla identify that the subject land has been historically cleared and altered, with the majority of the hospital site comprising existing buildings and bitumen roads and carparks. The existing scattered vegetation is in the form of scattered trees, lawns and established gardens.

As discussed in the BDAR, the proposed development is expected to result in the removal of 0.07ha of planted native vegetation that does not constitute a NSW Plant Community Type (PCT). Therefore, no assessment under the BAM is required, no candidate ecosystem or credit species require offsetting under the Biodiversity Offset Scheme (BOS) and no submission within the Biodiversity Assessment Method Calculator (BAMC) is required. Notwithstanding, the BDAR provides the following mitigation measures to minimise any potential impacts of the proposal on local biodiversity values:

- Ensure all contractors employed to work within and around identified biodiversity values within the subject land are suitably qualified and experience;
- Assign a project ecologist to be present during the clearing of all vegetation (both native and exotic) related to the proposed development to capture, treat and relocate any displaced fauna; and
- Implement all relevant biological hygiene protocols and requirements as per NSW Government Guidelines.

Further discussion is provided in **Appendix S**.

6.20 Geotechnical

A Geotechnical Report has been prepared by Geotechnics and is included at **Appendix X**. The Report identifies that the ground conditions on the western campus generally comprise fill overlying alluvial soils on the majority of the site, with residual soils in the north western corner and shale bedrock at varying depths. The fill comprises compacted clay and sand to a maximum depth of 3.5m and alluvial soils are predominantly silty clays, of medium to high plasticity. Rock levels vary in the north western corner from 2m to 13m over the site.

Groundwater was encountered during the previous borehole investigations, with observations made between RL0m and RL 9.1m.

Based on the results of the previous site investigations, the report provides advice on the proposed civil and structural design. These recommendations relate to further investigation on buried services, earthworks, excavation, batter slopes, seepage, basement retention runoff, groundwater and footings and specific geotechnical input will be sought during the construction phase of the project. Further discussion is provided in **Appendix X**.

6.21 Structural

A Structural Statement has been prepared by TTW and is included at **Appendix Y**. The Statement assesses the building foundations likely to be encountered across the site in relation to the geotechnical conditions. The Statement confirms that the structural design will be in accordance with the latest revision of all relevant Australian Design Standards, the Building Code of Australia and other statutory requirements. As a minimum, the design will be based on, but not limited to:

- AS/NZS 1170.0 – Structural Design Actions Part 0: General Principles
- AS/NZS 1170.1 – Structural Design Actions Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2 – Structural Design Actions Part 2: Wind Actions
- AS 1170.4 – Structural Design Actions Part 4: Earthquake loads
- AS 2159 – Piling – Design Installation
- As 3600 – Concrete Structures
- AS 3700 – Masonry Structures
- AS 4100 – Steel Structures
- HI Design Guidance Not 1 – Structural Design Criteria Guidelines
- HI Design Guidance Note 24 – Building Importance Levels for NSW Health Projects

6.22 BCA and Access

Blackett Maguire and Goldsmith (**Appendix W**) confirm the proposal complies with the deemed-to-satisfy provisions of the Building Code of Australia 2019 and the Disability (Access to Premises – Buildings) Standards 2010.

6.23 Contamination

A Stage 1 and Preliminary Stage 2 Environmental Site Investigation has been undertaken by JK Environments (JKE) (**Appendix L**). The scope of work was undertaken with reference to the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended (2013), *Contaminated Land Management Act (1997)*, *State Environmental Planning Policy No.55 – Remediation of Land*, *Site Investigations for Urban Salinity (2002)* and *National Acid Sulfate Soil Guidance (2018)* and *Acid Sulfate Soil Manual (1998).*

The assessment included a review of historical information and sampling from 22 boreholes and four groundwater monitoring wells (see **Figure 48**). The site has historically been used for agricultural purposes in the early 1900's after which the site has been used as a hospital.

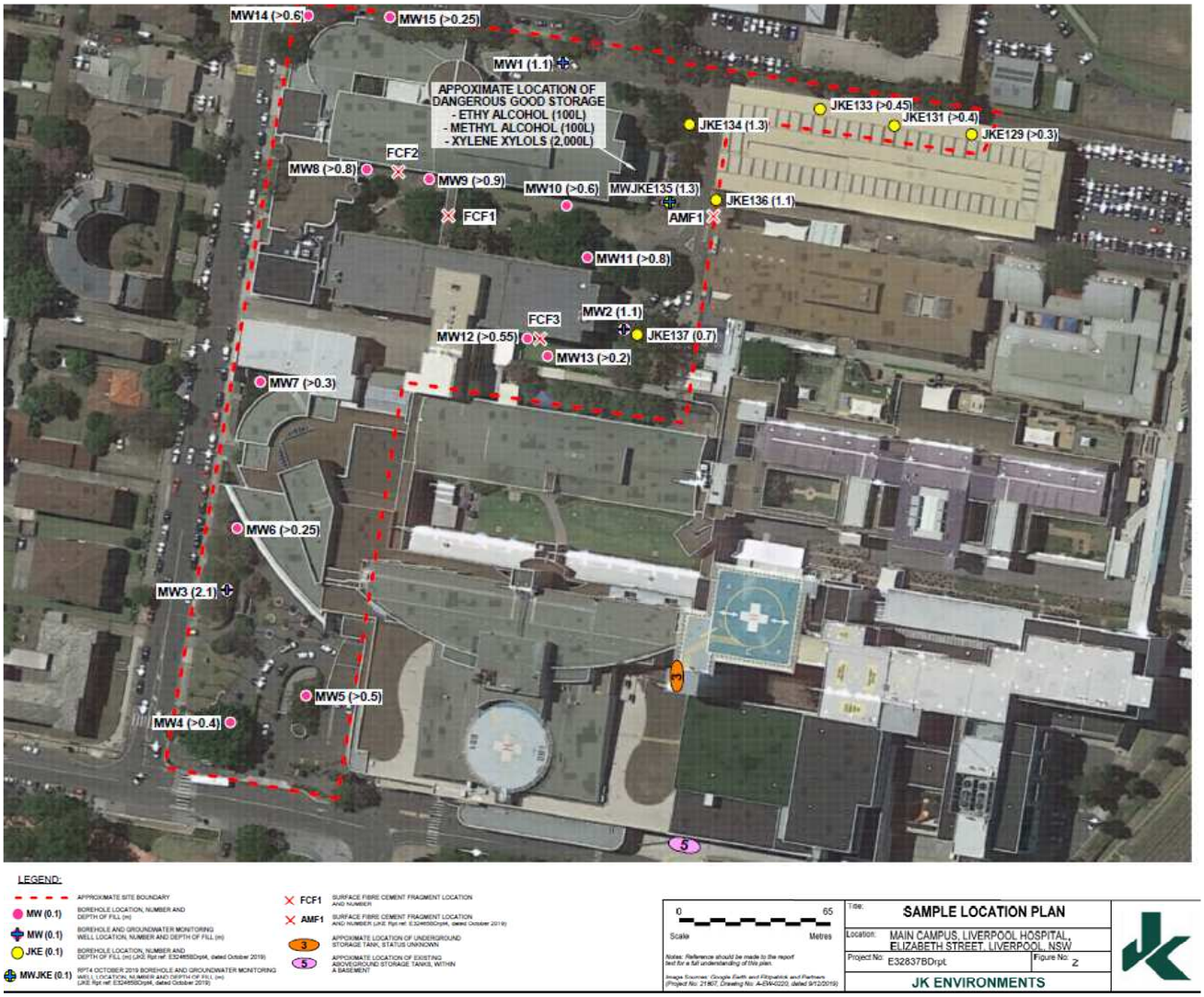

Figure 48 Soil Sample Location Plan

Source: JK Environments

Fill material was encountered at the surface or beneath the pavement in all boreholes. Selected soil samples were analysed for contaminants of potential concern, potential acid sulfate soils and potential saline soil conditions. Groundwater samples were analysed for contaminants of potential concern and salinity parameters. The results were compared against the selected site assessment criteria. A summary is provided below:

- Surface Asbestos Containing Material (ACM) and friable asbestos were found in the surface fill soils at sampling location JKE136 and JKE137 in the north east section of the site;
- Further surface ACM were identified during the recent field works;
- Friable asbestos was not detected within the fill samples analysed by the laboratory;
- The PAHs result for the fill soil sample DUPMP103 (MW3 (0-0.2m)) was above human health site assessment criteria;
- Other heavy metals, including TRH, BTEX, OCPs, OPPc, PCBs were found to have concentrations below the relevant criteria; and
- Potential Acid Sulfate Soils were not identified.

It is noted that sampling was restricted in some locations due to the existing operating Hospital. Accordingly, a number of data gaps are identified, which relate to further soil sampling being required following the demolition of the existing development on site to meet the *NSW EPA Contaminated Sites Sampling Design Guidelines 1995*, including further assessment of the friable and carcinogenic PAHs soil impacted areas.

Based on the findings of the detailed site investigation, JKE are of the opinion that the site can be made suitable for the proposed development, subject to the following measures:

- The identified data gaps are addressed following the demolition of existing buildings and prior to commencement of remediation works. The requirements for the data gap investigations works are to be outlined in the Remediation Action Plan (RAP);
- A RAP and Asbestos Management Plan (AMP) is prepared;
- A Validation Report is prepared on completion of the remediation works;
- A long-term Environmental Management Plan (EMP) is prepared at the completion of remediation and validations works, in the event that the capping and containment approached to remediation is adopted; and
- A Salinity Management Plan (SMP) is prepared and implemented during the works.

These mitigation measures are included at **Section 8.0**. A RAP is provided at **Appendix L**.

6.24 Ecologically Sustainable Development

The environmental performance of the development has been assessed by using clause 7(4) of Schedule 2 of the EP&A Regulations and the EIS is accompanied by an ESD Statement prepared by Steensen Varming at **Appendix G**. The initiatives and targets relate for the proposed development are as follows:

- The proposed development will be required to deliver a 10% improvement on National Construction Code (NCC) for energy efficiency in building fabric and building services / systems through JV3 modelling;
- Target certified 5 star self-certified equivalency rating against the Green Building Council of Australia (GBCA) Design and As-Built version 1.3 rating tool;
- Propose strategies in response to the CSIRO projected impacts of climate change; and
- The design measures outlined in **Section 4.9** above and as discussed in detail by Steensen Varming in the ESD Statement at **Appendix G**, the proposed development demonstrates the ways in which ESD is entrenched into the design of the proposal. Through the incorporation of ESD measures, the development will be designed in accordance with recognised best practice principles, which are capable of being applied throughout the design and ongoing operation phases of the development.

Furthermore, the proposed development is consistent with the four accepted principles of ESD. The Regulation lists four principles of ecologically sustainable development to be considered in assessing a project. They are:

- The precautionary principle;
- Intergenerational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation and pricing of environmental resources.

An analysis of these principles follows.

Precautionary Principle

The precautionary principle is utilised when uncertainty exists about potential environmental impacts. It provides that if there are threats of serious or irreversible environmental change, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. The precautionary principle requires careful evaluation of potential environmental impacts in order to avoid, wherever practicable, serious or irreversible damage to the environment.

This EIS has not identified any serious threat of irreversible damage to the environment and therefore the precautionary principle is not relevant to the proposal.

Intergenerational Equity

Inter-generational equity is concerned with ensuring that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The proposal has been designed to benefit both the existing and future generations by:

- Implementing safeguards and management measures to protect environmental values;
- Facilitating job creation in close proximity to homes and public transport; and
- Improving the public domain and amenity in the Liverpool Hospital precinct.

The proposal has integrated short and long term social, financial and environmental considerations so that any foreseeable impacts are not left to be addressed by future generations. Issues with potential long-term implications such as waste disposal would be avoided and/or minimised through construction planning and the application of safeguards and management measures described in this EIS and the appended technical reports.

Conservation of biological diversity and ecological integrity

The principle of biological diversity upholds that the conservation of biological diversity and ecological integrity should be a fundamental consideration.

The Biodiversity Assessment Report prepared by Narla Environmental and included in **Appendix S**, outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the development site and methodologies to minimise impacts during construction and operation of the development. The proposed development is expected to result in the removal of 0.07ha of planted native vegetation. No credit species will require offsetting as a result of the proposed development. Notwithstanding, various mitigation measures have been proposed in order to minimise any potential impacts of the proposed development on local biodiversity values, including assigning a Project Ecologist during the clearing of any vegetation.

Notwithstanding, considering the location of the proposed development in a highly urbanised and degraded area, there are unlikely to be any notable impacts on biodiversity values arising from the proposed development.

Improved valuation, pricing and incentive mechanisms

The principles of improved valuation and pricing of environmental resources requires consideration of all environmental resources which may be affected by a proposal, including air, water, land and living things. Mitigation measures for avoiding, reusing, recycling and managing waste during construction and operation would be implemented to ensure resources are used responsibly in the first instance.

Additional measures will be implemented to ensure no environmental resources in the locality are adversely impacted during the construction or operational phases.

6.25 Public Benefit

In general, investment in major projects can only be justified if the benefits of doing it so exceed the costs. Such an assessment must consider all costs and benefits, and not simply those that can be easily quantified. As a result the EP&A Act specifies that such a justification must be made having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development.

This means that the decision on whether a project can proceed or not needs to be made in the full knowledge of its effects, both positive and negative, whether those impacts can be quantified or not. The proposal involves the development of a new ISB. The assessment must therefore focus on the identification and appraisal of the effects of the proposed development, particularly given the demand for upgraded health services within the broader region.

Social Impact

The social impacts and benefits associated with the proposed development include:

- A development that will provide a significant piece of social infrastructure, increasing the number of hospital beds. The design and capacity increase of the redevelopment is anticipated to have positive impacts on the overall health outcomes of the region;
- Improves access to an extensive range of health services and facilities for people in Western Sydney;
- Improves community participation opportunities for a range of members of society, including migrants, minority groups and socially disadvantaged groups;
- Provides accessible access across the Hospital allowing equal ambulatory access;
- Provides additional social benefits for the region in terms of providing adequate employment in the area; and

- Liverpool Hospital is a major health facility in the South Western Sydney Local Health District. To not invest in the development would exacerbate the service offering and capacity constraints of the existing health infrastructure in the region and require patients to continue to travel significant distances to receive adequate health care.

Economic Impact

The economic impacts and benefits of the proposed development include:

- The proposed development is anticipated to create additional employment in consultancy, construction and operation.
- Will encourage the development of a well-integrated and economically vibrant City Centre by delivering a high activation facility in Liverpool CBD.
- Will be a stimulus to economic investment by delivering a key anchor development that will encourage and attract additional allied businesses and uses to Liverpool Hospital.
- The 24 hour operation nature of the Hospital will assist with achieving Council's vision for a night time economy in Liverpool CBD, extending the trading day to 18 hours. The Hospital is accessible between 6:00am – 8:00pm daily.
- Will build on the current health assets of the health precinct north of Bigge Park that will also grow the tertiary education sector in the CBD, by attracting tertiary medical education.

Biophysical

The environmental impact assessment of the proposed development has demonstrated that:

- The development will generate limited environmental impacts, as it is located in a highly urbanised and degraded area;
- The development will not have a significant impact on any threatened flora or fauna species; and
- Only 0.07 ha of planted native vegetation is required to be removed, and therefore no assessment under the Biodiversity Assessment Method (BAM) is required to be undertaken as no ecosystem or credit species will require offsetting under the Biodiversity Offset Scheme.

6.26 Development Contributions

The relevant contributions plan is the *Liverpool Contributions Plan 2018 – Liverpool City Centre*. The purpose of the plan is to enable Council to require a contribution towards the provision, extension, or augmentation of public amenities and public services that will or are likely to be required as a consequence of development within the LGA.

The following planning policies support the best practice of exempting community infrastructure from paying contributions:

Circular D6 – Crown Development Application and Conditions of Consent

Exemption from contributions is supported by Planning Circular (Circular D6) relating to Crown Development Applications issued by the then Department of Urban Affairs and Planning. Circular D6 sets out the circumstances in which it is appropriate for a consent authority to seek the approval of the applicant or the Minister to impose conditions of consent. Circular D6 notes that where a consent authority intends to levy contributions on Crown Development, they must be justified, and consideration should be given to the Crown's role in providing a community service, the cost of which is accountable to all taxpayers in the State.

The currency of Circular D6 is confirmed in the Draft Development Contributions Practice Note – July 2005, which states "the current limitation on imposition of levies on Crown Developments as outlined in Circulate D6…remain in force." Health Infrastructure is a Government agency which relies on government grants to provide new facilities for the local community.

The levying of a development contribution would divert a portion of these public funds, which have been specifically provided to fund a hospital redevelopment, to local services without any direct nexus to the impact of those services.

The inherent public character of the proposed development contrasts with a strictly commercial development where a full levy might be considered reasonable. The nature of the development means that the infrastructure which Council typically seeks to levy for will largely be provided by the hospital for use by the staff and public.

7.0 Environmental Risk Assessment

The Environmental Risk Assessment (ERA) establishes a residual risk by reviewing the significance of environmental impacts and the ability to manage those impacts. The ERA for the new ISB has been adapted from Australian Standard AS4369.1999 Risk Management and Environmental Risk Tools.

In accordance with the SEARs, the ERA addresses the following significant risk issues:

- The adequacy of baseline data;
- The potential cumulative impacts arising from other developments in the vicinity of the Site; and
- Measures to avoid, minimise, offset the predicted impacts where necessary involving the preparation of detailed contingency plans for managing any significant risk to the environment.

Figure 49 indicates the significance of environmental impacts and assigns a value between 1 and 10 based on:

- The receiving environment;
- The level of understanding of the type and extent of impacts; and
- The likely community response to the environmental consequence of the project;

The manageability of environmental impact is assigned a value between 1 and 5 based on:

- The complexity of mitigation measures;
- The known level of performance of the safeguards proposed; and
- The opportunity for adaptive management.

The sum of the values assigned provides an indicative ranking of potential residual impacts after the mitigation measures are implemented.

Significance of impact	Manageability of impact				
	5 Complex	4 Substantial	3 Elementary	2 Standard	1 Simple
1 – Low	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)	2 (Low)
2 – Minor	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)
3 – Moderate	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)
4 – High	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)
5 – Extreme	10 (High)	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)

Figure 49 Risk Assessment Matrix

				Risk Assessment		
Item	**Phase**	**Potential Environmental Impact**	**Proposed Mitigation Measures and / or Comment**	**Significance of Impact**	**Manageability of Impact**	**Residual Impact**
Key: C – Construction O – Occupation						
Traffic and Parking	C / O	• Increase in construction traffic on local roads • Increase in traffic and parking on local roads during operation	• A preliminary Construction Traffic Management Plan has been prepared detailing measures to minimise any adverse impacts arising from construction traffic. • Additional parking demand generated by the proposed development will be accommodated within the new multi storey car park which forms part of a separate application. The existing road network has capacity to support any increase in traffic associated with the proposed development.	C = 3 O = 2	C = 2 O = 2	C = 5 (low / medium) O = 4 (low / medium)
Visual and Built Form	O	• Visual impact of the development when viewed from the public domain • Visual impact from sensitive land uses to the north, south and west	• Measures have been incorporated to reduce the visual impact of the development when viewed from nearby residential development and the public domain, specifically Bigge Park.	O = 2	O = 1	O = 3 (low / medium)
Noise and Vibrations	C / O	• Increase in noise and vibrations levels during construction • Increase in noise levels during operation	• The proposed development will implement a Construction Noise and Vibration Management Plan which details specific measures to ameliorate any potential noise or vibration impacts to surrounding sensitive receivers. • Given that the site currently operates as a hospital, any potential noise impacts are considered to be manageable in the context of the overall development.	C = 3 O = 1	C = 2 O = 1	C = 5 (low / medium) O = 2 (low)
Air and Water Quality	C	• Potential for reduced air and water quality during construction	• A detailed Construction Management Plan will be developed once a contractor has been appointed to implement appropriate measures and ensure that air and water quality is maintained.	C = 2	C = 2	C = 4 (low / medium)

8.0 Mitigation Measures

The collective measures required to mitigate the impacts associated with the proposed works are detailed in **Table 17** below. These measures have been derived from the previous assessment in **Section 6.0** and those detailed in appended consultants' reports.

Table 17 Mitigation Measures

Mitigation Measures
Construction Hours Construction, including the delivery of materials to and from the site, may only be carried out between the following hours: (a) between 7am and 6pm, Mondays to Fridays inclusive; and (b) between 8am and 3pm, Saturdays. No work may be carried out on Sundays or public holidays. Construction activities may be undertaken outside of the general construction hours, in accordance with the schedule of out of hours work nominated at section 4.12 of the EIS
Transport and Accessibility Construction and operational traffic will be in accordance with the recommendations of the Transport Impact Assessment prepared by GTA Consultants and dated 6 May 2020.
Reflectivity The building materials used on the facades of all buildings will be designed so as not to result in glare that causes discomfort or threatens the safety of pedestrians or drivers. A report/statement demonstrating consistency with this requirement will be submitted to the satisfaction of the Certifying Authority prior to the commencement of above ground works.
Aboriginal Heritage Aboriginal Heritage will be managed in accordance with the Aboriginal Cultural Heritage Assessment prepared by RPS and dated 21 February 2020.
Waste Waste will be managed in accordance with the recommendations of the Operational and Construction Waste Management Plans prepared by Waste Audit and dated January 2020.
Stormwater The proposal will be in accordance with the recommendations of the Civil Report prepared by TTW and dated 20 February 2020.
Noise and Vibration The proposal will be in accordance with the Noise and Vibration Impact Assessment prepared by Acoustic Logic.
Tree Removal The mitigation measures outlined in the Arboricultural impact assessment tree protection specification prepared by Tree iQ dated 5 March 2020 are to be followed. • Tree protection fencing (in accordance with AS4970-2009) is to be installed for trees that are located within close proximity to the works; • Demolition works within the TPZ areas should be supervised by the Project Arborist and utilise tree sensitive methods. Structures should be demolished in small sections ensuring demolition machinery/equipment does not contact with any part of the tree.
Hazards and Risks • Develop a formal methodology for the transport of the hazardous materials from their existing storage locations to the new ISB storage locations. The methodology should include controls and indecent response and should be reviewed by third party experts. • The NSW EPA and SafeWork NSW should be contacted and advised of the proposed relocation of hazardous materials which relate to the relevant licences, prior to development of the formal methodology for transport of hazardous materials to the new ISB. • Undertake regular audits of the hospital processes and procedures to assess if current best practice hazardous waste controls are in place.
Construction Impacts A Construction Environmental Management Plan (CEMP) will be prepared by the appointed contractor prior to the commencement of works. The CEMP will establish site management principles generally in accordance with the Preliminary Construction Management Plan prepared Johnstaff and dated 9 March 2020.

Mitigation Measures
Contamination The proposal will be in accordance with the Preliminary Contamination Assessment prepared by JK Environments and dated 13 February 2020 and Remediation Action Plan dated 29 April 2020.
Environmentally Sustainable Development The detailed design of the development will incorporate all ESD principles and measures set out in the ESD Statement prepared by Steensen Varming.
Heritage The construction of the development will proceed in line with the following heritage recommendations: • The proposal should proceed witch caution; • Archival recording should be taken place to mitigate the loss of any s170 Avenue Planting; • If a stone capped, brick or other drain is encountered, all work should cease in the affected area, the area cordoned off and an archaeologist contacted to record (photographic and scale drawn record) of the drain; and • In the event that unexpected archaeological resources are identified in the course of the proposal, all work in the affected area should cease, the area should be cordoned off and Heritage NSW notified in accordance with Section 146 of the Heritage Act 1977.

9.0 Conclusion and Justification

The Environmental Impact Statement (EIS) has been prepared to consider the environmental, social and economic impacts of the proposed development of the new multi storey ISB and refurbishment works to certain existing buildings and facilities at Liverpool Hospital. The EIS has addressed the issues outlined in the SEARs (**Appendix A**) and accords with Schedule 2 of the EP&A Regulation with regards to consideration of relevant planning instruments, built form, social and environmental impact including traffic, noise, construction impacts, biodiversity and stormwater.

Having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development, the carrying out of the project is justified for the following reasons:

- The proposal will facilitate the development of a new state-of-the-art health facility which will further support and strengthen the services and facilities provided at the hospital for the benefit of the South Western Local Health District;
- The existing site allows for the provision of new health facilities that meet the special design requirements for the future proposed uses, whilst not resulting in significant adverse impacts on surrounding uses;
- The assessment of the proposal has demonstrated that the development will not result in any environmental impacts that cannot be appropriately managed and consistent with the relevant planning controls for the site; and
- The proposal is consistent with the principles of ecological sustainable development as defined by Schedule 2(7)(4) of the EP&A Regulation.

Given the merits described above it is requested that the application be approved.