

Attachment C6

Proponent ESD Strategy

Appendix C – Ecologically sustainable development strategy



Goodman Property Services (Aust) Pty Limited

Burrows Industrial Estate, 1-3 Burrows Road, St Peters
ESD Analysis and Strategy

March 2020

Table of contents

1.	Introduction	1
1.1	Scope and limitations.....	1
2.	Context review	1
3.	ESD strategy	18
3.1	Framework	18
3.2	ESD initiatives and considerations	20
4.	Conclusion	1

Table index

Table 1 – Goodman policies and project requirements	1
Table 2 – Site context.....	2
Table 3 – Planning controls and policy context.....	3
Table 4 – Sustainability framework	18
Table 5 – ESD Initiatives	20

Figure index

No table of figures entries found.

1. Introduction

This report summarises the ecologically sustainable development (ESD) strategy in support of a Planning Proposal for the proposed Goodman Burrows Industrial Estate at 1-3 Burrows Road, St Peters. The report includes:

- Review of site location and climate context
- Review of policy and planning proposal context
- A framework which defines the principles that will be incorporated into the future design, construction and operation of the site. The framework is built around key sustainability themes, principles and targets informed by best practice, site location, policy and planning controls
- Summary of ESD initiatives included in the current design and additional strategies recommended for inclusion or further consideration.

The report also addresses the sustainability and ESD related elements of the *Planning Proposal Lodgement Checklist* specific to 1-3 Burrows Road provided by the City of Sydney (9-Dec-2019). These responses are integrated into the relevant areas of the strategy.

1.1 Scope and limitations

This report: has been prepared by GHD for Goodman Property Services (Aust) Pty Limited and may only be used and relied on by Goodman Property Services (Aust) Pty Limited for the purpose agreed between GHD and the Goodman Property Services (Aust) Pty Limited.

GHD otherwise disclaims responsibility to any person other than Goodman Property Services (Aust) Pty Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD as described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Goodman Property Services (Aust) Pty Limited and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2.

Context review

The context review contains a summary of the physical, regulatory, policy and other drivers that will interact and influence ESD / sustainable outcomes. This review also includes consideration of Goodman's own sustainability and environmental, social and governance (ESG) policies. The aim of the context review is to identify key targets, sustainability themes and common objectives which will be used to develop a project specific framework and identify appropriate and practical development features and initiatives in order to achieve the sustainability outcomes.

Table 1 – Goodman policies and project requirements

Requirement or policy	Summary / overarching intent	Relevant requirements / objective targets	Development implications / interactions
Goodman's 2030 Sustainability Strategy	<p>Goodman's 2030 Sustainability Strategy is structured around three pillars.</p> <ul style="list-style-type: none"> • Property • People and Culture • Corporate performance <p>These are linked to a set of material issues, with each pillar backed by short and long-term ESG targets. Progress reporting against these targets will occur annually.</p>	<ul style="list-style-type: none"> • Carbon Neutral and 100% renewable electricity by 2025. 	<ul style="list-style-type: none"> • Low energy design principles, avoidance of fossil fuel on site and maximise on site photo voltaics (PV) • Formal sustainability rating to support Global Real Estate Sustainability Benchmark (GRESB) outcomes.

Table 2 – Site context

Item	Context	Implications / considerations for the development
<p>Site location / features</p> <ul style="list-style-type: none"> The site is in reasonable proximity to a range of local amenities and has good access to public transport systems including Mascot (1.4 km) and Sydenham (2.1 km) Close proximity to Sydney Airport, local road network including the Westconnex tunnel entry/exit point and the industrial nature of surrounds means higher levels of external noise and poorer air quality Extensive roof area provides opportunity for on-site PV system and large catchment for rain water harvesting Extensive roof areas have the potential to impact urban heat island. 		<ul style="list-style-type: none"> Inclusion of end of trip facilities to facilitate those cycling or walking to and from the development Consider position of outside air intakes with regard to local pollution sources External noise anticipated to be a major constraint for the development necessitating additional acoustic considerations for building envelope elements over general practices and will preclude the use of natural ventilation in regularly occupied areas and amenity of external areas Include roof mounted solar PV and use of high solar reflective index material finishes (balanced with aircraft travel path reflectively limitations) to reduce potential negative heat island effects Rainwater capture for non-potable use Potential to utilise some roof area for on-site staff amenity such as roof garden breakout area where structurally practical / feasible (e.g. office area roof).
<p>Climate</p>	<p>Warm / temperate – characterised by periods of hot days in summer and moderate temperatures in winter. The air temperature and humidity are typically within comfort conditions for approximately 40% of the year.</p> <p>Climate change projections published by NSW Office of Environment and Heritage for the Sydney Metropolitan region indicates:</p>	<ul style="list-style-type: none"> Mechanical heating and cooling still be required for significant periods of the year and mechanical ventilation for non-conditioned spaces likely required year round due to external noise constraints Climate change projections should be considered as part of the project design to ensure risks are assessed and addressed through features to increase resilience.

Item	Context	Implications / considerations for the development
	<ol style="list-style-type: none"> 1. Projected warming in the near future (2020-2039) projected to be on average 0.7°C and in the long-term (2060-2079) 1.9°C. 2. Maximum temperatures are also expected to increase in both the near and far future. 3. Increase in days with temps higher than 35°C. An additional 1-5 days are estimated and in the long-term. <p>Rainfall is expected to decrease in spring and winter and increase in summer and autumn</p>	

Table 3 – Planning controls and policy context

Planning control or policy	Summary / overarching intent	Specific requirements / objective measureable targets	Development implications / interactions
<p>Greater Sydney Region Plan (GSRP)</p>	<p>The plan defines a number of overarching objectives for greater Sydney including sustainability objectives covering landscape, efficiency and resilience.</p>	<p>Objective 25: The coast and waterways are protected and healthier</p> <p>Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced</p> <p>Objective 28: Scenic and cultural landscapes are protected</p> <p>Objective 31: Public open space is accessible, protected and enhanced</p>	<p>Refer to implications and interactions discussed under the Eastern City District Plan that is a sub-plan of the GSRP.</p>

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
		<p>Objective 32: The Green Grid links parks, open spaces, bushland and walking and cycling paths</p> <p>Objective 33: A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change</p> <p>Objective 34: Energy and water flows are captured, used and re-used</p> <p>Objective 35: More waste is re-used and recycled to support the development of a circular economy</p> <p>Objective 36: People and places adapt to climate change and future shocks and stresses</p> <p>Objective 37: Exposure to natural and urban hazards is reduced</p> <p>Objective 38: Heatwaves and extreme heat are managed.</p>	
Eastern City District Plan (ECDP)	<p>The ECDP (that sits under the GSRP) defines a number of strategic planning priorities and associated actions to deliver on the city wide objectives. These include:</p> <ul style="list-style-type: none"> • Planning Priority E14 - Protecting and improving the health and 	<p>Actions 58 to 61: include requirements for the protection and enhancement of waterways</p> <p>Action 62: requirements for protection and enhancement of biodiversity</p> <p>Actions 65 to 66: requirements to expand urban tree canopy and Green corridors and walking and cycling infrastructure</p>	<ul style="list-style-type: none"> • Stormwater management through water sensitive urban design (WSUD) and treatment before release from site to local waterways • Brownfield site with limited existing vegetation. Opportunity to enhance

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
	<p>enjoyment of Sydney Harbour and the District's waterways</p> <ul style="list-style-type: none"> • Planning Priority E15 - Protecting and enhancing bushland and biodiversity • Planning Priority E16 - Protecting and enhancing scenic and cultural landscapes • Planning Priority E18 - Delivering high quality open space • Planning Priority E17 - Increasing urban tree canopy cover and delivering Green Grid connections • Planning Priority E19 - Reducing carbon emissions and managing energy, water and waste efficiently • Planning Priority E20 - Adapting to the impacts of urban and natural hazards and climate change 	<p>Action 67: encourages expansion of new open space</p> <p>Actions 68 to 73: requirements to encourage achievement of net zero emissions by 2050, use of high efficiency, low carbon design principles, precinct based renewable energy generation and waste reduction and recycling</p> <p>Actions 74 to 76: support initiatives that respond to climate change, avoidance of locating new development in areas exposed to natural hazards and mitigation of urban heat island effect.</p>	<p>through landscaped elements / open and publicly accessible space</p> <ul style="list-style-type: none"> • Project to include cyclist / active transport facilities • Project to be low energy design by adopting passive and energy efficiency principles • Project to take advantage of extensive roof area and implement on site energy generation through roof top PV to offset demand • In addition to above, deliver building “net zero carbon ready” through consideration of site fuel sourcing (e.g. avoidance of fossil fuels for heating and hot water generation – preference for heat pumps) and balance of electricity supplied from green power • Climate risk assessment to be completed and risks designed out • External hardscape, landscape and building materials to have moderate to high solar reflective index (SRI) to reduce effects urban heat island.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
<p>Sustainable Sydney 2030 – Community Strategic Plan 2017 - 2021</p>	<p>The Sustainable Sydney 2030 strategic plan includes a framework with ten strategic directions:</p> <ul style="list-style-type: none"> • A globally competitive and innovative city • A leading environmental performer • Integrated transport for a connected city • A city for pedestrians and cyclists • A lively, engaging city Centre • Vibrant local communities and economies • A cultural and creative city • Housing for diverse population • Sustainable development, renewal and design • Implementation through effective partnerships. 	<ul style="list-style-type: none"> • 70% reduction of 2006 greenhouse gas (GHG) baseline by 2030 • Net Zero Carbon 2050 • 50% of electricity demand met by renewables • Zero increase in potable water use compared to 2006 baseline • Tree canopy cover increase by 50% from 2006 baseline • Bicycle trip rate – 10% • Public transport trip rate – 80%. 	<ul style="list-style-type: none"> • Project to be low energy design by adopting passive and energy efficiency principles • Project to take advantage of extensive roof area and implement on site energy generation through roof top PV to offset demand • In addition to above, deliver building “net zero carbon ready” through consideration of site fuel sourcing (e.g. avoidance of fossil fuels for heating and hot water generation – preference for heat pumps) and balance of electricity supplied from green power • Project to adopt water efficient design principles using high water efficiency labelling scheme (WELS) rated fittings/fixtures in conjunction with on-site rainwater capture and re use for all non-potable water uses (toilets, wash down, landscaping) • Development to include bike storage and end of trip (EOT) facilities for staff.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
<p>Environmental Action 2016 – 2021 Strategy and Action Plan</p>	<p>This strategy and action plan is linked to the 2030 strategy and addresses 6 key areas for the city:</p> <ul style="list-style-type: none"> • Low-carbon • Water sensitive • Climate resilient • Zero waste • Active and connected • Green and cool. <p>The document also includes a guide for excellence in new building design that nominates voluntary performance standards / targets across energy, emissions, water, materials and landscaping / biodiversity.</p>	<p>Targets For commercial buildings (only retail and office nominated):</p> <ul style="list-style-type: none"> • Office - National Australian Built Environment Rating System (NABERS) Energy Commitment: 6 Stars • Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher • Office Water - Designed to meet Sydney Water Good Practice standard (proposals without cooling towers: 0.47 kL/m²/ year; proposals with cooling towers: 0.84 kL/m²/year). <p>Design features for excellence in building performance</p> <ul style="list-style-type: none"> • Thermally efficient building design and shell • Highest efficiency appliances as indicated by the federal government's energy rating scheme • Light Emitting Diode (LED) lighting technology • Onsite renewable energy generation (especially photovoltaics) 	<ul style="list-style-type: none"> • Project to consider targeting formal rating under Green Star (whole building) and apply NABERS Energy/Water rating principles to the development office components • Energy / carbon – See above • Water – See above • Transport – See above • Co or tri generation not recommended unless onsite renewable / low carbon form of energy can be derived from site or local waste source (e.g. waste wood, bio gas or similar) • Development material selections: <ul style="list-style-type: none"> ○ Certified timber or recycled timber ○ Use of cement replacement materials and recycled aggregates. • Project to consider separating organic waste streams for composting for re use back on site in landscaping.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measureable targets	Development implications / interactions
		<ul style="list-style-type: none"> • Solar or heat pump water heating • On site low carbon energy generation (cogeneration or tri-generation) • High performance glazing • External shading (adjustable options) to glazing • Building management control systems • Highly energy efficient common area equipment space • heating/cooling (HVAC), car park ventilation • Highest efficiency fittings (taps, showerheads, toilet cisterns, urinals) using WELS Star ratings • On site water capture and re-use, or connection to precinct-scale recycled water scheme where available • Well designed and controlled cooling towers • Highest efficiency whitegoods (especially laundry): WELS 4 Star or higher 	

Planning control or policy	Summary / overarching intent	Specific requirements / objective measureable targets	Development implications / interactions
		<ul style="list-style-type: none"> • Timber products – Use of re-used or certified timber according to Green Building Council of Australia • Responsible Building Materials 20.2A and 20.2B • Concrete products – More than 30 per cent replacement of Portland cement with supplementary cementitious materials • Aggregates reduction – Replacement of virgin coarse and sand aggregate as per Section 19B.1.3 Green Star Design & As Built v1.1 • Organics recovery – Provision for on-site composting of kitchen and garden waste • Design for low water demand and drought resilience • Employ water sensitive urban design techniques • Select low water demand plant species • Protect existing healthy trees in accordance with AS 4970 • Plant well located canopy trees that provide summer shade and light in winter 	

Planning control or policy	Summary / overarching intent	Specific requirements / objective measureable targets	Development implications / interactions
		<ul style="list-style-type: none"> Supply of quality tree stock in accordance with AS 2303 Select local provenance, hardy and resilient plant species Engage with local bushcare groups for plant stock/advice Avoid disturbing existing soil profiles in areas designated for landscaping Create spaces for community gardens – community gardens are ‘enablers’ creating social connection opportunities for residents, neighbours, businesses. 	
Future Transport Strategy 2056 (FTS)	<p>FTS 2056 sets the 40 year vision, directions and outcomes framework for customer mobility in NSW to guide transport investment over the longer term. It will be delivered through a series of supporting plans. It is a suite of strategies and plans for transport developed in concert with the Greater Sydney Commission’s Sydney Region Plan, Infrastructure NSW’s State Infrastructure Strategy, and the Department of Planning and Environment’s regional plans, to provide an integrated vision for the state.</p>	<p>N/a</p>	<ul style="list-style-type: none"> Development to include end of trip facilities and bike parking / storage Parking for motorbikes / scooters Development to include parking spaces for ride share schemes Dedicated parking and infrastructure for low emission / alternative. Included EV charging Project to be designed to facilitate access and egress for autonomous vehicles

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
	<p>Relevant strategic directions that interact with the planning proposal include:</p> <ul style="list-style-type: none"> • Mobility as a services (MaaS) – encouraging a range of modes including “on demand”, “ride share”, “smart parking”, “Connected and Autonomous Vehicles” and “digital enablement” • Use of drones for delivery of goods and emergency response transport • Short trip (2km) mobility (e-bikes, motorised scooters) • Accessible to mass transit and other forms of public transport • Increasing modes of active travel (walking and cycling) through better connections • Encouraging low emission forms of transport using alternative fuels. 		<ul style="list-style-type: none"> • Project to consider use of use of drones for movement of goods and enable for future drone staging area.
Better Placed	<p>Better Placed is NSW Government Architect policy that provides a set of principles and guidance to support good design in NSW. It includes the following seven objectives which define key</p>	N/a	<p>Refer above. All considerations detailed in response to other policies are also relevant to Better Placed. Additional considerations:</p>

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
	<p>considerations for design of built environment:</p> <ol style="list-style-type: none"> 1. Better fit contextual, local and of its place 2. Better performance sustainable, adaptable and durable 3. Better for community inclusive, connected and diverse 4. Better for people safe, comfortable and liveable 5. Better working functional, efficient and fit for purpose 6. Better value creating and adding value 7. Better look and feel engaging, inviting and attractive <p>With regard to objective 2 Better Performance:</p> <ul style="list-style-type: none"> • Sustainable: Relates to the endurance of systems, buildings, spaces and processes – their ability to be maintained at a certain rate or level, which contributes positively to 		<ul style="list-style-type: none"> • Project will need to consider how it will positively contribute to achieving local social and economic outcomes.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
	<p>environmental, economic and social outcomes</p> <ul style="list-style-type: none"> • Adaptable: A building, place or space that is able to adjust to new conditions, or to be modified for a new purpose • Durable: A building, place or space that is built to be able to withstand wear and pressure. 		
Draft Greener Places	<p>Greener Places is GANSW guide for design, planning and delivery of green infrastructure across NSW. It includes four key principles:</p> <ul style="list-style-type: none"> • Principle 1 - Integration combine Green Infrastructure with urban development and grey infrastructure • Principle 2 - Connectivity create an interconnected network of open space • Principle 3 – Multi functionality deliver multiple ecosystem services simultaneously • Principle 4 - Participation involve stakeholders in development and implementation 	N/a	<p>Focus of the Greener places appears to be more relevant to major infrastructure and public space. However potential for project to contribute to the policy aims through:</p> <ul style="list-style-type: none"> • Ground plane landscaped elements included in the design • Consider increasing landscaped elements through green walls and roofs where feasible / practical.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
Sydney LEP	<p>Local Environmental Plans (LEPs) guide planning decisions for local government areas through zoning and development controls.</p> <p>The Sydney LEP 2012 includes a general aim to “promote ecologically sustainable development” and includes a number of specific controls relevant to ESD including:</p>	<p>6.2.1 Design Excellence</p> <p>(4) (d) Requires details on how proposed development addresses:</p> <ul style="list-style-type: none"> (vii) environmental impacts, such as sustainable design, overshadowing and solar access, visual and acoustic privacy, noise, wind and reflectivity, (viii) the achievement of the principles of ecologically sustainable development, (ix) pedestrian, cycle, vehicular and service access and circulation requirements, including the permeability of any pedestrian network, (xii) excellence and integration of landscape design. 	<ul style="list-style-type: none"> • Implications for development are addressed in other Planning Proposal Justification documents • ESD framework and targets have been developed for inclusion within a Design Excellence / Competition brief for the development • ESD implications and interactions noted above in response to other policies address the sustainability requirements of the LEP.
Sydney Development Control Plan 2012	<p>Section 3.6 of the of the DCP 2012 includes a number of Ecologically Sustainable Development (ESD) related provisions and objectives requiring Developments be designed and constructed so that:</p>	<p>Relevant ESD design requirements for non-residential development are summarised below:</p> <p><u>Energy Efficiency</u></p>	<ul style="list-style-type: none"> • ESD implications and interactions noted above in response to other policies address the sustainability requirements of the DCP.

Planning control or policy	Summary / overarching intent	Specific requirements / objective measureable targets	Development implications / interactions
	<p>(a) Greenhouse gas emissions will be reduced.</p> <p>(b) The use of cogeneration and tri-generation systems will be increased.</p> <p>(c) Energy that is used will be renewable and low carbon.</p> <p>(d) Potable water use will be reduced.</p> <p>(e) Development can adapt to climate change.</p> <p>(f) Waste will be reduced.</p> <p>(g) Recycling of waste and use of products from recycled sources will be increased.</p> <p>(h) Indoor environmental quality will be improved.</p> <p>(i) The environmental impact from building materials will be reduced through reduction, re-use and recycling of materials, resources and building components</p> <p>(j) The biodiversity will be improved.</p>	<ul style="list-style-type: none"> • Designed and constructed to incorporate passive design measures reducing the need for active cooling & heating. • Public domain lighting to be energy efficient such as LED technology. • Electrical sub-metering of: <ul style="list-style-type: none"> ○ Lighting, air-conditioning and power for multi-tenant or strata developments; ○ Significant uses (>10,000kWh/yr.). • Car parking to allow installation of electric vehicle charging points at a later time or where appropriate/possible install. • For new office with NLA >1000m², be capable of supporting a NABERS Energy 5.5 Star Base Building rating. <p><u>Water Efficiency</u></p> <ul style="list-style-type: none"> • Utilise the highest Water Efficiency Labelling Scheme (WELS) star rated fittings & fixtures available at the time of development. • Installed rainwater collection & reuse systems connected to appropriate uses. 	

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
		<ul style="list-style-type: none"> Irrigation water is to be supplied from captured rainwater or treated grey/waste water. Cooling tower water usage is to be reduced by appropriately controlling the contaminant bleed rate and top up with conductivity sensing of contaminants. <p><u>Photovoltaic Solar Panels</u></p> <ul style="list-style-type: none"> PV Solar panel placement is to take into account overshadowing from adjacent structures/planting as well as potential permissibility in the future. <p><u>Wind Turbines</u></p> <ul style="list-style-type: none"> Are not to exceed noise levels at nearby residential development, require removal or pruning of any existing vegetation that requires consent to do so, be clear of power lines, not affect building structural integrity or heritage items and be installed per manufacturer's specifications. <p><u>Materials and Building Components</u></p> <ul style="list-style-type: none"> Paints and floor coverings to have low volatile organic compounds (VOC) and composite wood products to be low formaldehyde emission. 	

Planning control or policy	Summary / overarching intent	Specific requirements / objective measurable targets	Development implications / interactions
		<ul style="list-style-type: none"> • Where possible, use materials/fittings/finishes that: <ul style="list-style-type: none"> ○ Have been reused or are made from / incorporate recycled materials; and ○ Are third party certified by a recognised scheme as environmentally friendly. • Design for longevity, adaptation, disassembly, reuse and recycling. • Reduce the amount of materials used in construction, where possible, compared to standard methods. 	

3. ESD strategy

3.1 Framework

The proposed ESD strategy for the project aims to integrate Goodman’s own sustainability strategy requirements alongside the objectives of the broader NSW and City of Sydney policies and planning controls. The context analysis summarised in Section 2 identifies the relevant sustainability themes, objectives and targets drawn from the various policies and planning controls. These have been used to develop a project specific framework that outlines mechanisms for guiding the integration of ESD and sustainability principles throughout the remainder of the project design and delivery stages to improve environmental performance.

Table 4 – Sustainability framework

Theme	Objective	Targets
Leadership & Governance	Demonstrate leadership by embedding sustainability objectives into decision-making processes and committing to setting targets and having a measuring and monitoring system to track the environmental performance of the building. Project to target a formal sustainability rating and be delivered “net zero carbon ready” in support of Goodman’s 2025 Carbon Neutral target.	<ul style="list-style-type: none"> Minimum 5 Star Green Star Design & As Built v1.3 rating
Energy & Carbon Minimisation	Minimisation of carbon emissions and energy consumption through adoption of hierarchical energy design strategies using passive design, energy efficiency and sourcing of energy from on and offsite low or zero carbon sources. Project to incorporate features to support use of low emission / alternative fuel transport.	<ul style="list-style-type: none"> Equivalent to minimum 5 Star NABERS Energy for Office areas Minimum 20% improvement on National Construction Code (NCC) Section J (prior to consideration onsite generation) Whole development delivered net zero carbon ready

Theme	Objective	Targets
Water	Reduce potable water usage through demand reduction and maximise opportunities for rainwater / stormwater capture and reuse for non-potable purposes.	<ul style="list-style-type: none"> • Equivalent to minimum 4 Star NABERS Water for Office areas • Minimum of 35% improvement over Green Star reference baseline
Health and Wellbeing	Use passive and active measures in combination to maintain a high standard of indoor air quality, visual, acoustic and thermal comfort and amenity. Incorporate features to encourage occupants to use active modes of transport.	<ul style="list-style-type: none"> • Initiatives to support 5 Star Green Star
Materials & Waste	Minimize construction and material waste generated throughout the project lifecycle by considering embodied lifecycle impacts of material selections for the project. Contractors, subcontractors and suppliers are to incorporate sustainability as a key initiative in their work and procurement processes. Reduce waste generation and encourage reuse or recycling through adoption of circular principles to avoid single use and waste going to landfill.	<ul style="list-style-type: none"> • Initiatives to support 5 Star Green Star
Land Use, Ecology & Biodiversity	Natural ecosystems and local landscape habitat to be preserved and site ecological value enhanced through landscaped elements.	<ul style="list-style-type: none"> • Initiatives to support 5 Star Green Star
Emissions and Discharges	Reduce sources of pollution and emissions to limit degree of environmental harm caused.	<ul style="list-style-type: none"> • Initiatives to support 5 Star Green Star
Climate Change Resilience	The site will be designed for resilience to the effects of climate change. Climate change risks and impacts to be assessed, with design strategies and plans in place to address them.	<ul style="list-style-type: none"> • Achieve Climate Change credit of Green Star

3.2 ESD initiatives and considerations

The following table outlines ESD strategies and/or commitments that are:

- Incorporated and form the basis of the current planning proposal design
- Recommended for inclusion in the project. These are to be documented during design and implemented during construction stages.
- Additional opportunities requiring further investigation. These are to be assessed in more detail and deemed viable to be included into the project.

Table 5 – ESD Initiatives

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
Leadership & Governance	<ul style="list-style-type: none"> • Development to target and achieve a 5 Star Green Star Design & As Built v1.3 rating and be delivered “net zero carbon ready” in support of Goodman’s 2025 Carbon Neutral target. 	<ul style="list-style-type: none"> • Design stage decision making on major building systems such as envelope, plant equipment, extent of onsite renewables to be guided using life-cycle costing and life cycle impact assessment. • Construction contractor to implement a site specific responsible construction practices including ISO14001 Environmental Management Plan and Staff Wellness program. • Implementation of comprehensive commissioning and tuning plan in accordance with best practice standards • Project will adopt design strategies to promote circular economy through design that encourages material re use and recycling 	<ul style="list-style-type: none"> • Construction Contractor to have formal policies and procedures to provide high quality staff support that exceed statutory occupational health and safety requirements and extend into promotion of wellbeing.

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
Energy & Carbon Minimisation	<ul style="list-style-type: none"> • Building form and orientation incorporates passive solar design principles including shading system proposed around occupied / conditioned spaces to reduce heat loads and glare • Spatial allowance has been made for a number of energy ESD initiatives including: <ul style="list-style-type: none"> ○ Water based heat rejection for offices ○ Heat pumps for hot water. 	<ul style="list-style-type: none"> • Building envelope to include the following features to balance heat loads, glare and daylighting: <ul style="list-style-type: none"> ○ Office Façade / glazing systems shall be low-e double glazed. Nominal window wall ratio not to exceed 70% ○ Solid walls to include insulation and outer skin cladding to reduce heat gains to inner mass construction that is exposed were practical to utilise as thermal mass smoothing temperature fluctuation and supporting occupant thermal comfort ○ Roofs to include foil faced reflective insulation. Exposed areas of roof be light coloured roof with high solar reflectance and low emissivity • Ventilation systems: <ul style="list-style-type: none"> ○ Mechanically assisted natural ventilation to warehousing exhausting at high level with air intakes at low level ○ Low temp Variable Air Volume air distribution system for office space with CO2 demand control and economy cycle control to utilise free cooling from outside air 	<ul style="list-style-type: none"> • Building envelope: <ul style="list-style-type: none"> ○ Double glazed low-e with thermally broken frame to offices ○ Reduce window wall ratio to 60% • Heat rejection <ul style="list-style-type: none"> ○ Consider integration of ground based heat exchange system for improved heat rejection efficiency, potential to reduce plant spatial requirements for cooling towers and the associated water consumption • Lighting <ul style="list-style-type: none"> ○ Solar lighting tubes for ground and level 1 warehousing running adjacent to structural columns. • Transport <ul style="list-style-type: none"> ○ Electric vehicle (EV) charging stations ○ Incorporate staging area for future drone use on site

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
		<ul style="list-style-type: none"> ○ Offices to include separate thermal control zones for north west, north east south east perimeters and centre zone ○ Allow for oversizing air distribution ducts and air handling units to reduce system pressure leading to reduced fan power and energy consumption ● Cooling thermal plant (heat rejection / chillers): <ul style="list-style-type: none"> ○ Water cooled variable speed compressor chillers selected to be best in class ○ Coefficient of Performance and part load efficiency (IPLV). ○ Cooling towers to be utilised to maximise chiller efficiency ● Domestic Hot Water (DHW) / Heating Hot Water (HHW) plant <ul style="list-style-type: none"> ○ Avoid fossil fuel / gas based systems ○ Electric heat pump systems to be used ○ For isolated amenities such as those located in warehousing use localised instantaneous electric or air sourced heat pump to avoid system losses from reticulating over long distances ● On site electricity generation 	

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
		<ul style="list-style-type: none"> ○ Roof top solar PV system to be included for onsite electrical energy generation. ○ System to be sized to offset as much site energy demand that is cost effective balanced with off-site green power supply. ● Lighting <ul style="list-style-type: none"> ○ Internal LED lighting throughout coupled with occupancy and daylight sensors ○ Daylighting controls for office and warehouse spaces where daylight is available ○ Roof lights / translucent roof sheeting to be included for top level warehouse to reduce daytime artificial lighting requirements ○ External LED lighting photoelectric sensor controlled ● Energy Management / Building Controls <ul style="list-style-type: none"> ○ Building to include comprehensive metering and monitoring systems to enable ongoing monitoring and management ○ HVAC controls on time schedule and with smart starts (building optimisation system) to promote early starts ahead of very hold/cold days to reduce peak demands ● Transport 	

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
Water	Spatial allowance has been made to include rainwater capture.	<ul style="list-style-type: none"> ○ Dedicated spaces for low emission vehicles and ride share. ● Rainwater tank to be included for supply of all on site non potable water use including irrigation, flushing toilets, cooling tower make up water ● Install water efficient fixtures and appliances ● Select drought-tolerant native indigenous vegetation for landscaping ● Testing water of wet fire systems to be captured for reuse or not discharged (e.g. recirculated) during testing processes ● Install water meters and monitoring system. 	<ul style="list-style-type: none"> ● Ground source heat rejection to be considered in lieu of cooling towers to avoid evaporative heat rejection water consumption ● Due to extensive roof area consider opportunities to capture rain water for supplying adjacent sites.
Health and Wellbeing	Design of façade and building form supports use of daylighting for perimeter office spaces and upper warehousing level.	<ul style="list-style-type: none"> ● Use of low formaldehyde and low volatile organic compounds (VOCs) materials to improve internal air quality ● Lighting to maximise visual comfort through maintaining appropriate lighting levels and glare control ● Outside air rates for office areas (or other areas that are regularly occupied) in excess of AS1668.2 requirements coupled with CO² demand controlled ventilation 	<ul style="list-style-type: none"> ● External communal landscaped areas with amenities such as tables, seating and BBQs.

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
		<ul style="list-style-type: none"> • Acoustic treatment of building envelope and ventilation openings to control egress of road traffic and aircraft • Acoustic attenuation of HVAC to limit noise and vibration from air handling plant • Provide bike racks and end of trip facilities (lockers, showers) to encourage staff to use active modes of transport to and from site. 	
Materials	N/a	<ul style="list-style-type: none"> • Reduce Portland cement content by maximising use of supplementary cementitious materials such as fly ash or blast furnace slag • Maximise use of steel sourced from certified environmentally responsible suppliers • Permanent formwork, pipes, flooring, blinds and cables to be free of PVC or contain PVC that is responsibly managed in manufacture per the Green Building Council of Australia's (GBCA) Best Practice Guidelines for PVC • Sustainable timber procurement through GBCA approved Forest Certification Schemes or reused sources • Select products with verified third party certification such as Environmental Product Declarations. 	<ul style="list-style-type: none"> • Road and carpark pavements (incl. sub base) to use recycled products (such as recycled aggregates, glass, etc.) • Consider use of structural timber where practical, such as office building to reduce embodied carbon.

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
Operational waste	Waste room sizing based on storage required for separation of general waste and recyclable waste streams.	On site separation and treatment of organic waste using composting facilities.	Consider implementation direct waste reuse / recycling initiatives pair with community needs.
Land Use, Ecology & Biodiversity	External ground plan landscaped elements are included in the design.	<ul style="list-style-type: none"> • All landscaping to use native species indigenous to the local areas • All external building materials and hardscape areas to be selected with Solar Reflectance Index properties that reduce impact of Urban Heat Island effect. 	<ul style="list-style-type: none"> • Consider including green wall systems for warehousing access roadway and ramp screening • Consider green roof for office building with potential for staff recreational use.
Emissions and Discharges	<p>A stormwater assessment has been undertaken by Costin Roe confirming that post development flow will not exceed pre development. Controls will be included to treat stormwater to the following:</p> <ul style="list-style-type: none"> ○ Gross pollutants (GP's) – 90% ○ Total Suspended Solids (TSS) – 85% ○ Total Phosphorous (TP) – 60% ○ Total Nitrogen (TN) – 45% ○ Hydrocarbons and oil – 90%. 	<ul style="list-style-type: none"> • Refrigerants for chillers and heat pumps to utilise 4th generation or natural refrigerants with an ozone depletion potential of zero and a global warming potential at or near zero. Total System Direct Environmental Impact (TSDEI) to be less than 15. • Light spill to neighbouring properties to be controlled • Light pollution to night sky to be prevented 	Project to investigate additional levels of stormwater treatment over those nominated.

Theme	Features / commitments of current proposal	Recommended for adoption	Recommended for further Investigation
Climate Resilience	The project is currently designed to sit outside the 1% AEP flood level and the NSW Floodplain Management Manual of 1% AEP + 0.5 m freeboard, Flooding occurs up to RL 2.3 m. The office and proposed building are at RL 3.5 m and 5.2 m respectively.	<ul style="list-style-type: none"> • Project to balance external performance of the building envelope with risk of overheating • HVAC design to consider climate change projections for impact on plant capacity • Consider any climate change induced flood risks and incorporate mitigation measures into design. 	<ul style="list-style-type: none"> • Project to complete a formal climate change risk assessment in accordance with a recognised standard (e.g. AS 5334:2013 Climate Change Adaption for Settlements and Infrastructure) • Building to include features to address all extreme and high risks.

4. Conclusion

A context analysis of the site location, climate and applicable policies and planning controls has been undertaken to identify key sustainability themes and objectives (refer Section 2).

A project specific ESD framework has been developed to capture the key overarching requirements and put in place a strategy to guide the consideration and implementation of best practice ESD features into the future design stages of the development (refer Section 3.1).

A number of sustainable design considerations have also been proposed and are summarised in Section 3.2. These include initiatives that are:

- Incorporated and form the basis of the current planning proposal design
- Recommended for inclusion in the project. These are to be documented during design and implemented during construction stages
- Requiring further investigation. These are to be assessed in more detail and if deemed viable to be included into the project.

On the basis of this review and assumption that the sustainability framework will be followed for future stages of the development, the proposed development is capable of including best practice initiatives and meeting the requirements of current planning controls and the intent of wider local and regional policies.

GHD

Level 15

133 Castlereagh Street

T: 61 2 9239 7100 F: 61 2 9239 7199 E: sydmail@ghd.com




© GHD 2020

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

12521130-

69183/https://projectsportal.ghd.com/sites/pp15_05/planningadvisoryserv/ProjectDocs/12521130-RPT-Goodman ESD Context Analysis and Strategy-R1.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	I Dixon	Tim Dunn		Shaun Lawer		24.02.2020
0	I Dixon	Tim Dunn		Shaun Lawer		04.03/2020

www.ghd.com

