Liverpool Civic Place – Phase A

Environmentally Sustainable Design Report

Prepared for: Built Development Group

Attention: Barry Teeling

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Prepared by: Guljit Bates

Ref: 43144-2

Stantec Australia Pty Ltd
Level 6, Building B, 207 Pacific Highway, St Leonards NSW 2065
Tel: +61 2 8484 7000 Web: www.stantec.com

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
1	22/07/2020	Draft for review	GB	GB
2	08/09/2020	DA Issue	GB	GB
3	11/09/2020	Updated DA Issue	GB	GB
4	22/09/2020	Updated DA Issue	GB	GB

Contents

1. Executive Summary

This Environmentally Sustainable Design (ESD) Development Application (DA) report has been prepared on behalf of Built Development Group for the proposed Liverpool Civic Place Phase A development located at 52 Scott Street, Liverpool NSW 2170.

This report provides an overview of the proposed project's ESD initiatives and framework proposed to maximise the overall sustainability of the development. It outlines the regulatory and project specific sustainability drivers and proposed design approaches for the project.

The ESD outcomes of the development are demonstrated through the following targets for the development:

- Thermal performance designed to meet stringent NCC 2019 Section J requirements;
- Council commercial building is designed to achieve a 5 Star NABERS Energy Base Building and a 3.5 Star NABERS Water Whole Building ratings;
- 5 Star Green Star Design & As Built v1.3 certification for the council commercial building; and
- Integration of Green Star and NABERS principles to the design of the public library.

The design approach will be focused around the following key initiatives:

- Use of passive design elements, as far practically possible, to naturally provide comfort and minimise energy consumption;
- Creation of healthy environments including reduction in the use of harmful volatile organic compounds in glues, sealants and paints;
- Bespoke design solutions that provide for long term climate adaptation and resilience;
- Minimising consumption of natural resources, including water and raw materials;
- Minimising environmental impacts during construction, including embodied energy and the ecological cost of materials;
- Minimising environmental impacts during operation, including energy consumption and waste creation;
- Promotion of urban ecology through biophilic design elements, the use of green roofs and extensive landscaping; and
- Provision of access to sustainable, integrated and convenient travel options.

2. Introduction

This Environmentally Sustainable Design (ESD) Report is submitted to Liverpool City Council (Council) on behalf of Built Development Group in support of a Stage 2 Development Application (DA) for Phase A of the Liverpool Civic Place development located at 52 Scott Street, Liverpool.

It follows the approval of a Concept Proposal / Stage 1 DA (DA-585/2019) for the broader Liverpool Civic Place master plan that has determined land uses, building envelopes, public domain and a multi-level common basement across the site. The full Liverpool Civic Place site, subject to the Concept Proposal / Stage 1 DA approval is illustrated at **Figure 1**, however the scope of this Stage 2 DA is limited to Phase A, as illustrated at **Figure 2**.
Phase B and Phase C will be subject to future Stage 2 DA(s).

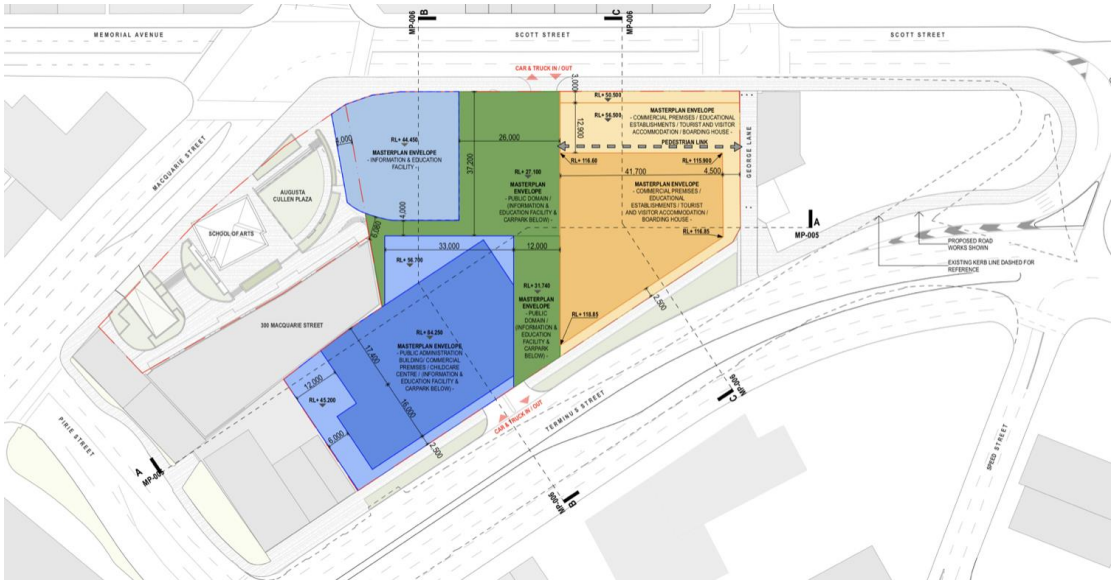


Figure 1 Liverpool Civic Place Master Plan Site

Source: FJMT

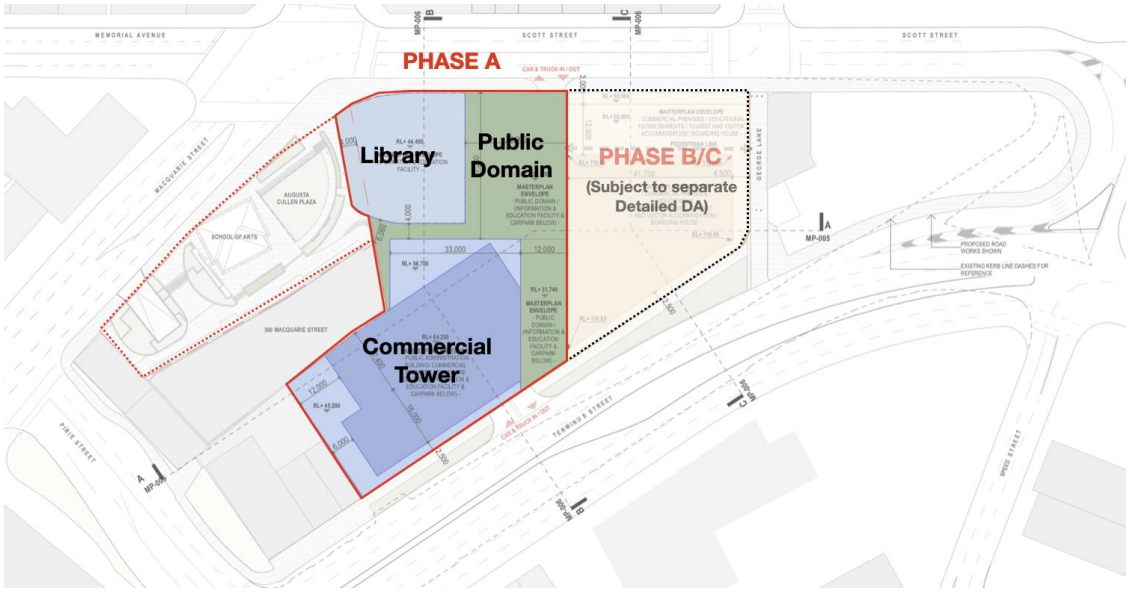


Figure 2 Liverpool Civic Place Stage 1 site (subject site)

Source: FJMT

This Stage 2 DA seeks approval for:

- Construction and use of a six (6) storey information and education facility (public library);
- Construction and use of a fourteen (14) storey mixed use building comprising:
  - Eight (8) storeys of public administration building floor space to be occupied by Liverpool City Council;
  - Four (4) storeys of commercial premises (office) floor space;
  - Single storey above ground child care centre on Level 6; and
  - Single storey of rooftop plant.
- Partial construction and use of the overall site's common basement;
- Landscaping and public domain works including:
  - an internal shared road connecting to Scott Street with basement access;
  - a public plaza fronting Scott Street; and
  - an elevated pocket park fronting Terminus Street.
- Extension and augmentation of services and infrastructure as required.

This DA reflects the staged planning approval pathway for the Liverpool Civic Place redevelopment which has included two previously approved DAs, as outlined below:

Concept DA DA-585/2019:

The planning approval pathway for the Liverpool Civic Place development commenced in in 2019, with the submission of a Concept Proposal / Stage 1 DA for the Liverpool Civic Place master plan. On 31 August 2020, the Concept Proposal / Stage 1 DA (DA-585/2019) was approved by the Sydney Western City Planning Panel. The Concept Proposal / Stage 1 DA consent sets out the future development concept of the site, including the approved land uses, building envelopes, an expanse of public domain and a common basement. The Concept Proposal / Stage 1 DA did not approve any physical works.

Early Works DA DA-906/2019:

Development Application DA-906/2019 was approved by the Sydney Western City Planning Panel on 29 June 2020. The development consent relates to demolition of all structures, select tree removal and bulk earthworks including shoring through the use of piles. Early works commenced on site in September 2020 and are scheduled for completion in August 2021.

2.1 Site Location and Context

The site is located at 52 Scott Street, Liverpool within the Liverpool City Council Local Government Area (LGA) as illustrated at **Figure 3**. The site is located at the southern fringe of the Liverpool CBD. The site is approximately 300m south west of the Liverpool Railway Station and is also in the vicinity of a number of regionally significant land uses and features including Liverpool Hospital, Westfield Liverpool, Western Sydney University Liverpool Campus, the Georges River and Biggie Park public open space as illustrated at **Figure 3**.

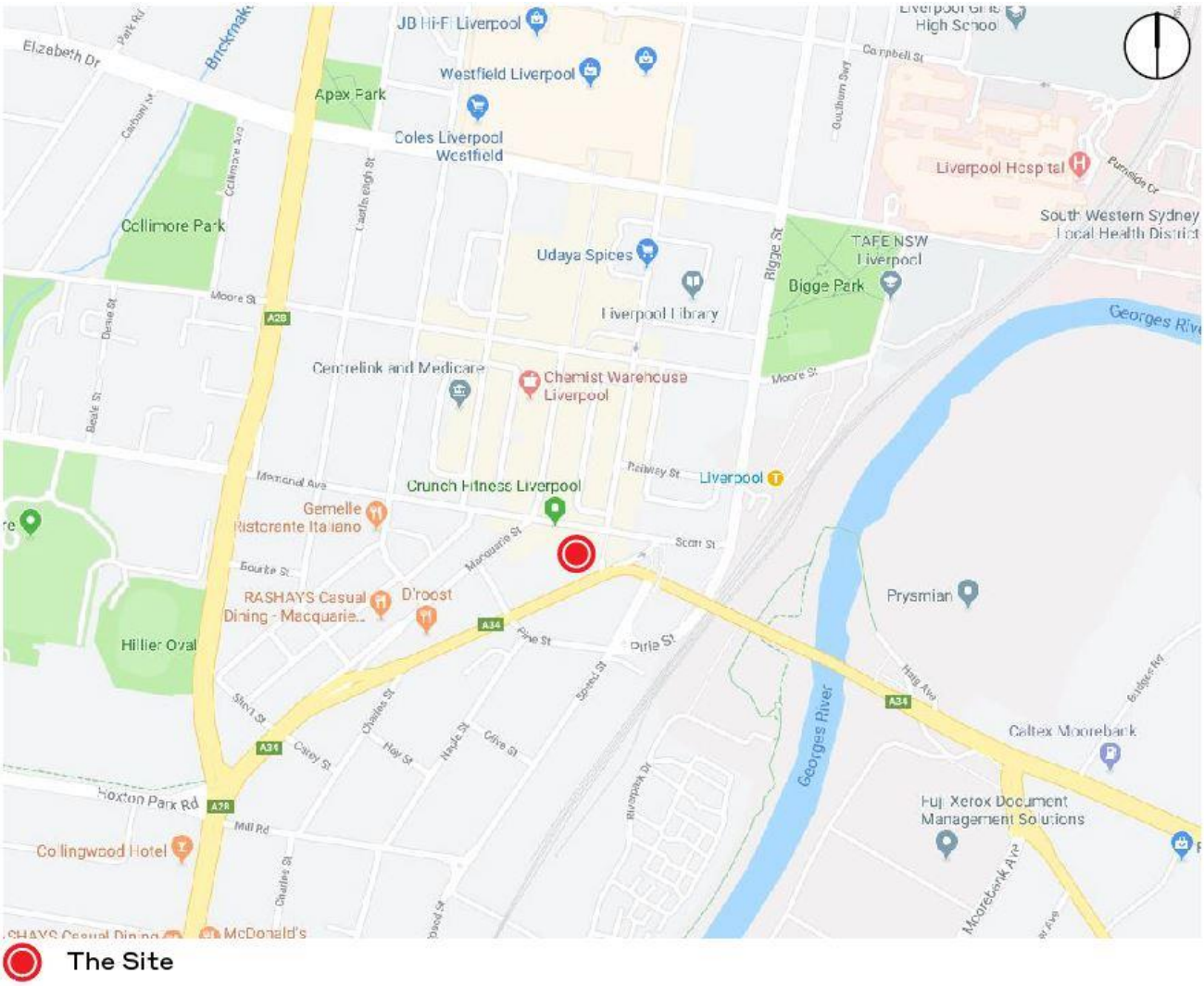


Figure 3 Site Location

Source: Google Maps & Ethos Urban

3. Project Sustainability Drivers

3.1 Sustainability Objectives

The proposed ESD initiatives for the Liverpool Civic Place Phase A development are collectively influenced by various associated requirements and drivers, including:

- Liverpool Local Environmental Plan 2008 (LEP 2008);
- Liverpool Development Control Plan 2008 (LDCP 2008);
- Green Star Design & As Built v1.3; and
- NCC 2019 Volume One – Section J Energy Efficiency

Further details regarding the above are documented below.

3.2 Liverpool Local Environmental Plan 2008

The Liverpool Local Environment Plan (2008) has a specific focus on providing ecologically sustainable development throughout Liverpool. The aims of the plan include:

- To foster economic, environmental and social well-being so that Liverpool continues to develop as a sustainable and prosperous place to live, work and visit;
- To conserve, protect and enhance the environmental and cultural heritage of Liverpool;
- To protect and enhance the natural environment in Liverpool, incorporating ecologically sustainable development; and
- To promote a high standard of urban design that responds appropriately to the existing or desired future character of areas.

3.3 Liverpool Development Control Plan 2008

The Liverpool Development Control Plan (LDCP 2008) supplements the LEP 2008 with more detailed provisions to guide the development, including.

- Part 1 General Controls for all Development
    - 6.8 Water Conservation
    - 20.3 Bicycle Parking and Cycling Facilities
    - 22 Energy Conservation
    - 25 Waste Disposal and Re-use Facilities
- Part 4 Development in Liverpool city centre
    - 4.2 Controls for Building Form
    - 4.5 Environmental Management

3.4 NCC 2019 Volume One – Section J

NCC Section J establishes the minimum energy efficiency provisions for all classes of buildings. The provisions are designed to achieve the functional objective of Section J which is to reduce greenhouse gas emissions.

NCC Section J 2019 will apply to the design and construction of Liverpool Civic Place Phase A. NCC Section J 2019 represents a 'step change' substantial increase in the minimum energy efficiency requirements for a building. The energy efficiency performance requirements are now significantly more stringent, with the overall aim of reducing future operational energy consumption and greenhouse gas emissions.

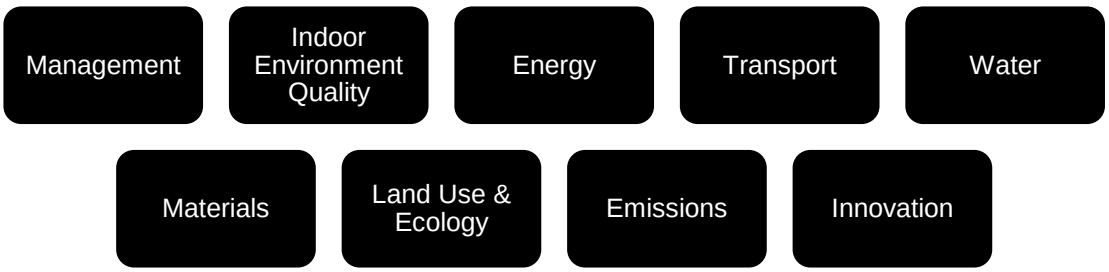
The development will demonstrate compliance with the minimum design provisions as identified within National Construction Code (NCC) 2019 Volume One, Section J – Energy Efficiency, including:

- Part J1 – Building Fabric
- Part J3 – Building Sealing
- Part J5 – Air-Conditioning and Ventilation Systems
- Part J6 – Artificial Lighting and Power
- Part J7 – Heated water supply and swimming pool and spa pool plant; and
- Part J8 – Facilities for energy monitoring

3.5 Green Star Design & As Built v1.3

Widely considered as the benchmark environmental assessment tool within the Australian Property Industry, Green Star is an independent accreditation framework which delivers sustainable built outcomes throughout the project lifecycle. Green Star is a credits-based star rating system ranging from one through to six stars.

Green Star assesses the environmental performance of projects in design, construction and operation via the following category frameworks:



The evaluation tool most suited to this project is the "Green Star Design & As Built v1.3" tool. This tool has been developed for new buildings and major refurbishments and aligns with the projects NCC 2019 Section J requirement.

The council commercial office base building design is to achieve a minimum 5 Star Green Star Design & As Built v1.3 outcome. A provisional Green Star analysis and matrix demonstrating the projects ability to achieve the minimum 5 Star Green Star performance outcome is included in **Appendix A** of this report. Note, the provisional list of initiatives will be subject to further amendment during project detailed design phase following development approval. Green Star initiatives will also be integrated into the design and construction of the public library.

4. ESD Strategy

In pursuit of environmentally sustainable design, the project is targeting the following sustainability outcomes:

- Thermal performance designed to meet stringent NCC 2019 Section J requirements;
- Council commercial building is designed to achieve a 5 Star NABERS Energy Base Building and a 3.5 Star NABERS Water Whole Building ratings;
- 5 Star Green Star Design & As Built v1.3 certification for the council commercial building; and
- Integration of Green Star and NABERS principles to the design of the public library.

The design response for the proposed Liverpool Civic Place Phase A development will consider and implement the ESD requirements and drivers identified below.

4.1 Energy & Carbon Emissions Improvements

A variety of energy efficiency measures will be considered for the proposed development. These energy efficiency measures will influence the final design, construction and future operation of the space. The final strategy will always be a combination of sustainability, operational feasibility, architectural & functional intent and site-specific appropriateness.

The energy efficiency strategy generally follows the hierarchy pyramid below. Best practice energy efficiency generally dictates that in the first instance demand is reduced. This has a much greater benefit to the overall long-term sustainability of the site compared to efficiency measures or renewables/offsets. As such, the focus will be on the elements that provide the greatest return on investment.

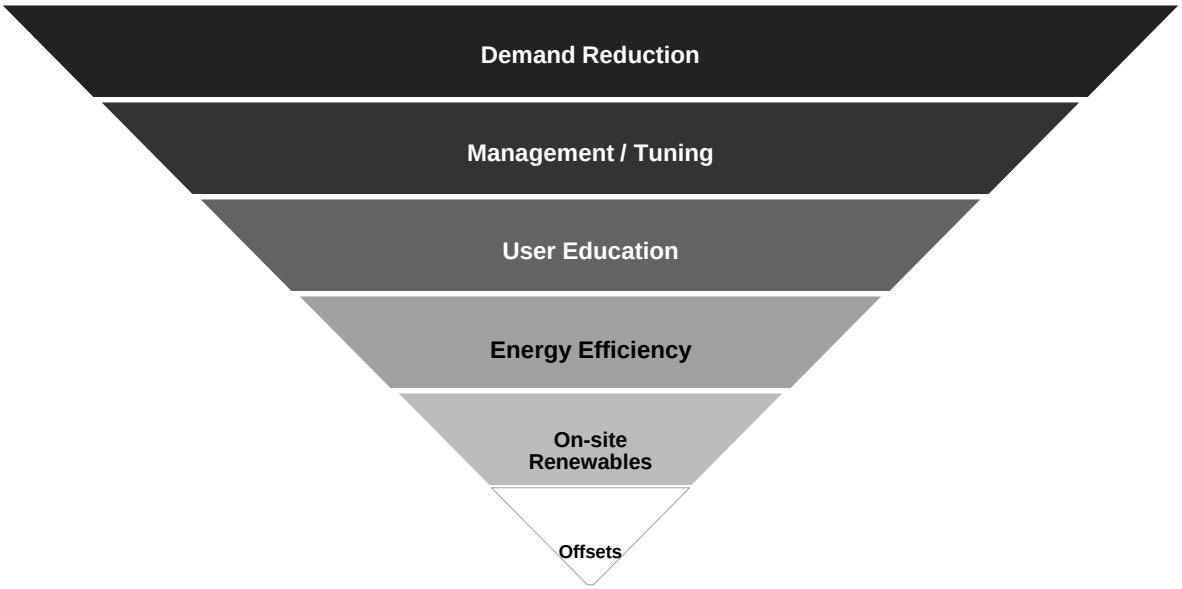


Figure 2: Energy efficiency strategy hierarchy

The commercial building will be designed to meet a 5 Star NABERS Energy Base Building Standard and the library will include energy efficiency initiatives to minimize energy consumption. The following key design elements are incorporated into the design:

Passive Building Design

- Use of high-performance façade systems to meet stringent NCC 2019 Section J requirements to passively reduce energy losses and gains throughout the year. This effectively reduces the cooling and heating loads to maintain thermal comfort for conditioned spaces.
- Lift cores are located on western and north-western façades which typically receive high levels of solar gain. The core positioning reduces unwanted solar gain and reduces strain on mechanical systems and overall energy use.
- Provision of automated shading devices on the library to manage solar gain and control glare. The shading devices will be connected to the building management system to ensure shading is deployed when required.
- Use of deep facade spandrel types on the council commercial building to provide shading and control solar gains
- Consideration of transparent window to overall conditioned façade area ratio in order to improve overall façade building envelope thermal efficiency.
- Consideration of thermal breaks to aid in façade thermal performance.
- Insulation to exposed floors, external walls and roofs for thermal efficiency and prevention of heat loss in winter
- Green roof design integrated with landscape design reduces urban heat island impacts.
- Deciduous tree species in public domain for seasonal solar control
- Thoughtful placement of skylights on library and childcare areas allows for good levels of daylight penetration into spaces that would normally require substantial artificial lighting demand. This will aid in reducing overall artificial lighting energy consumption.

Mechanical HVAC

- Dedicated air handling systems serving different thermal on the north, east, west, and south facades, and central zones.
- High efficiency variable speed centrifugal chiller system and high efficiency electric motors on all fans and pumps.
- Multiple plug fan technology capable of individual fans being able to shut down at part loads.
- High efficiency cooling towers, staged to reduce water, fan power and sized to serve the chilled water system.
- High efficiency gas fired generators to provide heating hot water.
- Fans to be regularly maintained and filters cleaned to reduce fan pressure.
- Mechanical HVAC system to comply with the stringent energy efficiency requirements of NCC Section J 2019 Part J5.
- Proper air-conditioning control to specific required space temperatures including adequate temperature setpoints and bandwidith. This will assist in avoidance of over-cooling or over-heating a particular area.
- Consideration of 100% electric plant to provide the option of the building being fully powered by renewables in future.

On-site Renewable Energy (Solar PV)

- A 99kW solar photovoltaic (PV) system is to be provided to the development. Solar PV will provide renewable electricity generation to offset main grid use. Consideration of roof design, spatial allowance and building electrical load profile will aid in maximising on-site Solar PV panel utilisation and system capacity to offset grid electricity demand for mechanical air-conditioning and lighting etc.

Electrical Systems & Lighting

- Electrical artificial lighting and power (including lifts) to comply with the stringent energy efficiency requirements of NCC Section J 2019 Part J6.
- High efficiency LED lighting will reduce the electrical load on the grid for the same output. Further, LED globes have a longer life, reducing replacement periods which demands less maintenance, as well as reducing landfill of precious materials.
- Lighting controls including time clocks, daylight & occupancy sensors to reduce the electrical demand for the lighting systems.
- Maximise usable natural daylight within the architectural design in conjunction with daylight dimming to reduce lighting energy demand.

Energy Metering and Monitoring

- Extensive energy metering of tenancy and base building services to facilitate energy monitoring.
- Energy sub-meters will allow for the monitoring of relevant areas or functions. Energy data will be recorded by the BMCS (or equivalent system) and used to manage/monitor energy consumption and be reviewed against energy targets/benchmarks.

4.2 Water

Given the current drought in Australia, potable water is a precious resource and the project is seeking to minimise the use of this water as far as possible. The commercial building will be designed to meet a 3.5 Star NABERS Water Whole Building rating and the library will utilise the same principles to reduce potable water demand. To ensure this outcome, the following design elements will be incorporated:

- Provision of high Water Efficiency Rating Scheme (WELS) rated fixtures, fittings and appliances ensuring lower building water demand:
    - Showers to be 7.5 L/min or lower
    - Urinals will be maximum 0.8 L/flush (6 Star WELS)
    - Taps to be 4.5 L/min or lower (6 Star WELS), unless in ambulant spaces
- Landscape irrigation system served with a subsoil drip system and moderate/low water species are to be selected.
- Fire system test water collected and recirculated or reused on site.
- Cooling tower design with high cycles of concentration (6+), as well as drift reducing barriers and accurate sizing of mechanical systems.
- A 60kL rainwater tank collecting water off the roof to be used for toilet flushing and irrigation.
- Sub metering and monitoring of major water uses.

4.3 Indoor Environment Quality

The proposed development seeks to improve the overall indoor environment quality for building occupants by addressing the following elements:

Indoor Air Quality

- Material selections & finishes will be selected that can assist with reducing indoor pollutants. This includes products and finishes (paints, adhesives/sealants, carpets, engineered wood products) with low volatile organic compounds (VOC) levels and low formaldehyde emissions impacts. Such selections can assist with improving occupant health through the reduction in internal air pollutant levels
- To maximise occupant experience and wellbeing, it is proposed outdoor air be increased 50% above minimum Australian Standards 1668.2. CO_2 will be managed in the space to a maximum of 800ppm, ensuring healthy air

Acoustic Comfort

- Ambient Noise levels will be designed to be in line with AS 2107:2016, ensuring a distraction-free environment.
- Reverberation times will be designed to AS2107:2016 and demonstrated in post-construction testing.

Thermal Comfort

- The proposed mechanical HVAC system will provide air conditioning & ventilation to all indoor occupied spaces to maintain appropriate indoor design temperatures and achieve good levels of occupant thermal comfort.
- Energy efficient mechanical HVAC systems will maintain internal space conditions and provide the required outdoor fresh air ventilation rates appropriate to the space use.

Visual Comfort & Daylight

- Considered placement of skylights to the library and childcare areas allows for good levels of natural daylight penetration into spaces.
- Architectural design and façade location allow building occupants to have good access to high quality external views.

4.4 Materials

The production of materials uses large amounts of raw materials including water and energy, as well as needing to be transported long distances to the development site. Building materials will generally be selected based on considerations of aesthetics, value, functionality, durability and minimising environmental impacts throughout the project life cycle. The following initiatives will be implemented:

- Steel sourced from a certified Responsible Steel Maker.
- Timber products to be certified by a forest certification scheme (FSC/PEFC) or re-used.
- PVC products (cables, pipes, flooring etc.) that are Green Star “Best Practice” sustainable PVC.
- Consideration in the selection of materials and products which include re-used content, environmental product declarations, third party sustainability certifications or product stewardship programs.
- Head Contractor to target recycling at least 90% of demolition and construction waste during construction phase.
- The use of concrete with reduced Portland cement content (lower embodied energy).
- Separated operational waste streams to divert as much waste from landfill as possible.

4.5 Sustainable Transport

To support the reduction of private car trips and encourage the use of sustainable transportation, the following initiatives will implemented:

- A Green Travel Plan and Transport Access Guide will be developed for the project to outline and encourage public transport options.
- The site is located close to the Liverpool Train Station and multiple bus stops.
- The site is surrounded by amenities such as cafes, shops and services within walking distance, encouraging people to move by foot over public transport.
- Approximately 111 secure bicycle spaces, 30 additional visitor bicycle packing spaces and supporting end of trip facilities will be provided to encourage bicycle use.

4.6 Land Use and Ecology

The following strategies will be implemented to reduce the negative impacts on the site's ecological value as a result of urban development, and to enhance the quality of local ecology post-construction.

- Landscaped public domain area with water sensitive / drought tolerant native plant species.
- Green roofs and pocket park to reduce urban heat island effect and provide improved building user amenity.
- Approximately 50% tree canopy cover to public domain with appropriate soil build up zones

4.7 Building Emissions

The following initiatives will be considered for implementation where possible:

- External lighting will be designed with consideration of the obtrusive effects of outdoor lighting and light pollution generally.
- Stormwater quality improvement devices will be implemented to improve the quality of stormwater runoff and achieve the necessary pollution reduction targets.

4.8 NCC 2019 Section J

The project is subject to the new provisions outlined within NCC Section J 2019. The proposed new performance standards for NCC Section J will increase the thermal performance requirements for code compliant façade designs. Glazing thermal performance, solar control, visible light transmittance and inclusion of appropriate shading features within the design response must be considered in accordance with the increased performance requirements of NCC Section J 2019.

A preliminary JV3 assessment has been carried out on the proposed development to confirm compliance with Section J 2019. The design has optimised energy efficiency & thermal performance via design of external façade design elements which improve the building passive thermal performance. These features include:

- Use of ultra high-performance façade systems with high levels of solar control.
- Lift cores located on western and north-western façades which typically receive high levels of solar gain.
- Provision of automated shading devices on the library to manage solar gain and control glare.

- Use of deep facade spandrel types on the council commercial building to provide shading and control solar gains
- Consideration of transparent window to overall conditioned façade area ratio in order to improve overall façade building envelope thermal efficiency.
- Consideration of thermal breaks to aid in façade thermal performance.
- Insulation to exposed floors, external walls and roofs for thermal efficiency and prevention of heat loss in winter.

In addition to the above, thermal comfort modelling will be included to demonstrate compliance with the new NCC 2019 code, with a minimum performance of -1.0 < PMV <1.0 in each mechanically conditioned zone. The design of the building fabric will demonstrate compliance with this clause through dynamic modelling of the building against a reference case.

5. Conclusion

Ecologically Sustainable Design is a driving consideration in the development of the proposed Liverpool Civic Place Phase A, located at 52 Scott Street, Liverpool NSW 2170. As described within the report above, the project will incorporate a number of ESD and environmentally conscious initiatives in both design and operation.

The ESD initiatives outlined in this report are a reflection of the ESD investigations to date, and a summary of the implemented and proposed design and operational initiatives. The specific initiatives that will be installed across the development will be determined throughout the design process and will be subject to feasibility analysis, including that of the final use and layout.

The development's commitment to reducing the overall environmental impact is evident of the holistic approach taken to long-term sustainability. Documented initiatives cover a range of concepts including:

- Energy & Greenhouse Gas emissions reduction
- Potable water reduction
- Minimising waste to landfill.
- Indoor environment quality
- Occupant amenity and comfort
- Building Management practices
- Climate adaptation and resilience

We trust this report provides sufficient overview of the project's commitment to environmentally sustainable design and the sustainability vision for the Liverpool Civic Place Phase A development.

Appendix A Preliminary Green Star Pathway

Green Star - Design & As Built Scorecard

Project:	LCP - Council Commercial	Round:	1	Core Points Available	Total Score Targeted
Targeted Rating:	5 Star - Australian Excellence			100	67

NA	CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
	Management				14	
	Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional	1	1
	Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets	-	Complies
			2.1	Services and Maintainability Review	1	1
			2.2	Building Commissioning	1	
			2.3	Building Systems Tuning	1	1
			2.4	Independent Commissioning Agent	1	1
	Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	2
	Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1
	Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1
			5.2	End of Life Waste Performance	1	1
	Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies
			6.1	Monitoring Systems	1	1
	Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	Complies
			7.1	Environmental Management System	1	1
			7.2	High Quality Staff Support	1	1
	Operational Waste	B. Prescriptive Pathway	8A	Performance Pathway: Specialist Plan	0	
			8B	Prescriptive Pathway: Facilities	1	1
	Total				14	13

	Indoor Environment Quality				17	
☐	Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1
☐			9.2	Provision of Outdoor Air ☑ ☐ ☐	2	1
☐			9.3	Exhaust or Elimination of Pollutants ☐	1	1

		9.0	Exhaust or Elimination of Pollutants	1	1
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	1
		10.2	Reverberation	1	1
		10.3	Acoustic Separation	1	1
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	1	1
			11.1.2 Glare Reduction		
		11.2	Surface Illuminance	1	
		11.3	Localised Lighting Control	1	
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies
		12.1	Daylight	2	1
		12.2	Views	1	1
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	1	1
			13.1.2 Carpets		
		13.2	Engineered Wood Products	1	1
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	1
		14.2	Advanced Thermal Comfort	1	1
Total				**17**	**13**

Energy				**22**	
Greenhouse Gas Emissions	E. Reference Building Pathway	15E.0	Conditional Requirement: Reference Building Pathway	-	Complies
		15E.1	GHG Emissions Reduction: Building Fabric	4	0.5
		15E.2	GHG Emissions Reduction	16	3.5
		15E.3	Off-Site Renewables	8	
		15E.4	District Services	7	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	1	
			15E.5.2 Fuel Switching	2	
			15E.5.3 On-Site Storage	1	
Peak Electricity Demand Reduction	B. Performance Pathway	16A	Prescriptive Pathway: On-Site Energy Generation	0	
		16B	Modelled Performance Pathway: Reference Building	2	2
Total				**22**	**6**

Transport				**10**	
Sustainable Transport	A. Performance Pathway	17A	Performance Pathway	10	8
Total				**10**	**8**

Water				12	
Potable Water	A. Performance Pathway	18A	Potable Water - Performance Pathway	12	4
Total				**12**	**4**

Materials				14	
Life Cycle Impacts	A. Performance Pathway - Life Cycle Assessment	19A.1	Comparative Life Cycle Assessment	6	1
		19A.2	Additional Reporting	4	3
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	-	Complies
				1	1
		20.2	Timber	1	
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	3	3
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	-	Complies
		22A	Fixed Benchmark	0	
		22B	Percentage Benchmark	1	1
Total				**14**	**10**

Land Use & Ecology				6	
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	-	Complies
		23.1	Ecological Value	3	1
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement	-	Complies
		24.1	Reuse of Land	1	1
		24.2	Contamination and Hazardous Materials	1	1
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction	1	
Total				**6**	**3**

Emissions				5	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	1
		26.2	Stormwater Pollution Targets	1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies
		27.1	Light Pollution to Night Sky	1	1
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28	Legionella Impacts from Cooling Systems	1	
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	1	

Total				**5**	**3**

Innovation				**10**	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process		
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation		
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks	10	2
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		3
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools.	30E	Global Sustainability		2
Total				**10**	**7**

AVAILABLE	TARGETED
100	60.0
[redacted]	60.0
10	7.0
[redacted]	67.0

Design with
community in mind

Level 6, Building B
207 Pacific Highway
St Leonards NSW 2065
Tel +61 2 8484 7000

For more information please visit
www.stantec.com

Stantec