



ATTACHMENTS

Development and Infrastructure Services Committee Meeting

10 August 2022

6.00pm

City of Albany Council Chambers

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Western Australian Local Government (South Metropolitan and Albany) LED Street Lighting Business Case



Prepared for

City of Cockburn

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Our Mission

The Ironbark mission is to achieve real action on sustainability for councils and their communities.

Certified



Ironbark are a certified B Corporation. We have been independently assessed as meeting the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance profit and purpose.

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1 Executive Summary

The report summarises the benefits to replacing existing streetlights with LEDs and the application of smart technology by Western Power within the Perth Southern Metropolitan Region and Albany local government area of Western Australia.

These replacement programs are widespread in many other Australian jurisdictions. The local governments of Albany, Armadale, Canning, Cockburn and Melville have been working collaboratively with the South West Group of Councils, the Western Australian Local Government Association (WALGA) and Western Power to build the case for a large scale roll out in their local government areas.

This program proposes to replace around 47,000 streetlights to energy efficient and low maintenance LED lights. The program will be funded by the participating councils.

Table 1 provides a summary of the expected outcomes for the councils from the program and the potential for this if extrapolated across the entirety of the Western Power managed SWIS Grid.

Table 1: Summary of results

Region	Number of lights	Project Cost (inc. interest)	Total Cost Savings (20 yrs.)	Total Energy Savings (MWh, 20 yrs.)	Total Greenhouse Savings (tCO ₂ -e, 20 yrs.)	Payback (yrs.)
Perth Sth Metro and Albany	47,000	\$25 to 29m	\$107 to 123m	300,000 to 370,000	210,000 to 250,000	5.0 to 6.3
All of Western Power SWIS Grid (est.)	276,000	\$150 to \$170m	\$620 to \$720m	1.7m to 2.2m	1.2m to 1.5m	5.0 to 6.3

It demonstrates a direct benefit of around \$4 saved for every \$1 spent over the life of the new lighting assets. In addition, the program demonstrates a reduction of 55-60 per cent in overall energy and emissions from the lighting system.

There are a range of other benefits for the Western Australian Community and for Western Power that are delivered by the project. The main additional community benefits include improved road safety through better designed, more reliable streetlights and the ability to control the lights to reduce overlighting and light spill.

For Western Power this program will support the roll out of a smart city system (the “advanced metering system”). Lighting will be one part of a widespread network that will enable automatic electricity meter reading and improved network fault detection. The lighting system will help by adding sensors to the system which will improve overall network coverage as well as supporting the business case for the smart city network deployment.

In addition, many of the lights being replaced will need replacement within the next 3-5 years to meet the requirements of the International Minamata Convention to limit mercury. The current lighting assets include large numbers of mercury-based products, by replacing them now at Council cost this will negate the need for added investment by Western Power in this replacement.

1.1 Key Recommendations

The key next steps to deliver this program are as follows:

- Negotiate agreed project costs, product selection and future system management models with Western Power. Importantly the project partners need to ensure an open book sharing of costs and savings so that the overall system costs and benefits are clear and overarching community benefit the main test of the overall project outcomes.
- Undertake lighting design based on the preferred project option. This is best directed by Council.
- Work with Western Power and Synergy to ensure the preferred technology (including smart lighting systems) are used within this project and there are appropriate tariffs for these.



It is the intent to ensure this program can be delivered in the short term, in conjunction with the roll out of the proposed smart city system. This **“advanced metering system”** is currently in roll out planning and councils desire roll out of the lighting replacement to begin in the 2021/22 year.

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2 Introduction

The South West Group of Councils, the Western Australian Local Government Association (WALGA) and a number of Metropolitan and Regional Local Governments have been exploring a proposal involving the replacement of existing streetlight lamps with LED lamps and the application of smart technology to achieve a range of community benefits with Western Power.¹

This report analyses the costs and savings that can be expected from a replacement of all non-LED light types for the following cities:

- Albany
- Armadale
- Canning
- Cockburn
- Melville.

This report includes a summary of the lights considered for replacement to LEDs within the region (Section 3), external funding opportunities (Section 6) and the impact of the lighting upgrade on social, environmental and health impacts of the upgrade (Section 7). However, the main focus is to report on the expected business case outcomes from different project scenarios (Section 4).



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¹ Image on page courtesy Western Power: <https://www.westernpower.com.au/our-energy-evolution/projects-and-trials/smart-streetlights-trial/>

3 About the Regions Street Lights

Public lighting consists of unmetered street lighting and off-street lighting in public places such as beaches, parks, public facilities and car parks. The scope of this report is limited to the management of streetlights within the unmetered streetlighting network.

Synergy is the retailer and charges tariffs for the cost of operation, maintenance and electricity use. Western Power's maintenance and operation charges are charged within these tariffs.

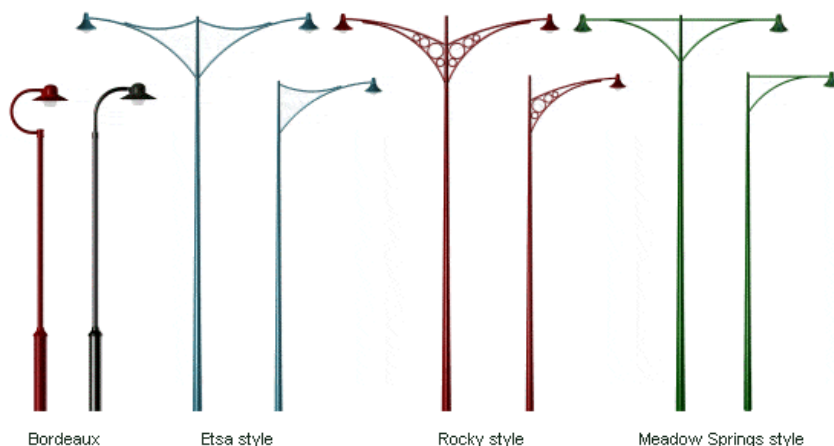
This business case considers the replacement of 35,888 minor road streetlight types (typically under 130W for non-LED lights) and 11,122 major road streetlights. Details of lighting types, road types and quantities can be found in Table 2.

Table 2: Council light types included in business case

Type	Nominal Wattage	Road Type (Indicative)	Quantity
CFL	42	Minor	9,051
HPS	250	Major	8,216
	150	Major	1,816
	70	Minor	80
LED	17	Minor	63
	20	Minor	330
	22	Minor	152
	36	Minor	108
	42	Minor	34
	53	Minor	115
	80	Major	64
	100	Major	5
	160	Major	43
	155	Major	1
MH	170	Major	97
	70	Minor	2,359
	250	Major	148
MV	150	Major	500
	50	Minor	2
	80	Minor	14,699
	125	Minor	8,895
	250	Major	232
Total Non-LEDs			45,998
Total LEDs (not included for replacement)			1,012
Total Lights			47,010
Total Minor Road Lights			35,888
Total Major Road Lights			11,122

3.1 Decorative street lighting

Councils commonly have a number of decorative lighting types which consist of several different luminaire models, paint colours and spigot entry points and sizes². This presents challenges for the accuracy of feasibility studies as well as for future stock management compared to the one size fits all approach that can be used for standard streetlight replacement programs. For the sake of this business case, these lights have been excluded from the analysis.



Careful planning of a bulk replacement of decorative lights is required as material costs can be up to 300 per cent greater than standard lights and each error that is passed through to the project implementation phase can result in additional project costs of \$1,000, thus highlighting the importance of having an accurate asset register of decorative street lighting assets. This is typically addressed within the planning and preparation stage of the project.

3.2 Off Street Lighting

For off street lighting assets an audit and management program can be developed. This has been completed by Cockburn and many of these assets replaced with LED lighting with smart controls. Within the same timeframe of the bulk LED street lighting program an audit of off-street lighting can be carried out by the other participating councils to determine future project scope for this replacement program. Typically, councils have around 10 per cent of total lights in off street locations and 90per cent are unmetered streetlighting. Based on that analysis within the region it is expected that around 5,000 off streetlights in parks, carparks, sporting grounds and other public spaces will be present.



3.3 Technology Choice

We have assumed for the purpose of this report that Council will install the luminaire with the lowest pay-back period and the lowest wattage that meets standards. In some circumstances

² Image Courtesy <https://adcoote.net.au/lighting-columns/architectural-columns/street-vision/>

that has meant identifying and utilising products that are the latest version of approved Western Power suppliers and products. It is important to check the price and wattages of the approved luminaires in the lead up to any streetlight bulk change as prices and wattages can drop, therefore influencing the pay-back periods of the approved luminaires.

Based on discussion with industry suppliers, suitable replacement options based on current luminaire types and lights wattages have been identified. In future, these choices will be available at a lower wattage and capital cost as technology improves.

In this business case the table below outlines the assumed technology for the replacement project.

Table 3: LED Residential LED replacement technology options

Current Light	Preferred equivalent LED luminaire
80W MV	Sylvania-Schröder 13.7W StreetLED3
150W HPS	Sylvania-Schröder 70W RoadLED Midi
250W HPS	Sylvania-Schröder 150W RoadLED Midi

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4 Benefits for Western Power and State Government

This section outlines some of the benefits to both Western Power and the Western Australian State Government/Community. This is not a full outline, but simply a summary of the range of potential community wide benefits the program will deliver.

4.1 Benefits for Western Australian State Government/Community

- Reduced greenhouse gas emissions
- **Supports the WA Government's** Climate Change Policy
- Reduced energy use and lower energy demand reducing upward pressure on electricity prices
- Creation of approximately 50 jobs during the project
- Reduced crime by providing more consistent and reliable night-time lighting
- Improves night-time safety for all road users. This is expected to have significant health benefits to the hospital system as well as property and vehicle damage. Initial estimates indicate benefits of in excess of \$1,000 per light over 20 years from smart lighting as a result of reduced accidents
- Western Power to lead the nation for a whole of grid conversion to Smart LED streetlights in collaboration with Local Government and State Government
- Significant Partnership initiative at no cost to State Government that can be announced within the next few months
- Accelerates State Government response to the international Minamata Convention which bans the sale of mercury-based products (the majority of the lamps replaced are mercury-based products)
- Improved tourism opportunities in the region (night-time space/star viewing through lower light spill and the ability to dim and control lights).

4.2 Benefits for Western Power

- Significantly reduced maintenance costs. LEDs are shown to reduce failure rates by 80-90 per cent over comparable technology
- Low or no capital investment to upgrade the technology reducing the need for further investment by Western Power to replace lights (in particular mercury products which will need replacing by 2025)
- Public lighting that meets an improved Australian Roadlighting Standards
- Improved public perception through lower light failure rates and rapid maintenance response through smart control, resulting in lower complaints
- Contribute to electricity network stability through reduced electricity demand in the peak evening and pre-dawn periods

- Protect against the impact of a ban on manufacture and trade of mercury containing globes
- Lower transition cost than the alternate 'replace on failure' approach
- Supports the business case for the wide scale network roll out of smart city technology which has a host of other benefits including:
 - Additional service opportunities through partnerships with other State Government agencies (e.g. Water Corporation remote water meter reading and real-time consumption data)
 - Consistency of smart technology and parallel timing with the rollout of Smart Meters (50 per cent households in metro area in 2021)
 - Adding sensors to the system which will improve overall network coverage
 - Community benefits through availability and utilisation of other smart applications (moisture meters, noise meters, traffic counters, etc.).

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5 Business Case Summary

A project to replace streetlighting on a large-scale in the Southern Metropolitan region of Perth and regional Western Australia makes financial sense if the Western Power project costs fall within the expected range and Synergy pass through the energy benefit to councils through reduced tariffs. The modelling has assessed the business case for the region as a whole. Individual Council modelling can be readily completed.

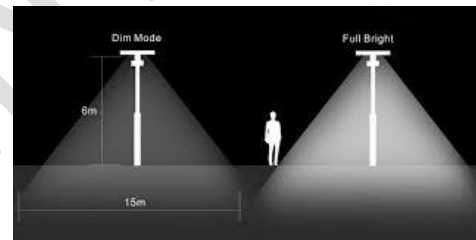
5.1 Business Case Options Considered

This section analyses the project considering three replacement options:

- Option 1: Standard, like for like replacement at the average national project cost
- Option 2: Standard, like for like replacement at the average contestable project cost
- Option 3: Smart lighting enabled and designed at the average contestable project cost.

5.1.1 About Lighting Design Options

The like for like replacement options (Options 1 and 2) assume only minor consideration of lighting design and that the lights include smart cells however, they are not designed to improve lighting to Australian Standards. The smart lighting enabled and designed option (Option 3) includes project costs to ensure the installations meet Australian Standards (where possible within project constraints) and to take advantage of the smart lighting functionality to reduce energy from the final LED installation by a further 30 per cent. In practice this additional energy savings ranges from 25 to 40 per cent based on a low number of installations nationwide.



5.1.2 Project Cost Benchmarking

Ironbark has collated current data on project costs from seven Distribution Network Service Providers (DNSPs) nationally (not including Western Power) who have delivered similar projects. Each of these include comparative technologies, often from the same technology providers using the same products available for this project. The results of this benchmarking is outlined in Table 4.

Table 4: LED Street Lighting Benchmark Pricing in Australia

	DNBP A	DNBP B	DNBP C	DNBP D	DNBP E	DNBP E	DNBP F	Average
Minor Road – 80W MV LED equivalent	\$260	\$260	\$388	\$405	\$396	\$344	\$350	\$343
Major Road - 150W HPS LED equivalent	\$587	\$587	\$726	\$737	\$715	N/A	\$620	\$662

This pricing is based on large scale replacements (greater than 2000 units) and includes luminaire material costs (exc. Smart cells), labour, traffic and project management costs. These prices do not include written down value or taxation on gifted assets or council side design, negotiation and preparation costs.

For the Options analysed within this business case we have utilised the average national project cost from these seven DNSPs (for Options 1 and 2) and the average contestable project cost (Option 3), whereby councils could directly engage all contractors except for minor works of the DNSP such as end of project sample auditing and updating data systems. To these project costs has been added a cost for written down value (\$60/light) and the smart cells (\$100). In reality the project costs may or may not be within the range of costs estimated with this report and is currently subject to negotiation between councils and Western Power.

5.1.3 About the Modelling

The modelling has been developed by Stuart Downing, Director of Finance & Corporate Services, from the City of Cockburn and reviewed and built upon by Paul Brown, Managing Director of Ironbark Sustainability to create the tables and graphs within this report.

As with all modelling this includes a range of assumptions which are outlined in Appendix 1. The major input into the modelling, other than the project costs (as outlined above) are the tariffs for maintenance and provision of energy for each luminaire by Synergy.

This report assumes the current system and the basic model continues and that the lower energy lights and smart enabled lighting will result in a two-part tariff:

1. Energy (from Synergy)
2. Network, Asset and Maintenance (from Western Power).

It is clear that smart enabled lighting will be able to determine the exact amount of power draw for each light. As discussed with Western Power believe this would make streetlighting a suitable candidate for contestability (power), something that is happening in Victoria.

5.2 Summary of Business Case Outcomes

Table 5 provides a summary of the outcomes of each of the three options. It demonstrates that the range of potential costs are expected to fall within the \$25 to \$29m range and the total savings over 20 years (the life of the light) ranges from \$107m to \$123m. Total greenhouse savings range from 210,000 to 250,000 tonnes and paybacks are expected to be between 5 and 6.3 years.

Table 5: Summary of results

Scenario	Project Cost (inc. interest)	Total Cost Savings (20 yrs.)	Total Energy Savings (MWh, 20 yrs.)	Total Greenhouse Savings (tCO ₂ -e, 20 yrs.)	Payback (yrs.)

Option 1: Average national project cost with like for like design	\$29m	\$107m	300,000	210,000	6.3
Option 2: Average contestable project cost with like for like design	\$25m	\$107m	300,000	210,000	5.4
Option 3: Average contestable project cost with smart lighting enabled design	\$26m	\$123m	370,000	250,000	5.0

Figure 1: Lifetime cashflows of different scenarios

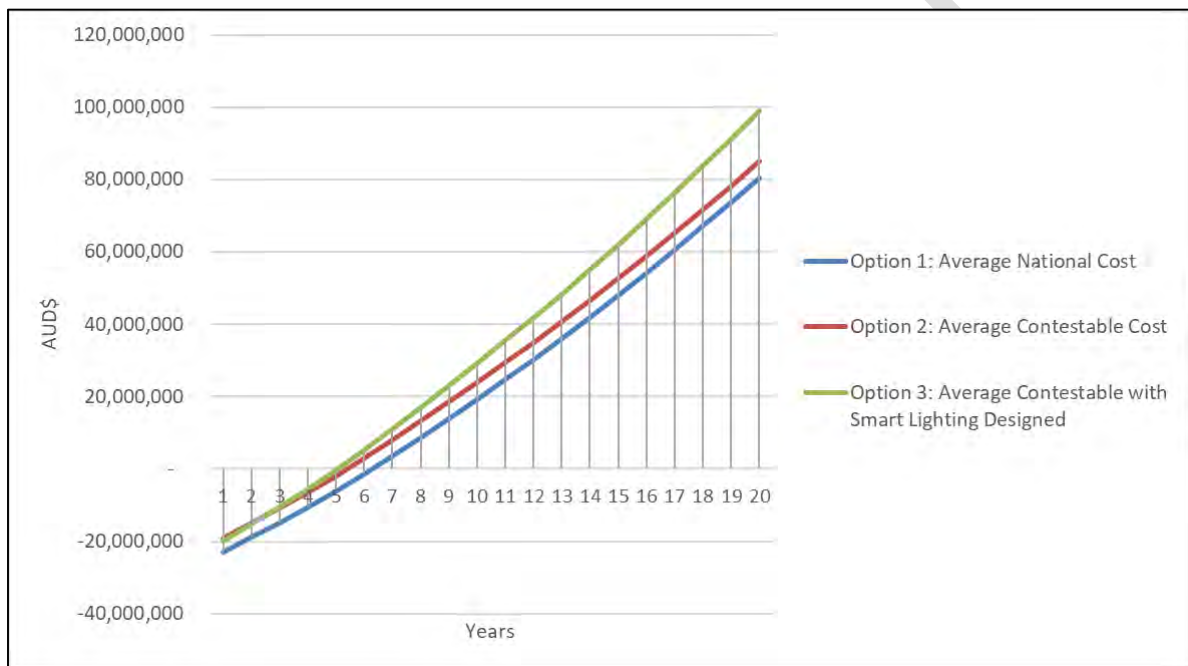


Figure 1 graphically represents the full range of costs and net savings range for these options. The best option is Option 3 as a result of the improved energy savings over the project lifetime. The savings estimates from smart lighting are based on comparative projects in other cities, however, a full understanding of the costs and savings from this option will only be known once preparatory design work is completed.

5.3 Key Recommendations

A project to replace lighting rapidly on a large-scale in Southern Perth Metropolitan region and regional Western Australia is expected to result in a positive project outcome and reasonable paybacks (between five and seven years).

In preparation for the project, it is recommended that negotiations with Western Power be progressed to confirm all project costs and confirm the management model for smart lighting systems to ensure ongoing community benefit.

The project preparation and delivery steps to implement the project over the next 12-24 months are well known and have been delivered by many other councils around Australia.

The recommended project stages to deliver an improved lighting system are as follows:

1. Prepare
2. Fund
3. Define
4. Procure
5. Manage and Finalise.

During Stage 1: Prepare the following is a summary of the key tasks Council can aim to achieve during this period:

- Negotiate the preferred project costs, product selection and future system management models with Western Power.
- Undertake design based on the preferred project option. This is best directed by Council. Examples of the standard process for both standard, like for like projects and for detailed smart lighting designs can be provided to Council from other jurisdictions.
- Work with Western Power and Synergy to ensure the preferred technology (including smart lighting systems) are used within this project and there are appropriate tariffs for these.



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6 External Funding

Over the last ten years, there have been a range of funding and financing opportunities available for street lighting projects and Ironbark has been assisting councils with these options. Many of these are no longer running (such as the Community Energy Efficiency Program). Two current avenues from the Federal Government available to the council are the [Local Roads and Community Infrastructure Fund](#) and the [Roads to Recovery Program](#).

6.1 Local Roads and Community Infrastructure Fund (LRCI)

The Federal Government have announced \$1.5 billion for local governments to spend to help the economic recovery after the COVID-19 pandemic. The Federal Treasurer said (after the program was expanded from \$500 million to \$1.5bn):

"We are also expanding the Local Roads and Community Infrastructure program. Investing an additional \$1 billion to support local councils' immediate upgrades of local roads, footpaths and street lighting. These investments in our local communities will support local jobs."

Dozens of councils are using this funding for street lighting bulk replacements. However, the timing of the funding means the project needs to be complete by June 2021 (for the first \$500m tranche) and December 2021 for the second tranche.



6.2 Roads to Recovery Funding (R2R)

Under the Roads to Recovery Program, direct funding to local councils is distributed as untied grants for local roads as part of annual financial assistance grants to councils. In other LED replacement projects, some councils have chosen to use the R2R funding to deliver the project.

Features of local roads grants are:

- Each State receives a fixed share of the grant.
- Each council's share of the grant is determined by the State's local government grants commission.

7 Social, Environmental and Health Implications

The LED options all perform comparably under a range of social criteria. All are a significant improvement on the existing lamps, particularly in terms of evenness of light spread and reduced mercury content. Many of these options are manufactured in Australia and are Australian owned technologies.

7.1 Social Considerations

It is undesirable to light residential streets above the minimum required standard. Doing so creates unnecessary cost and greenhouse emissions. In many areas, residents have a preference for low levels of lighting.

However, in some areas higher levels of lighting may be desirable to encourage walking, cycling and use of public transport. In areas where there are concerns about safety at night, it may improve perceptions of safety and residential amenity to exceed the Australian Standards for lighting levels. Council may also have specific policy objectives (such as pedestrian connectivity between transport nodes and shopping centres) that can be supported with higher levels of light in strategic locations.

Many councils, when delivering these projects undertake detailed design to ensure improved road and pedestrian safety. In addition, these can deliver improved energy savings through smart lighting. These improved design outcomes can be planned for in the standard bulk replacement program and has been included within Option 3 of this modelling.



7.2 Environmental Considerations

LED lights are substantially more efficient than current lighting, particularly MV lamps. The greenhouse savings are significant.

Some traditional light technologies such as MV are manufactured using harmful substances such as lead and mercury which are not used in the manufacturing of LEDs. These substances **risk being introduced into the environment during a light's service** life and must be carefully disposed of when a light is retired. However, while not containing mercury, LEDs contain printed circuit boards (PCBs), which include electronic waste that causes potential problems if not disposed properly.



Consideration should also be made on effects to local biodiversity – from insects such as moths through to birds and small marsupials. These can be addressed by cutting down glare and installing shields or **installing "warmer colour" LEDs where there are**

protected or endangered species. Generally, LEDs are advantageous because there is significantly less light spill.

There are now numerous completed projects around Australia demonstrating how bulk LED changeovers have resulted in reduced upward lighting spill and light pollution, such as the image above from the "Lighting the Regions" project in Bendigo, Victoria in 2015.

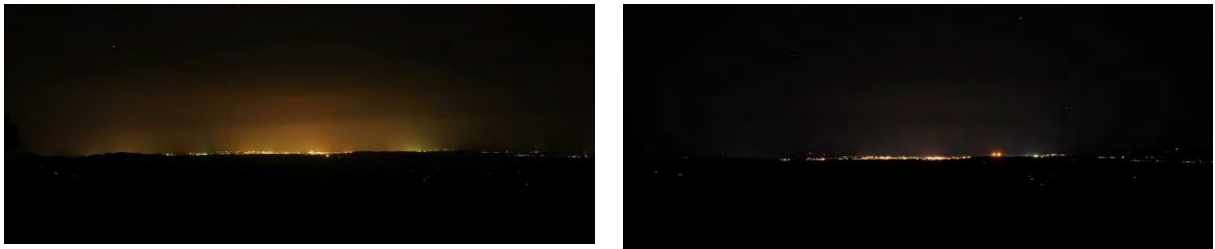


Figure 2: Bendigo glare "before" (in March 2015) and "after" (in August 2015) a change from 80W MVs to 18W StreetLED (HPS lights not yet replaced)

7.3 Health Considerations

There is an increasing amount of public discourse around the potential negative effect of public lighting on human health due to too much "blue light". In June 2016, a report by the American Medical Association (AMA) adopted guidance for local communities on selecting among LED lighting options to minimize potential harmful human and environmental effects. While the report is based on the experience in the USA, it reinforces what could be considered as "best practice public lighting" which dictates that lighting should be designed and managed by professionals and with concern for broader environment, health and social factors.

The AMA also blames high colour temperatures and recommends a colour temperature of 3000K or lower for LED street lighting to limit the amount of blue light. Unfortunately, many 3000K lights can have high blue light content and Figure 35 shows that the warmer colour temperatures (LPS and HPS at 3000K or lower) result in slower driver reaction times and have direct road safety implications.

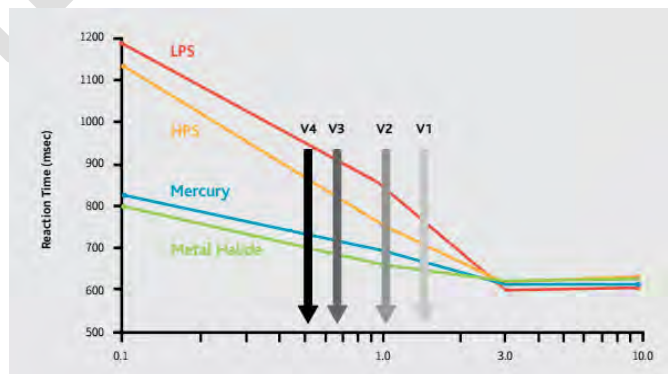


Figure 3: Australian Highway Lighting Categories, reaction times improved by white light (Davis 1999, Arizona DoT, SLPC, from IPWEA SLSC Roadmap 2016)

According to the IPWEA Street Lighting and Smart Controls Roadmap (2016) "in practical terms, this means that at a vehicle speed of 50km/hr, the stopping distance might be reduced by 4.2m" when using a higher colour temperature compared to the warmer colours. The understanding of reaction times for LEDs at warmer colours is not yet known. The Australian Standard (SA/SNZ TS 1158.6) that states a "recommended" colour temperature of 4000K for street lighting.

It's important to note that much of the public discourse around "over lighting" and too much "blue white" is based on experiences in the USA and Europe. While still important, it is of less relevance to Australia because Australian street lighting levels are relatively low by international standards. In the UK, the minimum lighting levels are up to seven times higher than the minimum levels in Australia. What's more, the "old" lights in USA and Europe are commonly HPS lights which generally have a lower colour temperature than the MV lights in Australia.

In the absence of any conclusive research or evidence, the potential risks of blue lighting can be managed by good design. For example, lighting to the levels required (not higher), reducing light spill through well-designed luminaires and lighting schemes and the use of glare shields where appropriate. These issues and actions are generally discussed and decided during the Design and Preparation Stage of a lighting project.

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Appendix 1: Modelling Assumptions

- All luminaires to be replaced over a 12-month period
- Borrowings at WATC rates including Loan Tax of 0.7 per cent
- Aim to repay loan ASAP which forms payback period
- Number of lights as per latest Synergy bill supplied
- Discount rate 3.8 per cent - NB if the discount rate matched the loan rate, the NPV would increase by about 25 per cent
- NPV Period is over 20 years
- Current project pricing as per benchmarked and \$100 for smart lighting PE \$60 for WDV
- Increase both current lighting and LED lighting tariffs by 2.5 per cent pa
- Tariffs are based on daily rates as per Synergy website including discount for councils paying for changeover
- The savings would be greater for growing councils such as Kwinana, Rockingham and Cockburn as streetlights are growing by approximately one per cent per annum on top of the price increase.
- Estimated kWh rate at 17c/kWh. This is relevant for the smart lighting benefits (Option 3)
- Technology power consumption is as per National Electricity Market Load Tables for Unmetered Connection Points
- All savings and cost figures are GST exclusive.

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**SAGE
CONSULTING
ENGINEERS**



BUSINESS CASE REVIEW

ROAD LIGHTING

RETROFITTING LED LUMINAIRES

APRIL 2021

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REV	DATE	DESCRIPTION	AUTHOR	REVIEW
01	13-4-2021	Initial draft	M Sage	
02	14-4-21	Second draft	M Sage	
03	21-4-2021	Third draft, for internal review	M Sage	C Lawrence
04	27-4-2021	Fourth draft incorporating client comment and WP comment	M Sage	C Lawrence

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1. INTRODUCTION

The purpose of this review is consider the February 2021 LED Street Lighting Business Case by Ironbark Sustainability for the City of Albany. The Business Case covered five local governments, City of Albany, City of Armadale, City of Canning, City of Cockburn, and City of Melville. This review is limited to the City of Albany.

2. BASIS OF REPORT

This report is based on the following documents:

- Ironbark Sustainability LED Street Lighting Business Case
- City of Cockburn spreadsheet
- AS/NZS 1158 Lighting of roads and public spaces
- Western Power Distribution Design Catalogue
- Discussion with Chris Meneghello of Western Power on 22-4-2021
- Western Power fixed pricing for LED street light replacements
- Synergy street light tariffs
- Synergy Electricity Account 01 Feb 2021 to 04 Mar 2021
- Prices of luminaires from lighting suppliers

3. LED STREET LIGHTING BUSINESS CASE

3.1. DESIGN

Clauses: 1.1, 5.3 2nd dot, and 7.1 3rd para

The Business Case recommends undertaking of lighting design. This is an excellent recommendation. Typically, existing street lighting does not conform to AS/NZS 1158 and may have an inconsistent assortment of lighting equipment.

AS/NZS 1158 has five Categories of vehicle lighting (V5 to V1) for major roads and six Categories of Pedestrian Road lighting (PR6 to PR1) for minor roads.

According to AS/NZS 1158.1.1, the selection of the Vehicular Category depends on the "Description of the road or area type" and the "Operating characteristics". Typically, local government major roads should be lit to Category V5 or V3.

According to AS/NZS 1158.3.1, the selection of Pedestrian Road Category depends on:

- Pedestrian/cycle activity
- Fear of crime
- Need to enhance amenity.

While Western Power offers a lighting design service, the City will need to direct their lighting designer to the City's selected lighting Category for each of their roads.

3.2. SMART TECHNOLOGY

Clause: 2 Introduction

The Business Case recommends smart technology. Smart technology equipment is not available in the Western Power Distribution Design Catalogue (DDC). The deployment of smart controllers on each luminaire would be useless unless there is a system of central



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controllers with which they can communicate. Smart technology for lighting uses different protocols from smart meters.

Western Power confirm that currently they do not have a smart street lighting control system, but hope to have a system on offer by the middle of 2021.

3.3. LUMINAIRES

Clause 3.3 Table 3

The Business Case proposes the Sylvania StreetLED and RoadLED luminaires. These are effective street light luminaires, but no longer used by Western Power.

In the past, Western Power used the Sylvania StreetLED (14 W) and Sylvania RoadLED (70 and 150 W) luminaires. Western Power now has the Philips Roadgrace (20, 36 and 53 W) and Roadflair (80, 160 and 170 W) luminaires listed in their Distribution Design Catalogue (DDC), but has de-listed the Sylvania StreetLED and RoadLED. We understand that Western Power does have Sylvania as a "secondary supplier", but as the Sylvania products are not listed in their DDC, designers cannot specify the Sylvania products for Western Power projects.

3.4. AUSTRALIAN STANDARDS

Clause 4.2

The Business Case states "public lighting that meets Australian Standards". LED luminaires are more effective in delivering conformance with AS/NZS 1158, and but conformance is unlikely to be achieved in all situations. Sometimes the existing street lights are spaced too far apart for conformance to be achieved.

Typically, local government major roads may be over lit and minor roads under lit. From experience, Western Power has often installed 250 W high pressure sodium luminaires where 150 W luminaires would suffice. With an LED retrofit, there is a risk that 160 W LED luminaires are installed instead of 80 W. This results in over lighting, complaints of obtrusive light from ratepayers, unnecessary running costs, and excessive energy consumption.

The LED retrofit offers an opportunity to correct such over lighting.

3.5. SMART CONTROLS

Clause 5.1

The Business Case presents three options, two assuming national average costs and contestable average costs. The third option adds smart controls. Smart controls are not listed in the Western Power DDC and not currently available from Western Power.

3.6. LIGHTING DESIGN OPTIONS

Clause 5.1.1

Western Power does not have dimmable drivers in their luminaires. Western Power currently does not have a smart control system. Synergy does not have a street light tariff for dimmed luminaires.



3.7. RETROFITTING COSTS

Clause 5.1.1

The Business Case presents that retrofitting a minor luminaire costs \$343, a major luminaire \$662 and smart cells \$100. Ironbark state that these costs were reported to them by the City of Cockburn and Western Power.

The material costs of the Sylvania StreetLED and RoadLED are \$290 and \$550 respectively. If the labour and plant costs of about \$100 are added, the StreetLED cost would be \$390 and the StreetLED and \$762 for the RoadLED.

The material costs for the Western Power for the Philips Roadgrace is about \$480 for the 20 W, 36 W and 53 W and for the Philips Roadflair is about \$480, \$530, and \$630 for the 80 W, 160 W, and 170 W respectively. These costs include a standard NEMA photo-electric switch, rather than a smart luminaire controller.

Western Power recently introduced fixed pricing for LED street lighting luminaire replacements. For minor street light luminaires the price is \$500 on wood poles, \$480 on steel poles, and \$880 for double outreach poles. For major street light luminaires the price is \$590 on wood poles, \$570 on steel poles and \$1050 for double outreach poles.

The costs presented in the Ironbark Business Case are too low.

3.8. SMART CONTROLS

Clause 5.1.1

The cost of a smart luminaire controller is about \$300. The cost of a master controller is about \$3,000 and typically covers about 200 luminaire controllers. The cost to control 4,000 luminaires would be about \$1,260,000. In addition there would be an annual service fee of about \$40,000 per annum.

Western Power's bulk purchasing power will bring prices down, but certainly not down to \$100.

Smart luminaire controllers may switch the luminaire on and off and relay fault signals to a central computer. Smart controllers may be able to perform dimming, but only if the luminaire is equipped with a dimmable driver. Standard Western Power LED luminaires do not have dimmable drivers.

The costs presented in the Business Case are too low.

3.9. MANUFACTURED IN AUSTRALIA

Clause 7

The Business Case states "manufactured in Australia" and "Australian owned technologies". While some assembly is carried out in Australia, the bulk of manufacturing is undertaken overseas.



3.10. COLOUR TEMPERATURE

Clause 7.3

The Business Case refers to the June 2016 AMA report and proposed road lighting research.

The AMA report was subsequently discounted following an approach to the AMA by the Illuminating Society of North America. Basically specifying one metric is unscientific. As well as colour, the intensity and duration of the light need to be considered.

AS/NZS 1158 does recommend a colour temperature of 4000K.

Western Power offer 3000K and 4000K colour temperature luminaires.

A colour temperature 3000K has proved successful with the Philips Roadflair luminaires in the Town of Cambridge where numerous complaints of glare and obtrusive light were received with 4000K road lighting.

The results of Australian research into road safety and colour temperature is awaited.

A BBC article "How to design safer cities for women" states: *Warm LED streetlights can combine energy efficiency with safer roads for drivers and pedestrians alike.*

Warm LED luminaires would have a 3000K colour temperature.

3.11. COST SAVINGS

Appendix 1

The Business Case quotes a tariff of 17 c/kWh for energy costs. Synergy has specific street light tariffs for each type of streetlight that cover energy and maintenance.

The cost savings should be calculated using the actual Synergy street lighting tariffs, rather than a hypothetical energy tariff. The Synergy tariffs include energy and maintenance costs.

4. SPREADSHEET

4.1. NUMBER OF LUMINAIRES

The City has about 4,000 street light luminaires. About 80% are minor luminaires and 20% major luminaires.

Minor street light luminaires include: 50 W, 80 W, and 125 W mercury vapour, 70 W high pressure sodium, 70 W metal halide, 42 W compact fluorescent, and LED luminaires of 53 W and below.

Major street light luminaires include 250 W mercury vapour, 150 W and 250 W high pressure sodium, 150 W and 250 W metal halide, and LED's of 80 W and above.

The Synergy Electricity Account lists 3,887 street light luminaires, of which 787 are minor luminaires, and 3,100 major luminaires. The Account lists 244 luminaires changed to LED luminaires.



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The spreadsheet lists 3,958 street light luminaires, of which 3453 are minor luminaires, and 366 are major luminaires. The spreadsheet lists 139 street light luminaires changed to LED luminaires.

The minor differences between the spreadsheet and Account are likely to be as a result of different accounting periods.

The Account distinguishes between street light luminaires that operate from dusk to dawn, from dusk to 1.15 am, and dusk to midnight. There is a small difference in the Synergy tariff between these operating regimes. Historically, a pilot wire was connected to old street light luminaires on overhead power poles. The pilot wire could affect the 1.15am, or midnight, switch off. New street light luminaires are equipped with photo-electric cells that operate from dusk to dawn. We suggest that all new LED luminaires will have photoelectric switches operating from dusk to dawn.

4.2. COST PER LUMINAIRE

The spreadsheet lists \$600 for a minor street light luminaire and \$700 for a major luminaire. The Western Power fixed pricing for replacing a minor road luminaire with a LED luminaire is \$480 (wood pole) and \$500 (steel pole), and for a major road \$590 (wood pole) and \$570 (steel pole). The estimated prices in the spreadsheet are reasonable, but a bit high compared to the Western Power fixed pricing, but this only enhances the business case.

If a lighting control system is added, we suggest an allowance of \$250 per luminaire. This would cover the individual luminaire controller, master controllers each covering about 200 luminaire controllers and a central control system.

Our Opinion of Probable Costs – Capital Costs is given in Appendix F. The OPC suggests \$2.08m for the luminaire replacements and an additional \$1.055m for lighting controls.

4.3. LED EQUIVALENTS

The spreadsheet has inaccuracies listed below:

- Line 8 - 70 W MH equivalent is 36 W not 80 W
- Lines 20, 38, and 39 – 250 W MV equivalent is 80 W not 160 W
- Line 27 – 70 W HPS equivalent is 36 W not 80 W
- Line 33 – 80 W MV equivalent is 20 W not 53 W
- Line 34 – 125 W MV equivalent is 53 W not 80 W

Correction of these minor inaccuracies would improve the Business Case.

4.4. ENERGY AND CO2 EMISSIONS

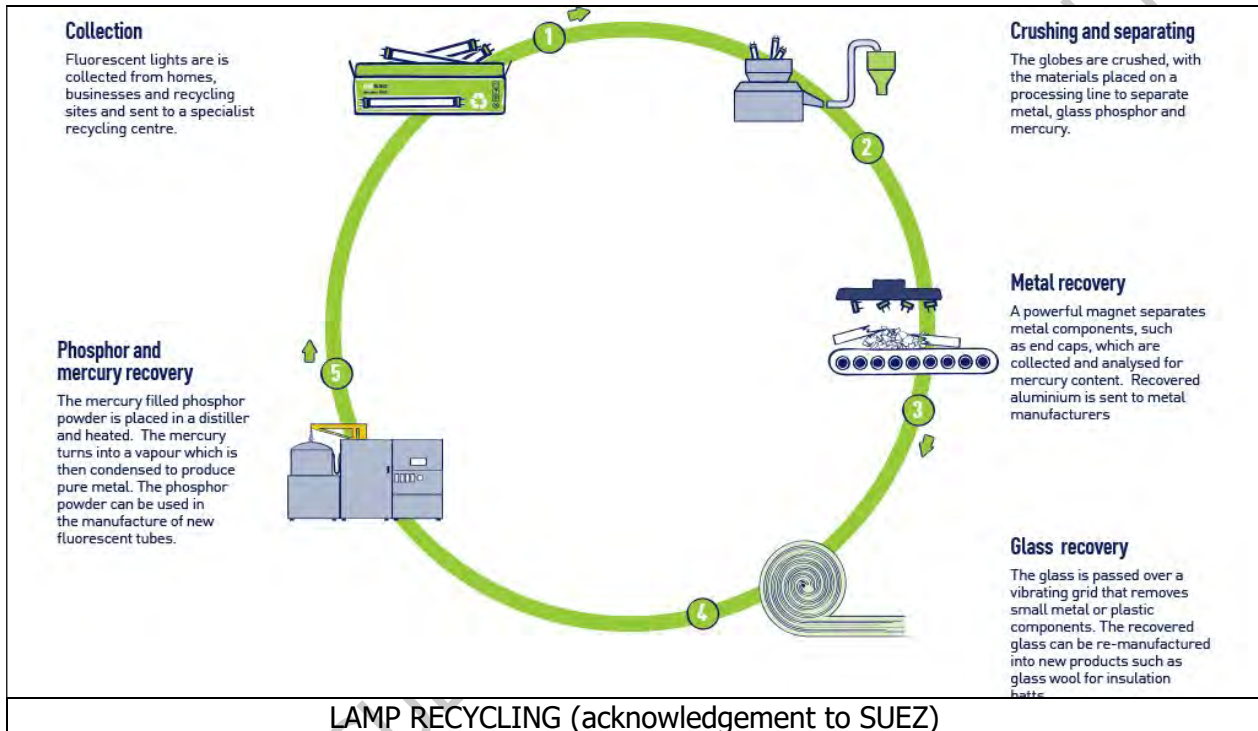
The spreadsheet has an inaccuracy in that Columns P and S should read kWh per annum, not MWh.

Columns U, V and W appear to be based on 0.7 kg per kWh that is reasonable for Western Australia.



5. DISPOSAL

The existing mercury vapour luminaires contain mercury. For instance, an 80 W mercury vapour street light luminaire incorporates a lamp containing 14 mg of mercury. Other lamps, such as compact fluorescent, metal halide, and high pressure sodium contain lesser amounts of mercury. When LED luminaires are retrofitted, responsible disposal of the existing luminaires needs consideration. A bulk LED retrofit will facilitate responsible disposal and reduce the cost of transporting the lamps. Disposal may comprise transport to the Perth metro area, crushing of the lamps in sealed containers, and transport to a lamp recycling facility in Victoria.



6. INVEST/DO NOT INVEST

6.1. BULK RETROFIT OR GRADUAL RETROFIT

The Business Case spreadsheet appears sound with minor inaccuracies.

If the City of Albany does not invest in an LED retrofit, Western Power will gradually retrofit LED luminaires as the existing luminaires fail. Western Power states that they do not replace an old luminaire with a new LED luminaire, if only a lamp needs replacement. Only if the whole luminaire has failed, will Western Power replace the old luminaire with a new LED luminaire. This would take place over a number of years. Most luminaires would be replaced after about 8 or 10 years. After this period, there may be some surviving road lighting luminaires not retrofitted with LED luminaires. The benefits of LED lighting would slowly accrue. The disposal of the luminaires would be difficult to manage and transport costs to the recycler's depot would be high. There is also the risk of fly dumping of hazardous waste.



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If the City of Albany does invest in a bulk LED road lighting retrofit, there will be immediate benefits in cost savings, energy reduction and CO₂ reduction. The responsible disposal of the luminaires would be facilitated and transport costs to the recycler's depot reduced.

The spreadsheet shows these benefits.

6.2. LED RISKS

LED road lighting luminaires represent established technology with low risks. LED road lighting luminaires have been available for over 10 years and have proven to minimise maintenance and reduce energy consumption. Western Power has had LED road lighting luminaires for a few years. Similarly, Synergy has had LED street lighting tariffs for a few years.

The risks associated with LED lighting are low and the benefits are high.

Referring to Appendix F, the payback period of the LED retrofit is 7 years (investment of \$2.1m and cost saving of \$300,000 per year). The 7 year payback may be compared with the life of a road lighting luminaire of about 25 years.

For their Roadflair luminaire Philips quotes a life of 100,000 hours to 80% light output and for their Roadgrace luminaire, 100,000 hours to 70% light output. At 4000 hours per year, this represents 25 years of life. AS/NZS 1158.6 requires a minimum design life of 20 years for road lighting luminaires.

6.3. SMART LIGHTING CONTROL RISKS

Smart lighting controls represent maturing technology, and implementation can face the barriers of incompatible protocols. Western Power does not yet have a lighting control system, but aims to have a system by the middle of this year. Synergy does not yet have a Tariff for dimming street lights. Western Power's trial in the City of Melville was a dummy trial and had no master or central control system.

Conventionally, photo-electric switches have controlled road lighting luminaires. With LED luminaires, the weak link in maintenance is the photo-electric switch. While the life of LED luminaires may exceed 20 years, the life of photo-electric switches is about 5 years.

Smart lighting control comprises luminaire controllers with wireless links to each other and to a master controller that links to a central controller. The luminaire controller replaces the photo-electric switch.

At its simplest, the luminaire controller switches the luminaire ON and OFF on receipt of a wireless signal from the central controller, and sends fault signals to the central controller. There is no dimming capability and the LED driver is simple and economical. The benefits are reliable switching and prompt reporting of faults.

With more sophistication, the luminaire controller switches the luminaire ON and OFF, dims the luminaire after hours, and send fault signals to the central controller. Such sophistication requires a dimmable LED driver.

The risks associated with smart lighting controls are high and the economic benefits are uncertain, as Synergy does not have a dimming tariff. The dimming of major luminaires



(170 W, 160 W and 80 W) has the opportunity to save energy economically. The costly luminaire controller can save more energy on major luminaires than on minor luminaires.

Dimming can occur after hours, say from midnight to 6am, from Sunday night to Thursday night. Dimming on Friday and Saturday nights cannot be recommended as there is an increase in night traffic, there are many younger drivers on the road, and there are the risks of alcohol consumption.

Referring to Appendix F, the lighting control investment would be \$1.1m. There would be environmental benefits in lower energy consumption and reduce CO2 emissions, but these may translate into cost savings. At present, a payback period cannot be estimated, as there is no Synergy street lighting tariff for dimming.

7. CONCLUSIONS

The Business Case spreadsheet by the City of Cockburn appears sound and more accurate than the Business Case report by Ironbark Sustainability. We suggest a capital budget of \$2.1m based on the Opinion of Probable Cost in Appendix F.

Before implementing the LED retrofit, the City should engage a lighting designer, for instance Western Power, to design the road lighting in conformance with AS/NZS 1158.

However, before engaging a lighting designer, the City should prepare a Lighting Master Plan, or at least a Lighting Policy, outlining their road lighting requirements in terms of the AS/NZS lighting Categories.

After design, and before the retrofit, the City should engage an independent design reviewer to check that the lighting designer has kept to AS/NZS 1158 Categories of the Lighting Master Plan, or Lighting Policy.

Lighting controls will cost about \$1.1 with an annual fee of about \$40,000. There are risks associated with lighting controls in that Western Power does not yet have an established system and Synergy does not have a street light tariff structure for dimming.

8. RECOMMENDATIONS

1. Invest in a bulk LED road lighting retrofit
2. Allow a capital budget of \$2.1m for the bulk LED retrofit
3. Prepare a Lighting Policy or Lighting Master Plan
4. Engage a lighting designer to design to the City's Lighting Policy or Lighting Master Plan
5. Engage an independent design reviewer
6. Install 3000K luminaires (Western Power Roadgrace and Roadflair luminaires)
7. Consider smart controls, and wait for Western Power and Synergy to launch a system and tariff structure. At this stage, allow \$1.1m capital costs and \$40,000 per annum for service costs for smart controls.



9. APPENDIX A – SYNERGY STREET LIGHTING CHARGES

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SYNERGY STREET LIGHTING CHARGES

July 2019

Price quoted is cents per day and inclusive of GST and is subject to change.

Tariff	Wattage	Lamp type	Midnight switch off (M)*	1.15am switch off (A)*	Dawn switch off (C)*
CFL					
Bourke Hill	42	Compact Fluorescent (CFL)	39.6922	41.3765	44.3487
Kensington	42	Compact Fluorescent (CFL)	43.6103	44.3224	48.2242
Suburban Eco	42	Compact Fluorescent (CFL)	38.7917	39.5735	42.5456
HPS					
Z13	150	High-pressure sodium	50.9626	53.401	63.6911
Z15	250	High-pressure sodium	63.7518	68.0937	84.6629
Z19	70	High-pressure sodium	N/A	N/A	45.5852
LED					
Z88	22	Standard LED	30.1800	30.5535	30.9373
Z89	20	Standard LED	24.9017	25.3255	26.9361
Z90	36	Standard LED	26.3421	27.1051	30.0043
Z91	53	Standard LED	27.9947	29.1179	33.3862
Z92	80	Standard LED	30.2792	31.9746	38.4173
Z93	160	Standard LED	38.9488	42.3397	55.2250
Z94	170	Standard LED	39.8490	43.4519	57.1426



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Tariff	Wattage	Lamp type	Midnight switch off (M)*	1,15am switch off (A)*	Dawn switch off (C)*
Z95	17	Decorative Bourke Hill LED	37.6687	38.0291	39.3982
Z96	17	Decorative Kensington LED	40.3846	40.7450	42.1141
Z97	34	Decorative LED	41.8415	42.5620	35.3002
Z98	42	Decorative LED	39.9194	40.8096	44.1920
Z99	80	Decorative LED	47.5239	49.2193	55.6620
Z100	100	Decorative LED	53.3108	55.4301	63.4834
Z101	155	Decorative LED	58.2624	61.5472	74.0299

MV

Z01	50	Mercury vapour	31.6842	32.5482	35.7863
Z02	80	Mercury vapour	39.6955	40.9881	46.1342
Z03	125	Mercury vapour	48.7361	50.8248	58.6600
Z07	250	Mercury vapour	66.0796	70.2296	85.9274
Z10	400	Mercury vapour	78.9489	82.1715	116.6974

MH

Z20	70	Metal halide	68.9514	69.1012	75.0948
Z21	150	Metal halide	83.6408	87.0604	99.9758
Z22	250	Metal halide	93.4814	99.1442	120.6955

INCANDESCENT

Z52	100	Incandescent	34.3299	35.6143	39.5902
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Z18

Z18	per kW	Privately owned	Not applicable	Not applicable	265.4777
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10. APPENDIX B – SYNERGY ELECTRICITY ACCOUNT

01 Feb 2021 to 04 Mar 2021, pages 1 to 5 of 10 pages

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ABN: 58 673 830 106



CITY OF ALBANY
PO BOX 484
ALBANY DC WA 6331

Your account details

Account number 949 998 990
Invoice number 2033188237
Date of issue 04 Mar 2021
Account period 01 Feb 2021 - 04 Mar 2021 (32 days)

Your account summary

Opening balance	\$0.00
+	
New charges	
Due 25 Mar 2021	\$63,162.87
=	
Total	\$63,162.87

Electricity Account

Tax Invoice

Need help with your bill? Visit synergy.net.au/businesshelp

Pay as you go

Doc No: ICI213142059
File: FM CRE 26
Date: 12 MAR 2021
Officer: FOCD6

Attach:
Box:
Bill:
Box+Vol:
Disposal: D

Control the electricity
Debit by instalments.

CITY OF ALBANY
PAYMENT AUTHORISATION

ORDER No

DATE: 11 MAR 2021

CHECKED

PAYMENT OF THIS INVOICE IS APPROVED

(Authorised Officer) *[Signature]*

CHARGE ACCOUNT 1753870.365

Learn how at synergy.net.au/instalments

Payment options

- Direct Debit***
The set and forget way to pay.
Visit synergy.net.au/directdebit
- Credit/Debit Card***
Online: synergy.net.au/payments
Phone: 1300 650 900
- Electronic Funds Transfer**
Please email remittance@synergy.net.au for details. A minimum payment of \$5,000 is required for EFT.
- Mail**
Send your cheque payable to Synergy with this payment slip to GPO Box U1913 Perth WA 6845.

- BPAY®/BPAY View***
Biller Code: 2600
Reference: 949 998 9929
Contact your bank or financial institution to make this payment from your cheque, savings, debit or transaction account.
 - Post Billpay***
Pay in person at any post office.
-
- *2608 9499989929
CITY OF ALBANY
Account number: 949 998 990
*Fees may apply

Payment number	949 998 9929
Due 25 Mar 2021	\$63,162.87

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<0006316287> <000260> <000949998992000> >



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How we've calculated your bill

Previous bill and payments

Last bill	\$63,343.04
Payments and adjustments	\$63,343.04cr
Opening balance	\$0.00

Your energy supply details

Total number of streetlights = 3,887

New charges

Streetlights tariff	Units	Unit of measure	Unit price (cents)	Amount
Charge period: 25 Jun 2020 - 24 Feb 2021				
50W Mercury Vapour - A				\$8.92
80W Mercury Vapour - A				\$3,030.23
80W Mercury Vapour - C				\$12,137.08
80W Mercury Vapour - M				\$858.37
125W Mercury Vapour - A				\$461.35
125W Mercury Vapour - C				\$8,032.22
125W Mercury Vapour - M				\$82.17
250W Mercury Vapour - A				\$526.93
250W Mercury Vapour - C				\$1,726.94
250W Mercury Vapour - M				\$19.63
100W LED PK - C				\$36.39
150W High Pressure Sodium - A				\$906.44
150W High Pressure Sodium - C				\$4,607.32
150W High Pressure Sodium - M				\$15.04
250W High Pressure Sodium - A				\$1,268.70
250W High Pressure Sodium - C				\$6,522.04
250W High Pressure Sodium - M				\$17.49
70W High Pressure Sodium - C				\$89.82
70W Metal Halide - C				\$379.60
150W Metal Halide - A				\$23.05
150W Metal Halide - C				\$26.35
250W Metal Halide - C				\$378.93
42W CFL BH - C				\$299.00
42W CFL SE - A				\$185.16
42W CFL SE - C				\$12,849.19

Important information

Need a payment extension?

If you need a little more time to pay your bill, then we're here to help. Visit synergy.net.au/extension

Customer Charter

For information on our products and services, and our obligations under the Customer Service Code, visit synergy.net.au/charter


Complaints process


At Synergy, we're here to help. If you have a complaint, please call 1800 754 004 to speak with our Customer Service Representative. If they're unable to resolve your complaint, our Complaints Team may be able to help. If your complaint remains unresolved, you can contact the Energy and Water Ombudsman on 13 13 51.


Faults


Call the Western Power 24hr emergency line on 13 13 51.

We're here to help

 synergy.net.au

 13 13 54

 TTY Service: (08) 9221 8608

 Interpreter Service: 13 14 50



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42W CFL SE - M	\$56.65
22W LED - C	\$34.21
20W LED RG - C	\$1,260.38
20W LED RG - M	\$7.05
36W LED RG - C	\$59.96
53W LED RG - C	\$315.84
80W LED RF - C	\$398.57
160W LED RF - C	\$690.26
170W LED RF - C	\$66.49
17W LED BH - C	\$11.16
80W LED PK - C	\$31.86
Plus GST @ 10.00%	\$5,742.08
Total new charges	\$63,162.87

If you're having problems paying your account, assistance is available. Please contact us before the due date.

A \$6.15 fee may apply for additional reminder notices sent regarding overdue payment of this account.

Overdue balances may incur an interest charge equal to the Reserve Bank of Australia's cash rate plus 6.00% and will appear on your bill when applied.

Energy data for this account is calculated in accordance with Electricity Industry Metering Code requirements.



Account number: 949 998 990

Current supply period

Supply period: 25 January 2021 - 24 February 2021

No. of days	SL asset type	No. of lamps	kWh	Cost \$/lamp/day	Cents/kWh	Network charge	Pre GST amount
31	100W LED PK - C	2	0.0000	0.5870	0.0000	\$0.00	\$36.39
31	125W Mercury Vapour - A	32	0.0000	0.4651	0.0000	\$0.00	\$461.35
31	125W Mercury Vapour - C	468	0.0000	0.5536	0.0000	\$0.00	\$8,032.22
31	125W Mercury Vapour - M	6	0.0000	0.4418	0.0000	\$0.00	\$82.17
31	150W High Pressure Sodium - A	57	0.0000	0.5130	0.0000	\$0.00	\$906.44
31	150W High Pressure Sodium - C	240	0.0000	0.6193	0.0000	\$0.00	\$4,607.32
31	150W High Pressure Sodium - M	1	0.0000	0.4850	0.0000	\$0.00	\$15.04
31	150W Metal Halide - A	1	0.0000	0.7436	0.0000	\$0.00	\$23.05
31	150W Metal Halide - C	1	0.0000	0.8499	0.0000	\$0.00	\$26.35
31	160W LED RF - C	43	0.0000	0.5178	0.0000	\$0.00	\$690.26
31	170W LED RF - C	4	0.0000	0.5362	0.0000	\$0.00	\$66.49
31	17W LED BH - C	1	0.0000	0.3598	0.0000	\$0.00	\$11.16
31	20W LED RG - C	118	0.0000	0.2468	0.0000	\$0.00	\$902.96
31	20W LED RG - M	1	0.0000	0.2273	0.0000	\$0.00	\$7.05
31	22W LED - C	4	0.0000	0.2759	0.0000	\$0.00	\$34.21
31	250W High Pressure Sodium - A	67	0.0000	0.6108	0.0000	\$0.00	\$1,268.70
31	250W High Pressure Sodium - C	267	0.0000	0.7880	0.0000	\$0.00	\$6,522.04
31	250W High Pressure Sodium - M	1	0.0000	0.5642	0.0000	\$0.00	\$17.49
31	250W Mercury Vapour - A	25	0.0000	0.6799	0.0000	\$0.00	\$526.93
31	250W Mercury Vapour - C	65	0.0000	0.8570	0.0000	\$0.00	\$1,726.94
31	250W Mercury Vapour - M	1	0.0000	0.6333	0.0000	\$0.00	\$19.63
31	250W Metal Halide - C	12	0.0000	1.0186	0.0000	\$0.00	\$378.93
31	36W LED RG - C	7	0.0000	0.2763	0.0000	\$0.00	\$59.96
31	42W CFL BH - C	23	0.0000	0.4194	0.0000	\$0.00	\$299.00
31	42W CFL SE - A	16	0.0000	0.3733	0.0000	\$0.00	\$185.16
31	42W CFL SE - C	1040	0.0000	0.4031	0.0000	\$0.00	\$12,995.11
31	42W CFL SE - M	5	0.0000	0.3655	0.0000	\$0.00	\$56.65
31	50W Mercury Vapour - A	1	0.0000	0.2877	0.0000	\$0.00	\$8.92
31	53W LED RG - C	33	0.0000	0.3087	0.0000	\$0.00	\$315.84
31	70W High Pressure Sodium - C	7	0.0000	0.4139	0.0000	\$0.00	\$89.82
31	70W Metal Halide - C	19	0.0000	0.6445	0.0000	\$0.00	\$379.60
31	80W LED PK - C	2	0.0000	0.5139	0.0000	\$0.00	\$31.86
31	80W LED RF - C	36	0.0000	0.3571	0.0000	\$0.00	\$398.57
31	80W Mercury Vapour - A	261	0.0000	0.3745	0.0000	\$0.00	\$3,030.23
31	80W Mercury Vapour - C	943	0.0000	0.4312	0.0000	\$0.00	\$12,605.36
31	80W Mercury Vapour - M	77	0.0000	0.3596	0.0000	\$0.00	\$858.37
Total		3887					\$57,677.57

Adjustments to previous periods

Supply period: 25 July 2020 - 27 July 2020



Account number: 949 998 990

Current supply period

Supply period: 25 January 2021 - 24 February 2021

No. of days	SL asset type	No. of lamps	kWh	Cost \$/lamp/day	Cents/kWh	Network charge	Pre GST amount
31	100W LED PK - C	2	0.0000	0.5870	0.0000	\$0.00	\$36.39
31	125W Mercury Vapour - A	32	0.0000	0.4651	0.0000	\$0.00	\$461.35
31	125W Mercury Vapour - C	468	0.0000	0.5536	0.0000	\$0.00	\$8,032.22
31	125W Mercury Vapour - M	6	0.0000	0.4418	0.0000	\$0.00	\$82.17
31	150W High Pressure Sodium - A	57	0.0000	0.5130	0.0000	\$0.00	\$906.44
31	150W High Pressure Sodium - C	240	0.0000	0.6193	0.0000	\$0.00	\$4,607.32
31	150W High Pressure Sodium - M	1	0.0000	0.4850	0.0000	\$0.00	\$15.04
31	150W Metal Halide - A	1	0.0000	0.7436	0.0000	\$0.00	\$23.05
31	150W Metal Halide - C	1	0.0000	0.8499	0.0000	\$0.00	\$26.35
31	160W LED RF - C	43	0.0000	0.5178	0.0000	\$0.00	\$690.26
31	170W LED RF - C	4	0.0000	0.5362	0.0000	\$0.00	\$66.49
31	17W LED BH - C	1	0.0000	0.3598	0.0000	\$0.00	\$11.16
31	20W LED RG - C	118	0.0000	0.2468	0.0000	\$0.00	\$902.96
31	20W LED RG - M	1	0.0000	0.2273	0.0000	\$0.00	\$7.05
31	22W LED - C	4	0.0000	0.2759	0.0000	\$0.00	\$34.21
31	250W High Pressure Sodium - A	67	0.0000	0.6108	0.0000	\$0.00	\$1,268.70
31	250W High Pressure Sodium - C	267	0.0000	0.7880	0.0000	\$0.00	\$6,522.04
31	250W High Pressure Sodium - M	1	0.0000	0.5642	0.0000	\$0.00	\$17.49
31	250W Mercury Vapour - A	25	0.0000	0.6799	0.0000	\$0.00	\$526.93
31	250W Mercury Vapour - C	65	0.0000	0.8570	0.0000	\$0.00	\$1,726.94
31	250W Mercury Vapour - M	1	0.0000	0.6333	0.0000	\$0.00	\$19.63
31	250W Metal Halide - C	12	0.0000	1.0186	0.0000	\$0.00	\$378.93
31	36W LED RG - C	7	0.0000	0.2763	0.0000	\$0.00	\$59.96
31	42W CFL BH - C	23	0.0000	0.4194	0.0000	\$0.00	\$299.00
31	42W CFL SE - A	16	0.0000	0.3733	0.0000	\$0.00	\$185.16
31	42W CFL SE - C	1040	0.0000	0.4031	0.0000	\$0.00	\$12,995.11
31	42W CFL SE - M	5	0.0000	0.3655	0.0000	\$0.00	\$56.65
31	50W Mercury Vapour - A	1	0.0000	0.2877	0.0000	\$0.00	\$8.92
31	53W LED RG - C	33	0.0000	0.3087	0.0000	\$0.00	\$315.84
31	70W High Pressure Sodium - C	7	0.0000	0.4139	0.0000	\$0.00	\$89.82
31	70W Metal Halide - C	19	0.0000	0.6445	0.0000	\$0.00	\$379.60
31	80W LED PK - C	2	0.0000	0.5139	0.0000	\$0.00	\$31.86
31	80W LED RF - C	36	0.0000	0.3571	0.0000	\$0.00	\$398.57
31	80W Mercury Vapour - A	261	0.0000	0.3745	0.0000	\$0.00	\$3,030.23
31	80W Mercury Vapour - C	943	0.0000	0.4312	0.0000	\$0.00	\$12,605.36
31	80W Mercury Vapour - M	77	0.0000	0.3596	0.0000	\$0.00	\$858.37
Total		3887					\$57,677.57

Adjustments to previous periods

Supply period: 25 July 2020 - 27 July 2020



11. APPENDIX C – LIGHTING STANDARDS

AS/NZS 1158.1.1: 2020 - ROADLIGHTING- Vehicular Traffic Lighting

AS/NZS 1158.3.1: 2020 - ROADLIGHTING- Pedestrian Area Lighting

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AS/NZS 1158.1.1: 2020—Lighting for roads and public spaces Part 1.1 Vehicular Traffic Lighting

Application	Category	Minimum Average Luminance L (cd/m^2) (maintained)	Min Overall Uniformity U_o	Min Longitudinal Uniformity U_l	Max Threshold Increment TI (%)	Min Surround Illuminance E_s (%)	At Intersections - Min Point horizontal Illuminance E_{min} , lux (maintained)	Max Illuminance Uniformity $E_{\text{max}}/E_{\text{min}}$	Max Upward Waste Light Ratio %
Arterial or main roads in central and regional activity centres of capital and major provincial cities, and other areas with major abutting traffic generators	V1	1.5	0.33	0.5	20	50	15	8	3
	V2	1.0	0.33	0.5	20	50	10	8	3
Arterial roads that predominantly carry through traffic from one region to another, forming principal avenues of communication for traffic movements with major abutting traffic generators	V3	0.75	0.33	0.5	20	50	7.5	8	3
	V4	0.5	0.33	0.5	20	50	5	8	3
Sub-arterial or principal roads which connect arterial or main roads to areas of development within a region, or which carry traffic directly from one part of a region to another part.	V5	0.35	0.33	0.5	20	50	3.5	8	3

Notes on reflectance characteristics :

- R1 = light diffuse road (e.g. concrete)
- R2 = diffuse & specular (e.g. asphalt with artificial brightener in aggregate)
- R3 = slightly specular, typical highways and MRWA design standard
- R4 = mostly specular, very smooth texture



AS/NZS 1158.3.1: 2020—Lighting for roads and public spaces Part 3.1 Pedestrian area (Category P) lighting Performance and design requirements

AREA	Activity	Fear of crime	Amenity	Category	Ave lux	Min lux	max/min	Vert lux
ROAD RESERVES IN LOCAL AREAS Mixed vehicle and pedestrian traffic	NA	HIGH	NA	PR1	7	2	8	-
	HIGH	MEDIUM	HIGH	PR2	3.5	0.7	8	-
	MEDIUM	LOW	MEDIUM	PR3	1.75	0.3	8	-
	MEDIUM	LOW	MEDIUM	PR4	1.3	0.22	8	-
	LOW	LOW	LOW	PR5	0.85	0.14	10	-
	NA	NA	NA	PR6	0.7	0.07	10	-
PEDESTRIAN AND CYCLE PATHS	NA	HIGH	-	PP1	10	2	5	1
	HIGH	MEDIUM	-	PP2	7	1	5	0.3
	MEDIUM	MEDIUM	-	PP3	3	0.5	5	0.1
	MEDIUM	LOW	-	PP4	1.5	0.25	5	0.05
	LOW	LOW	-	PP5	0.85	0.14	5	0.02
PUBLIC ACTIVITY AREAS	HIGH	HIGH	HIGH	PA1	21	7	8	7
	MEDIUM	MEDIUM	MEDIUM	PA2	14	4	8	4
				PA3	7	2	8	2
CONNECTING ELEMENTS: Areas primarily for pedestrian use, e.g. city, town, suburban centres, including outdoor shopping precincts, malls, open arcades, town squares, civic centres. Traffic terminals and interchanges, service areas	Subways, ramps, stairways			PE1	35	17.5	8	17.5
	Steps, stairways, footbridges, pedestrian			PE2	Same as highest category of abutting area, but min PA3			
	Ramps, footbridges for low use pathways			PE3	Same as highest category of abutting area, but min PP3			
	HIGH	HIGH	-	PC1	14	3	8	3
	MEDIUM	MEDIUM	-	PC2	7	1.5	8	1
CAR PARKS	LOW	LOW	-	PC3	3.5	0.7	8	-
	Disabled bays			PCD	-	≥ 14 & $\geq (E_{11})^d$	-	-
	Designated pedestrian crossings			PCX	21	5	8	-



12. APPENDIX D – BUSINESS CASE SPREADSHEET

SAGE CONSULTING ENGINEERS PTY LTD



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CITY OF ALBANY - STREETLIGHT CHANGEOVER - SMART ENABLED LED LIGHTS

Wattage	Type	Model	Quantity	Cost per Luminaire	Current Rate ex GST	Cost PA	LED SL	Current Rate inc GST	Current Rate ex GST	Cost PA	rate ex cap contribution	cost after cap contrib	base	consumed per day kWhrs	consumed per year kWhrs	consumed per year kWhrs	energy saving per class	Tomms CO2 for current	Tomms CO2 for LED	Saving	
42	CFL	SE-C	1054	\$600	0.3868	\$408,806	20	0.271531	0.3868	\$39,954	0.1382	\$76,267	42	0.5796	222.38	0.276	106.18	156.08	74.33	-81.76	
20	LED	40-C	67	\$0	0.2449	\$5,989	20	0.271531	0.2449	\$3,964	0.1382	\$76,267	42	0.276	6.75	0.276	6.75	0	4.72	4.72	0.00
80	MV	C	969	\$600	0.4194	\$408,335	20	0.271531	0.4194	\$408,335	0.1382	\$76,267	42	1.104	306.47	0.276	97.62	273.33	68.33	-205.00	
125	MV	C	486	\$600	0.5333	\$596,602	53	0.395632	0.5333	\$596,602	0.2951	\$159,944	125	1.725	300.00	0.276	129.74	249.20	90.82	-123.38	
42	LED	40-C	0	\$0	0.2449	\$0	20	0.271531	0.2449	\$0	0.1382	\$76,267	42	0.5796	222.38	0.276	106.18	156.08	0.00	0.00	
70	MH	C	20	\$600	0.6827	\$4,980	80	0.352853	0.6827	\$5,260	0.4571	\$2,605	70	0.966	7.05	1.104	8.06	14.94	5.64	0.71	
250	MH	C	13	\$700	1.0972	\$9,064	160	0.369511	1.0972	\$10,964	0.4855	\$2,486	250	3.45	16.37	2.208	10.48	11.46	7.33	-4.13	
33	LED	40-C	5	\$600	0.3035	\$3,035	53	0.395632	0.3035	\$3,035	0.2951	\$159,944	53	0.7314	6.14	0.276	6.14	0	4.30	4.30	0.00
170	LED	40-C	276	\$700	0.7897	\$77,540	160	0.369511	0.7897	\$77,540	0.4855	\$2,486	250	3.45	16.37	2.208	10.48	11.46	7.33	-4.13	
150	LED	40-C	30	\$600	0.3550	\$3,550	170	0.394042	0.3550	\$3,550	0.2951	\$159,944	170	2.346	2.57	1.104	2.57	1.80	1.80	0.00	
125	MV	40-C	34	\$600	0.5173	\$5,793	80	0.369511	0.5173	\$5,793	0.4855	\$2,486	250	1.38	3.40	1.104	3.40	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796	\$5,796	80	0.369511	0.5796	\$5,796	0.4855	\$2,486	250	1.75	3.41	1.104	3.41	0.35	0.35	0.00	
150	MV	40-C	34	\$600	0.5796																

WP COMPLIANT - SMART READY										WP APPROVED - SMART READY													
Luminaire 12	controls	gateway	connect	install	total	mainfee	Total per luminaire	L3 Option	controls	gateway	connect	install	total	mainfee	Total per luminaire	controls	gateway	connect	install	total	mainfee	Total per luminaire	Cost per group of luminaires
\$255.53	\$0.00	\$339.68	\$0.11	\$202.85	\$488.17	\$46.23	\$544.40	\$573.80153	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$635.83751	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$635.83751	\$53,400
\$281.08	\$0.00	\$339.68	\$0.11	\$202.85	\$523.72	\$46.23	\$569.95	\$38,186.90	\$0.00	\$22.22	\$13.28	\$202.85	\$539.48	\$46.23	\$585.71	\$0.00	\$22.22	\$13.28	\$202.85	\$539.48	\$46.23	\$585.71	\$50
\$332.19	\$0.00	\$339.68	\$0.11	\$202.85	\$574.83	\$46.23	\$621.06	\$552,385.16	\$0.00	\$22.22	\$13.28	\$202.85	\$600.49	\$46.23	\$646.72	\$0.00	\$22.22	\$13.28	\$202.85	\$600.49	\$46.23	\$646.72	\$981,400
\$281.08	\$0.00	\$339.68	\$0.11	\$202.85	\$523.72	\$46.23	\$569.95	\$301,836.97	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$593.77	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$593.77	\$291,600
\$321.97	\$0.00	\$339.68	\$0.11	\$202.85	\$479.01	\$46.23	\$525.24	\$12,421.27	\$0.00	\$22.22	\$13.28	\$202.85	\$500.49	\$46.23	\$546.72	\$0.00	\$22.22	\$13.28	\$202.85	\$500.49	\$46.23	\$546.72	\$12,000
\$255.53	\$0.00	\$339.68	\$0.11	\$202.85	\$488.17	\$46.23	\$544.40	\$5,628.17	\$0.00	\$22.22	\$13.28	\$202.85	\$545.66	\$46.23	\$591.89	\$0.00	\$22.22	\$13.28	\$202.85	\$545.66	\$46.23	\$591.89	\$93,000
\$281.08	\$0.00	\$339.68	\$0.11	\$202.85	\$488.17	\$46.23	\$544.40	\$1,501,855.43	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$593.77	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$593.77	\$139,200
\$255.53	\$0.00	\$339.68	\$0.11	\$202.85	\$488.17	\$46.23	\$544.40	\$1,183.21	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$591.89	\$0.00	\$22.22	\$13.28	\$202.85	\$547.54	\$46.23	\$591.89	\$50
\$236.37	\$0.00	\$339.68	\$0.11	\$202.85	\$479.01	\$46.23	\$525.24	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$20,400
																							\$148,400
																							\$50
																							\$50
																							\$50
																							\$51,800
																							\$41,400
																							\$50
																							\$13,800
																							\$50
																							\$51,600
																							\$3,000
																							\$5,400
																							\$700
																							\$49,200
																							\$1,200
																							\$168,000
																							\$3,600
																							\$5,400
																							\$700
																							\$16,200
																							\$600
																							\$50
																							\$700
																							\$50
																							\$2,341,800
																							\$1,797,562.08
																							\$444.05



13. APPENDIX E – WESTERN POWER FIXED PRICING

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WESTERN POWER FIXED PRICING FOR LED REPLACEMENT

Standard Range	Single luminaire on wood pole	Single luminaire on metal pole	Double outreach pole
Minor roads (20W, 36W and 53W luminaires)	\$500	\$480	\$880
Major Roads (80W, 160W and 170W luminaires)	\$590	\$570	\$1,050
Decorative Range			
Minor roads (17W, 34W and 42W luminaires)		\$1,370	\$2,870
Major Roads (80W, 100W and 155W luminaires)		\$1,700	\$3,550
<i>These prices are exclusive of Capital Contributions Tax Recovery and Regulated Asset Base.</i>			



14. APPENDIX F – OPINION OF PROBABLE COSTS

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OPINION OF PROBABLE COSTS

OPINION OF PROBABLE COST

PROJECT: CITY OF ALBANY ROAD LIGHTING
SECTION: LED RETROFIT

PROJECT No. 2913
DATE: 26-4-2021

CAPITAL COST

Item	Description	Unit	Q'ty	Rate	Amount(\$)	Subtotal(\$)
CAPITAL COSTS						
1 LUMINAIRES						
1.1	Minor luminaires 4000 X 80%	no	3200	500	1600000	
1.2	Major luminaires 4000 X 20%	no	800	600	480000	
1.2	Sundries	item	1	20000	20000	2100000
2 LIGHTING CONTROLS						
2.1	Luminaire controllers	no	3980	250	995000	
2.2	Master controllers	no	20	3000	60000	
2.3	Sundries	item	1	45000	45000	1100000
TOTAL exc GST						3200000

RUNNING COSTS						
3 OLD LUMINAIRES						
3.1	M50	no	2	35.7863	71.5726	
3.2	M80	no	1331	46.1342	61404.6202	
3.3	M125	no	526	58.66	30855.16	
3.4	M250	no	97	85.9274	8334.9578	
3.5	S150	no	249	63.6911	15859.0839	
3.6	S250	no	502	84.6629	42500.7758	
3.7	MH70	no	20	75.0948	1501.896	
3.8	MH150	no	2	99.9758	199.9516	
3.9	MH250	no	13	120.6955	1569.0415	
3.10	CF42	no	1077	42.5456	45821.6112	
TOTAL PER DAY cents					208118.6706	
TOTAL PER YEAR					\$ 759,633	\$ 759,633

4 LED LUMINAIRES						
4.1	LED20	no	2	26.9361	53.8722	
4.2	LED20	no	1331	26.9361	35851.9491	
4.3	LED53	no	526	33.3862	17561.1412	
4.4	LED80	no	97	38.4173	3726.4781	
4.5	LED80	no	249	38.4173	9565.9077	
4.6	LED170	no	502	57.1426	28685.5852	
4.7	LED36	no	20	30.0043	600.086	
4.8	LED80	no	2	38.4173	76.8346	
4.9	LED160	no	13	55.225	717.925	
4.10	LED20	no	1077	26.9361	29010.1797	
TOTAL PER DAY cents					125849.9588	
TOTAL PER YEAR					\$ 459,352	\$ 459,352

RUNNING COST SAVING PER YEAR

\$ 300,281 \$ 300,281

NOTES 1 The running cost part of this OPC assumes that the existing LED luminaires will remain

2 The luminaire codes are explained below:

OLD LUMINAIRES	LED LUMINAIRES & EQUIVALENTS
M50 50 W mercury vapour	LED20 20 W LED = CF42, M80
M80 80 W mercury vapour	LED36 36 W LED = M70, S70
M125 125 W mercury vapour	LED53 53 W LED = M125
M250 250 W mercury vapour	LED80 80 W LED = M250, MH150, S150
S150 150 W high pressure sodium	LED160 160 W LED = MH250
S250 250 W high pressure sodium	LED170 170 W LED = S250
MH70 70 W metal halide	
MH150 150 W metal halide	
MH250 250 W metal halide	
CF42 42 W compact fluorescent	



15. APPENDIX G – GLOSSARY

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A GLOSSARY OF LIGHTING TERMINOLOGY

Average Carriageway Luminance (L) - The average luminance of a given section of the road carriageway when viewed from the observer's position

Average Illuminance (E) - The average lighting levels at ground level measured in the horizontal plane

Average Lamp Life - Time taken until half of lamps have failed.

Colour Temperature - An indication of the colour appearance of a lamp measured in degrees Kelvin (K). 2700K indicates a very warm colour, 5700K a very cool colour

Colour Rendering Index - A measure of the faithfulness to which colours are shown

Depreciation - The loss of light output over time as lamps age and optical surfaces collect dirt

Direct buried pole - A pole that is buried in a hole. There is no pole flange and no concrete footing

Disability Glare - Glare resulting in reduced visual performance, often accompanied by discomfort.

Discomfort Glare - Glare causing discomfort without necessarily causing visual disability

Driver - An electronic device adapting mains power to drive an LED luminaire

Efficacy - A measure of lamp output efficiency, with units of lumen/watt

Flat Glass Luminaires - Luminaires with no light emitting above the horizontal giving low glare & low obtrusive light.

Fluorescent Lamps - Lamps that can give "white light". Compact fluorescent lamps present the ordinary tubular lamp in a small package.

Flange Mounted Pole - A pole manufactured with a flange at the bottom to bolt down to a concrete footing.

Footing - A concrete base for a flanged pole

Glare - A condition of vision in which there is discomfort or reduction of ability to see, or both, caused by an unsuitable distribution or range of luminance, or to extreme contrasts in the field of vision

Glare Rating - A measure of discomfort glare in a particular location on a scale of 1 to 100 with lower numbers being more comfortable

High Pressure Sodium (HPS) Lamps - Lamps with a yellow colour appearance that have been used on major roads

Ingress Protection - or "IP rating", a two digit code that indicates resistance to ingress of solids and liquids, the first digit refers to solids, the second to liquids. IP55 means dust-protected & water-jet proof. Higher numbers indicate better sealing.

Illuminance - Lighting level, measured in lux. Horizontal illuminance is measured in a horizontal plane; and vertical illuminance in a vertical plane

Illuminance Uniformity (Ue) - The ratio of maximum illuminance, or "hotspot", to average illuminance

Lamp - a generic term for a man made source of light sometimes colloquially referred to as a "globe" or "bulb"

LED - Light Emitting Diode, a lighting technology offering better energy efficiency than fluorescent and metal halide lamps, and with longer life

Light Technical Parameters - parameters such as illuminance, uniformity, glare, etc.

Light Output - The total luminous flux emitted by a lamp or luminaire in lumens.

Longitudinal Luminance Uniformity (UI) - The ratio of minimum to maximum carriageway luminance in a longitudinal line along the road through the observer's position



Low Pressure Sodium (LPS) Lamps – Obsolete lamps with a distinctive yellow colour and very high efficiency, but they fail to render the colours red, green and blue

Luminaire - A light fitting or "fixture" including lamps, optical system and control gear

Luminance - the brightness of an object or surface in candela per square metre (cd/m^2)

Luminous Intensity – the concentration of light in a certain direction, in candelas (cd)

Maintained – Light technical parameters at the end of lamp life, as opposed to initial parameters

Minimum Illuminance (Emin) - The minimum measured lighting level recorded in the measurement area, the measurements taken at ground level in the horizontal plane

Mercury Vapour (MV) Lamps – Obsolete lamps with a blue-white colour

Metal Halide Lamps - Lamps which give "white light"- more efficient than mercury vapour lamps

Mounting Height - The vertical distance between the centre of a luminaire and the ground

Nominal Height - The vertical distance between the bottom of the base plate or ground line, and: for poles with outreach arms – the centre of the outreach arm spigot; and for post top luminaires poles – the highest point of a pole excluding the fixing spigot.

Observer's Position - A position on the road from which theoretical calculations are based, approximately where a driver would sit when driving down the road

Obtrusive Light – Unwanted light (spill light or glare) that causes annoyance, discomfort, distraction or a reduction in the ability to see

Outreach - The horizontal distance from the centre of a pole to the centre of an outreach arm mounted luminaire.

Overall Luminance Uniformity (Uo) - The ratio of minimum carriageway luminance to the average luminance

Peak Intensity - The highest value of luminous intensity from a given luminaire

Planting Depth - The length of a pole buried below ground level.

Point illuminance – The illuminance at a point, not average illuminance

Road Lighting – Australian Standard terminology for lighting of roads

Street Lighting – Western Power and Synergy terminology for lighting of roads

Standards - Australian Standards include:

AS 1158	Public Lighting	AS 2560	Sports Lighting
AS 1428	Design for Access & Mobility	AS 2890	Off Road Car Parks
AS 1680	Interior Lighting	AS 4282	Obtrusive Light
AS 2293	Emergency Lighting		

Spigot – a tube for the fixing of a luminaire

Spill Light - Light which falls outside the boundary of the property on which the lighting installation is sited

Surround Illuminance Ratio (ES) - The ratio between the average illuminance of the road verge to the adjacent carriageway.

Threshold Increment - A measure of disability glare in percentage. Higher percentages indicate higher disability glare.

Uniformity Ratios – The ratio of minimum to maximum illuminance; or minimum to average illuminance

Uniformity Gradient – The rate of change of illuminance

Upcast Angle - The angle between the axis of the luminaire fixing and the horizontal

Uplift - For pole-mounted outreach arms - the vertical distance between the intersection of the outreach arm centre-line with the supporting face and the highest level of the outreach arm centre-line

Upward Waste Light – light that is emitted above the horizontal and is thus wasted



16. APPENDIX H – EXAMPLE OF A LIGHTING MASTER PLAN

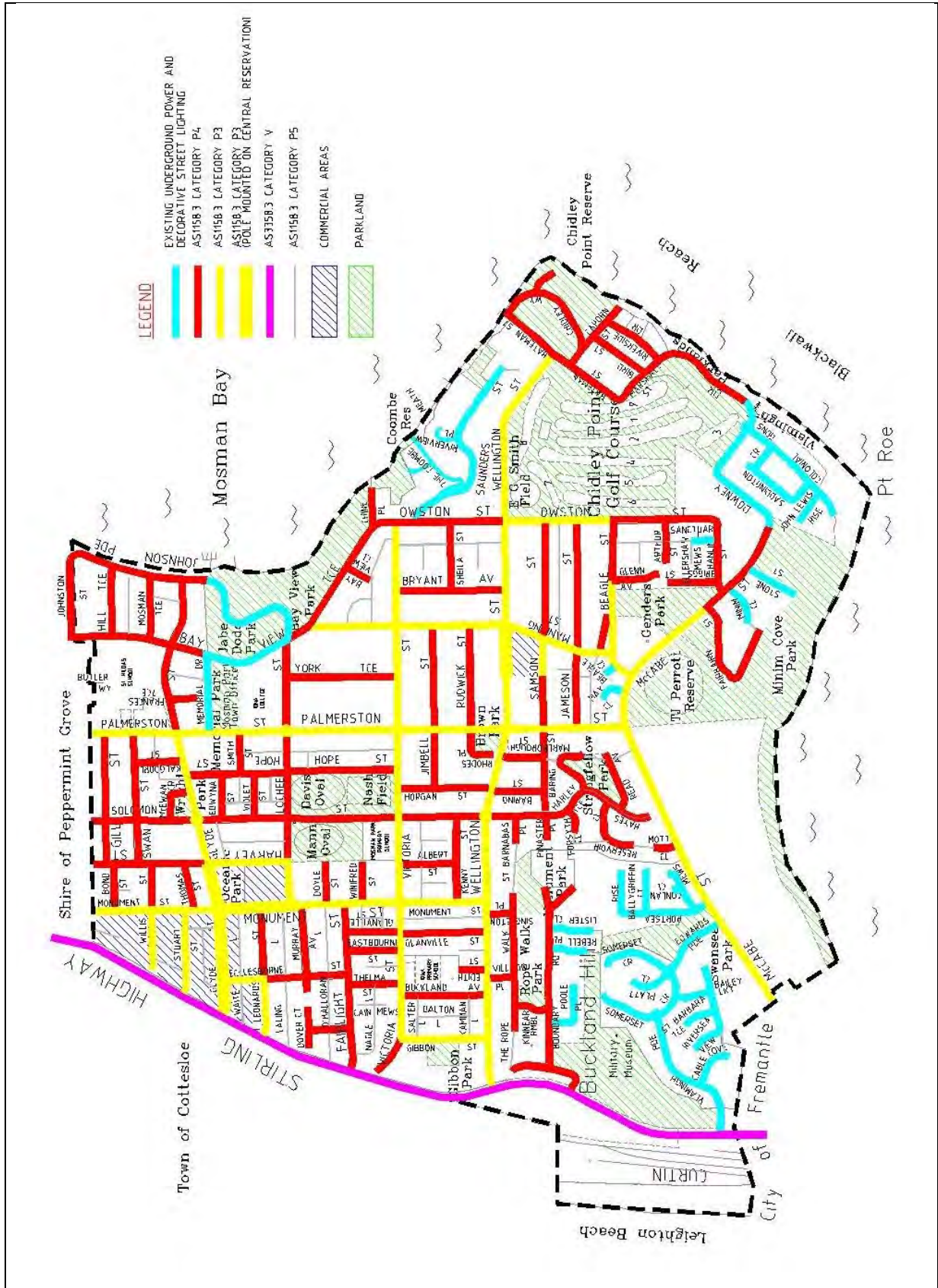
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EXAMPLE OF A LIGHTING MASTER PLAN



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SMART LED STREETLIGHT REPLACEMENT SUPER TRIAL PROPOSAL

The local governments of Albany, Armadale, Canning, Cockburn and Melville have been working collaboratively with Western Power to deliver innovative, intelligent and future-focussed solutions for streetlighting. The proposal is subject to Council approval by the respective local governments.

An ambitious and widespread rollout program to replace approximately 47,000 streetlights with energy efficient and low maintenance Smart LED streetlights across the five local government areas is being proposed as a *Super Trial* covering almost 17% of streetlights across the South West Interconnected System (SWIS) power grid.

FAST FACTS

Smart LED has the potential to achieve a:

65% Reduction in greenhouse gas emissions compared to standard streetlights and major energy savings of up to **40%** for each participating Local Government.

Streetlighting represents **40-50%** of total energy costs for most local governments

47,000 streetlight lamps in the Cities of Albany, Armadale, Canning, Cockburn and Melville

Approx. **278,000** streetlight lamps across the SWIS network covering the Perth Metropolitan Area and South West Region.

Western Power have already trialled **SMART LED** streetlights in the City of Melville

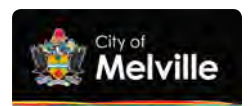


BACKGROUND

The five participating local governments have prepared a business case and are already advancing detailed replacement proposals with Western Power, based on the local governments meeting the capital cost of progressively replacing approximately 47,000 inefficient and poorer quality streetlights including mercury vapour streetlights that will need to be phased out under the Minimata Convention.

In the future, LED Smart Poles could be installed in key activity centres and popular community spaces with smart technology applications to facilitate art experiences, Wayfinding, PA systems, SOS, Public Wi-Fi, etc.

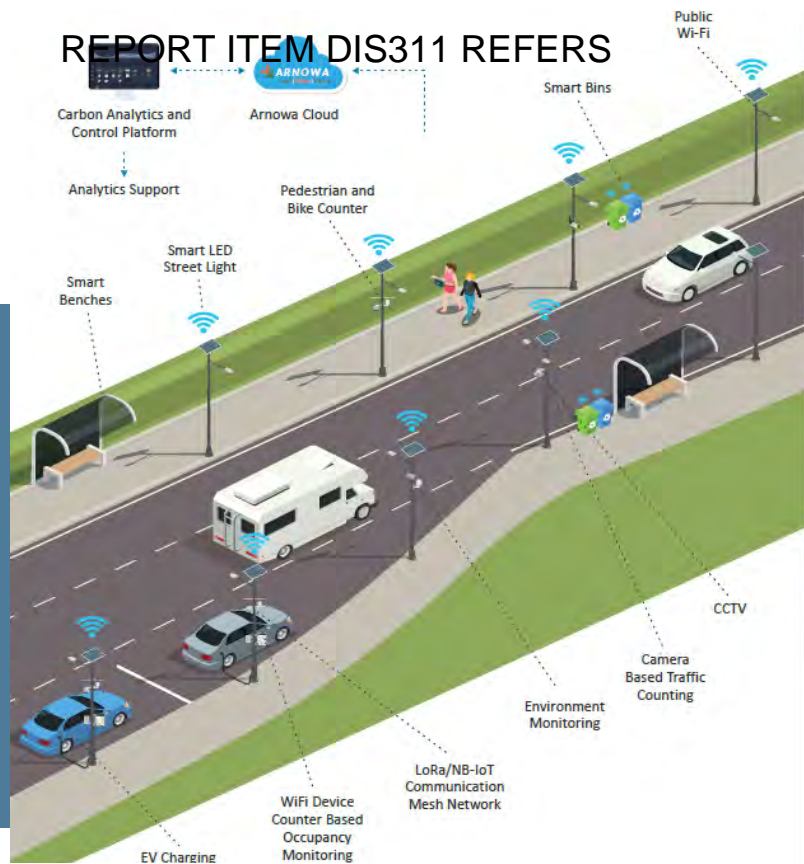
Sensors and cameras could also be installed for traffic counting, surveillance, environmental monitoring, etc. on poles as a valuable community asset supporting Smart City capability.



BENEFITS OF REPLACING STREETLIGHTS WITH SMART LED

- Accurate light dimming control on every streetlight
- Sensor mounting capability for various applications
- User-centric smart infrastructure to provide spatial intelligence and comfort
- Customisable LoRa, NB-IoT, RF, WiFi wireless networks
- End-to-end ecosystem including hardware, software and analytic support.

Image Source: ARNOWA Smart Street Infrastructure



COMMUNITY

- Safer driving at night through better lighting
- Safer communities as endorsed by the WA Police Service
- Using technology to ensure 100% of the streetlights remain "on"
- More efficient and better performing streetlights with superior lighting quality

LOCAL GOVERNMENT

- Improved quality (colour temperature and light distribution) and reliability of public lighting
- Lower electricity consumption (up to 50%) and greenhouse gas emissions (up to 65%)
- More efficient operating and maintenance costs reflected in reduced tariffs
- Reduced light spill and light pollution
- Lower waste though longer life-cycle
- Reduced impact of maintenance operations (lane closures etc)
- Elimination of harmful mercury from the environment especially landfill
- Ability to actively manage lighting to meet changing needs and respond to environmental impacts in sensitive locations

STATE GOVERNMENT

- Contribute to greenhouse gas emissions reductions of up to 7,250 tonnes CO₂ per year
- Create jobs from change over program
- Reduce crime by providing Police with superior night time lighting
- Improve night time safety for all road users
- Improved tourism opportunities in the region (night time –space/star viewing)

WESTERN POWER

- Lower operating costs and improved efficiency for Western Power
- Low or no capital investment required for street lights.
- Public lighting that better meets Australian Standards.
- Improved public perception through lower light failure rates and rapid maintenance response using smart controls
- Contribute to electricity network stability through reduced electricity demand in the peak evening and pre-dawn periods
- Protect against the impact of a ban on manufacture and trade of mercury containing globes.
- Lower transition cost than the alternate "replace on failure" approach



LED Street Light Trial, Atwell and Spearwood

Community Feedback Summary
April 2021

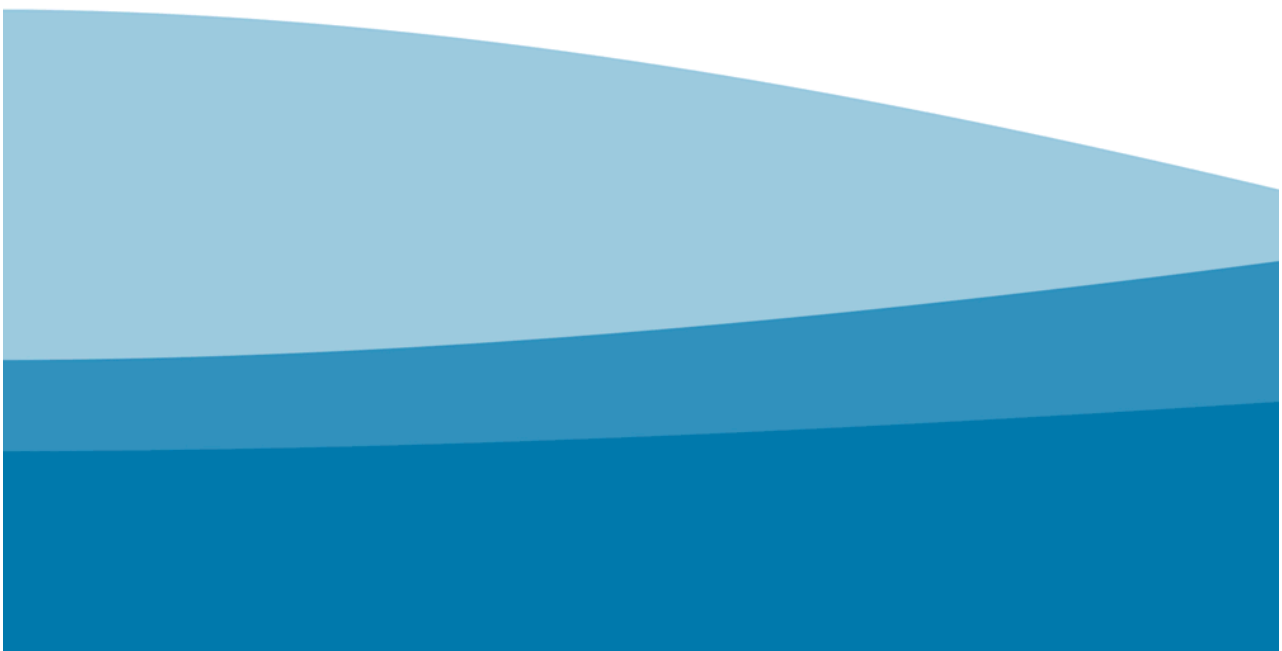


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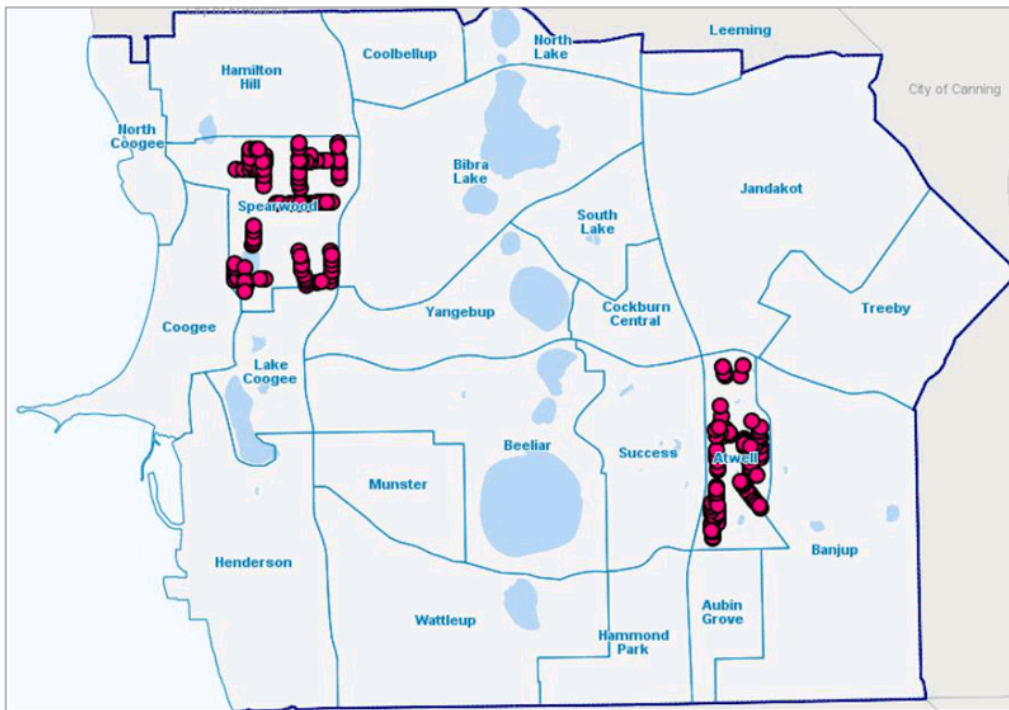


1. Context

The City's operational activities generate over 30,000 tCO₂-e per annum. This equates to 1.2% of emissions in the Cockburn municipality. Purchased electricity and gas are the second largest source of emissions (35%) and include energy used in street lighting, facilities, parks and sporting facilities.

Street lighting contributes to almost half of the City's electricity consumption at a cost of \$2.7 million per annum. Wider implementation of LEDs could reduce the City's street lighting emissions by around 50% while saving ratepayers.

Between December 2020 and March 2021, Western Power and the City of Cockburn trialled the use of 169 new LED luminaires on existing streetlight poles in sections of Spearwood and Atwell.



Above: Locations of the LED luminaires.

This trial was funded by the Australian Government (through the Local Roads and Community Infrastructure Program) and the City of Cockburn.

The purpose of this trial was to identify whether the existing streetlight poles are suitable for the LED luminaires, given LEDs have a different brightness and colour tone to the traditional mercury vapour/compact fluorescent luminaires.

Required luminance levels differ from area to area because of factors like road conditions. For this reason, the trial was carried out in areas of Spearwood and Atwell that reflect the variety of infrastructure in place across the City.

If the existing poles are considered suitable, it means LEDs could potentially be installed throughout Cockburn, without replacing the actual streetlight infrastructure.

While trial outcomes will be determined by technical criteria, community feedback provides valuable insight into the potential suitability of the LED luminaires on the existing poles. As such, the City invited feedback from residents who live near the modified luminaires during the trial. This document provides a summary of this process and the feedback received.



Above: LED street light, Spearwood.

2. Summary of Process

Information about the trial was communicated via the following channels:

- Letters to 2,236 households within the immediate vicinity of the trial areas.
- Signage affixed to street light poles at the following locations:
 - 5 Gerald Street, Spearwood;
 - 4 Kent Street, Spearwood;
 - 79 Edeline Street, Spearwood;
 - 22 Garden Road, Spearwood;
 - 4 Marvell Avenue, Spearwood;
 - 73 Beenyup Road, Atwell;
 - 10 Molloy Circuit, Atwell;
 - Intersection of Lydon Boulevard and Lipton Mews, Atwell.
- Footpath stickers with QR codes located under LED street lights along streets where the new luminaries were installed.
- A project page located on the City's consultation website, Comment on Cockburn.
- Social media posts.
- Articles in the City's Cockburn Soundings magazine.
- References and web-links in the City's e-newsletters.
- Media releases.
- Information on the City of Cockburn website.



Above: Footpath sticker.

The purpose of seeking feedback was to understand whether residents in the impacted areas felt the new LED lighting was adequate and whether there were specific design issues that needed to be considered.

Thus the feedback process actively targeted households within close proximity to the trial area. Participants were asked to share their views on the level of luminance, colour and brightness. An open ended section was provided for respondents to go into further detail or to provide any other suggestions.

While input was sought from those most impacted, the feedback form was available online to anyone and therefore a handful of non-local respondents submitted feedback. These responses are considered separately in the key findings.

The feedback period was open between 25 November 2020 and 31 March 2021.

Respondents were encouraged to wait a couple of weeks after the new luminaires were installed to adjust to the new lighting, before providing feedback.

Feedback was invited in the following ways:

- An online form available on the Comment on Cockburn website;
- Email
- Phone

In addition to the advertised feedback channels, a door-knock of a sample of households within the trial area was undertaken. Of the 33 properties door-knocked, 14 opted to provide feedback. City staff completed the feedback form with those interested in sharing their comments.

3. Key Findings

- During the feedback period, the project website on Comment on Cockburn had 221 visitors.
- A total of 28 responses were received:
 - 10 online feedback form responses were received.
 - Four responses were from residents outside of the trial area. These responses were about LEDs in general.
 - 14 online feedback forms were completed during the door-knock.
 - Four submissions were received via email.
- Responses received via the feedback form (from those that live in the trial area) indicated:
 - The majority of respondents are satisfied with the new LED lights in terms of overall lighting level in their street (75% said it was just right) and brightness of individual lights (70% said they were just right).

- Most respondents said the new LED lights made them feel either more safe (45%) or just as safe (25%) as before.
- The colour of the new lights attracted less feedback than brightness levels. 50% said the colour was just right, however 45% had no opinion.
- Of those less satisfied with street lighting (20%), all but one suggested this was a pre-existing concern as opposed to a result of the new lighting (e.g. “lights are blocked by trees”; “it is lighter than before but still not light enough”).
- Overall, respondents were either very positive about the new lighting or had not particularly noticed (e.g. “I think they are great, thank you for changing them”; “Haven’t noticed a difference, but I don’t go out at night”).
- Responses received via the feedback form (from those that do not live in the trial area) were general in nature and not specifically related to the trial lights. As feedback was unrelated to the trial lights, responses to the luminance, brightness and colour tones are omitted from the below points. General comments included:
 - Support for LED use elsewhere in Cockburn.
 - Comments on light colouring and the relationship to melatonin production.
 - How cost savings would flow on to ratepayers.
 - Technical queries regarding light patterns and illuminance distribution.
 - Comments on the intensity of LEDs and the potential for this to distract drivers.
- Responses received via email were mostly general in nature, including:
 - Support for LED use.
 - How cost savings would flow on to ratepayers.
 - The purpose of the trial.
 - Whether the trial includes smart lights (and a preference for smart LED lights not to be used in proximity to the respondent’s home).

Feedback form responses and submissions are provided in full in Section 2.

4. Next Steps

The feedback received will be considered alongside other technical information as part of the trial review.

Depending on the outcomes, the City plans to work with Western Power towards replacing incandescent street lighting throughout Cockburn with more energy efficient LED lighting.

For more information on the City's vision and roadmap towards a more climate resilient and sustainable future, view the City of Cockburn's Climate Change Strategy available at www.cockburn.wa.gov.au.

5. Results

5.1 Feedback Form Responses

In the interest of transparency, responses are as they appeared in the survey with minimal editing. Therefore some spelling and/or grammatical errors may exist.

Q1. What suburb do you live in?

Response	Count of responses
Spearwood	13
Atwell	7
Jandakot	1
Coogee	1
Success	1
Not specified	1

Q1b. (asked of those living in other suburbs) Do you have any other comments or feedback on the LED street lighting trial?

Comments
I like the idea, please do it in Jandakot.
Please use Warm yellower LED light as it is healthier than blue white lights. Warm light has a lower percentage of blue & green wavelengths. Blue & green wavelengths severely block melatonin production at night, leading to many of the maladies associated with shift work syndrome. Gingin's Observatory Discovery Centre astronomers talked about this on my visit there & advises our street lights should be warm white NOT blue white for this reason. Fauna also are affected by too much bright blue/white lighting.
Sounds like a great proposal for saving energy etc but we need to consider light pollution. Below is from the FAQ page. When compared to existing street lighting, LEDs may appear both brighter and whiter. This is largely due to the colour of the lights. See this article below which highlights some concerns. https://www.thenicee.com/Article/what-is-light-pollution Is it possible to consider utilising less bright or 'warm' coloured rather than white lights. We know that light pollution has a considerable impact on both people and animal populations especially ones who are nocturnal. With less bright, warm coloured light that is shielded and facing downwards rather than upwards into the sky and radiating further.
I have observed that the LED lights appear to be a high intensity type where the light

source causes intense glare and detracts from their lighting function of street furniture and the ground. Conventional lighting tends to use diffuser type covers or the light source itself is shaded from direct view of the observer. The intense LED light source tends to be visible to the observer and therefore causes distraction. How are the proposed energy savings going to be recouped by the rate payer? As I would understand it, street light circuits are not metered. How do LED lights perform in fog conditions? Is there information available on light pattern and illuminance distribution? Will street light distances need to change where existing conventional installations exist? The concept of reduced energy consumption and reduced maintenance costs is great but I remain to be convinced that the glare emitted from most I have seen is a good thing. Is any information available on the reasoning for the light colour selected in relation to observer (motorist) detecting movement such as pedestrians?

Q2. Now that the new LED lights have been installed, is the overall level of lighting in your street...

Response	Count of responses
Just right	15
Not light enough	5
Too light	1
No opinion	3

Q3. Compared to the previous street lights, do the new LED lights make you feel...

Response	Count of responses
More safe	10
Just as safe as before	5
Less safe	2
No opinion	7

Q4. Is the brightness level of the individual LED lights...

Response	Count of responses
Just right	14
Too dim	3
Too bright	1

No opinion	6
------------	---

Q5. Is the colour of the new LED lights...

Response	Count of responses
Just right	10
Too warm	2
Too cool	1
No opinion	11

Q6. Do you have any other comments or feedback on the LED street lighting trial?

Comments
They are lighter, it's a good thing. The more light the better.
Brighter than the old lights. It's a good light up there.
Better than it was. Way brighter.
Fairly dark near my house, but a little brighter than before. Very sparse across the street – the path is not lit up. More light now, but still dark.
Could do with a few more street lights – it's a bit dark at this end of the street especially near the footpath.
Better lighting, it's brighter and the flood is wider. The colour is just right.
Lighter than before which is a good thing. Reduces crime.
Noticed the new lights were quite bright. No complaints. They are quite good. They are brighter so you can see things clearer when it's dark. I'm happy with them.
Did not notice a difference
Haven't noticed a difference, but I don't go out at night
I hadn't noticed but I have the blinds pulled down at night so I don't see it
No different - I hadn't noticed. I don't go out after dark. It's a good idea, they will be more economical.
The lights are crap. It's completely dark because the trees on the street are too thick and block the lights. My house is very dark at night. The lights do not shine at all to my house. It's pitch black. I haven't noticed any difference since the new lights were installed.
I am not living in the area where the lighting trial is in place. So I cant comment other than what I have been advised by the astronomers at Gingin who are asking for warm lighting not Blue White lighting in our street lighting.
please consult with an expert on light pollution if the project hasnt already been.

<p>There is one up the corner i like to see another one down the middle of the street that is Daffodil Court</p>
<p>We've had the new LED fitted to a light post outside our house now for about 6 months. It's reduced the glare and although just as bright does not reflect back into the house or in eyes as you drive by. Great to see the rest of the street the same.</p>
<p>I am right outside a light pole and have been since 2001. [address] Fallow Crescent. the new LED light is not as bright, or at least it should much cooler in colour, the current light is too warm in colour, makes the area look definitely not as bright. thank you.</p>
<p>I think they are great, thank you for changing them.</p>
<p>This feedback form is pointless because your information provided does not name the streets in Spearwood that had new LED lights installed. I have checked twice - maybe I am blind. This does not surprise me though. Have you considered actually testing your consultation material to check you have provided enough information to allow the community to respond and make an informed decision or provide informed feedback? Whilst I support the concept of changing lights to LED for their cheaper running costs and less replacement requirements, LED street lights are known to cause undue and unnecessary brightness for some houses which affect peoples circadian rhythm and ability to rest and sleep. Again your consultation material lacks because it implies you are just straight out changing bulbs over. This does not address light direction, glow and spill. AS a result i dont think you're trial will be accurate and does not bode well for future decision making. Can you please confirm that the following national guidelines have been taken into account in this trial, given that we apparently have " world class wetlands" in Cockburn, but we also have protected marine species along the coast which is really the jewel in Cockburn's crown. There are roads and footpaths within proximity to the coast and the lightspill needs considering. https://www.environment.gov.au/biodiversity/publications/national-light-pollution-guidelines-wildlife</p>
<p>I live in Mac Morris Way Spearwood We have ongoing anti social behaviour drug houses nearby PowerWatch security light shining into Bavich Park and up the public access way.Improving the street lighting all the way along MacMorris Way would only improve the safety of residents and allow us to indentify the individuals who are creating problems for us and people who use the Park and Access Way to get to the Phoenix Shopping Centre</p>

5.2 Email Submissions

Note: In the interest of transparency, responses are as they appeared in the survey with minimal editing. Therefore some spelling and/or grammatical errors may exist.

Comments

I have viewed the LED lights trialled in Kent Street and Sussex Street in Spearwood and have found them to be brighter than the original lighting, to look at as you drive down the street but seem to light the area directly below a little less, in my opinion. However, it's modern times and we must go with the times. LED lighting is the way to go and I'm all for it. One small detail in the letter sent, the wattage consumption of the existing lighting was mentioned but not of the new lighting. My understanding is the new lighting uses considerably less power, not just 50% as presented. Anyhow, I'm all for the new lights and it will be a saving in energy bills and maintenance for Cockburn in the future.

I have received the council letter with regards to the above subject. It's a great work, and I hope it all goes well. If the trial is deemed successful and the new LED lights are installed across the Atwell suburb, would it reduce our annual council rate? I presume that a portion of the council rate goes towards the street lighting. I look forward to hearing from you.

My house is on the corner of [street] in Atwell. I note that there will be a LED street lighting trial. I have a street light right outside the main bedroom and do not wish to have a smart LED street light right outside my bedroom. How can I opt out of having this installed on this particular corner? Is this street light going to be a 'smart' LED streetlight? Why I ask is because on Western Power's website they talk of smart enabled LED streetlight technology. If it is a 'smart' LED streetlight, could you please tell me the radiofrequency electromagnetic energy associated with this infrastructure.

I don't understand why you have to waste ratepayers money with a trial before retrofitting all lights poles to LED, if you already know, it will save costs and CO2 emissions? Why not just go straight to the retrofitting to a cold LED lighting (the brighter of the two). No question they reduce cost and are more reliable than incandescent lighting. You could have saved money by just rolling them out. Jobs could have been created for a faster roll out, people may feel safer on the streets, with brighter lighting. Sometimes I don't understand local government, you spend a lot of money beautifying the streetscapes, median strip, not thinking how will this look in ten years? Ok when it is done but as trees grow can create blinds spots for traffic . One example is along Rockingham Rd, out front of KFC, the verge is tall with weed creating a not only danger to see cars coming if you come out of KFC or the bottle shop but unsightly, the verge is high than the road so it needs to be either concreted or some

Appendix A - List of Streets in Trial

Atwell trial streets (parts of the following roads):

Beenyup Road, Pindan Elbow, Avon Crescent, Lakehurst Way, Molloy Circuit, Jenniphur Court, Chivalry Way, Lyon Road, Congenial Loop, Balance Lane, Flourish Loop, Woodhead Way, Folland Parade, Nancarrow Way, Turnbull Close, St Claire Gardens, Freshwater Drive, Brenchley Drive, Mayhew Cross, Connolly Mews, Daley Court, Hedges Retreat, Haring Green, Dunnage Court, Kinship Way, Bartram Road & Bendee Drive.

Spearwood trial streets (parts of the following roads):

Gerald Street, Macmorris Way, Glendower Way, Gurney Road, Blunt Place, Bushy Road, Bolingbroke Street, Sussex Street, Hotspur Road, Edeline Street, Zlinya Circle, Mell Road, Bosnich Way, Newton Street, Ionesco Street, Fallow Crescent, Garden Road, Trellis Place, Daffodil Road, Marvell Avenue, Skeahan Street, Poins Place, Vernon Place, Kent Street, Leaside Way, Gerovich Way, Chesterton Street and Malcolm Street.

Appendix B – Frequently Asked Questions

What is the trial?

Western Power and the City of Cockburn have come together to trial new LED streetlights on existing street light poles in selected Cockburn suburbs.

What is the aim of the trial?

During the trial, existing street lights, which consist of old technology, will be replaced with modern LED lights in selected streets in Atwell and Spearwood. The LED lights will be retrofitted onto existing street light poles.

The trial will provide Western Power and the City of Cockburn with insight for the potential replacement of Western Power street lights in Cockburn.

Where is the trial happening?

This trial is occurring in two City of Cockburn suburbs, Atwell and Spearwood. The two suburbs were selected as they reflect both types of power infrastructure (underground and overhead).

A selection of streets in Atwell and Spearwood have been identified for the trial so that a range of new LED types can be tested.

Atwell trial streets (parts of the following roads):

Beenyup Road, Pindan Elbow, Avon Crescent, Lakehurst Way, Molloy Circuit, Jenniphur Court, Chivalry Way, Lyon Road, Congenial Loop, Balance Lane, Flourish Loop, Woodhead Way, Folland Parade, Nancarrow Way, Turnbull Close, St Claire Gardens, Freshwater Drive, Brenchley Drive, Mayhew Cross, Connolly Mews, Daley Court, Hedges Retreat, Haring Green, Dunnage Court, Kinship Way, Bartram Road & Bendee Drive.

Spearwood trial streets (parts of the following roads):

Gerald Street, Macmorris Way, Glendower Way, Gurney Road, Blunt Place, Bushy Road, Bolingbroke Street, Sussex Street, Hotspur Road, Edeline Street, Zlinya Circle, Mell Road, Bosnich Way, Newton Street, Ionesco Street, Fallow Crescent, Garden Road, Trellis Place, Daffodil Road, Marvell Avenue, Skeahan Street, Poins Place, Vernon Place, Kent Street, Leaside Way, Gerovich Way, Chesterton Street and Malcolm Street.

When is the trial happening?

The trial is expected to begin in December 2020 and be completed by March 2021. Feedback is invited until 31 March 2021.

Why do the street lights need upgrading?

Street light upgrades are being undertaken for a number of reasons:

- A number of current light types are no longer available, especially the 80w and 125w mercury vapour lights. Manufacturing here and overseas is moving to LED lights only.
- A coordinated move by both Western Power and the City of Cockburn to be more sustainable by reducing electricity consumption and the generation of carbon dioxide. This changeover will see a 50% reduction in CO2 production.
- LED lights are longer lasting and retain the quality of the light for a longer period, reducing ongoing maintenance expenditure.
- "Smartlights" – one of the trial's aims is to introduce smart-enabled lighting. These lights can alert Western Power when they fail, speeding up the replacement time.
- Improved lighting enhances safety on our roads and in our neighbourhoods. Consultation with the Western Australia Police favours the introduction on the new LED street lighting.
- LED street lighting is now being installed in Melbourne, Sydney, Adelaide and Brisbane.
- Western Power are currently installing LED lights on an ad-hoc basis and the proposed trial and replacement program will be the first retrofit program undertaken by Western Power and a council in WA.

What is the difference between LED lights and existing street lights?

Compared to existing street lights, LED street lights:

- Are more focussed, ensuring more of the light shines onto the street and sidewalks, with less light spill into adjacent areas.
- Provide a more uniform illumination of the area.
- Are brighter.
- Require less maintenance and last a lot longer than standard lighting.
- Use about 30% less energy than current street lighting technology.
- Reach full brightness instantly.
- Contain no mercury or lead which is better for our environment.
- Emit no UV rays or infrared radiation.
- Operate at a much cooler temperature, making them a safer option.
- Cut greenhouse gas emissions and reduce landfill.

Source: westernpower.com.au

Are LEDs brighter than previous street lights?

When compared to existing street lighting, LEDs may appear both brighter and whiter. This is largely due to the colour of the lights.

Fortunately, the direct light from LEDs will minimise glare which also reduces light into and onto properties in most situations.

Source: westernpower.com.au

City of Cockburn

9 Coleville Crescent, Spearwood WA 6193

PO Box 1215, Bibra Lake DC Western Australia 6965

T: 08 9411 3444 F: 08 9411 3333

E: comment@cockburn.wa.gov.au

cockburn.wa.gov.au





Predominate training area

house and parking area

Access

Proposed Site

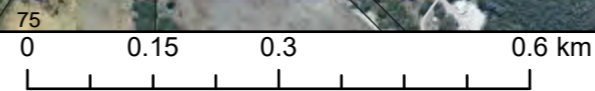
Lake Saide Rd

Thompson Rd

Ryan Rd

Piggott Martin Rd

Patterson Rd



All Terrain Vehicle Training (ATV) Riding School

Operational Management Plan

Lot 25 (290) Piggott-Martin Rd, Lowlands WA

Site details

- Property location – 290 Piggott-Martin Rd, Lowlands WA 6330
- Lot number 25
- Zoning General Agriculture
- Size – 52ha
- Buildings – Dwelling, machinery shed and hay shed
- Access – Via existing 250m long driveway from Piggott-Martin Rd to the south-east of the site
- Parking – space exists for more than 20 vehicles adjacent to dwelling on-site
- Existing use – the property is a lifestyle property with some cattle grazing
- Proposed use – it is proposed to utilize the property, predominately the 6ha area of open grassland in the center of the property to train children up to 14 years in the safe operation of off-road ATV's.
- No buildings will be constructed.
- Temporary shade structures/gazebos may be erected for shelter

Justification

- Children ride these machines from an early age on farms and tracks having, in most cases, received little, or no training at all. As a consequence, many have accidents that can result in injury, often severe, or even death.
- Often, fatalities are reported in the media, but injuries are not. Neither are all the near-misses or “close shaves”.

- Latest statistics from Victoria show that hospitals deal with ATV related injury every 5 days.
- I don't believe that injuries are due to poor machine design, but rather result from incorrect use due to lack of training and instruction.
- My proposed facility will offer training that will, hopefully, reduce the chance of injury and may even save lives.

Proposed hours of operation & Noise Management

- Days of operation: School holidays, weekends and public holidays only, but only as customer demand dictates. I expect this demand will wax and wane throughout the year with not a lot happening on most days, if at all.
- Customers can attend from 8am to 7pm during summer. Riding times will not commence prior to 9am or finish later than 6pm (during summer).
- Training sessions will vary between 2 to 3.5 hours dependent on customer requirements. There will be a maximum of 2.5 hours of riding time. The first half hour or so of each session is generally a stationary introduction.
- Operators – myself and my wife
- Noise levels: The operation will comply with the Noise Regulations 1997 as amended. An Environmental Acoustic Assessment has been provided. Acoustic testing was undertaken with up to 12 ATVs operating. To enable the assessment of noise based on the worst case possible, line noise sources have been applied to the entire boundary.
- There will be NO motorcycle use, i.e no 2 wheel machines.

Further Information

- All ATVs will be 90cc or less in engine capacity. In fact, most will be 50cc.
- No riders will be over 14 years of age. From previous experience as an owner/operator of this business in the Williams Shire, I expect most will be much younger.
- No riders will be permitted to bring their own machines
- All exhaust systems will be maintained to standard specification
- All riding will be supervised at all times

REPORT ITEM DIS312 REFERS

- Training sessions will take place predominately within the area shown on the attached site plan
- Noise levels will be very low and previous testing has shown that there will be no detrimental affect on the amenity of the area
- As riders will be beginners, and will be unfamiliar with the machines, speeds will be restricted, meaning that the already low levels of noise will be even lower.
- There will be no racing or competitive riding
- All machines are beginner type units, and are not performance orientated, or high revving types such as motocross bikes.
- No more than 12 machines will be used at any one time.
- As far as waste management is concerned, there are two existing toilets and if demands warrants, portable toilets will be made available.
- Parents will remain on site during the training sessions.

It is my opinion that my proposed facility will benefit the local area by giving young people with an interest in ATV's an opportunity to learn to operate and ride these machines safely.

I hope that you find this information helpful. If you have any enquiries, I am happy to respond.

Yours faithfully.

Philip Morgan
290 Piggott-Martin Rd
LOWLANDS WA 6330
Mobile 0428 877 071
Email philmorg@wn.com.au

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Lot 25 (290) Piggott Martin Road

Suburb: Lowlands

State: WA

P/code: 6330

Local government area: City of Albany

Description of the planning proposal: Development Application for an All-Terrain Vehicle (ATV) and Motorcycle Rider Training Facility.

BMP Plan / Reference Number: MSC0257

Version: Final Version 3.0

Date of Issue: 12/07/2021

Client / Business Name: Philip Morgan

Reason for referral to DFES

Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?

Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?

Is the proposal any of the following special development types (see SPP 3.7 for definitions)?

Unavoidable development (in BAL-40 or BAL-FZ)

Strategic planning proposal (including rezoning applications)

Minor development (in BAL-40 or BAL-FZ)

High risk land-use

Vulnerable land-use

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

The proposed development is for an All Terrain Vehicle training facility which will train persons under the age of 14, this proposal could be considered a Vulnerable Land Use.

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Jason Benson	Level 2	BPAD - 37893	31/07/2021
Company		Contact No.	
Bio Diverse Solutions		9842 1575	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner



Date 12/07/2021

Bushfire Management Plan and Bushfire Emergency Evacuation Plan

Site Details					
Address:	Lot 25 (290) Piggott Martin Road				
Suburb:	Lowlands	State:	W.A.	Postcode	6330
Local Government Area:	City of Albany				
Description of Building Works:	N/A				
Stage of WAPC Planning	Planning Approval				

Report Details			
Report / Job Number:	MSC0257	Report Version:	FINAL Version 2.0
Assessment Date:	9 October 2019	Report Date:	12 July 2021
Practitioner	Jason Benson	Accreditation No.	BPAD 37893



1. Introduction

Philip Morgan of 290 Piggott Martin Road, Lowlands (the “Subject Site”) commissioned Bio Diverse Solutions (Bushfire Consultants) to prepare a Bushfire Management Plan (BMP) and Bushfire Emergency Evacuation Plan (BEEP) to assist with a City of Albany (CoA) Planning Application to permit an All-Terrain Vehicle (ATV) and Motorcycle Rider Training Facility. No new construction is proposed as part of this application. The development site of approximately 52Ha and is within a Bushfire Prone Area. The Bushfire Management Plan (BMP) has assessed the proposal to ensure it is consistent with the current and endorsed Guidelines for Planning in Bushfire Prone Areas Vers 1.3 (WAPC, 2017) and State Planning Policy 3.7 (WAPC, 2015). It is noted that the site had previous planning approval to operate as a Junior Motorcycle and All-Terrain Vehicle Training facility, in which the previous approval has lapsed.

A Bushfire Attack Level (BAL) Assessment was undertaken on the existing house and is included as an appendix of this report (Appendix A). The BEEP can be found in Appendix B of this report.

1.1. Location

The Subject site is located in rural / agricultural setting to the west of Albany in the suburb of Lowlands in the municipality of the City of Albany. Refer to Figure 1.



Figure 1: Location Plan

1.2. Development Proposal

The proponent is applying to the CoA to operate an ATV and Motorcycle Rider Training Facility within the grounds of Lot 25 (290) Piggott Martin Road. The training will consist of up to 8 people (aged 14 and under) each operating an ATV or Motorcycle under the guidance of an instructor with a minimum of one adult (parent/guardian) per machine. Existing buildings will not be used as part of the training.

The publicly released Bushfire Prone Area Mapping (SLIP, 2019) shows that the existing approved family residence is located within a Bushfire Prone Area (within 100m of >1ha of bushfire prone vegetation) and therefore is subject to a planning assessment of the bushfire risks. Refer to Figure 2.



Figure 2: Map of Bushfire Prone Areas (SLIP, 2019)

1.3. Statutory Framework

This document and the recommendations contained within are aligned to the following policy and guidelines:

- *Planning and Development Act 2005;*
- *Planning and Development Regulations Pic;*
- *Planning and Development (Local Planning Scheme) Regulations 2015;*
- State Planning Policy (SPP) 3.7 Planning in Bushfire Prone Areas;
- Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017);
- A Guide to developing a Bushfire Emergency Evacuation Plan (WAPC, 2019);
- *Building Act 2011;*
- *Building Regulations 2012;*
- Building code of Australia (National Construction Code);
- *Fire and Emergency Services Act 1998.*
- AS 3959-2018 “Construction of Buildings in Bushfire Prone Areas” current and endorsed standards;
- *Bushfires Act 1954;* and
- City of Albany Fire Management Notice, (CoA, 2020).

Policy measure 6.6 of SPP 3.7 applies to vulnerable and high-risk land uses. A tourism venture (such as an ATV and Motorcycle Training Facility) is classified/defined under SPP 3.7 as a “Vulnerable Land Use”. SPP 3.7 requires assessment of vulnerable land uses against the bushfire protection criteria as well as the creation of a BMP report which includes an emergency evacuation plan, see Appendix B. The intent of this policy is to recognise that such sites require special consideration when located in a bushfire prone area (WAPC, 2017).

The BMP has been prepared to assess the proposal to WAPC guidelines and a BEEP has been prepared which is deemed consistent with the size and nature of the proposal.

1.4. Suitably Qualified Bushfire Consultants

This BMP has been prepared by Jason Benson who has 8 years operational fire experience with the (formerly) DEC (between 2002-2012) and has the following accreditation in bushfire management:

- Heavy Duty Fire Appliance Operator;
- Wildfire Suppression 1 & 2;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Jason Benson is an accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD37893) and has been an accredited Bushfire Consultant for 5 years. Bio Diverse Solutions are Silver Corporate Members of the Fire Protection Australia Association. Jason is a suitably qualified Bushfire Practitioner to prepare this Bushfire Management Plan (BMP) and Bushfire Emergency Evacuation Plan (BEEP).

This BMP has been reviewed by Kathryn Kinnear (nee White), who has 10 years operational fire experience with the (formerly) DEC (1995-2005) and has the following accreditation in bushfire management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;
- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear currently has the following tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Graduate Diploma in Environmental Management.

Kathryn Kinnear is an accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794). Bio Diverse Solutions are Silver Corporate Members of the Fire Protection Australia Association. Kathryn is a committee member of the WA Bushfire Working Group (FPAA) and Kathryn is a suitably qualified Bushfire Practitioner to prepare this Bushfire Management Plan (BMP) and Bushfire Emergency Evacuation Plan (BEEP).

2. Environmental Considerations

2.1. Native Vegetation – modification and clearing

There is no modification of vegetation required at this site.

2.2. Revegetation or landscaping

No revegetation or landscaping plans are proposed. Any future landscaping or revegetation of the site is to conform to WAPC APZ requirements (See BAL Assessment Report Appendix A, Appendix 3).

3. Bushfire Assessment Results

The bushfire assessment for this site has followed the Bushfire Hazard Level Assessment (BHL) process and included:

- Vegetation classification to AS3959;
- Assessment of the subject site to 150m from the proposed short stay accommodation; and
- Allocation of category of BAL to AS3959.

3.1. Assessment Inputs - Vegetation Classification and Slope Assessment to AS3959

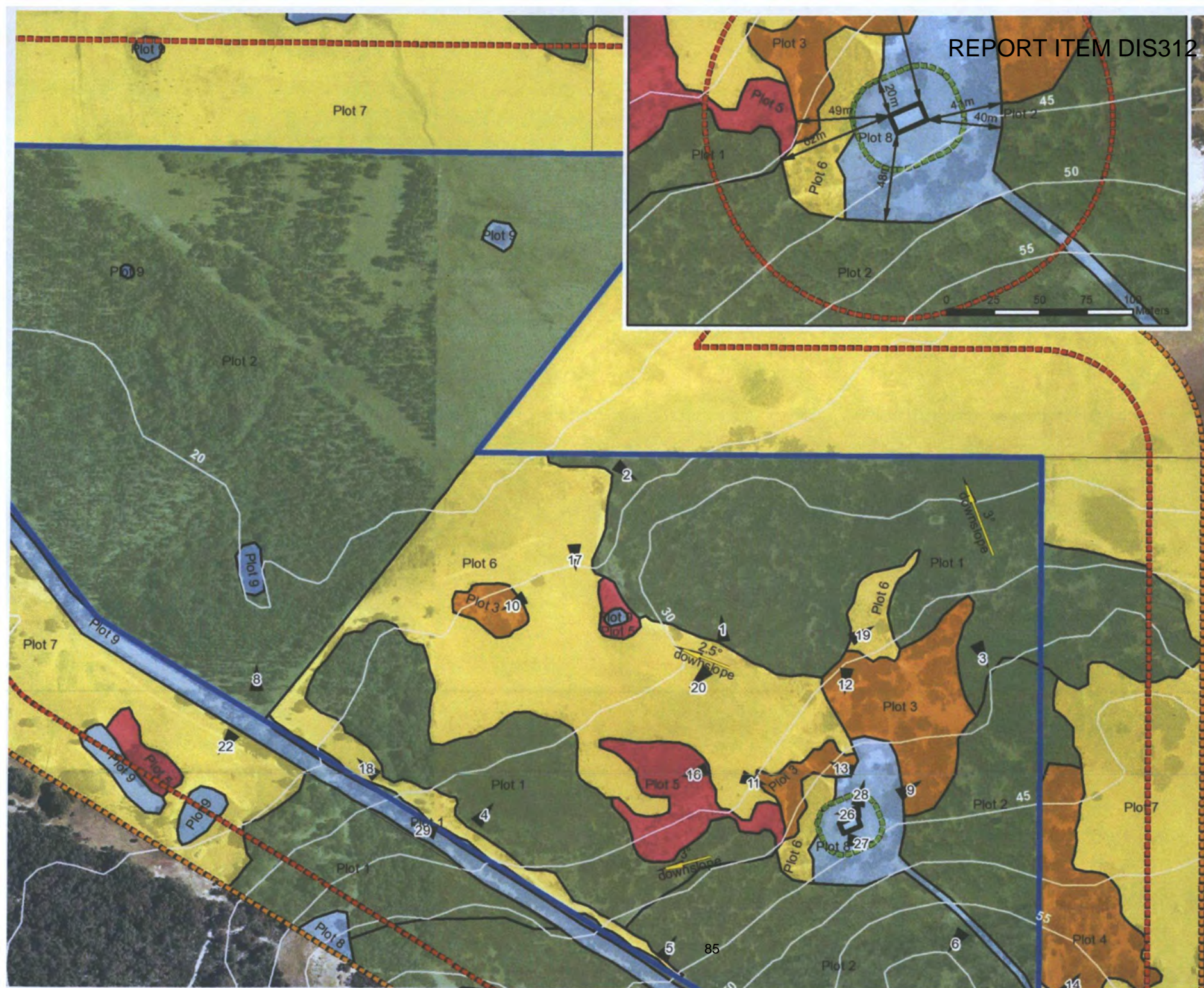
Bushfire Assessment inputs for the site has been calculated using the Method 1 BAL Assessment procedure as outlined in AS3959-2018. This incorporates the following factors:

- WA adopted Fire Danger Index (FDI), being FDI 80;
- Vegetation Classes;
- Slope under classified vegetation; and
- Distance between proposed development site and classified vegetation.

Vegetation Classification

All vegetation within 150m of the lot boundary was classified in accordance with Clause 2.3 of AS 3959-2018 for a Bushfire Hazard Assessment and BAL Assessment. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the detailed BAL Assessment Report Appendix A.

Plot Number	Vegetation Type	Effective Slope
1	Class A - Forest	Downslope >0 to 5 degrees.
2	Class A - Forest	Upslope/flat
3	Class B Woodland	Downslope >0 to 5 degrees.
4	Class B Woodland	Upslope/flat
5	Class D Scrub	Downslope >0 to 5 degrees.
6	Class G Grassland	Downslope >0 to 5 degrees.
7	Class G Grassland	Upslope/flat
8	Excludable – Clause 2.2.3.2(f)	N/A
9	Excludable – Clause 2.2.3.2(e)	N/A



Legend

- Subject Site (M)
 - Lot Boundary
 - 100m Assessm
 - 150m Assessm
 - Cadastre
 - Photo Point
 - 5m Contours
 - Slopes Degree:
 - APZ
 - Vegetation/Plot
- Vegetation**
- Forest Type A
 - Woodland Type
 - Scrub Type D
 - Grassland Type
 - Low fuel or non

Scale
 1:4,500 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: WA Now, Landgate
 Cadastre, Relief Contours and Road
 IRIS Road Network: Main Roads W
 Overview Map: World Topographic r

CLIENT
 Philip Morgan
 290 Piggott Marti

3.2. Assessment Outputs

A detailed BAL Assessment on the existing house found the building to be in BAL 19 (refer to Appendix A). The BAL Assessment indicates that existing buildings are compliant to the guidelines. The predominant bushfire risk associated with the site is the remnant woodland vegetation to the north, east and south of the subject site.

Plot	Vegetation Classification	Effective Slope	Separation (m)	BAL
1	Class A - Forest	Downslope >0 to 5 degrees.	62m	BAL – 12.5
2	Class A - Forest	Upslope/flat	40m	BAL – 19
3	Class B Woodland	Downslope >0 to 5 degrees.	41m	BAL – 12.5
4	Class B Woodland	Upslope/flat	164m	BAL – LOW
5	Class D Scrub	Downslope >0 to 5 degrees.	49m	BAL – 12.5
6	Class G Grassland	Downslope >0 to 5 degrees.	20m	BAL – 12.5
7	Class G Grassland	Upslope/flat	193m	BAL – LOW
8	Excludable – Clause 2.2.3.2(f)	N/A	N/A	BAL – LOW
9	Excludable – Clause 2.2.3.2(e)	N/A	N/A	BAL – LOW

Table 1: BAL Analysis

3.3. Bushfire Hazard Level Map (BHL)

Bushfire Hazard Level Maps are generally used for providing a broad brush means of determining the potential intensity of a bushfire in a particular area for Local Planning Schemes and Amendments and Local Structure Plans not for Development Applications. In this case a BHL map has been supplied to outline the overall bushfire risks impacting the proposed development site. The BHL Map outlines there are Extreme and Moderate Bushfire Hazard Levels on the whole of the subject lot.

Plot number	Vegetation Type (Table 2.3)	Effective Slope (Table 2.4.3)	BHL
1	Class A - Forest	Downslope >0 to 5 degrees.	Extreme
2	Class A - Forest	Upslope/flat	Extreme
3	Class B Woodland	Downslope >0 to 5 degrees.	Extreme
4	Class B Woodland	Upslope/flat	Extreme
5	Class D Scrub	Downslope >0 to 5 degrees.	Extreme
6	Class G Grassland	Downslope >0 to 5 degrees.	Moderate
7	Class G Grassland	Upslope/flat	Moderate
8	Excludable – Clause 2.2.3.2(f)	N/A	Moderate
9	Excludable – Clause 2.2.3.2(e)	N/A	Moderate

Table 2: Bushfire Hazard Level



Legend

-  Subject Site
-  Lot Boundary
-  100m Assessr
-  150m Assessr
-  Cadastre
-  ATV Training /
- Bushfire Hazard Level**
-  Extreme
-  Moderate
-  Low



Scale
 1:4,500 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: WANow, Landgate
 Cadastre, Relief Contours and Road
 IRIS Road Network, Main Roads W
 Overview Map, World Topographic

CLIENT
 Philip Morgan
 290 Pinnett Marti

4. Identification of bushfire hazard issues

4.1. Bushfire Risk

The identified bushfire risks associated with the subject site is the continuous vegetation internal to the subject site and external in the north, east and south. These areas present as Forest Type A, Scrub Type D and Woodland Type B. There are also large areas of Grassland Type G, internal and external to the site, Grassland vegetation presents as a moderate BHL. It is recommended that grassland vegetation within the designated training areas be kept slashed during the bushfire danger period (1st November to 30th April) and spark arrestor are fitted to all training vehicles to limit the potential for bushfire ignition. This may be conditioned by the City of Albany.

The recommended ATV training area as been located in a predominantly moderate BHL and the existing house within the lot is subject to a BAL rating of BAL-19.

Training should be reconsidered on Extreme and Catastrophic days and all vehicle movement bans should be adhered to.

4.2. Access

The proposed development is located on Piggott Martin Road which is a City of Albany managed public road. Piggott Martin Road provides safe access/egress to two different destinations and is available to all residents and the public at all time and under all weather conditions. Piggot Martin Road meets the technical requirements established by the guidelines, it has a >6m trafficable surface, >6m horizontal clearance and >4.5m vertical clearance, see Figure 6 Photos of Piggot Martin Road for proof of road standards. To the east Piggott Martin Road intersects with Lower Denmark Road and to the west it connects with Thompson Road then onto Lake Saide Road which also connects to Lower Denmark Road which provides options to travel in two different directions.

The private driveway is approximately 250m in length and has a suitable turn around area. The driveway has a 4m wide trafficable surface and will meet the technical requirements established by the guidelines, see Table 4. This may be conditioned by the City of Albany.

4.3. Water Supply

A reticulated water supply is not currently available to the site. The site has two 23,000ltr water tanks for domestic use located within the lot and additionally one 10,000ltr standalone steel water tank which will be full at all times and available for firefighting purposes. It will have a 50mm camlock fitting installed. This may be conditioned by the City of Albany.

5. Assessment against the Bushfire Protection Criteria

5.1. Compliance table

The Bushfire Protection Criteria have been provided by WAPC in the “Guidelines for Planning in Bushfire Prone Areas” (WAPC, 2017) to assist the assessment of the proposal in bushfire prone areas. The BMP report assesses the proposal to the “Acceptable Solutions” of the four elements a summary of this assessment is outlined below.

Table 3: Bushfire protection criteria applicable to the site

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1 – Location	A1.1 Development Location	Yes	<p>Compliant.</p> <p>The publicly released Bushfire Prone Mapping (DFES, 2019) indicates that the lot is in a bushfire prone area. A BAL Assessment was undertaken in accordance with AS3959 indicating the existing house is currently located in BAL-19. Refer to Appendix A. The majority of the area which will be utilised for the ATV and Motorcycle Training is in Grassland and is in a Moderate BHL. Refer to ATV area as shown on BHL Mapping.</p> <p>The proposal is deemed compliant to Acceptable Solution A.1.1</p>
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	<p>Compliant.</p> <p>The existing house currently has an APX consistent with a BAL-19 rating, see Appendix. This is contained within the lot boundary and to WAPC requirements (See Appendix 3 of the BAL Assessment Appendix A). The APZ area can be applied and maintained within the lot boundary meeting the acceptable solution. The majority of the area which will be utilised for the ATV and Motorcycle Training is in Grassland and is in a Moderate BHL.</p> <p>The proposal is deemed compliant to Acceptable Solution A.2.1.</p>
Element 3 – Vehicular Access Element 3 – Vehicular Access	A3.1 Two Access Routes	Yes	<p>Compliant.</p> <p>The proposed development is located on Piggott Martin Road which is a City of Albany managed public road. Piggott Martin Road provides safe access/egress to two different destinations and is available to all residents and the public at all time and under all weather conditions. To the east Piggott Martin Road intersects with Lower Denmark Road and to the west it connects with Thompson Road then onto Lake Saide Road which also connects to Lower Denmark Road which provides options to travel in two different directions.</p> <p>The Proposal deemed compliant to A3.1.</p>

REPORT ITEM DIS312 REFERS

Table 3 cont.

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 3 – Vehicular Access Element 3 – Vehicular Access	A3.2 Public Road	Yes	Compliant. No new roads are planned as part of this proposal. However, the proposed development is located on Piggott Martin Road which is a City of Albany managed public road. Piggot Martin Road and the surrounding existing road network meet the technical requirements established by the guidelines, See Figure 6. The Proposal deemed compliant to A3.2.
	A3.3 Cul-de-sacs	No	No cul-de-sacs are proposed. Not assessed to A3.3.
	A3.4 Battle axes	No	No battle axes are proposed. Not assessed to A3.4.
	A3.5 Private driveways	Yes	Compliant. The existing driveway is approximately 250m long to the existing house and has a suitable turn around area. The driveway was an all-weather surface with a minimum trafficable area of no less than 4m. The driveway will have a horizontal clearance of no less than 6m and a vertical clearance of 4.5m as indicated in Table 4 of this report. This may be conditioned by the City of Albany. The proposal can be compliant to A.3.5.
	A3.6 Emergency Access Ways	No	No EAWs proposed as the public road network will be utilised. Not assessed to A3.6.
	A3.7 Fire Service Access Ways	No	No FSA's proposed as the public road network will be utilised. Not assessed to A3.7.
	A3.8 Firebreaks	Yes	Compliant. Fire breaks and APZ areas around the existing house and property were noted to be in place and compliant to CoA Fire Management Notice. The proposed development will continue to comply with the requirements of the local government annual firebreak notice issued under s33 of the Bush Fires Act 1954. The proposal is deemed compliant to A.3.8.
Element 4 – Water	A4.1 Reticulated areas	No	Not assessed to A4.1.
	A4.2 Non-reticulated areas	No	Not assessed to A4.2.
	A4.3 Individual lots in non-reticulated areas	Yes	Compliant. A reticulated water supply is not currently available to the site. The site has two 23,000ltr water tanks for domestic use located within the lot and additionally one 10,000ltr standalone steel water tank which will be full at all times and available for firefighting purposes. It will have a 50mm camlock fitting installed. This may be conditioned by the City of Albany. The proposal is deemed compliant to A.4.3.

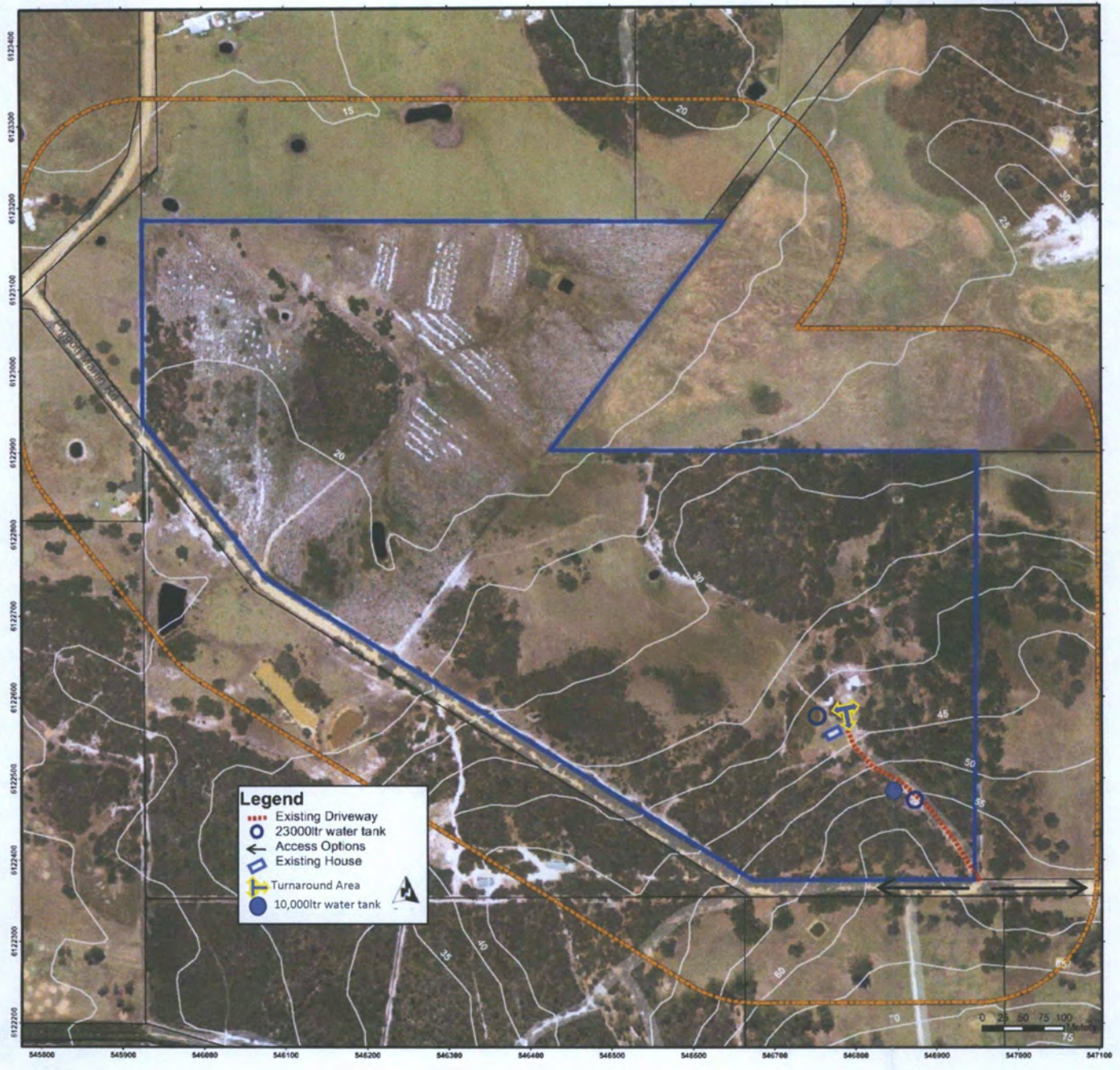


Figure 5: Map of access and water for Lot 25 Piggott Martin Road, Lowlands.

Table 4: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Private Driveways
Minimum trafficable surface (m)	4
Horizontal clearance (m)	6
Vertical clearance (m)	4.5
Maximum grades	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33
Curves minimum inner radius (m)	8.5



Figure 6: Pictures of Piggot Martin Road.

REPORT ITEM DIS312 REFERS

6. Implementation Actions

Site managers responsibilities for implementation	
No.	Implementation Action
1	Continue to maintain the Asset Protection Zone (APZ) surrounding the existing house to 20m as per the City of Albany Fire Management Notice.
2	Continue to maintain the area that is currently managed in a low threat state (Plot 8 Excluded 2.2.3.2 (f)) in perpetuity so the separation distance from classified vegetation is not decreased, a minimum BAL 19 separation distance must be maintained at all times.
3	Ensure private driveway is maintained to the construction technical requirements established by the Guidelines and sufficient turnaround areas are available at the end of the driveway.
4	Ensure private driveway has a horizontal clearance of no less than 6m and a vertical clearance of 4.5m as indicated in Table 4 of this report.
5	Ensure water tanks and recommended couplings are maintained at or above the designated capacity with a minimum of 10000ltr available for firefighting purposes at all times.
6	Ensure all training vehicles have appropriate safety mechanisms (spark arresters) fitted to limit the potential for bushfire ignition.
7	Ensure Bushfire Emergency Evacuation Plan is implemented during bushfire season November – April. An annual review of the Bushfire Emergency Evacuation Plan is recommended every year prior to the bushfire season to ensure any protocols from Emergency Services have not changed.

City of Albany responsibilities for implementation	
No.	Implementation Action
1	Monitor landowner compliance with the Bushfire Management Plan and the City of Albany Fire Management Notice.
2	Ensure Water Supply is sufficient and has appropriate couplings, this is a condition of D/A.

REPORT ITEM DIS312 REFERS

7. Certification

I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level (s) stated in this document have been prepared in accordance with the requirements of AS 3959-2018 (Incorporating Amendment Nos 1, 2 and 3) and the Guidelines for Planning in Bushfire Prone Areas Ver 1.3 (WAPC, 2017).

SIGNED, ASSESSOR: *Jason* DATE: 12/07/2021

Jason Benson, Bio Diverse Solutions

Accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD37893)

**REVISION RECORD**

Revision	Summary	Reviewed By	Date
Draft ID 23/10/2019	Internal QA	K. Kinnear	24/10/2019
Final ID 25/10/2019	Submitted to Client as final	Philip Morgan	25/10/2019
Final ID v2.0 30/10/2019	Minor Amendments Version 2.0 submitted to the client	Philip Morgan	30/10/2019
Final ID v3.0 12/07/2021	Minor Amendments in line with DFES response letter		12/07/2021

REPORT ITEM DIS312 REFERS

8. References

AS 3959-2018 Australian Standard, *Construction of buildings in bushfire-prone areas*, Building Code of Australia, Primary Referenced Standard, Australian Building Codes Board and Standards Australia.

AS 3745-2010 Australian Standard, *Planning for emergencies in facilities*, Standards Australia.

City of Albany Fire Management Notice 2018/2019, accessed from: www.albany.wa.gov.au

NSW Rural Fire Service (2014) Guide to developing a bush fire emergency management plan. State of New South Wales.

State Land Information Portal (SLIP) (2019) Map of Bushfire Prone Areas. Office of Bushfire Risk management (OBRM) data retrieved from: <https://maps.slip.wa.gov.au/landgate/bushfireprone/>

Western Australian Planning Commission (WAPC) (2017) Guidelines for Planning in Bushfire Prone Areas Version 1.3. Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

Western Australian Planning Commission (WAPC) (2015) State Planning Policy 3.7 Planning in Bushfire Prone

A Guide to developing a Bushfire Emergency Evacuation Plan (WAPC, 2019);

REPORT ITEM DIS312 REFERS

9. Appendices

Appendix A

BAL Assessment on the existing house

Appendix B

Bushfire Emergency Evacuation Plan

Appendix A

BAL Assessment on the Existing House

Bushfire Attack Level (BAL) Certificate

Determined in accordance with AS 3959-2018

This Certificate has been issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme. The certificate details the conclusions of the full Bushfire Attack Level Assessment Report (full report) prepared by the Accredited Practitioner.

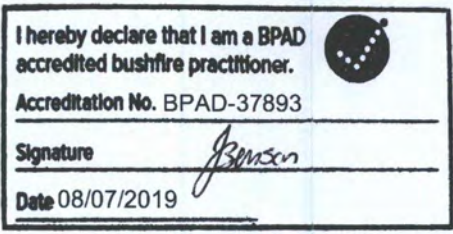
Property Details and Description of Works

Address Details	Unit no	Street no	Lot no	Street name / Plan Reference	
		290	25	Piggott Martin Road	
Local government area	Suburb			State	Postcode
	Lowlands			WA	6330
Main BCA class of the building	Use(s) of the building				
Description of the building or works	Class 1a	Habitable Dwelling			
BAL on existing habitable dwelling					

Determination of Highest Bushfire Attack Level

AS 3959 Assessment Procedure	Vegetation Classification	Effective Slope	Separation Distance	BAL
Method 1	Class A Forest	Flat/Upslope	40m	BAL-19

BPAD Accredited Practitioner Details

Name Jason Benson	 <p>I hereby declare that I am a BPAD accredited bushfire practitioner. Accreditation No. BPAD-37893 Signature <i>J. Benson</i> Date 08/07/2019</p>
Company Details Bio Diverse Solutions	
I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959-2018.	

Authorised Practitioner Stamp

Reliance on the assessment and determination of the Bushfire Attack Level contained in this certificate should not extend beyond a period of 12 months from the date of issue of the certificate. If this certificate was issued more than 12 months ago, it is recommended that the validity of the determination be confirmed with the Accredited Practitioner and where required an updated certificate issued.

Bushfire Attack Level Assessment Report

Prepared by a BPAD Accredited Practitioner



AS 3959 BAL Assessment Report

This report has been prepared by an Accredited BPAD Practitioner using the Simplified Procedure (Method 1) as detailed in Section 2 of AS 3959 – 2018. FPA Australia makes no warranties as to the accuracy of the information provided in the report. All enquiries related to the information and conclusions presented in this report must be made to the BPAD Accredited Practitioner.

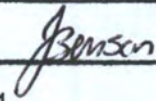

Property Details and Description of Works

Address Details	Unit no	Street no	Lot no	Street name / Plan Reference	
		290	25	Piggott Martin Road	
Local government area	Suburb			State	Postcode
	Lowlands			WA	6330
Main BCA class of the building	Use(s) of the building				
Description of the building or works	Class 1a		Habitable Dwelling		

Report Details

Report / Job Number MSC0257	Report Version Final	Assessment Date 9 October 2019	Report Date 8 July 2021
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BPAD Accredited Practitioner Details

Name Jason Benson BPAD37893 (L1)	<div style="border: 2px solid black; padding: 5px;"> <p>I hereby declare that I am a BPAD accredited bushfire practitioner.</p> <p>Accreditation No. BPAD-37893</p> <p>Signature </p> <p>Date 08/07/2021</p> </div>
Company Details Bio Diverse Solutions 29 Hercules Crescent Albany WA 6330. 	

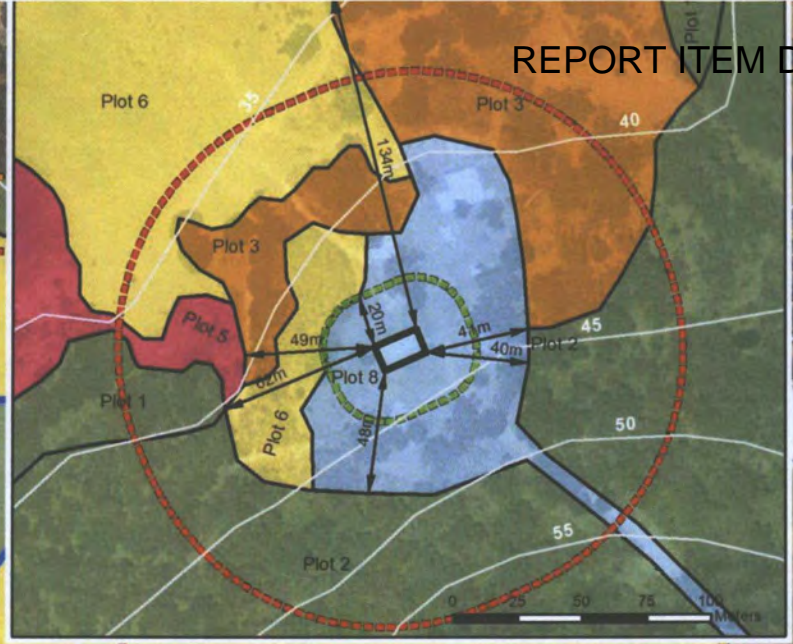
Authorised Practitioner Stamp

Reliance on the assessment and determination of the Bushfire Attack Level contained in this report should not extend beyond a period of 12 months from the date of issue of the report. If this report was issued more than 12 months ago, it is recommended that the validity of the determination be confirmed with the Accredited Practitioner and where required an updated report issued.

Type A	Upslope/flat
Type B	Downslope >0-5 degrees
Type B	Upslope/flat
Type D	Downslope >0-5 degrees
Type G	Downslope >0-5 degrees
Type G	Upslope/flat
2.3.2 (f)	N/A
2.3.2 (e)	N/A

REPORT ITEM DIS312 REFERS

Albany, WA 6330 (08) 9842 1575
Denmark, WA 6333 (08) 9848 1309



Legend

- Subject Site (Muster Point)
 - Lot Boundary
 - 100m Assessment Boundary
 - 150m Assessment Boundary
 - Cadastre
 - Photo Point
 - 5m Contours
 - Slopes Degrees
 - APZ
 - Vegetation/Plot Boundary
- Vegetation**
- Forest Type A
 - Woodland Type B
 - Scrub Type D
 - Grassland Type G
 - Low fuel or non vegetated 2.2.3



Scale
1:4,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2017

CLIENT

Vegetation Classification

All vegetation within 100m of the Existing House was classified in accordance with Clause 2.2.3 of AS 3959-2018. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below.


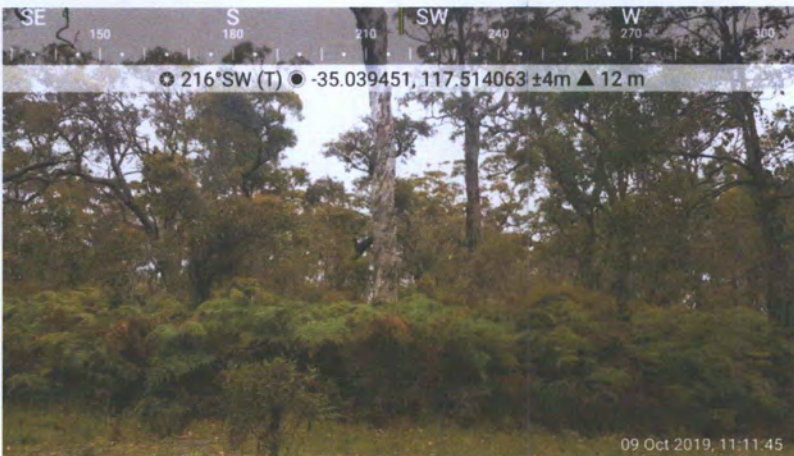
<p>Photo ID: 1 Plot: 1</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class A Forest - Open forest A-03</p> <p>Description / Justification for Classification</p> <p>Location: North and west of the existing house.</p> <p>Separation distance: 62m.</p> <p>Dominant species & description: Open forest mainly consisting of Peppermints, Jarrah and Marri. Dense foliage cover with multilayered scrub understorey of Hibbertia, bracken, sedges and rushes.</p> <p>Average vegetation height: 8 - 20m.</p> <p>Vegetation Coverage: >30-70% foliage cover.</p> <p>Available fuel loading: 25- 35t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p> <p>Photo description: View facing north towards remnant vegetation within Plot 1. Located north west of house site.</p>	
<p>Photo ID: 2 Plot: 1</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class A Forest - Open forest A-03</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 1.</p> <p>Photo description: View facing south east towards remnant vegetation within Plot 1.</p>	

Photo ID:	3	Plot:	1
Vegetation Classification or Exclusion Clause			
Class A Forest - Open forest A-03			
Description / Justification for Classification			
Additional Photo of Plot 1.			
Photo description: View facing south - south east towards remnant vegetation within Plot 1. Located north of house site.			



Photo ID:	4	Plot:	1
Vegetation Classification or Exclusion Clause			
Class A Forest - Open forest A-03			
Description / Justification for Classification			
Additional Photo of Plot 1.			
Photo description: View facing north east towards remnant vegetation within Plot 1.			



<p>Photo ID: 5 Plot: 2</p>	
<p>Vegetation Classification or Exclusion Clause</p>	
<p>Class A Forest - Open forest A-03</p>	
<p>Description / Justification for Classification</p>	
<p>Location: South, east and north west of the existing house.</p> <p>Separation distance: 40m.</p> <p>Dominant species & description: Open forest mainly consisting of Peppermints, Jarrah and Marri trees. Dense foliage cover with multilayered scrub understorey of Hibbertia, bracken, sedges and rushes. Includes Blue Gum Plantation to the north west of the house site.</p> <p>Average vegetation height: 8 - 20m.</p> <p>Vegetation Coverage: 30-70% foliage cover.</p> <p>Available fuel loading: 25-35t/ha.</p> <p>Effective slope: Upslope/flat.</p> <p>Photo description: View facing north east towards remnant vegetation within Plot 2.</p>	
<p>Photo ID: 6 Plot: 2</p>	
<p>Vegetation Classification or Exclusion Clause</p>	
<p>Class A Forest - Open forest A-03</p>	
<p>Description / Justification for Classification</p>	
<p>Additional Photo of Plot 2.</p> <p>Photo description: View facing south west from the private driveway towards remnant vegetation within Plot 2.</p>	

<p>Photo ID: 7 Plot: 2</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class A Forest - Open forest A-03</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 1.</p> <p>Photo description: View facing north-north west from Piggott Martin Road towards roadside vegetation within Plot 2.</p>	
<p>Photo ID: 8 Plot: 2</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class A Forest - Open forest A-03</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 2.</p> <p>Photo description: Blue Gum plantation on rotation in the north west of subject site, old areal imagery. View facing north towards Blue Gum plantation within Plot 2. Photo located south east of the plantation near Piggott Martin Road.</p>	
<p>Photo ID: 9 Plot: 3</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Location: Located to the north and north west of the existing house.</p> <p>Separation distance: 41m.</p> <p>Dominant species & description: Karri, Marri and Peppermint woodland, with an understorey mainly consisting of kikuyu grass, bracken fern and some arum lilies.</p> <p>Average vegetation height: 10-15m.</p> <p>Vegetation Coverage: 10-30% foliage cover.</p> <p>Available fuel loading: 15-25 t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p> <p>Photo description: View of Woodland vegetation to the north of the existing house.</p>	

<p>Photo ID: 10 Plot: 3</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 3.</p> <p>Photo description: View facing south west towards small patch of woodland vegetation in the background of this photo.</p>	
<p>Photo ID: 11 Plot: 3</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 3.</p> <p>Photo description: View facing east towards small patch of woodland vegetation to the north west of the existing house.</p>	
<p>Photo ID: 12 Plot: 3</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 3.</p> <p>Photo description: View facing south towards small patch of woodland vegetation to the north of the existing house.</p>	




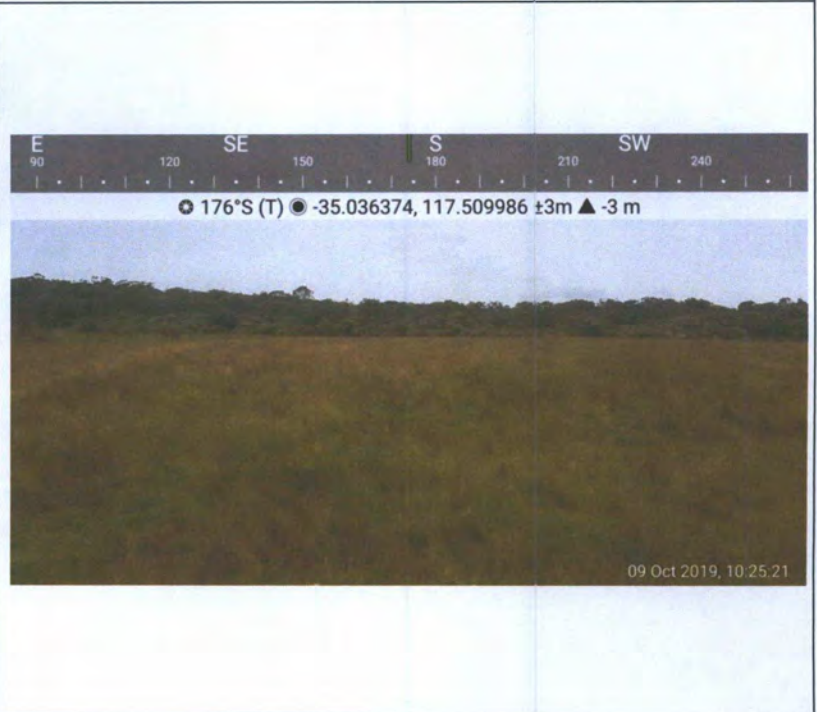
<p>Photo ID: 13 Plot: 3</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 3.</p> <p>Photo description: View facing east towards small patch of woodland vegetation to the north of the existing house.</p>	
<p>Photo ID: 14 Plot: 4</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Location: Located to the south east of the existing house in adjacent property.</p> <p>Separation distance: 164m.</p> <p>Dominant species & description: Karri Marri and Peppi woodland with predominantly grass understorey.</p> <p>Average vegetation height: 8-15m.</p> <p>Vegetation Coverage: 10-30% foliage cover.</p> <p>Available fuel loading: 15-25 t/ha.</p> <p>Effective slope: Upslope/flat.</p> <p>Photo description: View of Woodland vegetation to the south east of the subject site.</p>	
<p>Photo ID: 15 Plot: 4</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class B Woodland - Woodland B-05</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 4.</p> <p>Photo description: View facing south towards small patch of woodland vegetation on an adjacent lot to the south east of the existing house.</p>	

Photo ID:	16	Plot:	5
Vegetation Classification or Exclusion Clause			
Class D Scrub - Closed scrub D-13			
Description / Justification for Classification			
Location: Located to the west of the existing house.			
Separation distance: 49m.			
Dominant species & description: Dense Tea Tree scrub (native) with some bracken, sedges and rushes throughout.			
Average vegetation height: 2m (potential for maximum growth to 3-4m).			
Vegetation Coverage: >30%.			
Available fuel loading: <25t/ha.			
Effective slope: Downslope >0-5 degrees.			
Photo description: View of Scrub vegetation to the west of the existing house.			



Photo ID:	17	Plot:	6
Vegetation Classification or Exclusion Clause			
Class G Grassland – Sown pasture G-26			
Description / Justification for Classification			
Location: Located to the north and north west of the of the existing house.			
Separation distance: 20m.			
Dominant species & description: Paddock grasses mainly consisting of Kikuyu with some small patches of bracken and low rushes.			
Average vegetation height: <100-200mm.			
Vegetation Coverage: <10 % trees.			
Available fuel loading: <4.5 t/ha.			
Effective slope: Downslope >0 to 5 degrees.			
Photo description: Viewing looking south across Plot 6.			



<p>Photo ID: 18 Plot: 6</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 6.</p> <p>Photo description: View facing north west through Plot 6 in open area on the southern boundary of the lot.</p>	
<p>Photo ID: 19 Plot: 6</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 6.</p> <p>Photo description: View facing north east through small patch of grassland vegetation north of the existing house.</p>	
<p>Photo ID: 20 Plot: 6</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 6.</p> <p>Photo description: Viewing looking south west across Plot 6.</p>	

<p>Photo ID: 21 Plot: 7</p>	
<p>Vegetation Classification or Exclusion Clause</p>	
<p>Class G Grassland – Sown pasture G-26</p>	
<p>Description / Justification for Classification</p>	
<p>Location: Located to the north, east, south and west of the existing house.</p>	
<p>Separation distance: 193m.</p>	
<p>Dominant species & description: Paddock grasses mainly consisting of Kikuyu with some small patches of bracken and low rushes.</p>	
<p>Average vegetation height: <100-200mm.</p>	
<p>Vegetation Coverage: <10 % trees.</p>	
<p>Available fuel loading: <4.5 t/ha.</p>	
<p>Effective slope: Upslope/flat.</p>	
<p>Photo description: Viewing looking south east through paddock on nearby lot.</p>	
<p>Photo ID: 22 Plot: 7</p>	
<p>Vegetation Classification or Exclusion Clause</p>	
<p>Class G Grassland – Sown pasture G-26</p>	
<p>Description / Justification for Classification</p>	
<p>Additional Photo of Plot 7.</p>	
<p>Photo description: Viewing looking south east through paddock on nearby lot.</p>	

<p>Photo ID: 23 Plot: 7</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 7.</p> <p>Photo description: Viewing looking north east through paddock on nearby lot, to the west of the subject site.</p>	
<p>Photo ID: 24 Plot: 7</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 7.</p> <p>Photo description: Viewing looking east through paddock on nearby lot, to the north west of the subject site.</p>	
<p>Photo ID: 25 Plot: 7</p> <p>Vegetation Classification or Exclusion Clause</p> <p>Class G Grassland – Sown pasture G-26</p> <p>Description / Justification for Classification</p> <p>Additional Photo of Plot 7.</p> <p>Photo description: Viewing looking north through paddock on nearby lot, to the south east of the subject site.</p>	

Photo ID: 26 Plot: 8

Vegetation Classification or Exclusion Clause

Excludable - 2.2.3.2(f) Low Threat Vegetation

Description / Justification for Classification

Location: Area directly surrounding the existing house including a 20m Asset Protection Zone.

Description: Managed lawns and gardens.

As per exclusion clause 2.2.3.2 (f) of AS3959-2018.

Photo description: View facing west on the northern side of the existing house (20m APZ).

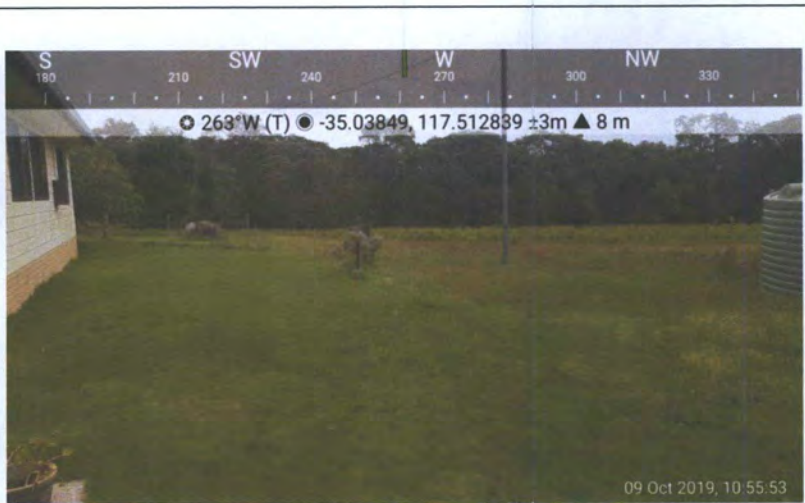


Photo ID: 27 Plot: 8

Vegetation Classification or Exclusion Clause

Excludable - 2.2.3.2(f) Low Threat Vegetation

Description / Justification for Classification

Additional Photo of Plot 8.

Photo description: View facing east on the southern side of the existing house (20m APZ).



Photo ID: 28 Plot: 8

Vegetation Classification or Exclusion Clause


Excludable - 2.2.3.2(f) Low Threat Vegetation

Description / Justification for Classification

Additional Photo of Plot 8.

Photo description: View facing north through managed area towards existing sheds to the north of the existing house.



Photo ID: 29	Plot: 9
Vegetation Classification or Exclusion Clause	
Excludable - 2.2.3.2(e) Non Vegetated Areas	
Description / Justification for Classification	
Location: South and west of the existing building.	
Description: Roads, driveways and dams.	
As per exclusion clause 2.2.3.2 (f) of AS3959-2018.	
Photo description: View facing east along Piggott Martin Road.	
	

Relevant Fire Danger Index

The fire danger index for this site has been determined in accordance with Table 2.1 or otherwise determined in accordance with a jurisdictional variation applicable to the site.

Fire Danger Index

FDI 40

Table 2.4.5

FDI 50

Table 2.4.4

FDI 80

Table 2.4.3

FDI 100

Table 2.4.2

Potential Bushfire Impacts

The potential bushfire impact to the site / proposed development from each of the identified vegetation plots are identified below.

Plot	Vegetation Classification	Effective Slope	Separation (m)	BAL
1	Class A - Forest	Downslope >0 to 5 degrees.	62m	BAL – 12.5
2	Class A - Forest	Upslope/flat	40m	BAL – 19
3	Class B Woodland	Downslope >0 to 5 degrees.	41m	BAL – 12.5
4	Class B Woodland	Upslope/flat	164m	BAL – LOW
5	Class D Scrub	Downslope >0 to 5 degrees.	49m	BAL – 12.5
6	Class G Grassland	Downslope >0 to 5 degrees.	20m	BAL – 12.5
7	Class G Grassland	Upslope/flat	193m	BAL – LOW
8	Excludable – Clause 2.2.3.2(f)	N/A	N/A	BAL – LOW
9	Excludable – Clause 2.2.3.2(e)	N/A	N/A	BAL – LOW

Table 1: BAL Analysis

Determined Bushfire Attack Level (BAL)

The Determined Bushfire Attack Level (highest BAL) for the site / proposed development has been determined in accordance with clause 2.2.6 of AS 3959-2018 using the above analysis.

Determined Bushfire Attack Level

BAL – 19

Appendix 1: Plans and Drawings

Plans and drawings relied on to determine the bushfire attack level

Drawing / Plan Description N/A

Job Number

Revision

Date of Revision

Appendix 2: Additional Information / Advisory Notes

BAL Calculation is based on the "Method 1" of AS3959-2018. Separation distances were measured in the field to surface fuel loads with a Nikon Forestry Pro. Effective Slopes measured in the field with a Nikon Forestry Pro and verified with AHD contour analysis in GIS mapping. See Site Plan Page 2.

Refer to attached WAPC extract from the current and endorsed guidelines regarding an Asset Protection Zone (APZ) in Appendix 3. This is information for the lot owners regarding long -term maintenance of a lot/building in a bushfire prone area. All areas surrounding the building should be maintained as per APZ standards associated with the BAL setback assigned to the lot/building. Any setback associated to a BAL setback distance is to apply APZ **standards at all times**. Failure of the building owner to do so will void the BAL Assessment as defined in this document.

AS3959-2018 disclaimer

It should be borne in mind that the measures contained within this Standard (AS3959-2018) cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather condition.

(AS3959, 2018)

Building to AS3959-2018 is a standard primarily concerned with improving the ability of buildings in designated bushfire prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself.

(AS3959-2018)

DISCLAIMER

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959-2018 – Building in Bushfire Prone Areas. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.

Appendix 3: Asset Protection Zone (APZ) to apply

Guidelines for
Planning in
Bushfire
Prone Areas

61

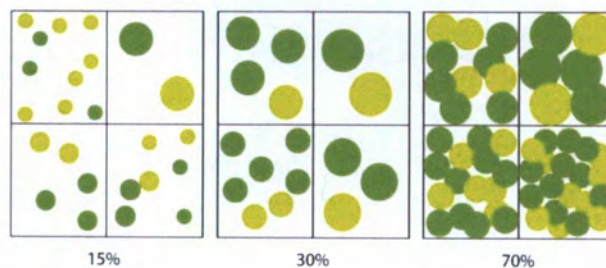


ELEMENT 2: SITING AND DESIGN OF DEVELOPMENT

SCHEDULE 1: STANDARDS FOR ASSET PROTECTION ZONES

- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.

Figure 16: Tree canopy cover – ranging from 15 to 70 per cent at maturity



- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

REPORT ITEM DIS312 REFERS

Appendix A

Bushfire Emergency Evacuation Plan



PHILIP MORGAN

PROPOSED ALL TERRAIN VEHICLE (ATV) RIDER TRAINING
FACILITY
290 PIGGOT MARTIN RD, LOWLANDS

ENVIRONMENTAL ACOUSTIC ASSESSMENT

OCTOBER 2021

OUR REFERENCE: 28564-2-21378



DOCUMENT CONTROL PAGE

**ENVIRONMENTAL ACOUSTIC ASSESSMENT
PROPOSED RIDER TRAINING FACILITY**

Job No: 21378

Document Reference: 28564-2-21378

FOR

PHILIP MORGAN

DOCUMENT INFORMATION

Author:	Paul Daly	Checked By:	George Watts
Date of Issue:	25 October 2021		

REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Property Boundary Review	26/10/2021	PLD	

DOCUMENT DISTRIBUTION

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Philip Morgan philmorg@wn.com.au		✓
1	1	Philip Morgan philmorg@wn.com.au		✓

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APPENDICIES

A	Site Layout/ Reference Locations
B	Noise Contours

1. INTRODUCTION

Herring Storer Acoustics have been commissioned by Philip Morgan to carry out an acoustical assessment of noise emissions from a proposed All Terrain Vehicle (ATV) Rider training facility to be located at 290 Piggot Martin Rd, Lowlands.

Previously an application was approved (via State Administrative Tribunal) for the operations of the training facility, however this did not proceed at that time. Subsequently, a re-application to the City of Albany has required an update of the original acoustic assessment, which was conducted in 2007 (Reference *HSA 8267-1-07001-098*) for the noise emission relating to the proposed operations.

The previous operations have been revised, with the key points noted below:

- Only ATV's will be used ie only 4 wheel machines.
- Engine size will be limited to 90cc, with Figure 1.1 detailing the type of ATV.
- Training will be conducted in sessions of 3.5 hours duration incorporating about 2.5hours of actual riding.
- Riders will be continually supervisor by the trainer.
- Training sessions will commence at 9am or 2pm.
- There will be no motorcycle use, i.e., no 2-wheel machines.
- Up to 12 ATV operating have been considered in this acoustic assessment.



FIGURE 1.1 – PROPOSED ATV TYPE

2. SUMMARY

Noise modelling and assessment of the noise emissions from the operating conditions has been undertaken. The result of that assessment shows that noise emissions from the facility will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all operational times.

3. CRITERIA

The allowable noise level for noise sensitive premises in the vicinity of the proposed Facility site is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 and 8 stipulate maximum allowable external noise levels or assigned noise levels that can be received at a premise from another premises. For "highly sensitive area" of a residential premises, this noise level is determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. For noise received at noise sensitive premises, "other than highly sensitive area" the assigned noise levels are fixed at all times. The base noise levels for residential premises are listed in Table 3.1.

TABLE 3.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Noise sensitive premises: other than highly sensitive area	At all times	60	75	80

Note: L_{A10} is the noise level exceeded for 10% of the time.
 L_{A1} is the noise level exceeded for 1% of the time.
 L_{Amax} is the maximum noise level.
 IF is the influencing factor.

The "Highly sensitive area" of a noise sensitive premises means:

that area (if any) of noise sensitive premises comprising —

- (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
- (b) any other part of the premises within 15 m of that building or that part of the building.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

“impulsiveness” means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax Slow}$ is more than 15 dB when determined for a single representative event;

“modulation” means a variation in the emission of noise that –

- (a) is more than 3dB $L_{A Fast}$ or is more than 3 dB $L_{A Fast}$ in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

“tonality” means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A Slow}$ levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 3.2 below.

TABLE 3.2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The closest neighboring noise sensitive premises have been identified using Google Earth, and information provided by the client who resides at the proposed property with the noise sensitive premises as shown in Figure 1.2.

Whilst confirmation via land use planning maps was not possible (City Albany web site does not contain intramaps) it has been assumed there are no known industrial nor commercial land uses, nor major or secondary roads, therefore the Influencing Factor at these residences would be zero.

Based on the above influencing factor, the assigned outdoor noise levels are listed in Table 3.4.

TABLE 3.4 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
R1 to R6	0700 - 1900 hours Monday to Saturday (Day)	45	55	65
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40	50	65
	1900 - 2200 hours all days (Evening)	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35	45	55
Noise sensitive premises: other than highly sensitive area	At all times	60	75	80

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

4. MODELLING

To determine the noise that would be received at the surrounding premises from the facility, modelling of noise emission propagation was carried out using "SoundPlan".

The calculations used the following input data:

- a) Ground contours (Google Earth topography).
- b) Sound power levels used in the model were based on either data measured on site, or file data. The sound power data is summarised in Table 4.1.
- c) DWER worst case day or night weather conditions.

Previously (2007 acoustic assessment), noise level measurements were conducted of the same sized ATV proposed for use at the facility. This was a Suzuki 80cc ATV LT80 2-Stroke. Noise levels were measured during a pass-by event, i.e., the ATV was ridden within 1m of the sound level meter at a representative engine speed. The sound pressure level was 72 dB(A), which was noted in the previous report.

This type of ATV is no longer available for purchase new, however, 4 stroke motor ATVs are. Information on the noise levels for these new units of the same capacity were not available, however, based on experience of noise measurement from both 2 and 4 stroke vehicles, generally the two stroke motors are considered more annoying, and potentially higher in noise levels than the four strokes. Therefore, the previously measured noise levels of the 2 stroke ATV have been used for the assessment. This would provide a level of conservatism as it is likely new 4 stroke ATV s will be used.

TABLE 4.1 - SOUND POWER LEVELS, dB(A)

Item	Sound Power Level dB(A)
Suzuki 80cc ATV LT80 2-Stroke	83

Based on the above information, the following scenarios have been developed:

Scenario 1 – Day Operations (9am and 2pm) – Up to 12 ATVs in operation

As the facility is located on a large property, with no designated tracks, to enable the assessment of noise from the worst-case possible location for the operating ATVs, line noise sources have been used. These line noise sources represent an individual ATV at any location along the noise source line. For the purpose of assessment, this line source has been located at the boundary of the entire premise. Whilst unlikely this would occur; it provides a conservative assessment where an ATV could be operating at the closest position to any of the neighbouring noise sensitive receivers.

Generally, the individual noise of an ATV would be the dominant noise source contributing to the receiver noise level. The individual sound power level of the ATV is 80 dB(A). However, to allow for the contribution of the bikes before and after, the sound power level has been increased by 3 dB. Therefore, the modelling allows for a sound power level of 83 dB(A) located anywhere along the boundary of the property which would represent a line of ATVs being ridden at staggered intervals.

The layout for the site is as per Figure 4.1, with the noise source location shown at the perimeter boundary of the proposed facility.

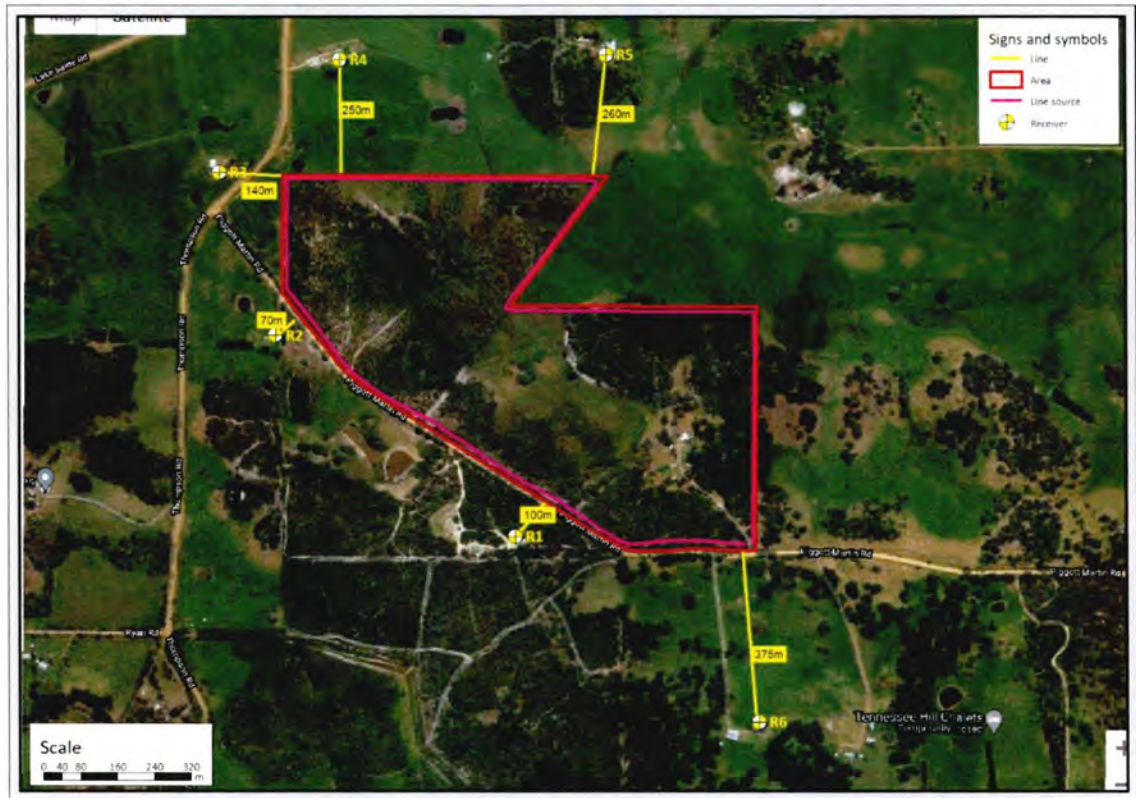


FIGURE 4.1 – NOISE SOURCE (ATV) LOCATION

Weather conditions for the modelling were undertaken using the "Default Conditions for Noise Modelling" as stipulated within the Environmental Protection Authority's "Draft Guidance for Environmental Noise for Prescribed Premises" as listed in Table 4.2.

TABLE 4.2 – WEATHER CONDITIONS

Condition	Day
Temperature	20°C
Relative humidity	50%
Pasquill Stability Class	E
Wind speed	4 m/s*

* From sources, towards receivers.

5. RESULTS

The results of the noise modelling are attached in Appendix B.

The resultant noise level at the worst case receivers for the above scenarios are listed in Table 5.1.

TABLE 5.1 – SUMMARY OF RESULTS
WORST CASE RECIEVER

Scenario	Scenario 1 L _{A10}
R1	27
R2	26
R3	22
R4	19
R5	18
R6	16

6. ANALYSIS / ASSESSMENT

Based on calculated noise levels at the nearest premises, and the likely background noise levels, noise levels emissions from the operations are likely to be around background noise levels, hence it is unlikely they contain annoying characteristics, such as tonality. However, to ensure the worst-case scenario for assessment, penalties have been applied to the noise levels.

Based on the above, for noise sources which are assessable under the L_{A10} parameter, the noise levels have been considered as containing tonal annoying characteristics with the resultant adjustment shown in Table 6.1.

TABLE 6.1 – ADJUSTMENTS TO MEASURED LEVELS

Receiver	Scenario 1 L _{A10} (+5)
R1	32
R2	31
R3	27
R4	24
R5	23
R6	21

Based on the assessable noise level above, comparison against the relevant assigned noise level is contained in Table 6.2. For the ease of reporting the most stringent time period of Sunday (after 9am) and Public Holidays has been considered, as achieving compliance with this criterion will achieve compliance with all other operating time periods.

TABLE 6.2 – ASSESSMENT OF L_{A10} NOISE LEVELS DAY OPERATIONS

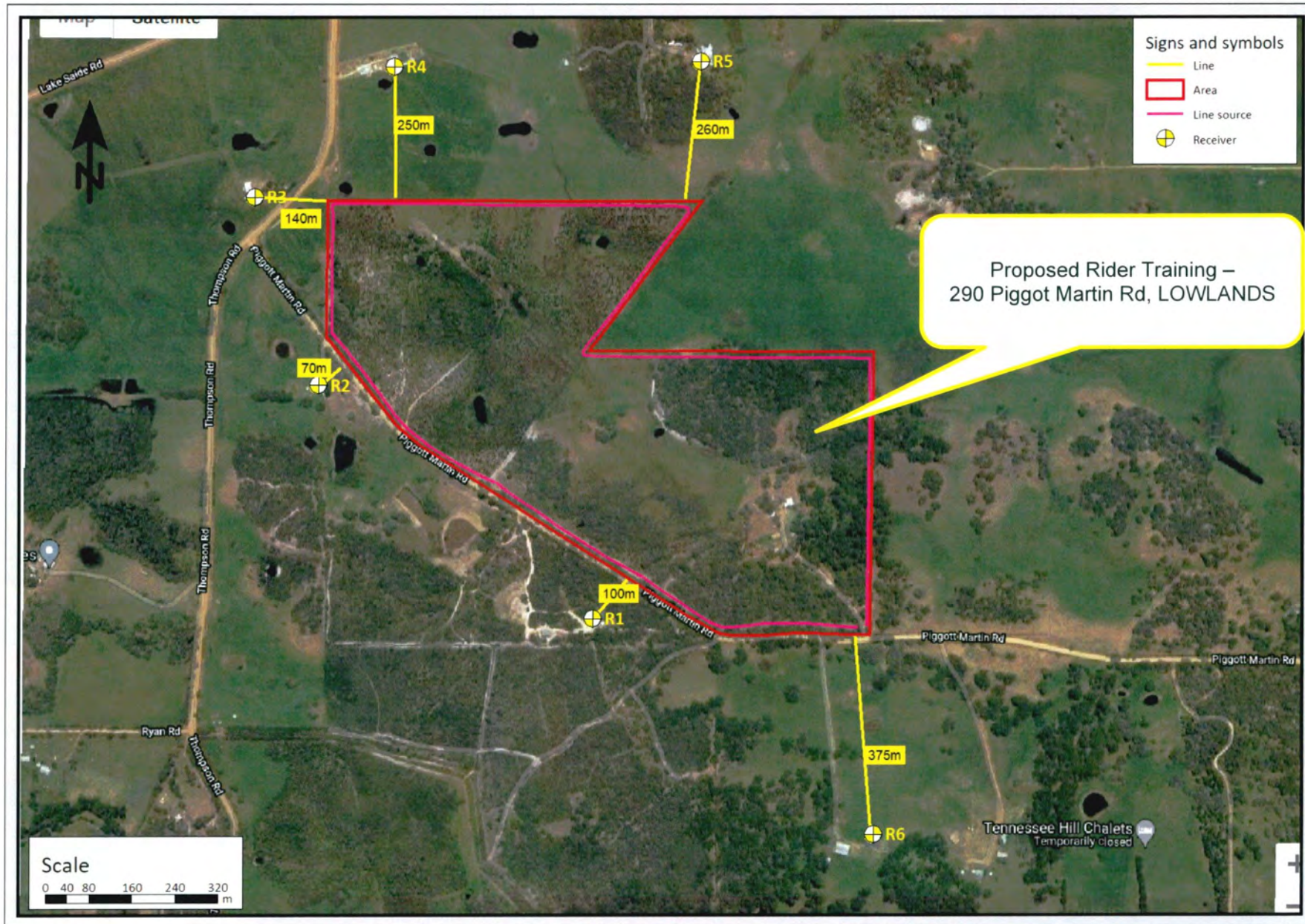
Receiver	Scenario 1 L_{A10}	Time of Day	Assigned L_{A10} Level (dB)	Compliance
A	32			Complies
B	31	0900 - 1900 hours		Complies
C	27	Sunday and Public Holidays (Sunday /	40	Complies
D	24	Public Holiday Day		Complies
E	23	Period)		Complies
F	21			Complies

7. CONCLUSION

Noise modelling and assessment of the noise emissions from the operating conditions has been undertaken. The results of that assessment shows that noise emissions from the facility will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all operational times.

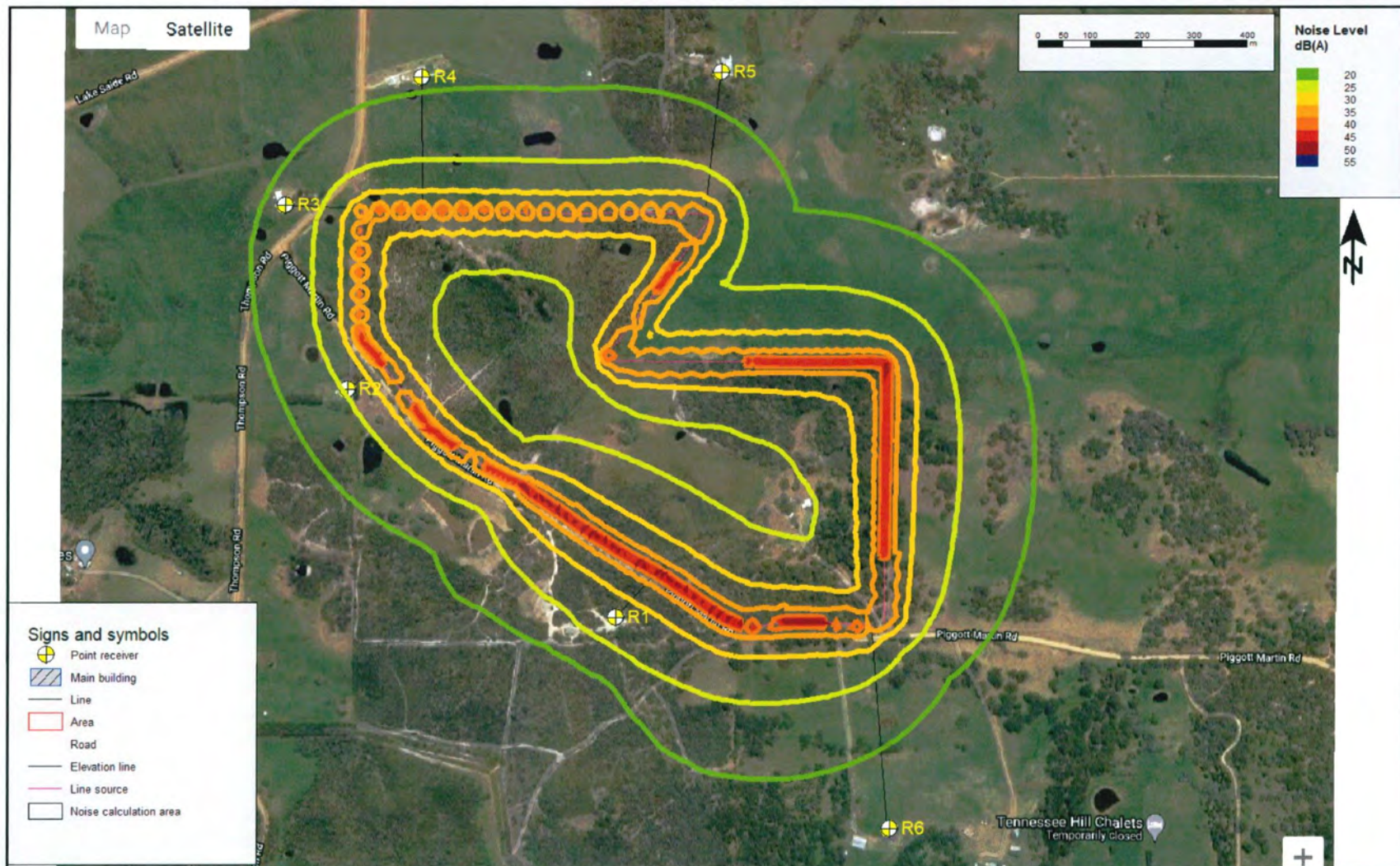
APPENDIX A

LOCATION MAPS / REFERENCE LOCATIONS



APPENDIX B

NOISE CONTOUR PLOT



Herring Storer Acoustics
Job No - 21378

Rider Traing Facility - 290 Piggott Martin Rd, LOWLANDS
ATV Operational Noise Source



Figure B1
Ref # 003

CITY OF ALBANY LOCAL PLANNING SCHEME No. 1

Recreation – Private (All-Terrain Vehicle Training) – 290 Piggott Martin Rd, Lowlands - P2190543

SCHEDULE OF SUBMISSIONS AND MODIFICATIONS

Note: This is a broad summary of the submissions only.

Summary of submission.	Officer Comment
<u>18 submissions objecting to the proposal</u>	
<p><u>Amenity (noise and emissions):</u></p> <ul style="list-style-type: none"> • Use is inappropriate in this area as will affect the amenity • Noise will impact rural amenity (peaceful and tranquil), quality of life, tourist accommodation will be impacted. • Insufficient noise buffers Noise from motorcycles and ATV's travel multiple km's on windy days • Hours of operation - School holidays, weekends and public holidays are when people want to relax. Hours of operation are too long • Are they only using 4 stroke or will 2 stroke still be used 	Refer to Council Report (23-39)
<p><u>Increased traffic and condition of the road:</u></p> <ul style="list-style-type: none"> • Road is a narrow gravel road and proposal would result in increased traffic • Road conditions - is already corrugated and full of pot holes from lack of maintenance • Increase in dust 	Refer to Council Report (40-41)
<p><u>Environmental - Impact on flora, fauna, livestock and emissions:</u></p> <ul style="list-style-type: none"> • Ringtail possums 	Refer to Council Report (42-46)

CITY OF ALBANY LOCAL PLANNING SCHEME No. 1

Recreation – Private (All-Terrain Vehicle Training) – 290 Piggott Martin Rd, Lowlands - P2190543

SCHEDULE OF SUBMISSIONS AND MODIFICATIONS

Note: This is a broad summary of the submissions only.

Summary of submission.	Officer Comment
<ul style="list-style-type: none"> • Black cockatoos • Eagles • Snakes • Livestock and domestic animal will be impacted • Will encourage unsupervised riders within the nearby reserve, Munda Biddi trail and Bibbulmun track • Emissions will increase within the area. How are the owners proposing to offset this • <i>Have electric ATV's been considered to reduce emissions (noise and pollution)</i> 	
<p><u>Concerned that the use will intensify if approved and ongoing compliance</u></p> <ul style="list-style-type: none"> • Concerned that it will become a race track for adults • Concerned numbers will increase • Who will regulate that it complies with conditions 	<p>Refer to Council Report (51-53)</p>
<p><u>Increased Fire risk</u></p> <ul style="list-style-type: none"> • Increased risk of fire within the area • Insufficient existing firebreaks 	<p>Refer to Council Report (47-50)</p>
<p><u>Qualifications, Insurance and Safety</u></p> <ul style="list-style-type: none"> • Do they have First Aid training, training qualifications, police clearance or working with childrens check? 	<p>Refer to Council Report (54-58)</p>

CITY OF ALBANY LOCAL PLANNING SCHEME No. 1

Recreation – Private (All-Terrain Vehicle Training) – 290 Piggott Martin Rd, Lowlands - P2190543

SCHEDULE OF SUBMISSIONS AND MODIFICATIONS

Note: This is a broad summary of the submissions only.

Summary of submission.	Officer Comment
<ul style="list-style-type: none"> • Do they have public liability insurance or other insurance to cover other properties if it causes a fire? • Young children should not be exposed to lethal powered machinery and it will contribute to the problem by promoting the use • There should be one on one individual attention given to each child. • Do the machines meet new Federal Government laws and safety standards such as roll bars – New ATV sales without roll protection were banned in Australia on 11/10/20 • Training area has stumps and rocks. Are the cattle restricted from this training area? • Proponent has not provided info on ATV deaths for the whole of Australia, only Victoria • The figures in relation to quad bike deaths on Worksafe suggest that it is the adults, parents and seniors who are in need of the education and training • Suzuki guidance states that the Quadsport Z90 may be used only by those aged 12 and older 	
<p><u>Property value</u></p> <ul style="list-style-type: none"> • Will impact the value of property 	Refer to Council Report (54-58)
<p><u>Unsure of community benefit</u></p> <ul style="list-style-type: none"> • No evidence to show that this will prevent accidents 	Refer to Council Report (54-58)

CITY OF ALBANY LOCAL PLANNING SCHEME No. 1

Recreation – Private (All-Terrain Vehicle Training) – 290 Piggott Martin Rd, Lowlands - P2190543

SCHEDULE OF SUBMISSIONS AND MODIFICATIONS

Note: This is a broad summary of the submissions only.

Summary of submission.	Officer Comment
<p><u>Amenities</u></p> <ul style="list-style-type: none"> • Are there toilets, wheelchair accessible 	<p>Refer to Council Report (54-58)</p>



City of Albany
Policy

Local Planning Policy 1.9 Waste Management

REPORT ITEM DIS313 REFERS

Document Approval			
Document Development Officer:		Document Owner: Paul Camins	
Manager Planning and Building Services (MPBS) Coordinator Planning Services (CPS) Planning Officer (PO)		Chief Executive Officer (CEO) Executive Director Development Services (EDDS)	
Document Control			
File Number - Document Type:	CM.STD.7 – Policy		
Document Reference Number:			
Status of Document:	Council decision:		
Quality Assurance:	Planning Services Team, Executive Management Team, Development & Council Committee and Council.		
Distribution:	Public Document		
Document Revision History			
Version	Author	Version Description	Date Completed
1	MPBS	Adoption Reference: Synergy Reference:	

REPORT ITEM DIS313 REFERS

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Legislative and Strategic Context	5
Review Position and Date	5
Associated Documents.....	5
Definitions	6

Policy Objectives

1. To ensure waste storage and collection facilities minimise visual, environmental and amenity impacts on the streetscape, public realm and adjoining properties.
2. To ensure developments provide and maintain cost effective and functional waste management practices.
3. To ensure occupants are provided with safe and convenient waste and recycling facilities.
4. To ensure proposed developments are designed, constructed and operated to maximise waste avoidance and resource recovery

Policy Scope

5. This policy is applicable to all proposals on zoned land within the City of Albany with the exception of proposals involving:
 - The development or extension to a single house;
 - The development or extension to less than four grouped or multiple dwellings;
 - The development or extension to an ancillary dwelling, outbuilding, boundary wall or fence, patio, pergola, verandah, garage, carport or swimming pool on the same lot as a single house or grouped dwelling.
 - The development or extension to less than four holiday accommodation/chalet units;
 - The development or extension to less than five aged or dependant persons dwellings.

Policy Statement

Requirements for Waste Management Plans

6. The City will require a Waste Management Plan to be submitted as part of the following categories of Development Application:
 - Residential
 - Four (4) or more grouped or multiple dwellings;
 - Four (4) or more holiday accommodation/chalet units
 - Five (5) or more aged or dependant persons dwellings;
 - Lodging houses.
 - Mixed Use Development
 - All forms of mixed used development
 - Commercial, Industrial and Other Non-Residential Development
 - All forms of non-residential development that will generate waste including;
 - Commercial (office, showroom, warehouse)
 - Industrial uses (all types)
 - Hotel/Motel
 - Retail (shops)
 - Food and Beverage establishments (cafes, restaurants)
 - Any other proposal the City considers will affect waste avoidance and resource recovery in the City.

REPORT ITEM DIS313 REFERS

Note: The City may waive the requirements for a Waste Management Plan for change of use applications that will not result in increased waste generation.

7. The City may also require waste management information as part of an approved Construction Management Plan.

Type of Waste Management Plan

8. Depending on the complexity of the application, the City may accept a Level 1 Waste Management Plan (Simple Waste Management Plan), which is included in the WALGA Guidelines. This requirement should be determined in consultation with the City of Albany Sustainability and Waste Strategy Team prior to submission of the application.

Waste Management Plan Considerations

9. The Waste Management Plan should be based on the requirements of the applicable Western Australian Local Government Association (WALGA) Guidelines.

Note 1: *Waste Management Plans for residential uses should be based on the requirements of the WALGA Multiple Dwelling Waste Management Plan Guidelines.*

Note 2: *Waste Management Plans for Commercial, Industrial and Non-Residential Development should be based on the requirements of the WALGA – Commercial and Industrial Waste Management Plan Guidelines*

Note 3: *The City of Albany recommends that a qualified waste consultant be engaged to prepare the Waste Management Plan.*

10. Further to clause 9. above, Waste Management Plans should also identify measures to ensure waste management activities have no adverse visual, environmental or amenity impacts, either directly on site or indirectly off site.
11. Should development approval be granted, compliance with the Waste Management Plan will be an ongoing condition to be complied with at all times.

Legislative and Strategic Context

12. The policy operates within the following framework of legislation.
 - *Planning and Development Act 2005*
 - *Planning and Development (Local Planning Schemes) Regulations 2015*
 - *City of Albany Local Planning Scheme No. 1.*

Review Position and Date

13. This policy was adopted on [Insert Date]. This policy must be reviewed every two years after a general Local Government election, or earlier if Council considers it necessary.

Associated Documents

14. Related strategies, procedures, references, guidelines or other documents that have a bearing on this policy and that may be useful reference material for users of this policy, follow:
 - *WALGA – Multiple Dwelling Waste Management Plan Guidelines*
 - *WALGA – Commercial and Industrial Waste Management Plan Guidelines*
 - *WALGA – Construction Waste Management Guidelines*
 - *WALGA – Demolition Waste Management Guidelines*

Definitions

- 15. Waste Management Plan** is a document that outlines how large amounts of waste created by a business will be managed and dealt with, including estimates of waste type, volume and management method.
- 16. Construction Management Plan** is a contract between the Builder/developer and Council addressing the site and development management issues that are relevant during building activity.

