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Report

PRESTONS WAREHOUSE ASSESSMENT – ECOLOGICALLY SUSTAINABLE DEVELOPMENT REPORT AND WATER DEMAND ASSESSMENT

Logos Property

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1 INTRODUCTION

Pacific Environment Limited has been engaged by DBL Property Pty Ltd on behalf of Logos Property to provide ecologically sustainable development principles as well as set out the water requirements for the proposed development of Prestons Industrial Estate (the 'Project') located on the corner of Yarrunga Street and Bernera Road, Prestons, NSW.

The proposed industrial estate will serve as a distribution and warehousing centre that will include:

- Five warehouse facilities with adjoining office space.
- Internal roadways.
- Open-air parking.
- Landscaping.
- Service and infrastructure expansion.

With reference to **Figure 1,** the proposed industrial estate has an area of approximately 20ha and is bounded by Yarrunga Street, Bernera Road and Kurrajong Road.

Section 2 of the report addresses the key issue of *Ecologically Sustainable Development* (ESD) within the *Secretary's Environmental Assessment Requirements (SEARs)* – Section 78A(8A) of the *Environmental Planning and Assessment Act* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.* **Section 3** of the report addresses the water related SEARs requirements, in particular the potable water demand and waste water predictions. It also lists potential efficiency measures and services in place.

This report was developed for the preparation of an Environmental Impact Statement (EIS) where-by Pacific Environment Limited will provide:

"*An assessment of how the development will incorporate ecological sustainable development principles in all phases of the development*". (for ESD)

and:

"*an outline of the proposed water requirements, including a consolidated site water balance, details of water supply sources, usage data and efficiency measures; additionally wastewater predictions, and the measures that would be implemented to treat, re-use and/or dispose of this water.*" (for water)

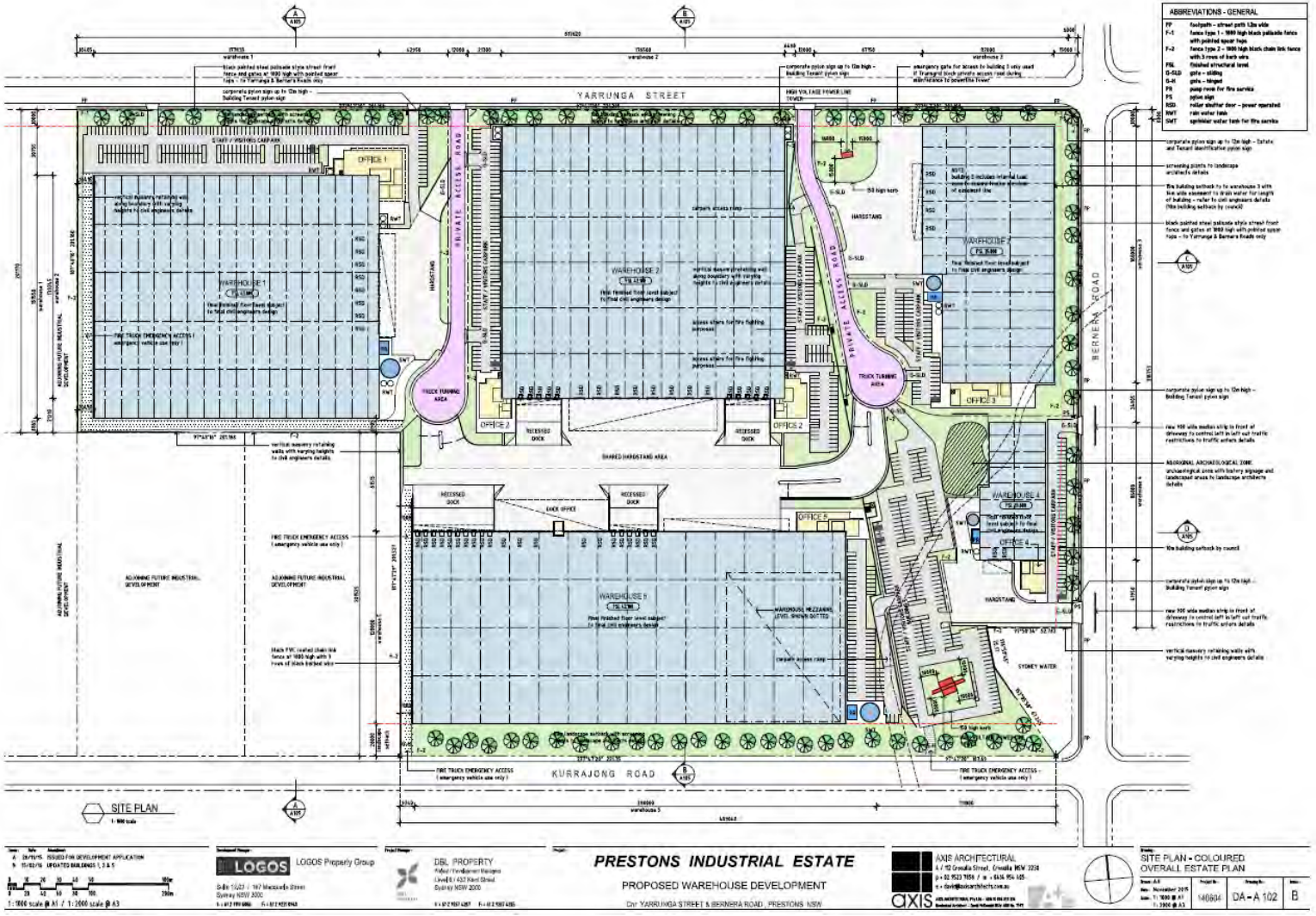

Figure 1: Masterplan of proposed Prestons Industrial Estate

2 SUSTAINABLE DESIGN STRATEGIES

This section addresses the key issue of *Ecologically Sustainable Development* (ESD)within the *Secretary's Environmental Assessment Requirements (SEARs)* – Section 78A(8A) of the *Environmental Planning and Assessment Act* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.*

There are opportunities to achieve ESD with areas for consideration and recommendations identified in **Table 1**. A list of materials and their CO2-equivalent can be found in **Table 2**.

Table 1: Summary of Sustainable Design Strategies

Project Aspect	Recommendations
Transport	To reduce the reliance on private vehicles and relieve any traffic pressures on nearby roads and local communities, the following approaches should be investigated: - Secure bicycle parking facilities. - Extension of existing bus routes or the provision of a regular bus service from the Project to nearby public transport facilities. - Reward drivers for using fuel efficient vehicles by providing space for small cars and motorbikes. - Promote car-pooling/car-sharing initiatives.
Materials	Endeavour to use material with minimal carbon dioxide equivalent (CO_2e) emissions and embodied energy during the construction and operation of the Project. Refer to **Table 2.**
	All timber products used at the site should be procured from certified sustainably harvested resources. No timber should be specified from rainforest or old growth forest.
	Use insulation and refrigerants with zero ozone depleting potential.
	Use of all paints, carpets, adhesives and sealants that have low volatile organic compounds (VOCs) during the construction and operation phase.
	Use low emission Formaldehyde composite wood products during the development of the Project.
	Promote the use of regional or local manufacturers.
Water	Develop a stormwater management plan that incorporates water sensitive urban design (WSUD) such as: - Infiltration trenches and bio retention basins. - Bioswales. - Rain gardens. - Gross pollutant traps. - Rainwater tanks. - Porous pavement. These initiatives reduce the quantity and quality of stormwater runoff, protect waterways and ecosystems, minimise drainage infrastructure costs and enhance liveability.
	Implement rainwater harvesting techniques to minimise potable water use by using rainwater collected from warehouse and/or office roofs for non-potable uses such as toilet flushing and irrigation. If implemented during the construction stage, rainwater harvesting could be used to mitigate dust generation.
	Adopt a landscaping plan that promotes the use of plants that are drought resistant and have low water requirements.
	Use water efficient fixtures with high WELS rating.
	Timely maintenance of fixtures and fittings.
Management	Adopt an independent consultant to provide tuning and maintenance for fire, mechanical, electric and hydraulic services to ensure all aspects are running to their design specification as efficient as possible.
	These strategies are recommended to be implemented via a Site Management Plan or equivalent.

Project Aspect	Recommendations
Indoor Environment Quality	Consider a design to optimise occupant satisfaction in accessibility, usability, air quality and public space utility by adopting a high level of indoor environmental quality. This can be achieved by: - Optimising natural light in work environment through clear roof sheeting in the warehouse. - Optimising fresh air ventilation through natural ventilation. - Optimising thermal comfort through passive solar design such as insulation, air conditioning, glazing, curtains, external louvers/eves, high performance glass and a reflective roof or 'cool roof'. - Minimising internal noise transference between warehouse tenants by: o Using noise absorbent fillers to reduce any reverberation. o Installing walls with a high acoustic transmission loss value. o Using door seals. - Installing eco-certified workstations within the office space.
Noise	Consider a warehouse wall and roofing design that limits internal noise transmission to nearby neighbourhood residences. This can be accomplished by using: - Concrete walls. - Double sheeted zincalume roofing with insulation. - Door seals.
Energy Efficiency	Investigate the possible viability of the following energy sources to reduce bought electricity: - Solar water heating with gas boost. - Solar panels (photovoltaics) or future proofing building for future installation. - On-site co-generation plant.
	Adopt the use of the air conditioning design features to minimise the associated bought electricity.
	Adopt the use of energy efficient appliances and equipment used within the office and warehouse space.
Waste	Ensure the bulk earthworks on-site balance cut and fill where possible.
	Construction contractor develops and implements a Waste Management Plan.
Land Use and Ecology Impact	Use indigenous planting appropriate to the area.
	Design external lighting to avoid releasing light into the night sky or beyond the site boundary.
	Adopt the use of water sensitive urban design (WSUD) described above.
	Employ specialist advice to develop an independent ecological report to identify any protected local flora and fauna.

Table 2: Material Embedded CO_2e (Worley Parsons, 2010)

Building Material	Kg CO_2e
Aluminium	18.6
Steel BlueScope	3.11
Steel BlueScope 20% Recycling	2.80
Flat Glass, Uncoated	0.71
Hardwood	0.45
Structural Pine	0.39
Bricks	0.25
Eco-bricks	0.20
Bitumen	0.66
Concrete Plain Mix	0.25
Concrete 30% Flyash Mix	0.21

3 WATER REQUIREMENTS AND WASTEWATER PREDICTIONS

This section addresses the SEAR's requirements in relation water requirements and wastewater predictions. It also addresses any efficiency measures and services in place.

3.1 Potable water

3.1.1 Demand

The water demand was assessed based on the "*Average Daily Water Use by Property Type*", a Sydney Water publication (**Sydney Water, 2015**). This document provides guidance on potable water demand based on floor areas that are generated from a development. This document is supported by studies that Sydney Water has undertaken to determine a realistic assessment of the average water demand.

The values presented in **Table 3** show how an average daily water demand of 325 kL/day for the site was derived.

Table 3: Potable water demand

Property type	Average daily demand L/m²/day	Floor area[1] m²	Average daily demand kL/day
Industrial – Warehousing	2.82	111,480	314.4
Commercial – Office	2.27	4,555	10.3
Total			**325**

1) Floor areas were provided on the DA application Drawing, Cover page Axis DA – A000, Rev B Feb 2016

3.1.2 Servicing the site

A report by **LandPartners, 2015** identified the services that the site potentially has access to. These are listed in **Table 4**. The report also states that "*The site is well-serviced by substantial Sydney Water potable and recycled water assets. These assets all have been sized to provide adequate pressure and flows for the industrial development that will occur in the Prestons Industrial precinct. Water demand has been estimated to be 290 kL/day [*the new estimate is 325 kL/day*] and the reticulation main that are constructed will adequately provide for that demand.*

Sydney Water will require development of the subject site to extend the 250 mm lead in water main at the intersection of Yarrunga Street and Bernera Road for the full frontage of the site."

3.1.3 Site water balance

A civil engineering report (**Costin Roe Consulting, 2016**) outlines the rainwater harvesting strategy for the site. A minimum of 20% of roof catchment is directed to rainwater reuse (approx. 2ha of 10ha total roof area). This rainwater harvesting design includes a total storage volume of 510 kL for the entire site, with tank sizes ranging between 20 and 155 kL, depending on the size of the ware house building they are attached to.

The design was based on a target of 80% reduction of non-potable water demand. The configuration of rainwater will be distributed depending on the size of the building and associated demand, with final arrangement subject to a detailed water balance assessment on the individual building.

Potable water will be replaced by tank water for suitable uses if available:

- Internal: 5 kL/day toilet flushing demand
- External: 5000 kL/year for irrigation (14 kL/day)

Table 4: Potable water services

Access from	Access to	Comments
Bernera Road	750 mm SCL Trunk main	Not available for connection
Bernera Road	150 mm CICL reticulation main	
Bernera Road	250 mm SCL Trunk main	Partly constructed adjacent to Yato Place intersection
Bernera Road	375 DICL Trunk Main	Not available for connection
Bernera Road	250 mm Recycled Water main	
Yarrunga Street	100 mm CICL reticulation main	
Yarrunga Street	250 mm SCL/DICL main	This has been extended from Bernera Road into Yarrunga St during another development. This main will need to be extended along Yarrunga Street for the full frontage of the site and will be the main which will service the site.
Yarrunga Street	Recycled water main	Similarly, this recycled water main will be required to be extended along Yarrunga Street to facilitate connection.
Kurrajong Road	250 mm CICL reticulation main	
Kurrajong Road	450 mm recycled water main	Not available for connection

Note: this information has been reproduced from **LandPartners, 2015**.

3.1.4 Efficiency measures

As presented in the sustainable design strategies (refer to **Table 1**), rainwater harvesting techniques will be implemented to minimise potable water use by using rainwater collected from warehouse and/or office roofs for non-potable uses such as toilet flushing and irrigation.

The design plans show water tanks for rain water harvesting at the suggested locations. However, there are no final designs yet for the sizes of these tanks, since the final use of the warehouses is not known at this stage.

Indoor/Domestic Water

- Install high-efficiency dishwashing equipment and run only when full.
- Fit restrooms with water-saving fixtures. Waterless urinals, dual-flush toilets, and motion-detecting faucets can all reduce water usage. Motion detectors on restroom lights, and high-efficiency hand dryers, also contribute toward savings.
- Install high-efficiency clothes washing machines in laundry operations and run only when full (if applicable, end use not yet determined).

Outdoor Water Use

- Use a weather-based irrigation control or soil moisture sensor for automatic irrigation system control.
- Choose native, drought-resistant plants for landscaping.
- Audit and optimize irrigation systems to achieve maximum distribution uniformity of water.

3.2 Waste water

3.2.1 Predictions

The waste water predictions for the site were assessed in different ways. According to the planning guidelines that "*Sewerage Code of Australia (Sydney Water Edition)*" (**Water Services Association of Australia, 2009**), a population yield of 75EP/ha are allowed for. Should the site be developed for a warehousing commercial use, this number is likely to be an overestimate. However, the planning guidelines are laid out for 80-100 years into the future. To cater for this timeframe, the recommended value was used.

Each EP is assessed to discharge 180 litres/day as outlined in the "*Sewerage Code of Australia (Sydney Water Edition)*" (**Water Services Association of Australia, 2009**). **Table 5** shows the calculation for the waste water demand.

Table 5: Waste water demand

Property type	Total Area (ha)	EP/ha	Discharge / EP (L/day)	Discharge (kL/day)
Industrial – Warehousing	20.73	75	180	280

1) Floor areas were provided on the DA application Drawing, Cover page Axis DA – A000, Rev B Feb 2016

Another way to estimate the waste water demand is with a factor of the average daily water usage. Waste water can be estimated to be around 90% of the average water usage. In this case, the waste water demand would result in 290 kL/day. Both numbers are in the same range. The more conservative, i.e. 290 kL/day will be used for the waste water prediction.

3.2.2 Services

Citing (**LandPartners, 2015**), there are adequate waste water services in place:

"The topography is such that 80% of the site falls from west to east. In 2010, we designed the extension of Yarrunga Street Waste water carrier, Sec 2, which was been constructed and is available for connection on the north-east corner of the site. The catchment analysis and flow schedules, which were developed for that carrier extension, correctly sized the downstream pipes. Therefore, adequate capacity exists within that waste water system to handle flows from this development, which was been estimated as 260 kL/day [note: updated to 290 kL/day].

20% of the site falls from east to west. A subdivision development is being constructed on land which abuts the south-west corner of the site. The proponents of that subdivision have designed a lead-in carrier from the George River submain. That carrier will be constructed this year [note: last year, i.e. 2015] *to provide waste water drainage for the adjacent development site. The catchment diagram for that carrier shows that the eastern part of the subject site is catered for by this new carrier. Therefore, the downstream waste water system will adequately cater for discharge from the subject site.*

The reticulation system for the adjacent development provides a lead-out waste water main into Lot A DP 413 483. Development of the subject site will require obtaining a Notice of Entry from the property-owner of Lot A to facilitate the extension into the subject site. "

3.2.3 Treatment and Reuse Measures

At this stage, re-using or treating the water on-site has not been considered. Disposal will be undertaken via the services mentioned in **Section 3.2.2**.

4 CONCLUSIONS

This report has addressed the SEARs requirements in regards to sustainable development principles as well as water and waste water demand. The water balance for the site can be prepared and updated for each stage of the development once rainwater harvesting proposals are finalised.

5 REFERENCES

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